INVITATION FOR BIDS

FOR CONSTRUCTION OF

DUTCH FLOHR NEIGHBORHOOD PARK

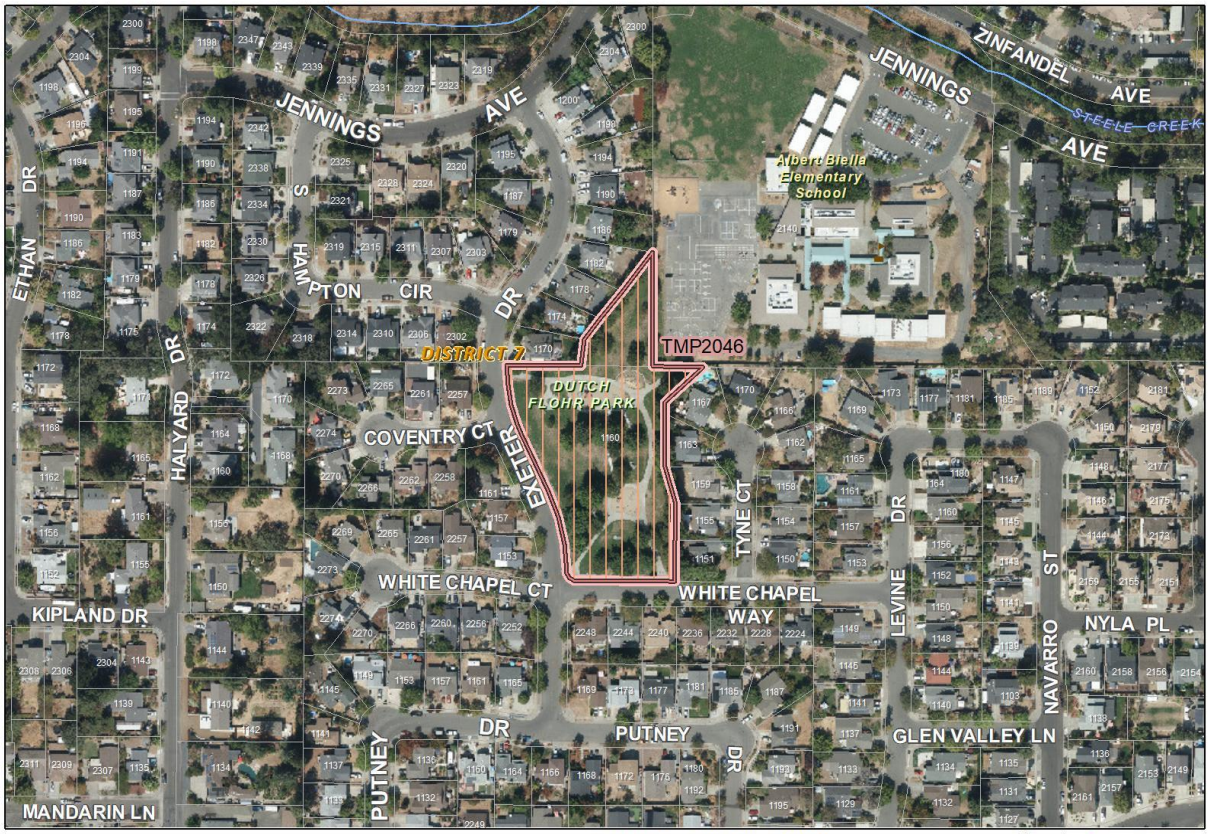
CITY CONTRACT NUMBER
C02461

ISSUED BY

CAPITAL PROJECTS ENGINEERING DIVISION

CITY OF SANTA ROSA, CALIFORNIA

2024



LOCATION MAP

City of Santa Rosa

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Notice Inviting Bids

1. **Bid Submission.** City of Santa Rosa ("City") will accept sealed bids for its Dutch Flohr Neighborhood Park ("Project"), before January 28, 2025, at 2:00 p.m., at its Transportation and Public Works office, located at 69 Stony Circle, Santa Rosa, California, at which time the bids will be publicly opened and read aloud. Bidders may attend the public opening in person.

2. **Project Information.**

   2.1 **Location and Description.** The Project is located at 1160 Exeter Drive, Santa Rosa, CA 95401, and is described as follows: The Dutch Flohr Neighborhood Park improvement project includes a significant renovation of the central area of the site including updated children's play areas, picnic areas, new pathways and site furnishings, as well as the addition of a series of adult fitness features. There are existing open lawn areas and several established large trees that will remain. All paths will be updated to meet ADA requirements. Four curb ramps along the park frontages will be replaced for ADA compliance at Exeter Drive and White Chapel Way, and three more will be at Exeter Drive and Coventry Court. Two bioretention areas will be installed in the park – one at the west side adjacent to Exeter Drive, and one at the south side adjacent to White Chapel Way.

   2.2 **Time for Final Completion.** The Project must be fully completed within 185 calendar days from the start date set forth in the Notice to Proceed. City anticipates that the Work will begin on or about May 1, 2025, but the anticipated start date is provided solely for convenience and is neither certain nor binding.

3. **License and Registration Requirements.**

   3.1 **License.** This Project requires a valid California contractor's license for the following classification: (A) General Engineering Contractor.

   3.2 **DIR Registration.** City may not accept a Bid Proposal from or enter into the Contract with a bidder without proof that the bidder is registered with the California Department of Industrial Relations ("DIR") to perform public work pursuant to Labor Code § 1725.5, subject to limited legal exceptions.

4. **Contract Documents.** The plans, specifications, bid forms and contract documents for the Project, and any addenda thereto ("Contract Documents") may be downloaded from the City's PlanetBids portal, which may be accessed by selecting the "Bid/Proposal Opportunities" link on the City's website at https://www.srcity.org/165/Bids-Proposals. A printed copy of the Contract Documents is not available.

5. **Bid Security.** The Bid Proposal must be accompanied by bid security of ten percent of the maximum bid amount, in the form of a cashier's or certified check made payable to City, or a bid bond executed by a surety licensed to do business in the State of California on the Bid Bond form included with the Contract Documents. The bid security must guarantee that within ten days following receipt of the City's Notice of Award, the successful bidder will execute the Contract and submit the payment and performance bonds, insurance certificates and endorsements, valid Certificates of Reported Compliance as required under the California Air Resources Board's In-Use Off-Road Diesel-Fueled Fleets Regulation (13 CCR § 2449 et seq.) ("Off-Road Regulation"), if applicable, and any other submittals required by the Contract Documents and as specified in the Notice of Award.

6. Prevailing Wage Requirements.

6.1 General. Pursuant to California Labor Code § 1720 et seq., this Project is subject to the prevailing wage requirements applicable to the locality in which the Work is to be performed for each craft, classification or type of worker needed to perform the Work, including employer payments for health and welfare, pension, vacation, apprenticeship and similar purposes.

6.2 Rates. The prevailing rates are on file with the City and are available online at http://www.dir.ca.gov/DLSR. Each Contractor and Subcontractor must pay no less than the specified rates to all workers employed to work on the Project. The schedule of per diem wages is based upon a working day of eight hours. The rate for holiday and overtime work must be at least time and one-half.

6.3 Compliance. The Contract will be subject to compliance monitoring and enforcement by the DIR, under Labor Code § 1771.4.

7. Performance and Payment Bonds. The successful bidder will be required to provide performance and payment bonds, each for 100% of the Contract Price, as further specified in the Contract Documents.

8. Substitution of Securities. Substitution of appropriate securities in lieu of retention amounts from progress payments is permitted under Public Contract Code § 22300.

9. Subcontractor List. Each Subcontractor must be registered with the DIR to perform work on public projects. Each bidder must submit a completed Subcontractor List form with its Bid Proposal, including the name, location of the place of business, California contractor license number, DIR registration number, and percentage of the Work to be performed (based on the base bid price) for each Subcontractor that will perform Work or service or fabricate or install Work for the prime contractor in excess of one-half of 1% of the bid price, using the Subcontractor List form included with the Contract Documents.

10. Instructions to Bidders. All bidders should carefully review the Instructions to Bidders for more detailed information before submitting a Bid Proposal. The definitions provided in Article 1 of the General Conditions apply to all of the Contract Documents, as defined therein, including this Notice Inviting Bids.

11. Bidders' Conference. A site visit will be held on January 9, 2025, at 10:30 a.m., at the following location: 1160 Exeter Drive, Santa Rosa, CA 95401 to acquaint all prospective bidders with the Contract Documents and the Worksite. The site visit is mandatory. A bidder who fails to attend a mandatory site visit may be disqualified from bidding.

By: Lisa Welsh _____ Date: 12/19/2024
Lisa Welsh (Dec 19, 2024 15:26 PST)

Lisa Welsh, Supervising Engineer

Publication Date: December 20, 2024

END OF NOTICE INVITING BIDS

Instructions to Bidders

Each Bid Proposal submitted to the City of Santa Rosa ("City") for its Dutch Flohr Neighborhood Park ("Project") must be submitted in accordance with the following instructions and requirements:

1. Bid Submission.

1.1 General. Each Bid Proposal must be completed, using the form provided in the Contract Documents, signed, and submitted to City in a sealed envelope, with all required forms and attachments, before the date and time set forth in Section 1 of the Notice Inviting Bids, or as amended by subsequent addendum. Faxed or emailed Bid Proposals will not be accepted, unless otherwise specified. Late submissions (i.e., submissions at or after the exact hour of bid opening) will be returned unopened. City reserves the right to postpone the date or time for receiving or opening bids. Each bidder is solely responsible for all of its costs to prepare and submit its bid and by submitting a bid waives any right to recover those costs from City. The bid price(s) must include all costs to perform the Work as specified, including all labor, material, supplies, and equipment and all other direct or indirect costs such as applicable taxes, insurance and overhead.

1.2 Vendor Registration. To participate in the bidding process, each bidder must register as a vendor on PlanetBids, download the Contract Documents, and add itself to the "Prospective Bidders" list for the Project. If City issues an addendum, each bidder must log in to PlanetBids and acknowledge the addendum. (See Section 8, below.)

1.3 Bid Envelope. The sealed envelope containing the Bid Proposal and all required forms and attachments must be clearly labeled and addressed as follows:

> **BID PROPOSAL:**
> Dutch Flohr Neighborhood Park
> Contract No. C02461
>
> Transportation and Public Works Department
> 69 Stony Circle
> Santa Rosa, California 95401
> Attn: Dezire Perez

The envelope must also be clearly labeled, as follows, with the bidder's name, address, and its registration number with the California Department of Industrial Relations ("DIR") for bidding on public works contracts (Labor Code §§ 1725.5 and 1771.1):

> *[Contractor company name]*
> *[street address]*
> *[city, state, zip code]*
> DIR Registration No: _____

1.4 DIR Registration. Subject to limited legal exceptions for joint venture bids and federally-funded projects, City may not accept a Bid Proposal from a bidder without proof that the bidder is registered with the DIR to perform public work under Labor Code § 1725.5. If City is unable to confirm that the bidder is currently registered with the DIR, City may disqualify the bidder and return its bid unopened. (Labor Code §§ 1725.5 and 1771.1(a).)

1.5 Bid Tabulation. To access the bid tabulation when available, visit https://cippublic.srcity.org/CIPList. Bid information will be posted to the project page when it becomes available.

2. Bid Proposal Form and Enclosures. Each Bid Proposal must be completed legibly using the Bid Proposal form included with the Contract Documents. The Bid Proposal form must be fully completed without interlineations, alterations, or erasures. Any necessary corrections must be clear and legible, and must be initialed by the bidder's authorized representative. A Bid Proposal submitted with exceptions or terms such as "negotiable," "will negotiate," or similar, will be considered nonresponsive. Each Bid Proposal must be accompanied by bid security, as set forth in Section 4 below, and by a completed Subcontractor List and Non-Collusion Declaration using the forms included with the Contract Documents, and any additional forms required by the Notice Inviting Bids or Instructions to Bidders, such as the Contractor Agreement to be Bound by the CWA, executed by bidder, using the form included in the Contract Documents, if applicable.

3. Authorization and Execution. Each Bid Proposal must be signed by the bidder's authorized representative. A Bid Proposal submitted by a partnership must be signed in the partnership name by a general partner with authority to bind the partnership. A Bid Proposal submitted by a corporation must be signed with the legal name of the corporation, followed by the signature and title of two officers of the corporation with full authority to bind the corporation to the terms of the Bid Proposal, under California Corporations Code § 313.

4. Bid Security. Each Bid Proposal must be accompanied by bid security of ten percent of the maximum bid amount, in the form of a cashier's check or certified check, made payable to the City, or bid bond using the form included in the Contract Documents and executed by a surety licensed to do business in the State of California. The bid security must guarantee that, within ten days following receipt of the City's Notice of Award, the bidder will: execute and submit the enclosed Contract for the bid price; submit payment and performance bonds for 100% of the maximum Contract Price; submit the insurance certificates and endorsements; and submit valid Certificates of Reported Compliance as required by the Off-Road Regulation, if applicable, and any other submittals, if any, required by the Contract Documents or the Notice of Award. A Bid Proposal may not be withdrawn for a period of 60 days after the bid opening without forfeiture of the bid security, except as authorized for material error under Public Contract Code § 5100 et seq.

5. Requests for Information. Questions or requests for clarifications regarding the Project, the bid procedures, or any of the Contract Documents must be submitted in writing to City via the PlanetBids platform. Oral responses are not authorized and are not binding on the City. Bidders should submit any such written inquiries at least five Working Days before the scheduled bid opening. Questions received any later might not be addressed before the bid deadline. An interpretation or clarification by City in response to a written inquiry will be issued in an addendum.

6. Pre-Bid Investigation.

6.1 General. Each bidder is solely responsible at its sole expense for diligent and thorough review of the Contract Documents, examination of the Project site, and reasonable and prudent inquiry concerning known and potential site and area conditions prior to submitting a Bid Proposal. Each bidder is responsible for knowledge of conditions and requirements which reasonable review and investigation would have disclosed. However, except for any areas that are open to the public at large, bidders may not enter property owned or leased by the City or the Project site without prior written authorization from City.

6.2 Document Review. Each bidder is responsible for review of the Contract Documents and any informational documents provided "For Reference Only," e.g., as-builts, technical reports, test data, and the like. A bidder is responsible for notifying City of any errors, omissions, inconsistencies, or conflicts it discovers in the Contract Documents, acting solely in its capacity as a contractor and subject to the limitations of Public Contract Code § 1104. Notification of any such errors, omissions, inconsistencies, or conflicts must be submitted in writing to the City no later than five Working Days before the scheduled bid opening. (See Section 5, above.) City expressly disclaims responsibility for assumptions a bidder might draw from the presence or absence of information provided by City.

6.3 Project Site. Questions regarding the availability of soil test data, water table elevations, and the like should be submitted to the City in writing, as specified in Section 5, above. Any subsurface exploration at the Project site must be done at the bidder's expense, but only with prior written authorization from City. All soil data and analyses available for inspection or provided in the Contract Documents apply only to the test hole locations. Any water table elevation indicated by a soil test report existed on the date the test hole was drilled. The bidder is responsible for determining and allowing for any differing soil or water table conditions during construction. Because groundwater levels may fluctuate, difference(s) in elevation between ground water shown in soil boring logs and ground water actually encountered during construction will not be considered changed Project site conditions. Actual locations and depths must be determined by bidder's field investigation. The bidder may request access to underlying or background information on the Project site in City's possession that is necessary for the bidder to form its own conclusions, including, if available, record drawings or other documents indicating the location of subsurface lines, utilities, or other structures.

6.4 Utility Company Standards. The Project must be completed in a manner that satisfies the standards and requirements of any affected utility companies or agencies (collectively, "utility owners"). The successful bidder may be required by the third party utility owners to provide detailed plans prepared by a California registered civil engineer showing the necessary temporary support of the utilities during coordinated construction work. Bidders are directed to contact the affected third party utility owners about their requirements before submitting a Bid Proposal.

7. Bidders Interested in More Than One Bid. No person, firm, or corporation may submit or be a party to more than one Bid Proposal unless alternate bids are specifically called for. However, a person, firm, or corporation that has submitted a subcontract proposal or quote to a bidder may submit subcontract proposals or quotes to other bidders.

8. Addenda. Subject to the limitations of Public Contract Code § 4104.5, City reserves the right to issue addenda prior to bid time. Any addenda issued prior to the bid opening are part of the Contract Documents. Bidders should check City's PlanetBids portal periodically for any addenda or updates on the Project, which may be accessed via City's website at: https://www.srcity.org/165/Bids-Proposals. Each bidder is solely responsible for ensuring it has received and reviewed all addenda prior to submitting its bid and must acknowledge each addendum in the PlanetBids portal.

9. Brand Designations and "Or Equal" Substitutions. Any specification designating a material, product, thing, or service by specific brand or trade name, followed by the words "or equal," is intended only to indicate quality and type of item desired, and bidders may request use of any equal material, product, thing, or service. All data substantiating the proposed substitute as an equal item must be submitted with the written request for

substitution. A request for substitution must be submitted within 35 days after Notice of Award unless otherwise provided in the Contract Documents. This provision does not apply to materials, products, things, or services that may lawfully be designated by a specific brand or trade name under Public Contract Code § 3400(c).

10. Bid Protest. Any bid protest against another bidder must be submitted in writing and received by City at 69 Stony Circle, Santa Rosa, CA 95401 or sent via email at dperez@srcity.org before 5:00 p.m. no later than two Working Days following bid opening ("Bid Protest Deadline") and must comply with the following requirements:

10.1 General. Only a bidder who has actually submitted a Bid Proposal is eligible to submit a bid protest against another bidder. Subcontractors are not eligible to submit bid protests. A bidder may not rely on the bid protest submitted by another bidder, but must timely pursue its own protest. For purposes of this Section 10, a "Working Day" means a day that City is open for normal business, and excludes weekends and holidays observed by City. Pursuant to Public Contract Code § 4104, inadvertent omission of a Subcontractor's DIR registration number on the Subcontractor List form is not grounds for a bid protest, provided it is corrected within 24 hours of the bid opening or as otherwise provided under Labor Code § 1771.1(b).

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

10.3 Copy to Protested Bidder. Upon submission of its bid protest to City, the protesting bidder must also concurrently transmit the protest and all supporting documents to the protested bidder, and to any other bidder who has a reasonable prospect of receiving an award depending upon the outcome of the protest, by email or hand delivery to ensure delivery before the Bid Protest Deadline.

10.4 Response to Protest. The protested bidder may submit a written response to the protest, provided the response is received by City before 5:00 p.m., within two Working Days after the Bid Protest Deadline or after actual receipt of the bid protest, whichever is sooner (the "Response Deadline"). The response must attach all supporting documentation. Material submitted after the Response Deadline will not be considered. The response must include the name, address, email address, and telephone number of the person responding on behalf of or representing the protested bidder if different from the protested bidder.

10.5 Copy to Protesting Bidder. Upon submission of its response to the bid protest to the City, the protested bidder must also concurrently transmit by email or hand delivery, by or before the Response Deadline, a copy of its response and all supporting documents to the protesting bidder and to any other bidder who has a reasonable prospect of receiving an award depending upon the outcome of the protest.

10.6 Exclusive Remedy. The procedure and time limits set forth in this Section are mandatory and are the bidder's sole and exclusive remedy in the event of a bid protest. A bidder's failure to comply with these procedures will constitute a waiver

of any right to further pursue a bid protest, including filing a Government Code Claim or initiation of legal proceedings.

10.7 Right to Award. City reserves the right, acting in its sole discretion, to reject any bid protest that it determines lacks merit, to award the Contract to the bidder it has determined to be the responsible bidder submitting the lowest responsive bid, and to issue a Notice to Proceed with the Work notwithstanding any pending or continuing challenge to its determination.

11. Reservation of Rights. Subject to the provisions of its charter and the Santa Rosa City Code ("City Code"), City reserves the unfettered right, acting in its sole discretion, to waive or to decline to waive any immaterial bid irregularities; to accept or reject any or all bids; to cancel or reschedule the bid; to postpone or abandon the Project entirely; or to perform all or part of the Work with its own forces. The Contract will be awarded, if at all, within 60 days after opening of bids or as otherwise specified in the Special Conditions, to the responsible bidder that submitted the lowest responsive bid. Any planned start date for the Project represents the City's expectations at the time the Notice Inviting Bids was first issued. City is not bound to issue a Notice to Proceed by or before such planned start date, and it reserves the right to issue the Notice to Proceed when the City determines, in its sole discretion, the appropriate time for commencing the Work. The City expressly disclaims responsibility for any assumptions a bidder might draw from the presence or absence of information provided by the City in any form. Each bidder is solely responsible for its costs to prepare and submit a bid, including site investigation costs.

12. Bonds. Within ten calendar days following receipt of the Notice of Award, the successful bidder must submit payment and performance bonds to City as specified in the Contract Documents using the bond forms included in the Contract Documents. All required bonds must be calculated on the maximum total Contract Price as awarded, including additive alternates, if applicable.

13. License(s) and Certificate(s). The successful bidder and its Subcontractor(s) must possess the California contractor's license(s) in the classification(s) required by law to perform the Work. The successful bidder must also obtain a City business tax certificate, issued pursuant to Chapter 6.04 of the City Code before performing any Work on the Project. Subcontractors must also obtain a City business tax certificate before performing any Work.

14. Ineligible Subcontractor. Any Subcontractor who is ineligible to perform work on a public works project under Labor Code §§ 1777.1 or 1777.7 is prohibited from performing work on the Project.

15. Safety Orders. If the Project includes construction of a pipeline, sewer, sewage disposal system, boring and jacking pits, or similar trenches or open excavations, which are five feet or deeper, each bid must include a bid item for adequate sheeting, shoring, and bracing, or equivalent method, for the protection of life or limb, which comply with safety orders as required by Labor Code § 6707.

16. In-Use Off-Road Diesel-Fueled Fleets. If the Project involves the use of vehicles subject to the California Air Resources Board's In-Use Off-Road Diesel-Fueled Fleets Regulation (13 CCR § 2449 et seq.) ("Off-Road Regulation"), then within ten calendar days following receipt of the Notice of Award, the successful bidder must submit to City valid Certificates of Reported Compliance for its fleet and its listed Subcontractors, if applicable, in accordance with the Off-Road Regulation, unless exempt under the Off-Road Regulation.

17. Community Workforce Agreement (If Applicable). If the Project is subject to the City's Community Workforce Agreement ("CWA"), each bidder must submit with its bid an executed Contractor Agreement to be Bound by the CWA, using the form attached to the CWA as Appendix A. The CWA is attached to the Contract Documents and incorporated herein by reference. Each bidder must provide a copy of the CWA to its Subcontractors, and the successful bidder and its Subcontractors must comply with the CWA. Entering into the CWA is a condition of award of the Contract for the Project.

Select One:

☒ This Project is subject to the City's CWA. Submit an executed Contractor Agreement to be Bound, using the form attached to the CWA as Appendix A, with the bid.

☐ This Project is <u>not</u> subject to the City's CWA.

18. Additive and Deductive Alternates. As required by Public Contract Code § 20103.8, if this bid solicitation includes additive or deductive items, the method checked below will be used to determine the lowest bid. If no method is checked, subparagraph (A) will be used to determine the lowest bid. City retains the right to add to or deduct from the Contract any of the additive or deductive alternates included in the Bid Proposal.

__X__ (B) The lowest bid will be the lowest total of the bid prices on the base contract and those additive or deductive items that were specifically identified in the bid solicitation or Bid Proposal as being used for the purpose of determining the lowest bid price.

19. For Reference Only. The following documents are provided "For Reference Only," as defined in Section 3.4 of the General Conditions:

- SUNBURST PARK Record Plans dated August 31, 1989

END OF INSTRUCTIONS TO BIDDERS

Bid Proposal

Dutch Flohr Neighborhood Park

_____ ("Bidder") hereby submits this Bid Proposal to the City of Santa Rosa ("City") for the above-referenced project ("Project") in response to the Notice Inviting Bids and in accordance with the Contract Documents referenced in the Notice.

1. Base Bid. Bidder proposes to perform and fully complete the Work for the Project as specified in the Contract Documents, within the time required for full completion of the Work, including all labor, materials, supplies, and equipment and all other direct or indirect costs including, but not limited to, taxes, insurance and all overhead, for the following price ("Base Bid"):
$_____.

2. Bid Alternates. Add Alternatives are included in this project. The lowest bid will be the lowest total of the bid prices on the base contract and all alternates. Bidder submits the following prices for the specified bid alternates:

Alternate #1: School Adjacent Work
Add/Deduct: $_____

Alternate #2: Sidewalks, Ramps, and Crossings
Add/Deduct: $_____

Alternate #3: Fence Along Play Area
Add/Deduct: $_____

3. Addenda. Bidder agrees that it has confirmed receipt of or access to, and reviewed, all addenda issued for this bid, as evidenced by its acknowledgement of each addendum on the City's PlanetBids portal. Bidder waives any claims it might have against the City based on its failure to receive, access, or review any addenda for any reason.

4 Bidder's Certifications and Warranties. By signing and submitting this Bid Proposal, Bidder certifies and warrants the following:

4.1 Examination of Contract Documents. Bidder has thoroughly examined the Contract Documents and represents that, to the best of Bidder's knowledge, there are no errors, omissions, or discrepancies in the Contract Documents, subject to the limitations of Public Contract Code § 1104.

4.2 Examination of Worksite. Bidder has had the opportunity to examine the Worksite and local conditions at the Project location.

4.3 Bidder Responsibility. Bidder is a responsible bidder, with the necessary ability, capacity, experience, skill, qualifications, workforce, equipment, and resources to perform or cause the Work to be performed in accordance with the Contract Documents and within the Contract Time.

4.4 Responsibility for Bid. Bidder has carefully reviewed this Bid Proposal and is solely responsible for any errors or omissions contained in its completed bid. All statements and information provided in this Bid Proposal and enclosures are true and correct to the best of Bidder's knowledge.

4.5 Nondiscrimination. In preparing this bid, the Bidder has not engaged in discrimination against any prospective or present employee or Subcontractor on grounds of race, color,

ancestry, national origin, ethnicity, religion, sex, sexual orientation, age, disability, or marital status.

4.6 Iran Contracting Act. If the Contract Price exceeds $1,000,000, Bidder is not identified on a list created under the Iran Contracting Act, Public Contract Code § 2200 et seq. (the "Act"), as a person engaging in investment activities in Iran, as defined in the Act, or is otherwise expressly exempt under the Act.

5. Award of Contract. By signing and submitting this Bid Proposal, Bidder agrees that, if City issues the Notice of Award to Bidder, then within ten days following receipt of the Notice of Award, Bidder will do all of the following:

5.1 Execute Contract. Enter into the Contract with City in accordance with the terms of this Bid Proposal, by signing and submitting to City the Contract prepared by City using the form included with the Contract Documents;

5.2 Submit Required Bonds. Submit to City a payment bond and a performance bond, each for 100% of the Contract Price, using the bond forms provided and in accordance with the requirements of the Contract Documents;

5.3 Insurance Requirements. Submit to City the insurance certificate(s) and endorsement(s) as required by the Contract Documents; and

5.4 Certificates of Reported Compliance. Submit to City valid Certificates of Reported Compliance for its fleet and its listed Subcontractors, if applicable, if the Project involves the use of vehicles subject to the Off-Road Regulation.

6. Bid Security. As a guarantee that, if awarded the Contract, Bidder will perform its obligations under Section 4 above, Bidder is enclosing bid security in the amount of ten percent of its maximum bid amount in one of the following forms (check one):

____ A cashier's check or certified check payable to City and issued by _____ [Bank name] in the amount of $_____.

____ A bid bond, using the Bid Bond form included with the Contract Documents, payable to City and executed by a surety licensed to do business in the State of California.

7. Schedule of Values after Bid Opening. The apparent lowest bid shall provide a schedule of values for the lump sum bid, including any alternates to be awarded, as requested by the City within 5 days of the bid opening. The schedule of values shall have at a minimum break out unit pricing:

- General Conditions
- Submittals
- Bonds
- Mobilization
- Staking
- Demolition (Lump Sum):
  - Demo
  - Tree Removal and Protection
  - SWPPP compliance monthly
- Grading, Site Preparation and Utilities (Lump Sum):
  - Site Utilities (Trenching & Backfill)
  - Grading And Site Preparation
- Paving, Striping, Play Surfacing and Ramps (square foot, unless noted otherwise):
  - Concrete Paving (Standard)

    - Concrete Paving (Vehicular)
    - Play Area Surfacing
    - Curb Ramp
    - Curb And Gutter (Linear Foot)
    - Cobble Non-Walkable Surface
    - Asphalt Paving
    - Traffic Striping (Linear Foot)
    - Road Signs (Each)
    - Play Area Surfacing
    - Mow Band (Linear Foot)
    - Concrete Curb at Play Area and Sandbox (Linear Foot)
    - Sandbox Transfer Station (Lump Sum)
    - Play Equipment (Lump Sum)
    - Fitness Stations (Each)
- Site Elements and Furnishings (Each):
    - Hand Rails
    - Entry Ramps
    - Stepping Stones
    - Boulders, 1.5' - 2'
    - Boulders, 2' - 3'
    - Boulders, 4' - 5'
    - Fence
    - Site Furnishings
    - Park Signs
    - Monument Sign
    - Lighting
- Electrical (Linear Foot)
- Planting And Irrigation:
    - Shrub And Groundcover - 1 Gal. (Each)
    - Shrub And Groundcover - 5 Gal. (Each)
    - Trees - 15 Gal. (Each)
    - Trees - 24" Box (Each)
    - Turf (Sod and Red Fescue) (Square foot)
    - Irrigation (Linear foot)
    - 120 Day Maintenance Period (Lump Sum)
- Additive Alternates (Lump Sum):
    - Add Alternate #1 - School Adjacent Work
    - Add Alternate #2 - Sidewalks, Ramps and Crossings
    - Add Alternate #3 - Fence Along Play Area

This Bid Proposal is hereby submitted on _____, 20__.

s/ _____ _____
Name and Title

s/ _____ _____
[See Section 3 of Instructions to Bidders] Name and Title

_____ _____
Company Name License #, Expiration Date, and Classification

_____ _____
Address DIR Registration #

_____ _____
City, State, Zip Phone

_____ _____
Contact Name Contact Email

END OF BID PROPOSAL

Bid Schedule

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

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

BID ITEM NO.	ITEM DESCRIPTION	EST. QTY.	UNIT	UNIT COST	EXTENDED TOTAL AMOUNT
1	**Base Bid**	**1**	**LS**	$	$
2	**Add Alternate 1:** School Adjacent Work	**1**	**LS**	$	$
3	**Add Alternate 2:** Sidewalks, Ramps, and Crossings	**1**	**LS**	$	$
4	**Add Alternate 3:** Fence Along Play Area	**1**	**LS**	$	$

* Final Pay Quantity

TOTAL BASE BID: Items 1 through 4 inclusive: $_____

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

BIDDER NAME: _____

END OF BID SCHEDULE

Subcontractor List

For each Subcontractor that will perform a portion of the Work in an amount in excess of one-half of 1% of the Bidder's total Base Bid,[1] the bidder must list a description of the Work, the name of the Subcontractor, its California contractor license number, the location of its place of business, its DIR registration number, and the portion of the Work that the Subcontractor is performing based on a percentage of the Base Bid price.

DESCRIPTION OF WORK	SUBCONTRACTOR NAME	CALIFORNIA CONTRACTOR LICENSE NO.	LOCATION OF BUSINESS	DIR REG. NO.	PERCENT OF WORK

END OF SUBCONTRACTOR LIST

[1] For street or highway construction, this requirement applies to any subcontract of $10,000 or more.

Noncollusion Declaration

TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID

The undersigned declares:

I am the _____ [title] of _____ [business name], the party making the foregoing bid.

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

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

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

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

s/_____

_____
Name [print]

END OF NONCOLLUSION DECLARATION

Bid Bond

_____ ("Bidder") has submitted a bid, dated _____, 20_____ ("Bid"), to the City of Santa Rosa ("City") for work on the Dutch Flohr Neighborhood Park ("Project"). Under this duly executed bid bond ("Bid Bond"), Bidder as Principal and _____, its surety ("Surety"), are bound to City as obligee in the penal sum of ten percent of the maximum amount of the Bid (the "Bond Sum"). Bidder and Surety bind themselves and their respective heirs, executors, administrators, successors and assigns, jointly and severally, as follows:

1. **General.** If Bidder is awarded the Contract for the Project, Bidder will enter into the Contract with City in accordance with the terms of the Bid.

2. **Submittals.** Within ten days following receipt of the Notice of Award, Bidder must submit to City the following:

   2.1 **Contract.** The executed Contract, using the form provided by City in the Project contract documents ("Contract Documents");

   2.2 **Payment Bond.** A payment bond for 100% of the maximum Contract Price, executed by a surety licensed to do business in the State of California using the Payment Bond form included with the Contract Documents;

   2.3 **Performance Bond.** A performance bond for 100% of the maximum Contract Price, executed by a surety licensed to do business in the State of California using the Performance Bond form included with the Contract Documents;

   2.4 **Insurance.** The insurance certificate(s) and endorsement(s) required by the Contract Documents;

   2.5 **Certificates of Reported Compliance.** Valid Certificates of Reported Compliance for its fleet and its listed Subcontractors, if applicable, in accordance with the In-Use Off-Road Diesel-Fueled Fleets Regulation (13 CCR § 2449 et seq.) ("Off-Road Regulation"), if the Project involves the use of vehicles subject to the Off-Road Regulation; and

   2.6 **Other Submittals.** Any other documents required by the Instructions to Bidders or Notice of Award.

3. **Enforcement.** If Bidder fails to execute the Contract or to submit the bonds, insurance certificates, and valid Certificates of Reported Compliance as required by the Contract Documents, Surety guarantees that Bidder forfeits the Bond Sum to City. Any notice to Surety may be given in the manner specified in the Contract and delivered or transmitted to Surety as follows:

   Attn: _____
   Address: _____
   City/State/Zip: _____
   Phone: _____
   Fax: _____
   Email: _____

4. **Duration and Waiver.** If Bidder fulfills its obligations under Section 2, above, then this obligation will be null and void; otherwise, it will remain in full force and effect for 60 days following the bid opening or until this Bid Bond is returned to Bidder, whichever occurs first. Surety waives the provisions of Civil Code §§ 2819 and 2845.

This Bid Bond is entered into and effective on _____, 20_____.

SURETY:

_____
Business Name

s/_____ _____
Date

_____
Name, Title

(Attach Acknowledgment with Notary Seal and Power of Attorney)

BIDDER:

_____
Business Name

s/_____ _____
Date

_____
Name, Title

END OF BID BOND

Contract

This public works contract ("Contract") is entered into by and between the City of Santa Rosa ("City") and _____ ("Contractor"), for work on the Dutch Flohr Neighborhood Park ("Project").

The parties agree as follows:

1. **Award of Contract.** In response to the Notice Inviting Bids, Contractor has submitted a Bid Proposal to perform the Work to construct the Project. On _____, 20___, City authorized award of this Contract to Contractor for the amount set forth in Section 4, below. City has elected to include the following Project alternate(s) in the Contract:
   _____
   _____.

2. **Contract Documents.** The Contract Documents incorporated into this Contract include and are comprised of all of the documents listed below. The definitions provided in Article 1 of the General Conditions apply to all of the Contract Documents, including this Contract.

   2.1 Notice Inviting Bids;
   2.2 Instructions to Bidders;
   2.3 Addenda, if any;
   2.4 Bid Proposal and attachments thereto;
   2.5 Contract;
   2.6 Payment and Performance Bonds;
   2.7 General Conditions;
   2.8 Special Conditions;
   2.9 Project Plans and Specifications;
   2.10 Change Orders, if any;
   2.11 Notice of Award;
   2.12 Notice to Proceed;
   2.13 City Standards and City Specifications, as applicable;
   2.14 City's CWA, if applicable; and

3. **Contractor's Obligations.** Contractor will perform all of the Work required for the Project, as specified in the Contract Documents. Contractor must provide, furnish, and supply all things necessary and incidental for the timely performance and completion of the Work, including all necessary labor, materials, supplies, tools, equipment, transportation, onsite facilities, and utilities, unless otherwise specified in the Contract Documents. Contractor must use its best efforts to diligently prosecute and complete the Work in a professional and expeditious manner and to meet or exceed the performance standards required by the Contract Documents.

4. **Payment.** As full and complete compensation for Contractor's timely performance and completion of the Work in strict accordance with the terms and conditions of the Contract Documents, City will pay Contractor $_____ ("Contract Price") for all of Contractor's direct and indirect costs to perform the Work, including all labor, materials, supplies, equipment, taxes, insurance, bonds and all overhead costs, in accordance with the payment provisions in the General Conditions.

5. **Time for Completion.** Contractor will fully complete the Work for the Project, meeting all requirements for Final Completion, within 185 Calendar Days from the start date set forth in

the Notice to Proceed ("Contract Time"). By signing below, Contractor expressly waives any claim for delayed early completion.

6. **Liquidated Damages.** As further specified in Section 5.4 of the General Conditions, if Contractor fails to complete the Work within the Contract Time, City will assess liquidated damages in the amount of $1,500.00 per day for each day of unexcused delay in achieving Final Completion, and such liquidated damages may be deducted from City's payments due or to become due to Contractor under this Contract.

7. **Labor Code Compliance.**

   7.1 General. This Contract is subject to all applicable requirements of Chapter 1 of Part 7 of Division 2 of the Labor Code, including requirements pertaining to wages, working hours and workers' compensation insurance, as further specified in Article 9 of the General Conditions.

   7.2 Prevailing Wages. This Project is subject to the prevailing wage requirements applicable to the locality in which the Work is to be performed for each craft, classification or type of worker needed to perform the Work, including employer payments for health and welfare, pension, vacation, apprenticeship and similar purposes. Copies of these prevailing rates are available online at http://www.dir.ca.gov/DLSR.

   7.3 DIR Registration. City may not enter into the Contract with a bidder without proof that the bidder and its Subcontractors are registered with the California Department of Industrial Relations to perform public work pursuant to Labor Code § 1725.5, subject to limited legal exceptions.

8. **Workers' Compensation Certification.** Pursuant to Labor Code § 1861, by signing this Contract, Contractor certifies as follows: "I am aware of the provisions of Labor Code § 3700 which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the Work on this Contract."

9. **Conflicts of Interest.** Contractor, its employees, Subcontractors, and agents may not have, maintain, or acquire a conflict of interest in relation to this Contract in violation of any City ordinance or requirement, or in violation of any California law, including Government Code § 1090 et seq., or the Political Reform Act, as set forth in Government Code § 81000 et seq. and its accompanying regulations. Any violation of this Section constitutes a material breach of the Contract.

10. **Independent Contractor.** Contractor is an independent contractor under this Contract and will have control of the Work and the means and methods by which it is performed. Contractor and its Subcontractors are not employees of City and are not entitled to participate in any health, retirement, or any other employee benefits from City.

11. **Notice.** Any notice, billing, or payment required by or pursuant to the Contract Documents must be made in writing, signed, dated, and sent to the other party by personal delivery, U.S. Mail, a reliable overnight delivery service, or by email as a PDF file. Notice is deemed effective upon delivery, except that service by U.S. Mail is deemed effective on the second working day after deposit for delivery. Notice for each party must be given as follows:

    City:

Public Works
69 Stony Circle
Santa Rosa, CA 95404
707-543-4203
Attn: Dezire Perez
dperez@srcity.org

Copy to: Kimberly Hopwood
khopwood@srcity.org

Contractor:

Name:_____
Address:_____
City/State/Zip:_____
Phone:_____
Attn:_____
Email:_____
Copy to:_____

12. General Provisions.

12.1 Assignment and Successors. Contractor may not assign its rights or obligations under this Contract, in part or in whole, without City's written consent. This Contract is binding on Contractor's and City's lawful heirs, successors and permitted assigns.

12.2 Third Party Beneficiaries. There are no intended third party beneficiaries to this Contract.

12.3 Governing Law and Venue. This Contract will be governed by California law and venue will be in the Sonoma County Superior Court, and no other place. Contractor waives any right it may have pursuant to Code of Civil Procedure § 394, to file a motion to transfer any action arising from or relating to this Contract to a venue outside of Sonoma County, California.

12.4 Amendment. No amendment or modification of this Contract will be binding unless it is in a writing duly authorized and signed by the parties to this Contract.

12.5 Integration. This Contract and the Contract Documents incorporated herein, including authorized amendments or Change Orders thereto, constitute the final, complete, and exclusive terms of the agreement between City and Contractor.

12.6 Severability. If any provision of the Contract Documents is determined to be illegal, invalid, or unenforceable, in whole or in part, the remaining provisions of the Contract Documents will remain in full force and effect.

12.7 Iran Contracting Act. If the Contract Price exceeds $1,000,000, Contractor certifies, by signing below, that it is not identified on a list created under the Iran Contracting Act, Public Contract Code § 2200 et seq. (the "Act"), as a person engaging in investment activities in Iran, as defined in the Act, or is otherwise expressly exempt under the Act.

12.8 Authorization. Each individual signing below warrants that he or she is authorized to do so by the party that he or she represents, and that this Contract is legally binding on that party. If Contractor is a corporation, signatures from two officers of the corporation are required pursuant to California Corporations Code § 313.

12.9 Electronic Signatures. In accordance with Government Code § 16.5 and Civil Code § 1633.1 et seq., the parties agree that this Contract may be transmitted and executed electronically and that electronic signatures will have the same force and effect as the use of manual signatures.

[Signatures are on the following page.]

The parties agree to this Contract as witnessed by the signatures below:

CITY:

s/_____

_____
Name, Title

Date: _____

Approved as to form:

s/_____

_____
Name, Title

Date: _____

Attest:

s/_____

_____
Name, Title

Date: _____

CONTRACTOR: _____
Business Name

s/_____

Seal:

_____
Name, Title

Date: _____

Second Signature (See Section 12.8):

s/_____

_____
Name, Title

Date: _____

_____
Contractor's California License Number(s) and Expiration Date(s)

END OF CONTRACT

Payment Bond

The City of Santa Rosa ("City") and _____ ("Contractor") have entered into a contract for work on the Dutch Flohr Neighborhood Park ("Project"). The Contract is incorporated by reference into this Payment Bond ("Bond").

1. **General.** Under this Bond, Contractor as principal and _____, its surety ("Surety"), are bound to City as obligee in an amount not less than $_____, under California Civil Code § 9550 et seq., to ensure payment to authorized claimants. This Bond is binding on the respective successors, assigns, owners, heirs, or executors of Surety and Contractor.

2. **Surety's Obligation.** If Contractor or any of its Subcontractors fails to pay a person authorized in California Civil Code § 9100 to assert a claim against a payment bond, any amounts due under the Unemployment Insurance Code with respect to work or labor performed under the Contract, or any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of Contractor and its Subcontractors under California Unemployment Insurance Code § 13020 with respect to the work and labor, then Surety will pay the obligation.

3. **Beneficiaries.** This Bond inures to the benefit of any of the persons named in California Civil Code § 9100, so as to give a right of action to those persons or their assigns in any suit brought upon this Bond. Contractor must promptly provide a copy of this Bond upon request by any person with legal rights under this Bond.

4. **Duration.** If Contractor promptly makes payment of all sums for all labor, materials, and equipment furnished for use in the performance of the Work required by the Contract, in conformance with the time requirements set forth in the Contract and as required by California law, Surety's obligations under this Bond will be null and void. Otherwise, Surety's obligations will remain in full force and effect.

5. **Waivers.** Surety waives any requirement to be notified of alterations to the Contract or extensions of time for performance of the Work under the Contract. Surety waives the provisions of Civil Code §§ 2819 and 2845. City waives the requirement of a new bond for any supplemental contract under Civil Code § 9550. Any notice to Surety may be given in the manner specified in the Contract and sent to Surety as follows:

   Attn: _____
   Address: _____
   City/State/Zip: _____
   Phone: _____
   Email: _____

6. **Law and Venue.** This Bond will be governed by California law, and venue for any dispute pursuant to this Bond will be in the Sonoma County Superior Court, and no other place. Surety will be responsible for City's attorneys' fees and costs in any action to enforce the provisions of this Bond.

[Signatures are on the following page.]

7. Effective Date; Execution. This Bond is entered into and is effective on _____, 20__.

SURETY:

_____
Business Name

s/_____ _____
Date

_____
Name, Title

(Attach Acknowledgment with Notary Seal and Power of Attorney)

CONTRACTOR:

_____
Business Name

s/_____ _____
Date

_____
Name, Title

APPROVED BY CITY:

s/ _____ _____
Date

_____
Name, Title

END OF PAYMENT BOND

Performance Bond

The City of Santa Rosa ("City") and _____ ("Contractor") have entered into a contract for work on the Dutch Flohr Neighborhood Park ("Project"). The Contract is incorporated by reference into this Performance Bond ("Bond").

1. **General.** Under this Bond, Contractor as principal and _____, its surety ("Surety"), are bound to City as obligee for an amount not less than $_____ to ensure Contractor's faithful performance of its obligations under the Contract. This Bond is binding on the respective successors, assigns, owners, heirs, or executors of Surety and Contractor.

2. **Surety's Obligations.** Surety's obligations are co-extensive with Contractor's obligations under the Contract. If Contractor fully performs its obligations under the Contract, including its warranty obligations under the Contract, Surety's obligations under this Bond will become null and void. Otherwise, Surety's obligations will remain in full force and effect.

3. **Waiver.** Surety waives any requirement to be notified of and further consents to any alterations to the Contract made under the applicable provisions of the Contract Documents, including changes to the scope of Work or extensions of time for performance of Work under the Contract. Surety waives the provisions of Civil Code §§ 2819 and 2845.

4. **Application of Contract Balance.** Upon making a demand on this Bond for completion of the Work prior to acceptance of the Project, City will make the Contract Balance available to Surety for completion of the Work under the Contract. For purposes of this provision, the Contract Balance is defined as the total amount payable by City to Contractor as the Contract Price minus amounts already paid to Contractor, and minus any liquidated damages, credits, or backcharges to which City is entitled under the terms of the Contract.

5. **Contractor Default.** Upon written notification from City of Contractor's termination for default under Article 13 of the Contract General Conditions, time being of the essence, Surety must act within the time specified in Article 13 to remedy the default through one of the following courses of action:

   5.1 Arrange for completion of the Work under the Contract by Contractor, with City's consent, but only if Contractor is in default solely due to its financial inability to complete the Work;

   5.2 Arrange for completion of the Work under the Contract by a qualified contractor acceptable to City, and secured by performance and payment bonds issued by an admitted surety as required by the Contract Documents, at Surety's expense; or

   5.3 Waive its right to complete the Work under the Contract and reimburse City the amount of City's costs to have the remaining Work completed.

6. **Surety Default.** If Surety defaults on its obligations under the Bond, City will be entitled to recover all costs it incurs due to Surety's default, including legal, design professional, or delay costs.

7. **Notice.** Any notice to Surety may be given in the manner specified in the Contract and sent to Surety as follows:

Attn: _____
Address: _____
City/State/Zip: _____
Phone: _____
Fax: _____
Email: _____

8. **Law and Venue.** This Bond will be governed by California law, and venue for any dispute pursuant to this Bond will be in the Sonoma County Superior Court, and no other place. Surety will be responsible for City's attorneys' fees and costs in any action to enforce the provisions of this Bond.

9. **Effective Date; Execution.** This Bond is entered into and effective on _____, 20___.

SURETY:

_____
Business Name

s/_____ _____
Date

_____
Name, Title

(Attach Acknowledgment with Notary Seal and Power of Attorney)

CONTRACTOR:

_____
Business Name

s/_____ _____
Date

_____
Name, Title

APPROVED BY CITY:

s/ _____ _____
Date

_____
Name, Title

END OF PERFORMANCE BOND

General Conditions

Article 1 - Definitions

Definitions. The following definitions apply to all of the Contract Documents unless otherwise indicated, e.g., additional definitions that apply solely to the Specifications or other technical documents. Defined terms and titles of documents are capitalized in the Contract Documents, with the exception of the following (in any tense or form): “day,” “furnish,” “including,” “install,” “work day,” or “working day.”

Allowance means a specific amount that must be included in the Bid Proposal for a specified purpose.

Article, as used in these General Conditions, means a numbered Article of the General Conditions, unless otherwise indicated by the context.

Change Order means a written document duly approved and executed by City, which changes the scope of Work, the Contract Price, or the Contract Time.

City means the City of Santa Rosa, acting through its City Council, officers, employees, City Engineer, and any other authorized representatives.

City Engineer means the City Engineer for City and his or her authorized delegee(s).

City Specifications means the City’s Construction Specifications for Public Improvements, which may be accessed on the City’s website at https://www.srcity.org/2321/Design-Construction-Standards.

City Standards means the City’s Design and Construction Standards, which may be accessed on the City’s website at https://www.srcity.org/2321/Design-Construction-Standards.

Claim means a separate demand by Contractor for a change in the Contract Time or Contract Price, that has previously been submitted to City in accordance with the requirements of the Contract Documents, and which has been rejected by City, in whole or in part; a written demand by Contractor disputing a unilateral Change Order or a portion thereof; or a written demand by Contractor objecting to the amount of Final Payment.

Contract means the signed agreement between City and Contractor for performing the Work required for the Project, and all documents expressly incorporated therein.

Contract Documents means, collectively, all of the documents listed as such in Section 2 of the Contract, including the Notice Inviting Bids; the Instructions to Bidders; addenda, if any; the Bid Proposal and attachments thereto; the Contract; the Notice of Award and Notice to Proceed; the payment and performance bonds; the General Conditions; the Special Conditions; the Project Plans and Specifications; any Change Orders; and any other documents which are clearly and unambiguously made part of the Contract Documents. The Contract Documents do not include documents provided “For Reference Only,” or documents that are intended solely to provide information regarding existing conditions.

Contract Price means the total compensation to be paid to Contractor for performance of the Work, as set forth in the Contract and as may be amended by Change Order or adjusted for an Allowance. The Contract Price is not subject to adjustment due to inflation or due to the increased cost of labor, material, supplies, or equipment following submission of the Bid Proposal.

Contract Time means the time specified for complete performance of the Work, as set forth in the Contract and as may be amended by Change Order.

Contractor (or **You**) means the individual, partnership, corporation, or joint-venture that has signed the Contract with City to perform the Work.

CWA means the Community Workforce Agreement for the City.

Day means a calendar day unless otherwise specified.

Design Professional means the licensed individual(s) or firm(s) retained by City to provide architectural, engineering, or other design professional services for the Project. If no Design Professional has been retained for this Project, any reference to Design Professional is deemed to refer to the Engineer.

DIR means the California Department of Industrial Relations.

Drawings has the same meaning as Plans.

Engineer means the City Engineer for the City of Santa Rosa and his or her authorized delegees.

Excusable Delay is defined in Section 5.3(B), Excusable Delay.

Extra Work means new or unforeseen work added to the Project, as determined by the Engineer in his or her sole discretion, including Work that was not part of or incidental to the scope of the Work when the Contractor's bid was submitted; Work that is substantially different from the Work as described in the Contract Documents at bid time; or Work that results from a substantially differing and unforeseeable condition.

Final Completion means Contractor has fully completed all of the Work required by the Contract Documents to the City's satisfaction, including all punch list items and any required commissioning or training, and has provided the City with all required submittals, including the instructions and manuals, product warranties, and as-built drawings.

Final Payment means payment to Contractor of the unpaid Contract Price, including release of undisputed retention, less amounts withheld or deducted pursuant to the Contract Documents.

Furnish means to purchase and deliver for the Project.

Government Code Claim means a claim submitted pursuant to California Government Code § 900 et seq.

Hazardous Materials means any substance or material identified now or in the future as hazardous under any Laws, or any other substance or material that may be considered hazardous or otherwise subject to Laws governing handling, disposal, or cleanup.

Including, whether or not capitalized, means "including, but not limited to," unless the context clearly requires otherwise.

Install means to fix in place for materials, and to fix in place and connect for equipment.

Laws means all applicable local, state, and federal laws, regulations, rules, codes, ordinances, permits, orders, and the like enacted or imposed by or under the auspices of any governmental entity with jurisdiction over any of the Work or any performance of the Work, including health and safety requirements.

Materials Lab means City's Materials Engineering Laboratory, which may perform quality assurance functions for a Project, including inspection and/or testing of the workmanship, materials, and manner of construction of the Project. If the Materials Lab will not perform quality assurance functions for the Project, any reference to Materials Lab is deemed to mean the individual(s) or firm(s) retained by City to inspect and/or test the workmanship, materials, and manner of construction of the Project.

Non-Excusable Delay is defined in Section 5.3(D), Non-Excusable Delay.

Plans means the City-provided plans, drawings, details, or graphical depictions of the Project requirements, but does not include Shop Drawings.

Project means the public works project referenced in the Contract, as modified by any Project alternates elected by City, if any.

Project Manager means the individual designated by City to oversee and manage the Project on City's behalf and may include his or her authorized delegee(s) when the Project Manager is unavailable. If no Project Manager has been designated for this Project, any reference to Project Manager is deemed to refer to the Engineer.

Recoverable Costs is defined in Section 5.3(F), Recoverable Costs.

Request for Information or **RFI** means Contractor's written request for information about the Contract Documents, the Work or the Project, submitted to City in the manner and format specified by City.

Section, when capitalized in these General Conditions, means a numbered section or subsection of the General Conditions, unless the context clearly indicates otherwise.

Shop Drawings means drawings, plan details or other graphical depictions prepared by or on behalf of Contractor, and subject to City acceptance, which are intended to provide details for fabrication, installation, and the like, of items required by or shown in the Plans or Specifications.

Specialty Work means Work that must be performed by a specialized Subcontractor with the specified license or other special certification, and that the Contractor is not qualified to self-perform.

Specifications means the technical, text specifications describing the Project requirements, which are prepared for and incorporated into the Contract by or on behalf of City, and does not include the Contract, General Conditions or Special Conditions.

Subcontractor means an individual, partnership, corporation, or joint-venture retained by Contractor directly or indirectly through a subcontract to perform a specific portion of the Work. The term Subcontractor applies to subcontractors of all tiers, unless otherwise indicated by the context. A third party such as a utility performing related work on the Project is not a Subcontractor, even if Contractor must coordinate its Work with the third party.

Technical Specifications has the same meaning as Specifications.

Water Department means the City of Santa Rosa Water Department.

Work means all of the construction and services necessary for or incidental to completing the Project in conformance with the requirements of the Contract Documents.

Work Day or **Working Day**, whether or not capitalized, means a weekday when the City is open for business, and does not include holidays observed by the City.

Worksite means the place or places where the Work is performed, which includes, but may extend beyond the Project site, including separate locations for staging, storage, or fabrication.

Article 2 - Roles and Responsibilities

2.1 City.

(A) ***City Council.*** The City Council has final authority in all matters affecting the Project, except to the extent it has delegated authority to the Engineer.

(B) ***Engineer.*** The Engineer, acting within the authority conferred by the City Council, is responsible for administration of the Project on behalf of City, including authority to provide directions to the Design Professional and to Contractor to ensure proper and timely completion of the Project. The Engineer's decisions are final and conclusive within the scope of his or her authority, including interpretation of the Contract Documents.

(C) ***Project Manager.*** The Project Manager assigned to the Project will be the primary point of contact for the Contractor and will serve as City's representative for daily administration of the Project on behalf of City. Unless otherwise specified, all of Contractor's communications to City (in any form) will go to or through the Project Manager. City reserves the right to reassign the Project Manager role at any time or to delegate duties to additional City representatives, without prior notice to or consent of Contractor.

(D) ***Design Professional.*** The Design Professional is responsible for the overall design of the Project and, to the extent authorized by City, may act on City's behalf to ensure performance of the Work in compliance with the Plans and Specifications, including any design changes authorized by Change Order. The Design Professional's duties may include review of Contractor's submittals, visits to any Worksite, inspecting the Work, evaluating test and inspection results, and participation in Project-related meetings, including any pre-construction conference, weekly meetings, and coordination meetings. The Design Professional's interpretation of the Plans or Specifications is final and conclusive.

2.2 Contractor.

(A) ***General.*** Contractor must provide all labor, materials, supplies, equipment, services, and incidentals necessary to perform and timely complete the Work in strict accordance with the Contract Documents, and in an economical and efficient manner in the best interests of City, and with minimal inconvenience to the public.

(B) ***Responsibility for the Work and Risk of Loss.*** Contractor is responsible for supervising and directing all aspects of the Work to facilitate the efficient and timely completion of the Work. Contractor is solely responsible for and required to exercise full control over the Work, including the construction means, methods, techniques, sequences, procedures, safety precautions and programs, and coordination of all portions of the Work with that of all other contractors and Subcontractors, except to the extent that the Contract Documents provide other specific instructions. Contractor's responsibilities extend to any plan, method or sequence suggested, but not required by City or specified in the Contract Documents. From the date of commencement of the Work until either the date on which City formally accepts the Project or the effective date of termination of the Contract, whichever is later, Contractor bears all risks of injury or damage to the Work and the materials and equipment delivered to any Worksite, by any

cause including fire, earthquake, wind, weather, vandalism, or theft, subject to the limitations of Laws.

(C) ***Project Administration.*** Contractor must provide sufficient and competent administration, staff, and skilled workforce necessary to perform and timely complete the Work in accordance with the Contract Documents. Before starting the Work, Contractor must designate in writing and provide complete contact information, including telephone numbers and email address, for the officer or employee in Contractor's organization who is to serve as Contractor's primary representative for the Project, and who has authority to act on Contractor's behalf. A Subcontractor may not serve as Contractor's primary representative.

(D) ***On-Site Superintendent.*** Contractor must, at all times during performance of the Work, provide a qualified and competent full-time superintendent acceptable to City, and assistants as necessary, who must be physically present at the Project site while any aspect of the Work is being performed. The superintendent must have full authority to act and communicate on behalf of Contractor, and Contractor will be bound by the superintendent's communications to City. City's approval of the superintendent is required before the Work commences. If City is not satisfied with the superintendent's performance, City may request a qualified replacement of the superintendent. Failure to comply may result in temporary suspension of the Work, at Contractor's sole expense and with no extension of Contract Time, until an approved superintendent is physically present to supervise the Work. Contractor must provide written notice to City, as soon as practicable, before replacing the superintendent.

(E) ***Standards.*** Contractor must, at all times, ensure that the Work is performed in an efficient, skillful manner following best practices and in full compliance with the Contract Documents, Laws, and applicable manufacturer's recommendations. Contractor has a material and ongoing obligation to provide true and complete information, to the best of its knowledge, with respect to all records, documents, or communications pertaining to the Project, including oral or written reports, statements, certifications, Change Order requests, or Claims.

(F) ***Meetings.*** Contractor, its project manager, superintendent and any primary Subcontractors requested by City, must attend a pre-construction conference, if requested by City, as well as weekly Project progress meetings scheduled with City. If applicable, Contractor may also be required to participate in coordination meetings with other parties relating to other work being performed on or near the Project site or in relation to the Project, including work or activities performed by City, other contractors, or other utility owners.

(G) ***Construction Records.*** Contractor will maintain up-to-date, thorough, legible, and dated daily job reports, which document all significant activity on the Project for each day that Work is performed on the Project. The daily report for each day must include the number of workers at the Project site; primary Work activities; major deliveries; problems encountered, including injuries, if any; weather and site conditions; and delays, if any. Contractor will take date and time-stamped photographs to document general progress of the Project, including site conditions prior to construction activities, before and after photographs at offset trench laterals, existing improvements and utilities, damage and restoration. Contractor will maintain copies of all subcontracts, Project-related correspondence with Subcontractors, and records of meetings with Subcontractors. Upon request by the City, Contractor will permit review of and/or provide copies of any of these construction records.

(H) ***Responsible Party.*** Contractor is solely responsible to City for the acts or omissions of any Subcontractors, or any other party or parties performing portions of the

Work or providing equipment, materials or services for or on behalf of Contractor or the Subcontractors. Upon City's written request, Contractor must promptly and permanently remove from the Project, at no cost to City, any employee or Subcontractor or employee of a Subcontractor who the Engineer has determined to be incompetent, intemperate or disorderly, or who has failed or refused to perform the Work as required under the Contract Documents.

(I) ***Correction of Defects.*** Contractor must promptly correct, at Contractor's sole expense, any Work that is determined by City to be deficient or defective in any way, including workmanship, materials, parts, or equipment. Workmanship, materials, parts, or equipment that do not conform to the requirements under the Contract Documents, as determined by City, will be considered defective and subject to rejection. Contractor must also promptly correct, at Contractor's sole expense, any Work performed beyond the lines and grades shown on the Plans or established by City, and any Extra Work performed without City's prior written approval. If Contractor fails to correct or to take reasonable steps toward correcting defective Work within five days following notice from City, or within the time specified in City's notice to correct, City may elect to have the defective Work corrected by its own forces or by a third party, in which case the cost of correction will be deducted from the Contract Price. If City elects to correct defective Work due to Contractor's failure or refusal to do so, City or its agents will have the right to take possession of and use any equipment, supplies, or materials available at the Project site or any Worksite on City property, in order to effectuate the correction, at no extra cost to City. Contractor's warranty obligations under Section 11.2, Warranty, will not be waived nor limited by City's actions to correct defective Work under these circumstances. Alternatively, City may elect to retain defective Work, and deduct the difference in value, as determined by the Engineer, from payments otherwise due to Contractor. This paragraph applies to any defective Work performed by Contractor during the one-year warranty period under Section 11.2.

(J) ***Contractor's Records.*** Contractor must maintain all of its records relating to the Project in any form, including paper documents, photos, videos, electronic records, approved samples, and the construction records required pursuant to paragraph (G), above. Project records subject to this provision include complete Project cost records, copies of the insurance policies and endorsements required by the Contract Documents, and records relating to preparation of Contractor's bid, including estimates, take-offs, and price quotes or bids.

(1) Contractor's cost records must include all supporting documentation, including original receipts, invoices, and payroll records, evidencing its direct costs to perform the Work, including, but not limited to, costs for labor, materials, and equipment. Each cost record should include, at a minimum, a description of the expenditure with references to the applicable requirements of the Contract Documents, the amount actually paid, the date of payment, and whether the expenditure is part of the original Contract Price, related to an executed Change Order, or otherwise categorized by Contractor as Extra Work. Contractor's failure to comply with this provision as to any claimed cost operates as a waiver of any rights to recover the claimed cost.

(2) Contractor must continue to maintain its Project-related records in an organized manner for a period of five years after City's acceptance of the Project or following Contract termination, whichever occurs first. Subject to prior notice to Contractor, City is entitled to inspect or audit any of Contractor's records relating to the Project during Contractor's normal business hours. Contractor's records may also be subject to examination and audit by the California State Auditor, pursuant to Government Code § 8546.7. The record-keeping requirements set

forth in this subsection 2.2(J) will survive expiration or termination of the Contract.

(K) ***Copies of Project Documents.*** Contractor and its Subcontractors must keep copies, at the Project site, of all Work-related documents, including the Contract, permit(s), Plans, Specifications, addenda, Contract amendments, Change Orders, RFIs and RFI responses, Shop Drawings, as-built drawings, schedules, daily records, testing and inspection reports or results, and any related written interpretations. These documents must be available to City for reference at all times during construction of the Project.

(L) ***Quality Control.*** Contractor is responsible for developing, implementing, and maintaining a quality control program that includes sampling, testing, and inspecting the Work to control material quality and to ensure that the Work satisfies the quality characteristics in the Contract Documents.

(1) *Records*. Contractor must prepare and maintain quality control records, including the names and qualifications of samplers, testers, and inspectors; testing laboratories' identification and certifications; testing equipment calibrations and certifications; inspection reports; sampling and testing records organized by date and type of material; test results with comparison of quality characteristic requirements; test results in relation to action and any suspension limits; and records of corrective actions and suspensions. Contractor must immediately notify the Engineer of any noncompliant Work identified by Contractor's quality control program. Contractor must submit <__> copies of each authorized quality control plan and make one copy available at each Worksite. Contractor will submit any quality control test data and test results to the Engineer within two Working Days following test completion.

(2) *Quality Control Manager*. Unless otherwise specified in the Special Conditions, before starting Work, Contractor will designate in writing, and provide complete contact information for, the quality control manager for the Project who will be responsible for receiving, reviewing, and approving all correspondence and submittals prior to submission to the City; signing and implementing Contractor's quality control plan; and maintaining quality control records. The quality control manager must either be an employee of Contractor, or a Subcontractor retained to provide only quality control services for the Project. The quality control manager must not be employed or compensated by a Subcontractor who will provide other Work for the Project.

2.3 Subcontractors.

(A) ***General.*** All Work which is not performed by Contractor with its own forces must be performed by Subcontractors. City reserves the right to approve or reject any and all Subcontractors proposed to perform the Work, for reasons including the Subcontractor's poor reputation, lack of relevant experience, financial instability, and lack of technical ability or adequate trained workforce. Each Subcontractor must obtain a City business tax certificate before performing any Work.

(B) ***Contractual Obligations.*** Contractor must require each Subcontractor to comply with the provisions of the Contract Documents as they apply to the Subcontractor's portion(s) of the Work, including the generally applicable terms of the Contract Documents, and to likewise bind their subcontractors. Contractor will provide that the rights that each Subcontractor may have against any manufacturer or supplier for breach of warranty or guarantee relating to items provided by the Subcontractor for the Project, will be assigned to City. Nothing in these Contract Documents creates a

contractual relationship between a Subcontractor and City, but City is deemed to be a third-party beneficiary of the contract between Contractor and each Subcontractor.

(C) ***Termination.*** If the Contract is terminated, each Subcontractor's agreement must be assigned by Contractor to City, subject to the prior rights of any surety, but only if and to the extent that City accepts, in writing, the assignment by written notification, and assumes all rights and obligations of Contractor pursuant to each such subcontract agreement.

(D) ***Substitution of Subcontractor.*** If Contractor requests substitution of a listed Subcontractor under Public Contract Code § 4107, Contractor is solely responsible for all costs City incurs in responding to the request, including legal fees and costs to conduct a hearing, and any increased subcontract cost to perform the Work that was to be performed by the listed Subcontractor. If City determines that a Subcontractor is unacceptable to City based on the Subcontractor's failure to satisfactorily perform its Work, or for any of the grounds for substitution listed in Public Contract Code § 4107(a), City may request removal of the Subcontractor from the Project. Upon receipt of a written request from City to remove a Subcontractor pursuant to this paragraph, Contractor will immediately remove the Subcontractor from the Project and, at no further cost to City, will either (1) self-perform the remaining Work to the extent that Contractor is duly licensed and qualified to do so, or (2) substitute a Subcontractor that is acceptable to City, in compliance with Public Contract Code § 4107, as applicable.

2.4 Coordination of Work.

(A) ***Concurrent Work.*** City reserves the right to perform, have performed, or permit performance of other work on or adjacent to the Project site while the Work is being performed for the Project. Contractor is responsible for coordinating its Work with other work being performed on or adjacent to the Project site, including by any City work forces or utility companies or agencies, and must avoid hindering, delaying, or interfering with the work of other contractors, individuals, or entities, and must ensure safe and reasonable site access and use as required or authorized by City. To the full extent permitted by law, Contractor must hold harmless and indemnify City against any and all claims arising from or related to Contractor's avoidable, negligent, or willful hindrance of, delay to, or interference with the work of any City work forces, utility company or agency, or another contractor or subcontractor.

(B) ***Coordination.*** If Contractor's Work will connect or interface with work performed by others, Contractor is responsible for independently measuring and visually inspecting such work to ensure a correct connection and interface. Contractor is responsible for any failure by Contractor or its Subcontractors to confirm measurements before proceeding with connecting Work. Before proceeding with any portion of the Work affected by the construction or operations of others, Contractor must give the Project Manager prompt written notification of any defects Contractor discovers which will prevent the proper execution of the Work. Failure to give notice of any known or reasonably discoverable defects will be deemed acknowledgement by Contractor that the work of others is not defective and will not prevent the proper execution of the Work. Contractor must also promptly notify City if work performed by others, including work or activities performed by City's own forces, is operating to hinder, delay, or interfere with Contractor's timely performance of the Work. City reserves the right to backcharge Contractor for any additional costs incurred due to Contractor's failure to comply with the requirements in this Section 2.4.

2.5 Submittals. Unless otherwise specified, Contractor must submit to the Engineer for review and acceptance, all schedules, Shop Drawings, samples, product data, and similar submittals required by the Contract Documents, or upon request by the Engineer.

Unless otherwise specified, all submittals, including Requests for Information, are subject to the general provisions of this Section, as well as specific submittal requirements that may be included elsewhere in the Contract Documents, including the Special Conditions or Specifications. The Engineer may require submission of a submittal schedule at or before a pre-construction conference, as may be specified in the Notice to Proceed.

(A) ***General.*** Contractor is responsible for ensuring that its submittals are accurate and conform to the Contract Documents.

(B) ***Time and Manner of Submission.*** Contractor must ensure that its submittals are prepared and delivered in a manner consistent with the current City-accepted schedule for the Work and within the applicable time specified in the Contract Documents, or if no time is specified, in such time and sequence so as not to delay the performance of the Work or completion of the Project.

(C) ***Required Contents.*** Each submittal must include the Project name and contract number, Contractor's name and address, the name and address of any Subcontractor or supplier involved with the submittal, the date, and references to applicable Specification section(s) and/or drawing and detail number(s).

(D) ***Required Corrections.*** If corrections are required, Contractor must promptly make and submit any required corrections as specified in full conformance with the requirements of this Section, or other requirements that apply to that submittal.

(E) ***Effect of Review and Acceptance.*** Review and acceptance of a submittal by City will not relieve Contractor from complying with the requirements of the Contract Documents. Contractor is responsible for any errors in any submittal, and review or acceptance of a submittal by City is not an assumption of risk or liability by City.

(F) ***Enforcement.*** Any Work performed or any material furnished, installed, fabricated or used without City's prior acceptance of a required submittal is performed or provided at Contractor's risk, and Contractor may be required to bear the costs incident thereto, including the cost of removing and replacing such Work, repairs to other affected portions of the Work or material, and the cost of additional time or services required of City, including costs for the Design Professional, Project Manager, and Materials Lab.

(G) ***Excessive RFIs.*** A RFI will be considered excessive or unnecessary if City determines that the explanation or response to the RFI is clearly and unambiguously discernable from the Contract Documents. City's costs to review and respond to excessive or unnecessary RFIs may be deducted from payments otherwise due to Contractor.

2.6 Shop Drawings. When Shop Drawings are required by the Specifications or requested by the Engineer, they must be prepared according to best practices at Contractor's expense. The Shop Drawings must be of a size and scale to clearly show all necessary details. Unless otherwise specified by City, Shop Drawings must be provided to the Engineer for review and acceptance at least 30 days before the Work will be performed. If City requires changes, the corrected Shop Drawings must be resubmitted to the Engineer for review within the time specified by the Engineer. For all Project components requiring Shop Drawings, Contractor will not furnish materials or perform any Work until the Shop Drawings for those components are accepted by City. Contractor is responsible for any errors or omissions in the Shop Drawings, shop fits and field corrections; any deviations from the Contract Documents; and for the results obtained by the use of Shop Drawings. Acceptance of Shop Drawings by City does not relieve Contractor of Contractor's responsibility.

2.7 Material List. Unless otherwise specified by City, Contractor must submit to the Engineer, sufficiently in advance of the start of Work, a list of all materials proposed for use in the Work and any supporting documentation and samples required by the Contract Documents and source of supply. For a material listed on the "Engineer's List of Approved Items," located in the Sewer and Water sections of the City Standards, Contractor must provide the name of the manufacturer and model and part number for each material proposed for the Work, unless the item has been replaced for the Project, as specifically set forth in the Contract Documents. For all other materials, Contractor must provide the name of the manufacturer, model and part number, and supporting documentation and samples that will enable the Engineer to evaluate the material.

2.8 Access to Work. Contractor must afford prompt and safe access to any Worksite by City and its employees, agents, or consultants authorized by City; and upon request by City, Contractor must promptly arrange for City representatives to visit or inspect manufacturing sites or fabrication facilities for items to be incorporated into the Work.

2.9 Personnel. Contractor and its Subcontractors must employ only competent and skillful personnel to perform the Work. Contractor and its Subcontractor's supervisors, security or safety personnel, and employees who have unescorted access to the Project site must possess proficiency in English sufficient to read, understand, receive, and implement oral or written communications or instructions relating to their respective job functions, including safety and security requirements. Upon written notification from the Engineer, Contractor and its Subcontractors must immediately discharge any personnel who are incompetent, disorderly, disruptive, threatening, abusive, or profane, or otherwise refuse or fail to comply with the requirements of the Contract Documents or Laws, including Laws pertaining to health and safety. Any such discharged personnel may not be re-employed or permitted on the Project in any capacity without City's prior written consent.

Article 3 - Contract Documents

3.1 Interpretation of Contract Documents.

(A) ***Plans and Specifications.*** The Plans and Specifications included in the Contract Documents are complementary. If Work is shown on one but not on the other, Contractor must perform the Work as though fully described on both, consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results. The Plans and Specifications are deemed to include and require everything necessary and reasonably incidental to completion of the Work, whether or not particularly mentioned or shown. Contractor must perform all Work and services and supply all things reasonably related to and inferable from the Contract Documents. In the event of a conflict between the Plans and Specifications, the Specifications will control, unless the drawing(s) at issue are dated later than the Specification(s) at issue. Detailed drawings take precedence over general drawings, and large-scale drawings take precedence over smaller scale drawings. Any arrangement or division of the Plans and Specifications into sections is for convenience and is not intended to limit the Work required by separate trades. A conclusion presented in the Plans or Specifications is only a recommendation. Actual locations and depths must be determined by Contractor's field investigation. Contractor may request access to underlying or background information in City's possession that is necessary for Contractor to form its own conclusions.

(B) ***Duty to Notify and Seek Direction.*** If Contractor becomes aware of a changed condition in the Project, or of any ambiguity, conflict, inconsistency, discrepancy, omission, or error in the Contract Documents, including the Plans or Specifications, Contractor must promptly submit a Request for Information to the Engineer and wait for a response from City before proceeding further with the related Work. The RFI must notify

City of the issue and request clarification, interpretation or direction. The Engineer's clarification, interpretation or direction will be final and binding on Contractor. If Contractor proceeds with the related Work before obtaining City's response, Contractor will be responsible for any resulting costs, including the cost of correcting any incorrect or defective Work that results. Timely submission of a clear and complete RFI is essential to avoiding delay. Delay resulting from Contractor's failure to submit a timely and complete RFI to the Engineer is Non-Excusable Delay. If Contractor believes that City's response to an RFI justifies a change to the Contract Price or Contract Time, Contractor must perform the Work as directed, but may submit a timely Change Order request in accordance with the Contract Documents. (See Articles 5 and 6.)

(C) ***Figures and Dimensions.*** Figures control over scaled dimensions.

(D) ***Technical or Trade Terms.*** Any terms that have well-known technical or trade meanings will be interpreted in accordance with those meanings, unless otherwise specifically defined in the Contract Documents.

(E) ***Measurements.*** Contractor must verify all relevant measurements in the Contract Documents and at the Project site before ordering any material or performing any Work, and will be responsible for the correctness of those measurements or for costs that could have been avoided by independently verifying measurements.

(F) ***Compliance with Laws.*** The Contract Documents are intended to comply with Laws and will be interpreted to comply with Laws.

3.2 Order of Precedence. Information included in one Contract Document but not in another will not be considered a conflict or inconsistency. Unless otherwise specified in the Special Conditions, in case of any conflict or inconsistency among the Contract Documents, the following order of precedence will apply, beginning from highest to lowest, with the most recent version taking precedent over an earlier version:

(A) Change Orders;
(B) Addenda;
(C) Contract;
(D) Notice to Proceed;
(E) Attachment B – Federal Contract Requirements (only if used);
(F) Special Conditions;
(G) General Conditions;
(H) Payment and Performance Bonds;
(I) Specifications;
(J) Plans;
(K) Notice of Award;
(L) Notice Inviting Bids;
(M) Attachment A – Federal Bidding Requirements (only if used);
(N) Instructions to Bidders;
(O) CWA, if applicable;
(P) Contractor's Bid Proposal and attachments;
(Q) City Standards and City Specifications, as applicable; and
(R) Any generic documents prepared by and on behalf of a third party, that were not prepared specifically for this Project, such as the Caltrans Standard Specifications or Caltrans Special Provisions.

3.3 Caltrans Standard Specifications. Any reference to or incorporation of the Standard Specifications of the State of California, Department of Transportation ("Caltrans"), including "Standard Specifications," "Caltrans Specifications," "State Specifications," or "CSS," means the most current edition of Caltrans' Standard Specifications, unless

otherwise specified ("Caltrans Standard Specifications"), including the most current amendments as of the date that Contractor's bid was submitted for this Project. The following provisions apply to use of or reference to the Caltrans Standard Specifications or Special Provisions:

(A) ***Limitations.*** The "General Provisions" of the Caltrans Standard Specifications, i.e., sections 1 through 9, do not apply to these Contract Documents with the exception of any specific provisions, if any, which are expressly stated to apply to these Contract Documents.

(B) ***Conflicts or Inconsistencies.*** If there is a conflict or inconsistency between any provision in the Caltrans Standard Specifications or Special Provisions and a provision of these Contract Documents, as determined by City, the provision in the Contract Documents will govern.

(C) ***Meanings.*** Terms used in the Caltrans Standard Specifications or Special Provisions are to be interpreted as follows:

(1) Any reference to the "Engineer" or "Director" is deemed to mean the City Engineer.

(2) Any reference to the "Special Provisions" is deemed to mean the Special Conditions, unless the Caltrans Special Provisions are expressly included in the Contract Documents listed in Section 2 of the Contract.

(3) Any reference to the "Department" or "State" is deemed to mean City.

(4) Any reference to "Laboratory" is deemed to mean the Materials Lab, or such other laboratory as may be authorized by City.

3.4 For Reference Only. Contractor is responsible for the careful review of any document, study, or report provided by City or appended to the Contract Documents solely for informational purposes and identified as "For Reference Only." Nothing in any document, study, or report so appended and identified is intended to supplement, alter, or void any provision of the Contract Documents. Contractor is advised that City or its representatives may be guided by information or recommendations included in such reference documents, particularly when making determinations as to the acceptability of proposed materials, methods, or changes in the Work. Any record drawings or similar final or accepted drawings or maps that are not part of the Contract Documents are deemed to be For Reference Only. The provisions of the Contract Documents are not modified by any perceived or actual conflict with provisions in any document that is provided For Reference Only.

3.5 Current Versions. Unless otherwise specified by City, any reference to standard specifications, technical specifications, or any City or state codes or regulations means the latest specification, code, or regulation in effect on the date that bids were due.

3.6 Conformed Copies. If City prepares a conformed set of the Contract Documents following award of the Contract, it will provide Contractor with two hard copy (paper) sets and one copy of the electronic file in PDF format. It is Contractor's responsibility to ensure that all Subcontractors, including fabricators, are provided with the conformed set of the Contract Documents at Contractor's sole expense.

3.7 Ownership. No portion of the Contract Documents may be used for any purpose other than construction of the Project, without prior written consent from City. Contractor is deemed to have conveyed the copyright in any designs, drawings, specifications, Shop

Drawings, or other documents (in paper or electronic form) developed by Contractor for the Project, and City will retain all rights to such works, including the right to possession.

Article 4 - Bonds, Indemnity, and Insurance

4.1 Payment and Performance Bonds. Within ten days following receipt of the Notice of Award, Contractor is required to provide a payment bond and a performance bond, each in the penal sum of not less than 100% of the Contract Price, and each executed by Contractor and its surety using the bond forms included with the Contract Documents.

(A) ***Surety.*** Each bond must be issued and executed by a surety admitted in California. If an issuing surety cancels the bond or becomes insolvent, within seven days following written notice from City, Contractor must substitute a surety acceptable to City. If Contractor fails to substitute an acceptable surety within the specified time, City may, at its sole discretion, withhold payment from Contractor until the surety is replaced to City's satisfaction, or terminate the Contract for default.

(B) ***Supplemental Bonds for Increase in Contract Price.*** If the Contract Price increases during construction by five percent or more over the original Contract Price, Contractor must provide supplemental or replacement bonds within ten days of written notice from City pursuant to this Section, covering 100% of the increased Contract Price and using the bond forms included with the Contract Documents.

4.2 Indemnity. To the fullest extent permitted by law, Contractor must indemnify, defend, and hold harmless City, its Council, officers, officials, employees, agents, volunteers, and consultants (individually, an "Indemnitee," and collectively the "Indemnitees") from and against any and all liability, loss, damage, claims, causes of action, demands, charges, fines, costs, and expenses (including, without limitation, attorney fees, expert witness fees, paralegal fees, fees and costs of litigation or arbitration, and fees and expenses incurred in enforcing this Section) (collectively, "Liability") of every nature arising out of or in connection with the acts or omissions of Contractor, its employees, Subcontractors, representatives, or agents, in bidding or performing the Work or in failing to comply with any obligation of Contractor under the Contract, except such Liability caused by the active negligence, sole negligence, or willful misconduct of an Indemnitee. This indemnity requirement applies to any Liability arising from alleged defects in the content or manner of submission of Contractor's bid for the Contract. Contractor's failure or refusal to timely accept a tender of defense pursuant to this Contract will be deemed a material breach of the Contract. City will timely notify Contractor upon receipt of any third-party claim relating to the Contract, as required by Public Contract Code § 9201. Contractor waives any right to express or implied indemnity against any Indemnitee. Contractor's indemnity obligations under this Contract will survive the expiration or any early termination of the Contract.

4.3 Insurance. No later than ten days following receipt of the Notice of Award, Contractor must procure and provide proof of the insurance coverage required by this Section in the form of certificates and endorsements acceptable to City. The required insurance must cover the activities of Contractor and its Subcontractors relating to or arising from the performance of the Work. The required insurance must remain in full force and effect at all times during the period covered by the Contract through the date of City's acceptance of the Project, except as specified for commercial general liability insurance in subsection (A)(1), below, which requires a longer duration. All required insurance must be issued by a company licensed to do business in the State of California, and each such insurer must have an A.M. Best's financial strength rating of "A-" or better and a financial size rating of "VII" or better. If Contractor fails to provide any of the required coverage in full compliance with the requirements of the Contract Documents, City may, at its sole

discretion, purchase such coverage at Contractor's expense and deduct the cost from payments due to Contractor, or terminate the Contract for default. The procurement of the required insurance, or Contractor's failure to procure and maintain the required insurance, will not be construed to limit Contractor's liability under this Contract. The procurement of the required insurance will not be construed to fulfill Contractor's indemnification obligations under this Contract.

(A) ***Policies and Limits.*** The following insurance policies and limits are required for this Contract, unless otherwise specified in the Special Conditions:

(1) *Commercial General Liability ("CGL") Insurance:* The CGL insurance policy must be issued on an occurrence basis, written on a comprehensive general liability form with coverage at least as broad as ISO CG 00 01, and must include coverage for liability arising from Contractor's or its Subcontractor's acts or omissions in the performance of the Work, including contractor's protective coverage, contractual liability, products liability, completed operations, and broad form property damage, with limits of at least $5,000,000 per occurrence and at least $5,000,000 general aggregate. If insurance applies separately to a project/location, aggregate may be equal to per occurrence amount. The CGL insurance coverage may be arranged under a single policy for the full limits required or by a combination of underlying policies with the balance provided by excess or umbrella policies, provided each such policy complies with the requirements set forth in this Section, including required endorsements. The products liability and completed operations coverage must continue for a period of three years following City's acceptance of the Project.

(2) *Automobile Liability Insurance:* The automobile liability insurance policy must provide coverage of at least $3,000,000 combined single-limit per accident for bodily injury, death, or property damage, including hired, owned, and non-owned auto liability. Coverage must be at least as broad as ISO Form Number CA 00 01 covering any auto (Code 1).

(3) *Workers' Compensation Insurance and Employer's Liability:* The workers' compensation and employer's liability insurance policy must comply with the requirements of the California Labor Code, providing coverage of at least $1,000,000 or as otherwise required by statute, per accident for bodily injury or disease. If Contractor is self-insured, Contractor must provide its Certificate of Permission to Self-Insure, duly authorized by the DIR.

(4) *Pollution Liability Insurance:* The pollution liability insurance policy must provide coverage of at least $1,000,000 per occurrence and $2,000,000 aggregate for all loss arising out of claims for bodily injury, death, property damage, or environmental damage caused by pollution conditions resulting from the Work. If the Work involves lead-based paint or asbestos identification and/or remediation, the pollution liability insurance policy must not contain lead-based paint or asbestos exclusions. If the Work involves mold identification, the pollution liability policy must not contain a mold exclusion and the definition of "pollution" in the policy must include microbial matter, including mold.

(5) *Builder's Risk Insurance:* The builder's risk insurance policy must be issued on an occurrence basis, for all-risk or "all perils" coverage on a 100% completed value basis on the insurable portion of the Project for the benefit of City, without co-insurance provisions. Contractor must name City as loss payee.

(B) ***Notice.*** Each certificate of insurance must state that the coverage afforded by the policy or policies will not be reduced, cancelled or allowed to expire without at least

30 days prior written notice to City, unless due to non-payment of premiums, in which case ten days prior written notice must be made to City.

(C) ***Waiver of Subrogation.*** Each required policy must include an endorsement providing that the carrier will waive any right of subrogation it may have against City.

(D) ***Required Endorsements.*** The CGL policy, automobile liability policy, pollution liability policy, and builder's risk policy must include the following specific endorsements:

(1) The City of Santa Rosa, including its Council, officials, officers, employees, agents, volunteers and consultants (collectively, "Additional Insured") must be named as an additional insured for all liability arising out of the operations by or on behalf of the named insured, and the policy must protect the Additional Insured against any and all liability for personal injury, death or property damage or destruction arising directly or indirectly in the performance of the Contract. Coverage for an Additional Insured will not be limited to the Additional Insured's vicarious liability. The additional insured endorsement must be provided using ISO forms at least as broad as CG 20 10 04 13 or 20 38 04 13 (ongoing operations) and CG 20 37 04 13 (completed operations), or equivalent form(s) approved by the City.

(2) The inclusion of more than one insured will not operate to impair the rights of one insured against another, and the coverages afforded will apply as though separate policies have been issued to each insured.

(3) The insurance provided by Contractor is primary and no insurance held or owned by any Additional Insured may be called upon to contribute to a loss. This endorsement must be provided using ISO form CG 20 01 04 13 or an equivalent form approved by the City.

(4) This policy does not exclude explosion, collapse, underground excavation hazard, or removal of lateral support.

(E) ***Contractor's Responsibilities.*** This Section 4.3 establishes the minimum requirements for Contractor's insurance coverage in relation to this Project, but is not intended to limit Contractor's ability to procure additional or greater coverage. Contractor is responsible for its own risk assessment and needs and is encouraged to consult its insurance provider to determine what coverage it may wish to carry beyond the minimum requirements of this Section. Contractor is solely responsible for the cost of its insurance coverage, including premium payments, deductibles, or self-insured retentions, and no Additional Insured will be responsible or liable for any of the cost of Contractor's insurance coverage. Contractor's insurance coverage applies to the full extent of the policies, and nothing contained herein will be construed to limit the application of such coverage.

(F) ***Deductibles and Self-Insured Retentions***. Any deductibles or self-insured retentions that apply to the required insurance (collectively, "deductibles") in excess of $10,000 are subject to approval by the City's Risk Manager, acting in his or her sole discretion, and must be declared by Contractor when it submits its certificates of insurance and endorsements pursuant to this Section 4.3. If the City's Risk Manager determines that the deductibles are unacceptably high, at City's option, Contractor must either reduce or eliminate the deductibles as they apply to City and all required Additional Insured; or must provide a financial guarantee, to City's satisfaction, guaranteeing payment of losses and related investigation, claim administration, and legal expenses.

(G) ***Subcontractors.*** Contractor must ensure that each Subcontractor is required to maintain the same insurance coverage required under this Section 4.3, with respect to its performance of Work on the Project, including those requirements related to the Additional Insureds and waiver of subrogation, but excluding pollution liability or builder's risk insurance unless otherwise specified in the Special Conditions. A Subcontractor may be eligible for reduced insurance coverage or limits, but only to the extent approved in writing in advance by the City's Risk Manager. Contractor must confirm that each Subcontractor has complied with these insurance requirements before the Subcontractor is permitted to begin Work on the Project. Upon request by the City, Contractor must provide certificates and endorsements submitted by each Subcontractor to prove compliance with this requirement. The insurance requirements for Subcontractors do not replace or limit the Contractor's insurance obligations.

Article 5 - Contract Time

5.1 Time is of the Essence. Time is of the essence in Contractor's performance and completion of the Work, and Contractor must diligently prosecute the Work and complete it within the Contract Time.

(A) ***General.*** Contractor must commence the Work on the date indicated in the Notice to Proceed and must fully complete the Work in strict compliance with all requirements of the Contract Documents and within the Contract Time. Contractor may not begin performing the Work before the date specified in the Notice to Proceed.

(B) ***Authorization.*** Contractor is not entitled to compensation or credit for any Work performed before the date specified in the Notice to Proceed, with the exception of any schedules, submittals, or other requirements, if any, that must be provided or performed before issuance of the Notice to Proceed.

(C) ***Rate of Progress.*** Contractor and its Subcontractors must, at all times, provide workers, materials, and equipment sufficient to maintain the rate of progress necessary to ensure full completion of the Work within the Contract Time. If City determines that Contractor is failing to prosecute the Work at a sufficient rate of progress, City may, in its sole discretion, direct Contractor to provide additional workers, materials, or equipment, or to work additional hours or days without additional cost to City, in order to achieve a rate of progress satisfactory to City. If Contractor fails to comply with City's directive in this regard, City may, at Contractor's expense, separately contract for additional workers, materials, or equipment or use City's own forces to achieve the necessary rate of progress. Alternatively, City may terminate the Contract based on Contractor's default.

5.2 Schedule Requirements. Contractor must prepare all schedules using standard, commercial scheduling software acceptable to the Engineer, and must provide the schedules in electronic and paper form as requested by the Engineer. In addition to the general scheduling requirements set forth below, Contractor must also comply with any scheduling requirements included in the Special Conditions or in the Technical Specifications.

(A) ***Baseline (As-Planned) Schedule.*** Within ten calendar days following City's issuance of the Notice to Proceed (or as otherwise specified in the Notice to Proceed), Contractor must submit to City for review and acceptance a baseline (as-planned) schedule using critical path methodology showing in detail how Contractor plans to perform and fully complete the Work within the Contract Time, including labor, equipment, materials, and fabricated items. The baseline schedule must show the order of the major items of Work and the dates of start and completion of each item, including when the materials and equipment will be procured. The schedule must also include the

work of all trades, reflecting anticipated labor or crew hours and equipment loading for the construction activities, and must be sufficiently comprehensive and detailed to enable progress to be monitored on a day-by-day basis. For each activity, the baseline schedule must be dated, provided in the format specified in the Contract Documents or as required by City, and must include, at a minimum, a description of the activity, the start and completion dates of the activity, and the duration of the activity.

(1) *Specialized Materials Ordering*. Within five calendar days following issuance of the Notice to Proceed, Contractor must order any specialized material or equipment for the Work that is not readily available from material suppliers. Contractor must also retain documentation of the purchase order date(s).

(B) ***City's Review of Schedules.*** City will review and may note exceptions to the baseline schedule, and to the progress schedules submitted as required below, to assure completion of the Work within the Contract Time. Contractor is solely responsible for resolving any exceptions noted in a schedule and, within seven days, must correct the schedule to address the exceptions. City's review or acceptance of Contractor's schedules will not operate to waive or limit Contractor's duty to complete the Project within the Contract Time, nor to waive or limit City's right to assess liquidated damages for Contractor's unexcused failure to do so.

(C) ***Progress Schedules.*** After City accepts the final baseline schedule with no exceptions, Contractor must submit an updated progress schedule and three-week look-ahead schedule, in the format specified by City, for review and acceptance with each application for a progress payment, or when otherwise specified by City, until completion of the Work. The updated progress schedule must: show how the actual progress of the Work as constructed to date compares to the baseline schedule; reflect any proposed changes in the construction schedule or method of operations, including to achieve Project milestones within the Contract Time; and identify any actual or potential impacts to the critical path. Contractor must also submit periodic reports to City of any changes in the projected material or equipment delivery dates for the Project.

(1) *Float*. The progress schedule must show early and late completion dates for each task. The number of days between those dates will be designated as the "float." Any float belongs to the Project and may be allocated by the Engineer to best serve timely completion of the Project.

(2) *Failure to Submit Schedule*. Reliable, up-to-date schedules are essential to efficient and cost-effective administration of the Project and timely completion. If Contractor fails to submit a schedule within the time periods specified in this Section, or submits a schedule to which City has noted exceptions that are not corrected, City may withhold up to five percent from payment(s) otherwise due to Contractor until the exceptions are resolved, the schedule is corrected and resubmitted, and City has accepted the schedule. In addition, Contractor's failure to comply with the schedule requirements in this Section 5.2 will be deemed a material default and a waiver of any claims for Excusable Delay or loss of productivity arising during any period when Contractor is out of compliance, subject only to the limits of Public Contract Code § 7102.

(D) ***Recovery Schedule.*** If City determines that the Work is more than one week behind schedule, within seven days following written notice of such determination, Contractor must submit a recovery schedule, showing how Contractor intends to perform and complete the Work within the Contract Time, based on actual progress to date.

(E) ***Effect of Acceptance.*** Contractor and its Subcontractors must perform the Work in accordance with the most current City-accepted schedule unless otherwise

directed by City. City's acceptance of a schedule does not operate to extend the time for completion of the Work or any component of the Work, and will not affect City's right to assess liquidated damages for Contractor's unexcused delay in completing the Work within the Contract Time.

(F) ***Posting.*** Contractor must at all times prominently post a copy of the most current City-accepted progress or recovery schedule in its on-site office.

(G) ***Reservation of Rights.*** City reserves the right to direct the sequence in which the Work must be performed or to make changes in the sequence of the Work in order to facilitate the performance of work by City or others, or to facilitate City's use of its property. The Contract Time or Contract Price may be adjusted to the extent such changes in sequence actually increase or decrease Contractor's time or cost to perform the Work.

(H) ***Authorized Working Days and Times.*** Contractor is limited to working Monday through Friday, excluding holidays, during City's normal business hours, except as provided in the Special Conditions or as authorized in writing by City. City reserves the right to charge Contractor for additional costs incurred by City due to Work performed on days or during hours not expressly authorized in the Contract Documents, including reimbursement of costs incurred for inspection, testing, and construction management services.

5.3 Delay and Extensions of Contract Time.

(A) ***Notice of Delay.*** If Contractor becomes aware of any actual or potential delay affecting the critical path, Contractor must promptly notify the Engineer in writing, regardless of the nature or cause of the delay, so that City has a reasonable opportunity to mitigate or avoid the delay.

(B) ***Excusable Delay.*** The Contract Time may be extended if Contractor encounters "Excusable Delay," which is an unavoidable delay in completing the Work within the Contract Time due to causes completely beyond Contractor's control, and which Contractor could not have avoided or mitigated through reasonable care, planning, foresight, or diligence, provided that Contractor is otherwise fully performing its obligations under the Contract Documents. Grounds for Excusable Delay may include fire, natural disasters including earthquake or unusually severe weather, acts of terror or vandalism, epidemic, unforeseeable adverse government actions, unforeseeable actions of third parties, encountering unforeseeable hazardous materials, unforeseeable site conditions, or suspension for convenience under Article 13. The Contract Time will not be extended based on circumstances which will not unavoidably delay completing the Work within the Contract Time based on critical path analysis.

(C) ***Weather Delays.*** A "Weather Delay Day" is a Working Day during which Contractor and its forces, including Subcontractors, are unable to perform more than 40% of the critical path Work scheduled for that day due to adverse weather conditions which impair the ability to safely or effectively perform the scheduled critical path Work that day. Adverse weather conditions may include rain, saturated soil, and Project site clean-up required due to adverse weather. Determination of what constitutes critical path Work scheduled for that day will be based on the most current, City-approved schedule. Contractor will be entitled to a non-compensable extension of the Contract Time for each Weather Delay Day in excess of the normal Weather Delay Days within a given month as determined by reliable records, including monthly rainfall averages, for the preceding ten years (or as otherwise specified in the Special Conditions or Specifications).

(1) Contractor must fully comply with the applicable procedures in Articles 5 and 6 of the General Conditions regarding requests to modify the Contract Time.

(2) Contractor will not be entitled to an extension of time for a Weather Delay Day to the extent Contractor is responsible for concurrent delay on that day.

(3) Contractor must take reasonable steps to mitigate the consequences of Weather Delay Days, including prudent workforce management and protecting the Work, Project Site, materials, and equipment.

(D) ***Non-Excusable Delay.*** Delay which Contractor could have avoided or mitigated through reasonable care, planning, foresight, or diligence is "Non-Excusable Delay." Contractor is not entitled to an extension of Contract Time or any compensation for Non-Excusable Delay, or for Excusable Delay that is concurrent with Non-Excusable Delay. Non-Excusable Delay includes delay caused by:

(1) weather conditions which are normal for the location of the Project, as determined by reliable records, including monthly rainfall averages, for the preceding ten years;

(2) Contractor's failure to order equipment and materials sufficiently in advance of the time needed for completion of the Work within the Contract Time;

(3) Contractor's failure to provide adequate notification to utility companies or agencies for connections or services necessary for completion of the Work within the Contract Time;

(4) foreseeable conditions which Contractor could have ascertained from reasonably diligent inspection of the Project site or review of the Contract Documents or other information provided or available to Contractor;

(5) Contractor's failure, refusal, or financial inability to perform the Work within the Contract Time, including insufficient funds to pay its Subcontractors or suppliers;

(6) performance or non-performance by Contractor's Subcontractors or suppliers;

(7) the time required to respond to excessive RFIs (see Section 2.5(G));

(8) delayed submission of required submittals, or the time required for correction and resubmission of defective submittals;

(9) time required for repair of, re-testing, or re-inspection of defective Work;

(10) enforcement of Laws by City, or outside agencies with jurisdiction over the Work; or

(11) City's exercise or enforcement of any of its rights or Contractor's duties pursuant to the Contract Documents, including correction of defective Work, extra inspections or testing due to non-compliance with Contract requirements, safety compliance, environmental compliance, or rejection and return of defective or deficient submittals.

(E) ***Compensable Delay.*** Pursuant to Public Contract Code § 7102, in addition to entitlement to an extension of Contract Time, Contractor is entitled to compensation for costs incurred due to delay caused solely by City, when that delay is unreasonable under the circumstances involved and not within the contemplation of the parties ("Compensable Delay"). Contractor is not entitled to an extension of Contract Time or recovery of costs for Compensable Delay that is concurrent with Non-Excusable Delay. Delay due to Weather Delay Days in excess of normal for a given month, as set forth in Section 5.3(C), is not Compensable Delay, and will only entitle Contractor to an extension of time commensurate with the time lost due to such delay.

(F) ***Recoverable Costs.*** Contractor is not entitled to compensation for Excusable Delay unless it is Compensable Delay, as defined above. Contractor is entitled to recover only the actual, direct, reasonable, and substantiated costs ("Recoverable Costs") for each working day that the Compensable Delay prevents Contractor from proceeding with more than 50% of the critical path Work scheduled for that day, based on the most recent progress schedule accepted by City. Recoverable Costs will not include home office overhead or lost profit.

(G) ***Request for Extension of Contract Time or Recoverable Costs.*** A request for an extension of Contract Time or any associated Recoverable Costs must be submitted in writing to City within 14 calendar days of the date the delay is first encountered, even if the duration of the delay is not yet known at that time, or any entitlement to the Contract Time extension or to the Recoverable Costs will be deemed waived. In addition to complying with the requirements of this Article 5, the request must be submitted in compliance with the Change Order request procedures in Article 6 below. Strict compliance with these requirements is necessary to ensure that any delay or consequences of delay may be mitigated as soon as possible, and to facilitate cost-efficient administration of the Project and timely performance of the Work. Any request for an extension of Contract Time or Recoverable Costs that does not strictly comply with all of the requirements of Article 5 and Article 6 will be deemed waived.

(1) *Required Contents.* The request must include a detailed description of the cause(s) of the delay and must also describe the measures that Contractor has taken to mitigate the delay and/or its effects, including efforts to mitigate the cost impact of the delay, such as by workforce management or by a change in sequencing. If the delay is still ongoing at the time the request is submitted, the request should also include Contractor's plan for continued mitigation of the delay or its effects.

(2) *Delay Days and Costs.* The request must specify the number of days of Excusable Delay claimed or provide a realistic estimate if the duration of the delay is not yet known. If Contractor believes it is entitled to Recoverable Costs for Compensable Delay, the request must specify the amount and basis for the Recoverable Costs that are claimed or provide a realistic estimate if the amount is not yet known. Any estimate of delay duration or cost must be updated in writing and submitted with all required supporting documentation as soon as the actual time and cost is known. The maximum extension of Contract Time will be the number of days, if any, by which an Excusable Delay or a Compensable Delay exceeds any concurrent Non-Excusable Delay. Contractor is entitled to an extension of Contract Time, or compensation for Recoverable Costs, only if, and only to the extent that, such delay will unavoidably delay Final Completion.

(3) *Supporting Documentation.* The request must also include any and all supporting documentation necessary to evidence the delay and its actual impacts, including scheduling and cost impacts with a time impact analysis using critical path methodology and demonstrating the unavoidable delay to Final

Completion. The time impact analysis must be submitted in a form or format acceptable to City.

(4) *Burden of Proof.* Contractor has the burden of proving that: the delay was an Excusable Delay or Compensable Delay, as defined above; Contractor has fully complied with its scheduling obligations in Section 5.2, Schedule Requirements; Contractor has made reasonable efforts to mitigate the delay and its schedule and cost impacts; the delay will unavoidably result in delaying Final Completion; and any Recoverable Costs claimed by Contractor were actually incurred and were reasonable under the circumstances.

(5) *Legal Compliance.* Nothing in this Section 5.3 is intended to require the waiver, alteration, or limitation of the applicability of Public Contract Code § 7102.

(6) *No Waiver.* Any grant of an extension of Contract Time, or compensation for Recoverable Costs due to Compensable Delay, will not operate as a waiver of City's right to assess liquidated damages for Non-Excusable Delay.

(7) *Dispute Resolution.* In the event of a dispute over entitlement to an extension of Contract Time or compensation for Recoverable Costs, Contractor may not stop Work pending resolution of the dispute, but must continue to comply with its duty to diligently prosecute the performance and timely completion of the Work. Contractor's sole recourse for an unresolved dispute based on City's rejection of a Change Order request for an extension of Contract Time or compensation for Recoverable Costs is to comply with the dispute resolution provisions set forth in Article 12 below.

5.4 Liquidated Damages. It is expressly understood that if Final Completion is not achieved within the Contract Time, City will suffer damages from the delay that are difficult to determine and accurately specify. Pursuant to Public Contract Code § 7203, if Contractor fails to achieve Final Completion within the Contract Time due to Contractor's Non-Excusable Delay, City will charge Contractor in the amount specified in the Contract for each calendar day that Final Completion is delayed beyond the Contract Time, as liquidated damages and not as a penalty. Any waiver of accrued liquidated damages, in whole or in part, is subject to approval of the City Council or its authorized delegee.

(A) ***Liquidated Damages.*** Liquidated damages will not be assessed for any Excusable Delay or Compensable Delay, as set forth above.

(B) ***Milestones.*** Liquidated damages may also be separately assessed for failure to meet milestones specified elsewhere in the Contract Documents.

(C) ***Setoff.*** City is entitled to deduct the amount of liquidated damages assessed against any payments otherwise due to Contractor, including progress payments, Final Payment, or unreleased retention. If there are insufficient Contract funds remaining to cover the full amount of liquidated damages assessed, City is entitled to recover the balance from Contractor or its performance bond surety.

(D) ***Occupancy or Use.*** Occupancy or use of the Project in whole or in part prior to Final Completion does not constitute City's acceptance of the Project and will not operate as a waiver of City's right to assess liquidated damages for Contractor's Non-Excusable Delay in achieving Final Completion.

(E) ***Other Remedies.*** City's right to liquidated damages under this Section applies only to damages arising from Contractor's Non-Excusable Delay or failure to complete the Work within the Contract Time. City retains its right to pursue all other remedies

under the Contract for other types of damage, including damage to property or persons, costs or diminution in value from defective materials or workmanship, costs to repair or complete the Work, or other liability caused by Contractor.

Article 6 - Contract Modification

6.1 Contract Modification. Subject to the limited exception set forth in subsection (D) below, any change in the Work or the Contract Documents, including the Contract Price or Contract Time, will not be a valid and binding change to the Contract unless it is formalized in a Change Order, including a "no-cost" Change Order or a unilateral Change Order. Changes in the Work pursuant to this Article 6 will not operate to release, limit, or abridge Contractor's warranty obligations pursuant to Article 11 or any obligations of Contractor's bond sureties.

(A) ***City-Directed Changes.*** City may direct changes in the scope or sequence of Work or the requirements of the Contract Documents, without invalidating the Contract. Such changes may include Extra Work as set forth in subsection (C) below, or deletion or modification of portions of the Work. Contractor must promptly comply with City-directed changes in the Work in accordance with the original Contract Documents, even if Contractor and City have not yet reached agreement as to adjustments to the Contract Price or Contract Time for the change in the Work or for the Extra Work. Contractor is not entitled to extra compensation for cost savings resulting from "value engineering" pursuant to Public Contract Code § 7101, except to the extent authorized in advance by City in writing, and subject to any applicable procedural requirements for submitting a proposal for value engineering cost savings.

(B) ***Disputes.*** In the event of a dispute over entitlement to or the amount of a change in Contract Time or a change in Contract Price related to a City-directed change in the Work, Contractor must perform the Work as directed and may not delay its Work or cease Work pending resolution of the dispute, but must continue to comply with its duty to diligently prosecute the performance and timely completion of the Work, including the Work in dispute. Likewise, in the event that City and Contractor dispute whether a portion or portions of the Work are already required by the Contract Documents or constitute Extra Work, or otherwise dispute the interpretation of any portion(s) of the Contract Documents, Contractor must perform the Work as directed and may not delay its Work or cease Work pending resolution of the dispute, but must continue to comply with its duty to diligently prosecute the performance and timely completion of the Work, including the Work in dispute, as directed by City. If Contractor refuses to perform the Work in dispute, City may, acting in its sole discretion, elect to delete the Work from the Contract and reduce the Contract Price accordingly, and self-perform the Work or direct that the Work be performed by others. Alternatively, City may elect to terminate the Contract for convenience or for cause. Contractor's sole recourse for an unresolved dispute related to changes in the Work or performance of any Extra Work is to comply with the dispute resolution provisions set forth in Article 12, below.

(C) ***Extra Work.*** City may direct Contractor to perform Extra Work related to the Project. Contractor must promptly perform any Extra Work as directed or authorized by City in accordance with the original Contract Documents, even if Contractor and City have not yet reached agreement on adjustments to the Contract Price or Contract Time for such Extra Work. If Contractor believes it is necessary to perform Extra Work due to changed conditions, Contractor must promptly notify the Engineer in writing, specifically identifying the Extra Work and the reason(s) the Contractor believes it is Extra Work. This notification requirement does not constitute a Change Order request pursuant to Section 6.2, below. Contractor must maintain detailed daily records that itemize the cost of each element of Extra Work, and sufficiently distinguish the direct cost of the Extra Work from

the cost of other Work performed. For each day that Contractor performs Extra Work, or Work that Contractor contends is Extra Work, Contractor must submit no later than the following Working Day, a daily report of the Extra Work performed that day and the related costs, together with copies of certified payroll, invoices, and other documentation substantiating the costs ("Extra Work Report"). The Engineer will make any adjustments to Contractor's Extra Work Report(s) based on the Engineer's records of the Work. When an Extra Work Report(s) is agreed on and signed by both City and Contractor, the Extra Work Report(s) will become the basis for payment under a duly authorized and signed Change Order. Failure to submit the required documentation by close of business on the next Working Day is deemed a full and complete waiver for any change in the Contract Price or Contract Time for any Extra Work performed that day.

(D) ***Minor Changes and RFIs.*** Minor field changes, including RFI replies from City, that do not affect the Contract Price or Contract Time and that are approved by the Engineer acting within his or her scope of authority, do not require a Change Order. By executing an RFI reply from City, Contractor agrees that it will perform the Work as clarified therein, with no change to the Contract Price or Contract Time.

(E) ***Remedy for Non-Compliance.*** Contractor's failure to promptly comply with a City-directed change is deemed a material breach of the Contract, and in addition to all other remedies available to it, City may, at its sole discretion, hire another contractor or use its own forces to complete the disputed Work at Contractor's sole expense, and may deduct the cost from the Contract Price.

6.2 Contractor Change Order Requests. Contractor must submit a request or proposal for a change in the Work, compensation for Extra Work, or a change in the Contract Price or Contract Time as a written Change Order request or proposal.

(A) ***Time for Submission.*** Any request for a change in the Contract Price or the Contract Time must be submitted in writing to the Engineer within 14 calendar days of the date that Contractor first encounters the circumstances, information or conditions giving rise to the Change Order request, even if the total amount of the requested change in the Contract Price or impact on the Contract Time is not yet known at that time. If City requests that Contractor propose the terms of a Change Order, unless otherwise specified in City's request, Contractor must provide the Engineer with a written proposal for the change in the Contract Price or Contract Time within five working days of receiving City's request, in a form satisfactory to the Engineer.

(B) ***Required Contents.*** Any Change Order request or proposal submitted by Contractor must include a complete breakdown of actual or estimated costs and credits, and must itemize labor, materials, equipment, taxes, insurance, subcontract amounts, and, if applicable, Extra Work Reports. Any estimated cost must be updated in writing as soon as the actual amount is known.

(C) ***Required Documentation.*** All claimed costs must be fully documented, and any related request for an extension of time or delay-related costs must be included at that time and in compliance with the requirements of Article 5 of the General Conditions. Upon request, Contractor must permit City to inspect its original and unaltered bidding records, subcontract agreements, subcontract change orders, purchase orders, invoices, or receipts associated with the claimed costs.

(D) ***Required Form.*** Contractor must use City's form(s) for submitting all Change Order requests or proposals, unless otherwise specified by City.

(E) ***Certification.*** All Change Order requests must be signed by Contractor and must include the following certification:

"The undersigned Contractor certifies under penalty of perjury that its statements and representations in this Change Order request are true and correct. Contractor warrants that this Change Order request is comprehensive and complete as to the Work or changes referenced herein, and agrees that any known or foreseeable costs, expenses, or time extension requests not included herein, are deemed waived."

6.3 Adjustments to Contract Price. The amount of any increase or decrease in the Contract Price will be determined based on one of the following methods listed below, in the order listed with unit pricing taking precedence over the other methods. Markup applies only to City-authorized time and material Work, and does not apply to any other payments to Contractor. For Work items or components that are deleted in their entirety, Contractor will only be entitled to compensation for those direct, actual, and documented costs (including restocking fees), reasonably incurred before Contractor was notified of the City's intent to delete the Work, with no markup for overhead, profit, or other indirect costs.

(A) ***Unit Pricing.*** Amounts previously provided by Contractor in the form of unit prices, either in a bid schedule or in a post-award schedule of values pursuant to Section 8.1, Schedule of Values, will apply to determine the price for the affected Work, to the extent applicable unit prices have been provided for that type of Work. No additional markup for overhead, profit, or other indirect costs will be added to the calculation.

(B) ***Lump Sum.*** A mutually agreed upon, all-inclusive lump sum price for the affected Work with no additional markup for overhead, profit, or other indirect costs.

(C) ***Time and Materials.*** On a time and materials basis, if and only to the extent compensation on a time and materials basis is expressly authorized by City in advance of Contractor's performance of the Work and subject to any not-to-exceed limit. Time and materials compensation for increased costs or Extra Work (but not decreased costs or deleted Work), will include allowed markup for overhead, profit, and other indirect costs, calculated as the total of the following sums, the cumulative total of which may not exceed the maximum markup rate of 15%:

(1) All direct labor costs provided by the Contractor, excluding superintendence, project management, or administrative costs, plus 15% markup;

(2) All direct material costs provided by the Contractor, including sales tax, plus 15% markup;

(3) All direct plant and equipment rental costs provided by the Contractor, plus 15% markup;

(4) All direct additional subcontract costs plus 10% markup for Work performed by Subcontractors; and

(5) Increased bond or insurance premium costs computed at 1.5% of total of the previous four sums.

6.4 Unilateral Change Order. If the parties dispute the terms of a proposed Change Order, including disputes over the amount of compensation or extension of time that Contractor has requested, the value of deleted or changed Work, what constitutes Extra Work, or quantities used, City may elect to issue a unilateral Change Order, directing performance of the Work, and authorizing a change in the Contract Price or Contract Time for the adjustment to compensation or time that the City believes is merited. Contractor's sole

recourse to dispute the terms of a unilateral Change Order is to submit a timely Claim pursuant to Article 12, below.

6.5 Non-Compliance Deemed Waiver. Contractor waives its entitlement to any increase in the Contract Price or Contract Time if Contractor fails to fully comply with the provisions of this Article. Contractor will not be paid for unauthorized Extra Work.

Article 7 - General Construction Provisions

7.1 Permits, Fees, Licenses, Certificates, and Taxes.

(A) ***Permits, Fees, Licenses, and Certificates.*** Contractor must obtain and pay for all permits, fees, licenses, and certificates required to perform the Work, including a City business tax certificate. Contractor must cooperate with and provide notifications to all government agencies with jurisdiction over the Project, as may be required. Contractor must provide City with copies of all records of permits and permit applications, payment of required fees, and any licenses and certificates required for the Work.

(B) ***Taxes.*** Contractor must pay for all taxes on labor, material, and equipment, except Federal Excise Tax to the extent that City is exempt from Federal Excise Tax.

7.2 Temporary Facilities. Contractor must provide, at Contractor's sole expense, any and all temporary facilities for the Project, including an onsite staging area for materials and equipment, a field office, sanitary facilities, utilities, storage, scaffolds, barricades, walkways, and any other temporary structure required to safely perform the Work along with any incidental utility services. The location of all temporary facilities must be approved by the City prior to installation. Temporary facilities must be safe and adequate for the intended use and installed and maintained in accordance with Laws and the Contract Documents. Contractor must fence and screen the Project site and, if applicable, any separate Worksites, including the staging area, and its operation must minimize inconvenience to neighboring properties. Additional provisions pertaining to temporary facilities are set forth in this Article 7 and may also be included in the Specifications or Special Conditions.

(A) ***Utilities.*** Contractor must install and maintain the power, water, sewer, and all other utilities required for the Project site and performance of the Work, including the piping, wiring, internet and wifi connections, and any related equipment necessary to maintain the temporary facilities. Contractor may obtain water from the City's water system or from a source other than City's water system, if approved in advance by the Engineer. Before obtaining water from the City's water system, Contractor must obtain a Water Use Permit from the Water Department and rent a hydrant or bridge meter. Contractor is responsible for the cost of all water and all related deposits, permits, and fees. Contractor is prohibited from operating gate valves or fire hydrants on the City's water system. The acquisition of water from the City's water system through un-metered hydrants or other facilities is a violation of Laws. Citations and fines may be levied for violation of these and other utility regulations and may be deducted from payment otherwise due Contractor.

(B) ***Removal and Repair.*** Contractor must promptly remove all such temporary facilities when they are no longer needed or upon completion of the Work, whichever comes first. Contractor must promptly repair any damage to City's property or to other property caused by the installation, use, or removal of the temporary facilities, and must promptly restore the property to its original or intended condition.

7.3 Noninterference and Site Management. Contractor must avoid interfering with City's use of its property at or adjacent to the Project site, including use of roadways, entrances, parking areas, walkways, and structures. Contractor must also minimize disruption of access to private property in the Project vicinity. Contractor must coordinate with affected property owners, tenants, and businesses, and maintain some vehicle and pedestrian access to their residences or properties at all times. Temporary access ramps, fencing or other measures must be provided as needed. Before blocking access to a private driveway or parking lot, Contractor must provide effective notice to the affected parties at least 48 hours in advance of the pending closure and allow them to remove vehicles. Private driveways, residences and parking lots must have access to a roadway during non-Work hours.

(A) ***Offsite Acquisition.*** Unless otherwise provided by City, Contractor must acquire, use, and dispose of, at its sole expense, any Worksites, licenses, easements, and temporary facilities necessary to access and perform the Work.

(B) ***Offsite Staging Area and Field Office*****.** If additional space beyond the Project site is needed, such as for the staging area or the field office, Contractor may need to make arrangements with the nearby property owner(s) to secure the space and obtain a temporary use permit, in accordance with City Code § 20-52.040. Before using or occupying any property owned by a third party, Contractor must provide City with a copy of the necessary license agreement, easement, or other written authorization from the property owner, together with a written release from the property owner holding City harmless from any related liability, in a form acceptable to the City Attorney.

(C) ***Traffic Management.*** Contractor must provide traffic management and traffic controls as specified in the Contract Documents, as required by Laws, and as otherwise required to ensure public and worker safety, and to avoid interference with public or private operations or the normal flow of vehicular, bicycle, or pedestrian traffic.

7.4 Signs. No signs may be displayed on or about City's property, except signage which is required by Laws or by the Contract Documents, without City's prior written approval as to size, design, and location.

7.5 Project Site and Nearby Property Protections.

(A) ***General.*** Contractor is responsible at all times, on a 24-hour basis and at its sole cost, for protecting the Work, the Project site, and the materials and equipment to be incorporated into the Work, until the City has accepted the Project, excluding any exceptions to acceptance, if any. Except as specifically authorized by City, Contractor must confine its operations to the area of the Project site indicated in the Plans and Specifications. Contractor is liable for any damage caused by Contractor or its Subcontractors to the Work, City's property, the property of adjacent or nearby property owners and the work or personal property of other contractors working for City, including damage related to Contractor's failure to adequately secure the Work or any Worksite.

(1) Subject to City's approval, Contractor will provide and install safeguards to protect the Work; any Worksite, including the Project site; City's real or personal property and the real or personal property of adjacent or nearby property owners, including plant and tree protections.

(2) City wastewater systems may not be interrupted. If the Work disrupts existing sewer facilities, Contractor must immediately notify City and establish a plan, subject to City's approval, to convey the sewage in closed conduits back into the sanitary sewer system. Sewage must not be permitted to flow in trenches or be covered by backfill.

(3) Contractor must remove with due care, and store at City's request, any objects or material from the Project site that City will salvage or reuse at another location.

(4) If directed by Engineer, Contractor must promptly repair or replace any property damage, as specified by the Engineer. However, acting in its sole discretion, City may elect to have the property damage remedied otherwise, and may deduct the cost to repair or replace the damaged property from payment otherwise due to Contractor.

(5) Contractor will not permit any structure or infrastructure to be loaded in a manner that will damage or endanger the integrity of the structure or infrastructure.

(6) All valves, hydrants, and other appurtenances of the City's water system that are the property of City and removed by Contractor in the performance of the Work must be delivered to City's Municipal Services Center (55 Stony Point Road) unless Contractor has obtained specific written approval from the Water Department to dispose of the items.

(B) ***Securing Project Site.*** After completion of Work each day, Contractor must secure the Project site and, to the extent feasible, make the area reasonably accessible to the public unless City approves otherwise. All excess materials and equipment not protected by approved traffic control devices must be relocated to the staging area or demobilized. Trench spoils must be hauled off the Project site daily and open excavations must be protected with steel plates. Contractor and Subcontractor personnel may not occupy or use the Project site for any purpose during non-Work hours, except as may be provided in the Contract Documents or pursuant to prior written authorization from City.

(C) ***Unforeseen Conditions.*** If Contractor encounters facilities, utilities, or other unknown conditions not shown on or reasonably inferable from the Plans or apparent from inspection of the Project site, Contractor must immediately notify the City and promptly submit a Request for Information to obtain further directions from the Engineer. Contractor must avoid taking any action which could cause damage to the facilities or utilities pending further direction from the Engineer. The Engineer's written response will be final and binding on Contractor. If the Engineer's subsequent direction to Contractor affects Contractor's cost or time to perform the Work, Contractor may submit a Change Order request as set forth in Article 6 above.

(D) ***Support; Adjacent Properties.*** Contractor must provide, install, and maintain all shoring, bracing, and underpinning necessary to provide support to City's property and adjacent properties and improvements thereon. Contractor must provide notifications to adjacent property owners as may be required by Laws. See also, Section 7.15, Trenching of Five Feet or More.

(E) ***Notification of Property Damage.*** Contractor must immediately notify the City of damage to any real or personal property resulting from Work on the Project, including damage to City's water system. Contractor must immediately provide a written report to City of any such property damage in excess of $500 (based on estimated cost to repair or replace) within 24 hours of the occurrence. The written report must include: (1) the location and nature of the damage, and the owner of the property, if known; (2) the name and address of each employee of Contractor or any Subcontractor involved in the damage; (3) a detailed description of the incident, including precise location, time, and names and contact information for known witnesses; and (4) a police or first responder

report, if applicable. If Contractor is required to file an accident report with another government agency, Contractor will provide a copy of the report to City.

(F) ***Damage to City's Water System.*** Contractor must promptly repair and remediate, at its sole expense, any damage caused by Contractor to the City's water system, in a manner satisfactory to the Water Department. This includes damage to property and facilities resulting from Contractor's failure to make a written request for a markout or starting Work without providing the Water Department a reasonable opportunity to mark facilities; Contractor's destruction of markouts; Contractor's failure to perform hand dinging or probing for utilities near markouts; and Contractor's failure to use reasonable caution, regardless of whether markouts are present or clear. Reasonable caution includes any efforts to avoid damaging existing facilities, such as when excavating in the vicinity of water mains. All repairs must be witnessed, inspected, and approved by the Water Department prior to backfilling the excavation. If backfilling occurs prior to inspection and approval, City may require re-excavation by Contractor, at Contractor's sole expense. Acting in its sole discretion, City may elect to have the damage remedied otherwise, including by its own forces, and may deduct the cost thereof from payment otherwise due to Contractor. If City elects to remedy damage to the water system with its own forces, the cost thereof will be in accordance with the emergency repair rate schedule of the Water Department.

7.6 Materials and Equipment.

(A) ***General.*** Unless otherwise specified, all materials and equipment required for the Work must be new, free from defects, and of the best grade for the intended purpose, and furnished in sufficient quantities to ensure the proper and expeditious performance of the Work. All materials, equipment, and tools furnished or installed by Contractor must meet or exceed applicable Occupational Safety and Health Administration ("OSHA") standards. Contractor must employ measures to preserve the specified quality and fitness of the materials and equipment. Unless otherwise specified, all materials and equipment required for the Work are deemed to include all components required for complete installation and intended operation and must be installed in accordance with the manufacturer's recommendations or instructions. Contractor is responsible for all shipping, handling, and storage costs associated with the materials and equipment required for the Work. Contractor is responsible for providing security and protecting the Work and all of the required materials, supplies, tools and equipment at Contractor's sole cost until City has formally accepted the Project as set forth in Section 11.1, Final Completion. Contractor will not assign, sell, mortgage, or hypothecate any materials or equipment for the Project, or remove any materials or equipment that have been installed or delivered.

(B) ***City-Provided.*** If the Work includes installation of materials or equipment to be provided by City, Contractor is solely responsible for the proper examination, handling, storage, and installation in accordance with the Contract Documents. Contractor must notify City of any defects discovered in City-provided materials or equipment, sufficiently in advance of scheduled use or installation to afford adequate time to procure replacement materials or equipment as needed. Contractor is solely responsible for any loss of or damage to such items which occurs while the items are in Contractor's custody and control, the cost of which may be offset from the Contract Price and deducted from any payment(s) due to Contractor.

(C) ***Intellectual Property Rights.*** Contractor must, at its sole expense, obtain any authorization or license required for use of patented or copyright-protected materials, equipment, devices, or processes that are incorporated into the Work. Upon request, Contractor must provide proof of any such authorization or license to City. Contractor's

indemnity obligations in Article 4 apply to any claimed violation of intellectual property rights.

7.7 Substitutions.

(A) ***"Or Equal."*** Any Specification designating a material, product, or thing (collectively, "item") or service by specific brand or trade name, followed by the words "or equal," is intended only to indicate the quality and type of item or service desired, and Contractor may request use of any equal item or service. Unless otherwise stated in the Specifications, any reference to a specific brand or trade name for an item or service that is used solely for the purpose of describing the type of item or service desired, will be deemed to be followed by the words "or equal." A substitution will only be approved if it is a true "equal" item or service in every aspect of design, function, and quality, as determined by City, including dimensions, weight, maintenance requirements, durability, fit with other elements, and schedule impacts.

(B) ***Request for Substitution.*** A post-award request for substitution of an item or service must be submitted in writing to the Engineer for approval in advance, within the applicable time period provided in the Contract Documents. If no time period is specified, the substitution request may be submitted any time within 35 days after the date of award of the Contract, or sufficiently in advance of the time needed to avoid delay of the Work, whichever is earlier. A request for substitution must contain a description of any proposed changes to the Work required to accommodate the substitution and drawings and details showing all such changes.

(C) ***Substantiation.*** Any available data substantiating the proposed substitute as an equal item or service must be submitted with the written request for substitution. Contractor's failure to timely provide all necessary substantiation, including any required test results as soon as they are available, is grounds for rejection of the proposed substitution, without further review.

(D) ***Burden of Proving Equality.*** Contractor has the burden of proving the equality of the proposed substitution at Contractor's sole cost. City has sole discretion to determine whether a proposed substitution is equal, and City's determination is final.

(E) ***Approval or Rejection.*** If the proposed substitution is approved, Contractor is solely responsible for any additional costs or time associated with the substituted item or service. If the proposed substitution is rejected, Contractor must, without delay, install the item or use the service as specified by City.

(F) ***Contractor's Obligations.*** City's approval of a proposed substitution will not relieve Contractor from any of its obligations under the Contract Documents. In the event Contractor makes an unauthorized substitution, Contractor will be solely responsible for all resulting cost impacts, including the cost of removal and replacement and the impact to other design elements.

7.8 Testing and Inspection.

(A) ***General.*** All materials, equipment, and workmanship used in the Work are subject to inspection and testing by City, including the Materials Lab, at all times and at all locations during construction and/or fabrication, including at any Worksite, shops, and yards. All manufacturers' application or installation instructions must be provided to the Engineer at least ten days prior to the first such application or installation. Contractor must, at all times, make the Work available for testing or inspection. Neither City's inspection or testing of Work, nor its failure to do so, operate to waive or limit Contractor's duty to complete the Work in accordance with the Contract Documents.

(B) ***Scheduling and Notification.*** Contractor must cooperate with City in coordinating the inspections and testing. Contractor must submit samples of materials, at Contractor's expense, and schedule all tests required by the Contract Documents in time to avoid any delay to the progress of the Work. Contractor will coordinate directly with the Engineer when scheduling inspections or tests, unless otherwise specified in the Special Conditions. Contractor must notify the Engineer no later than noon of the Working Day before any inspection or testing and must provide timely notice to the other necessary parties as specified in the Contract Documents. If Contractor schedules an inspection or test beyond regular Work hours, or on a Saturday, Sunday, or recognized City holiday, Contractor must notify the Engineer at least two Working Days in advance for approval. If approved, Contractor must reimburse City for the cost of the overtime inspection or testing. Such costs, including the City's hourly costs for required personnel, may be deducted from payments otherwise due to Contractor. Contractor will not coordinate directly with or direct the Materials Lab.

(C) ***Responsibility for Costs.*** City will bear the initial cost of inspection and testing to be performed by independent consultants retained by City, subject to the following exceptions:

(1) Contractor will be responsible for the costs of any subsequent inspections or tests which are required to substantiate compliance with the Contract Documents, and any associated remediation costs.

(2) Contractor will be responsible for inspection costs, at City's hourly rates, for inspection time lost because the Work is not ready, or Contractor fails to appear for a scheduled inspection.

(3) If any portion of the Work that is subject to inspection or testing is covered or concealed by Contractor prior to the inspection or testing, Contractor will bear the cost of making that portion of the Work available for the inspection or testing required by the Contract Documents, and any associated repair or remediation costs.

(4) Contractor is responsible for properly shoring all compaction test sites deeper than five feet below grade, as required under Section 7.15 below.

(5) Any Work or material that is defective or fails to comply with the requirements of the Contract Documents must be promptly repaired, removed, replaced, or corrected by Contractor, at Contractor's sole expense, even if that Work or material was previously inspected or included in a progress payment.

(D) ***Contractor's Obligations.*** Contractor is solely responsible for any delay occasioned by remediation of defective or noncompliant Work or material. Inspection or testing of the Work does not in any way relieve Contractor of its obligations to perform the Work as specified. Contractor has an independent duty to test and inspect its Work and perform quality control activities to ensure that the Work and the materials, products, and equipment incorporated into the Work comply with the Contract Documents. City is not responsible for any testing performed by Contractor or a third-party retained by Contractor. Contractor will submit its testing methodology to City for review and acceptance. Any Work done without the inspection(s) or testing required by the Contract Documents will be subject to rejection by City.

(E) ***Distant Locations.*** If required off-site testing or inspection must be conducted at a location more than 100 miles from the Project site, Contractor is solely responsible for the additional travel costs required for testing and/or inspection at such locations.

(F) ***Final Inspection.*** The provisions of this Section 7.8 also apply to final inspection under Article 11, Completion and Warranty Provisions.

7.9 Project Site Conditions and Maintenance. Contractor must at all times, on a 24-hour basis and at its sole cost, maintain the Project site and staging and storage areas in clean, neat, and sanitary condition and in compliance with all Laws pertaining to safety, air quality, and dust control. Adequate toilets must be provided, and properly maintained and serviced for all workers on the Project site, located in a suitably secluded area, subject to City's prior approval. Contractor must also, on a daily basis and at its sole cost, remove and properly dispose of the debris and waste materials from the Project site.

(A) ***Air Emissions Control*.** Contractor must not discharge smoke or other air contaminants into the atmosphere in violation of any Laws. Contractor must comply with all Laws, including the California Air Resources Board's In-Use Off-Road Diesel-Fueled Fleets Regulation (13 CCR § 2449 et seq.).

(B) ***Dust and Debris*.** Contractor must minimize and confine dust and debris resulting from the Work. Contractor must abate dust nuisance by cleaning, sweeping, and immediately sprinkling with water excavated areas of dirt or other materials prone to cause dust, and within one hour after the Engineer notifies Contractor that an airborne nuisance exists. The Engineer may direct that Contractor provide an approved water-spraying truck for this purpose. If water is used for dust control, Contractor will only use the minimum necessary. Contractor must take all necessary steps to keep waste water out of streets, gutters, or storm drains. See Section 7.19, Environmental Control. If City determines that the dust control is not adequate, City may have the work done by others and deduct the cost from the Contract Price. Contractor will immediately remove any excess excavated material from the Project site and any dirt deposited on public streets.

(C) ***Clean up.*** Before discontinuing Work in an area, Contractor must clean the area and remove all debris and waste along with the construction equipment, tools, machinery, and surplus materials.

(1) Except as otherwise specified, all excess Project materials, and the materials removed from existing improvements on the Project site with no salvage value or intended reuse by City, will be Contractor's property.

(2) Hauling trucks and other vehicles leaving the Project site must be cleaned of exterior mud or dirt before traveling on City streets. Materials and loose debris must be delivered and loaded to prevent dropping materials or debris. Contractor must immediately remove spillage from hauling on any publicly traveled way. Streets affected by Work on the Project must be kept clean by street sweeping.

(D) ***Disposal.*** Contractor must dispose of all Project debris and waste materials in a safe and legal manner. Contractor may not burn or bury waste materials on the Project site. Contractor will not allow any dirt, refuse, excavated material, surplus concrete or mortar, or any associated washings, to be disposed of onto streets, into manholes or into the storm drain system.

(E) ***Completion.*** At the completion of the Work, Contractor must remove from the Project site all of its equipment, tools, surplus materials, waste materials and debris, presenting a clean and neat appearance. Before demobilizing from the Project site, Contractor must ensure that all surfaces are cleaned, sealed, waxed, or finished as applicable, and that all marks, stains, paint splatters, and the like have been properly removed from the completed Work and the surrounding areas. Contractor must ensure that all parts of the construction are properly joined with the previously existing and

adjacent improvements and conditions. Contractor must provide all cutting, fitting and patching needed to accomplish that requirement. Contractor must also repair or replace, in accordance with City Standards, all existing improvements that are damaged or removed during the Work, both on and off the Project site, including curbs, sidewalks, driveways, fences, gates, signs, landscaping, drainage ditches, irrigation systems, utilities, street surfaces and structures. Repairs and replacements must be at least equal to the previously existing improvements, and the condition, finish and dimensions must match the previously existing improvements. Concrete surface treatment and score marks must match adjacent existing concrete improvements. Contractor must restore to original condition all property or items that are not designated for alteration under the Contract Documents and leave each Worksite clean and ready for occupancy or use by City.

(F) ***Non-Compliance.*** If Contractor fails to comply with its maintenance and cleanup obligations or any City clean up order, City may, acting in its sole discretion, elect to suspend the Work until the condition(s) is corrected with no increase in the Contract Time or Contract Price, or undertake appropriate cleanup measures without further notice and deduct the cost from any amounts due or to become due to Contractor.

7.10 Instructions and Manuals. Contractor must provide to City three copies each of all instructions and manuals required by the Contract Documents, unless otherwise specified. These must be complete as to drawings, details, parts lists, performance data, and other information that may be required for City to easily maintain and service the materials and equipment installed for this Project.

(A) ***Submittal Requirements.*** The instructions and manuals, along with any required guarantees, must be delivered to City for review prior to requesting final inspection pursuant to Section 11.1(A), unless otherwise specified.

(B) ***Training.*** Contractor or its Subcontractors must train City's personnel in the operation and maintenance of any complex equipment or systems as a condition precedent to Final Completion, if required in the Contract Documents.

7.11 As-built Drawings. Contractor and its Subcontractors must prepare and maintain at the Project site a detailed, complete and accurate as-built set of the Plans which will be used solely for the purpose of recording changes made in any portion of the original Plans in order to create accurate record drawings at the end of the Project.

(A) ***Duty to Update.*** The as-built drawings must be updated as changes occur, on a daily basis if necessary. City may withhold the estimated cost for City to have the as-built drawings prepared from payments otherwise due to Contractor, until the as-built drawings are brought up to date to the satisfaction of City. Actual locations to scale must be identified on the as-built drawings for all runs of mechanical and electrical work, including all site utilities installed underground, in walls, floors, or otherwise concealed. Deviations from the original Plans must be shown in detail. The exact location of all main runs, whether piping, conduit, ductwork or drain lines, must be shown by dimension and elevation. The location of all buried pipelines, appurtenances, or other improvements must be represented by coordinates and by the horizontal distance from visible above-ground improvements.

(B) ***Final Completion.*** Contractor must verify that all changes in the Work are depicted in the as-built drawings and must deliver the complete set of as-built drawings to the Engineer for review and acceptance as a condition precedent to Final Completion and Final Payment.

7.12 Existing Utilities.

(A) ***General.*** The Work may be performed in developed, urban areas with existing utilities, both above and below ground, including utilities identified in the Contract Documents or in other informational documents or records. Contractor must take due care to locate identified or reasonably identifiable utilities before proceeding with trenching, excavation, or any other activity that could damage or disrupt existing utilities. This may include excavation with small equipment, potholing, or hand excavation, and, if practical, using white paint or other suitable markings to delineate the area to be excavated. Except as otherwise provided herein, Contractor will be responsible for costs resulting from damage to identified or reasonably identifiable utilities due to Contractor's negligence or failure to comply with the Contract Documents, including the requirements in this Article 7.

(B) ***Unidentified Utilities.*** Pursuant to Government Code § 4215, if, during the performance of the Work, Contractor discovers utility facilities not identified by City in the Contract Documents, Contractor must immediately provide written notice to City and the utility. City assumes responsibility for the timely removal, relocation, or protection of existing main or trunkline utility facilities located on the Project site if those utilities are not identified in the Contract Documents. Contractor will be compensated in accordance with the provisions of the Contract Documents for the costs of locating, repairing damage not due to Contractor's failure to exercise reasonable care, and removing or relocating utility facilities not indicated in the Plans or Specifications with reasonable accuracy, and for equipment on the Project necessarily idled during such work. Contractor will not be assessed liquidated damages for delay in completion of the Work, to the extent the delay was caused by City's failure to provide for removal or relocation of the utility facilities.

(C) ***Alteration or Relocation of Utilities.*** If Contractor wishes to alter or relocate utilities for Contractor's convenience, and not due to a conflict that requires alteration or relocation, Contractor will be solely responsible for the time and cost required for such alteration or relocation, which may not proceed except as specified by the prior written authorization of the utility owner. Any damage to utilities or improvements caused by Contractor must be repaired by Contractor at its sole expense and to the full satisfaction of the utility owner and Engineer.

7.13 Notice of Excavation. Contractor must comply with all applicable requirements in Government Code § 4216 et seq., which are incorporated by reference herein.

7.14 Trenching and Excavations of Four Feet or More. As required by Public Contract Code § 7104, if the Work includes digging trenches or other excavations that extend deeper than four feet below the surface, the provisions in this Section apply to the Work and the Project.

(A) ***Duty to Notify.*** Contractor must promptly, and before the following conditions are disturbed, provide written notice to City if Contractor finds any of the following conditions:

(1) Material that Contractor believes may be a hazardous waste, as defined in § 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with the provisions of existing Laws;

(2) Subsurface or latent physical conditions at the Project site differing from those indicated by information about the Project site made available to bidders prior to the deadline for submitting bids; or

(3) Unknown physical conditions at the Project site of any unusual nature, materially different from those ordinarily encountered and generally recognized as inherent in work of the character required by the Contract Documents.

(B) ***City Investigation.*** City will promptly investigate the conditions and if City finds that the conditions materially differ from those indicated, apparent, or reasonably inferred from information about the Project site made available to bidders, or involve hazardous waste, and cause a decrease or increase in Contractor's cost of, or the time required for, performance of any part of the Work, City will issue a Change Order.

(C) ***Disputes.*** In the event that a dispute arises between City and Contractor regarding any of the conditions specified in subsection (B) above, or the terms of a Change Order issued by City, Contractor will not be excused from completing the Work within the Contract Time, but must proceed with all Work to be performed under the Contract. Contractor will retain any and all rights provided either by the Contract or by Laws which pertain to the resolution of disputes between Contractor and City.

7.15 Trenching of Five Feet or More. As required by Labor Code § 6705, if the Contract Price exceeds $25,000 and the Work includes the excavation of any trench or trenches of five feet or more in depth, a detailed plan must be submitted to City for acceptance in advance of the excavation. The detailed plan must show the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation. If the plan varies from the shoring system standards, it must be prepared by a California registered civil or structural engineer. Use of a shoring, sloping, or protective system less effective than that required by the Construction Safety Orders is prohibited.

7.16 New Utility Connections. Except as otherwise specified, City will pay connection charges and meter costs for new permanent utilities required by the Contract Documents, if any. Contractor must notify City sufficiently in advance of the time needed to request service from each utility provider so that connections and services are initiated in accordance with the Project schedule.

7.17 Lines and Grades. Contractor is required to use any benchmark provided by the Engineer. Unless otherwise specified in the Contract Documents, Contractor must provide all lines and grades required to execute the Work. Contractor must also provide, preserve, and replace if necessary, all construction stakes required for the Project, unless otherwise specified in the Special Conditions. All stakes or marks must be set by a California licensed surveyor or a California registered civil engineer. Contractor must notify the Engineer of any discrepancies found between Contractor's staking and grading and information provided by the Contract Documents. Upon completion, all Work must conform to the lines, elevations, and grades shown in the Plans, including any changes directed by a Change Order.

7.18 Historic or Archeological Items.

(A) ***Contractor's Obligations.*** Contractor must ensure that all persons performing Work at the Project site are required to immediately notify the Project Manager, upon discovery of any potential historic or archeological items, including historic or prehistoric ruins, a burial ground, archaeological or vertebrate paleontological site, including fossilized footprints or other archeological, paleontological or historical feature on the Project site (collectively, "Historic or Archeological Items").

(B) ***Discovery; Cessation of Work.*** Upon discovery of any potential Historic or Archeological Items, Work must be stopped within an 85-foot radius of the find and may

not resume until authorized in writing by City. If required by City, Contractor must assist in protecting or recovering the Historic or Archeological Items, with any such assistance to be compensated as Extra Work on a time and materials basis under Article 6, Contract Modification. At City's discretion, a suspension of Work required due to discovery of Historic or Archeological Items may be treated as Excusable Delay pursuant to Article 5, or as a suspension for convenience under Article 13.

7.19 Environmental Control. Contractor must not pollute any drainage course or its tributary inlets with fuels, oils, bitumens, acids, insecticides, herbicides or other harmful materials. Contractor must prevent the release of any hazardous material or hazardous waste into the soil or groundwater, and prevent the unlawful discharge of pollutants into City's storm drain system and watercourses as required below. Contractor and its Subcontractors must at all times in the performance of the Work comply with all Laws concerning pollution of waterways.

(A) ***Stormwater Permit.*** Contractor must comply with all applicable conditions of the State Water Resources Control Board National Pollutant Discharge Elimination System General Permit for Waste Discharge Requirements for Discharges of Stormwater Runoff Associated with Construction Activity ("Stormwater Permit").

(B) ***Contractor's Obligations.*** If required for the Work, a copy of the Stormwater Permit is on file in City's principal administrative offices, and Contractor must comply with it without adjustment of the Contract Price or the Contract Time. Contractor must timely and completely submit required reports and monitoring information required by the conditions of the Stormwater Permit. Contractor also must comply with all other Laws governing discharge of stormwater, including applicable municipal stormwater management programs.

7.20 Noise Control. Contractor must comply with all applicable noise control Laws. Noise control requirements apply to all equipment used for the Work or related to the Work, including trucks, transit mixers or transient equipment that may or may not be owned by Contractor.

7.21 Mined Materials. Pursuant to Public Contract Code § 20676, Contractor will not . purchase any sand, gravel, or other minerals for the Work from an operation subject to the Surface Mining and Reclamation Act of 1975 (Public Resources Code § 2710 et seq.) unless Contractor certifies, under penalty of perjury, that the minerals are from a mining operation included on the AB 3098 List, which may be accessed online at: https://www.conservation.ca.gov/smgb/Pages/AB-3098-List.aspx.

7.22 Water Department Notification. If Contractor requires the services of the Water Department in connection with the Work, Contractor must request such services at least two Working Days in advance of the time the services are needed. If the requested services require Water Department forces for more than eight hours or an extensive number of City-provided parts, Contractor must request services at least seven calendar days in advance of the time the services are needed.

(A) ***Service Shut Down.*** Contractor must minimize disruption of utility service to the greatest extent practicable. Contractor must coordinate any shut down or disruption of utility service with the Engineer, Water Department, and affected utility customers. If it is necessary to shut down or disrupt utility service to any customer of the Water Department, Contractor must request the services of the Water Department an additional three Working Days in advance of the time such services are needed, for a total of five Working Days advance notification for a standard service request, to allow affected customers a minimum of three days' advance notice. If Contractor fails to keep field

appointments, Contractor will be billed for scheduled Water Department crew standby time and for costs incurred by the Water Department for re-notification of customers.

(B) ***Water Department Scheduling*.** Water Department crews work a 9/80 schedule. This schedule may prohibit shutdowns for tie-ins on alternating Fridays. After-hours work or weekend work may be performed if authorized in advance by the Engineer. Requests by Contractor for after-hours or weekend work are to be avoided when possible. Contractor will be responsible for any overtime costs incurred by City for such work and the cost thereof may be deducted from payment otherwise due Contractor.

7.23 Public Safety and Traffic Control. Contractor must undertake all required and appropriate measures to ensure public safety during construction of the Project, in accordance with Laws, including, but not limited to, the Americans with Disabilities Act of 1990 (42 U.S.C. § 12101 et seq.). Contractor will ensure the safe passage of pedestrians around the Project site at all times. If Work is within a City-owned right-of-way, Contractor will ensure the safe passage of public traffic through the Project site at all times, consistent with the requirements of City Code Chapter 13-04. Contractor is solely responsible for the costs of all public safety and traffic control measures.

(A) ***Warning Devices*.** Contractor must furnish, install, and maintain, at its sole expense, all fences, barricades, signs, lights, and other devices necessary to prevent accidents, injuries, death, and property damage. All such devices must conform to the requirements of the current edition of the California Manual on Uniform Traffic Control Devices ("CA MUTCD") and the directions of the Engineer. Contractor's warning and safety devices will not obscure the visibility of or conflict with existing signs and traffic control devices. Contractor may be required to cover certain signs which regulate or direct public traffic to roadways that are not open to traffic, as directed by the Engineer.

(B) ***Flaggers.*** Contractor must also furnish, at Contractor's sole expense, trained flaggers as necessary to provide adequate warning to the public of construction conditions that may impact pedestrian or vehicular traffic.

(C) ***Project Signage*.** Unless otherwise specified in the Special Conditions, Contractor must install and maintain Project identification signs at each boundary of the Project site or as directed by the Engineer. Contractor must install the signs two weeks prior to the start of Work at the Project site, using sign panels furnished or otherwise approved by City. To mount sign panels, Contractor must furnish and install 4" X 4" posts or mount by other appropriate methods as approved by the Engineer. Upon completion of the Project, Contractor will remove Project identification signs and return any City-furnished sign panels to the City Corporation Yard at 55 Stony Point Road.

(D) ***Road Closure Signage*.** If the Work requires road closures, Contractor must furnish and install advance notice signs for road closures at each boundary of the Project site. Panel construction and lettering are subject to advance approval of the Engineer. Contractor must install the signs two weeks prior to the start of Work at the Project site. The signs must remain in place for the duration of the road closure and must be removed by Contractor when no longer necessary for the Work.

(E) ***Emergency Response Agencies.*** Contractor is responsible for notifying emergency response agencies operating in the jurisdiction of the Worksite(s) of obstructions to roads resulting from Contractor's Work.

(F) ***Additional Devices.*** City reserves the right to require additional warning or safety devices for the Project at the Contractor's sole expense, but no actions by City to add to or improve signage or any other public safety requirements will waive or limit Contractor's duties under the Contract Documents.

(G) ***Compliance.*** If Contractor fails or refuses to comply with the requirements of this Section, the Engineer may take immediate action to protect the public, including, but not limited to, furnishing the required safety measures at Contractor's expense or suspending the Work, in addition to all other remedies available to City. Any such remedial costs incurred by City may be deducted from payment otherwise due to Contractor as specified in Section 8.3, Adjustment of Payment Application. If there are insufficient Contract funds remaining to cover the remedial costs, City is entitled to recover the balance from Contractor or its performance bond surety.

Article 8 - Payment

8.1 Schedule of Values. Prior to submitting its first application for payment, Contractor must prepare and submit to the Project Manager a schedule of values apportioned to the various divisions and phases of the Work, including mobilization and demobilization. If a Bid Schedule was submitted with Contractor's bid, the amounts in the schedule of values must be consistent with the Bid Schedule. Each line item contained in the schedule of values must be assigned a value such that the total of all items equals the Contract Price. The items must be sufficiently detailed to enable accurate evaluation of the percentage of completion claimed in each application for payment, and the assigned value consistent with any itemized or unit pricing submitted with Contractor's bid.

(A) ***Measurements for Unit Price Work.*** Materials and items of Work to be paid for on the basis of unit pricing will be measured according to the methods specified in the Contract Documents.

(B) ***Deleted or Reduced Work.*** Contractor will not be compensated for Work that City has deleted or reduced in scope, except for any labor, material, or equipment costs for such Work that Contractor reasonably incurred before Contractor learned that the Work could be deleted or reduced. Contractor will only be compensated for those actual, direct and documented costs incurred, and will not be entitled to any mark up for overhead or lost profits.

8.2 Progress Payments. Following the last day of each month, or as otherwise required by the Special Conditions or Specifications, Contractor will submit to the Project Manager a monthly application for payment for Work performed during the preceding month based on the estimated value of the Work performed during that preceding month.

(A) ***Application for Payment.*** Each application for payment must be itemized to include labor, materials, and equipment incorporated into the Work, and materials and equipment delivered to the Project site, as well as authorized and approved Change Orders. Each payment application must be supported by the unit prices submitted with Contractor's Bid Schedule and/or schedule of values and any other substantiating data required by the Contract Documents.

(B) ***Payment of Undisputed Amounts.*** City will pay the undisputed amount due within 30 days after Contractor has submitted a complete and accurate payment application, subject to Public Contract Code § 20104.50. City will deduct a percentage from each progress payment as retention, as set forth in Section 8.5, below, and may deduct or withhold additional amounts as set forth in Section 8.3, below.

8.3 Adjustment of Payment Application. City may adjust or reject the amount requested in a payment application, including application for Final Payment, in whole or in part, if the amount requested is disputed or unsubstantiated. Contractor will be notified in writing of the basis for the modification to the amount requested. City may also deduct or withhold

from payment otherwise due based upon any of the circumstances and amounts listed below. Sums withheld from payment otherwise due will be released when the basis for that withholding has been remedied and no longer exists.

(A) For Contractor's unexcused failure to perform the Work as required by the Contract Documents, including correction or completion of punch list items, City may withhold or deduct an amount based on the City's estimated cost to correct or complete the Work.

(B) For loss or damage caused by Contractor or its Subcontractors arising out of or relating to performance of the Work or any failure to protect the Project site, City may deduct an amount based on the estimated cost to repair or replace.

(C) For Contractor's failure to pay its Subcontractors and suppliers when payment is due, City may withhold an amount equal to the total of past due payments and may opt to pay that amount separately via joint check pursuant to Section 8.6(B), Joint Checks.

(D) For Contractor's failure to timely correct rejected, nonconforming, or defective Work, City may withhold or deduct an amount based on the City's estimated cost to correct or complete the Work.

(E) For any unreleased stop notice, City may withhold 125% of the amount claimed.

(F) For Contractor's failure to submit any required schedule or schedule update in the manner specified or within the time specified in the Contract Documents, City may withhold an amount equal to five percent of the total amount requested until Contractor complies with its schedule submittal obligations.

(G) For Contractor's failure to maintain or submit as-built documents in the manner specified or within the time specified in the Contract Documents, City may withhold or deduct an amount based on the City's cost to prepare the as-builts.

(H) For Work performed without Shop Drawings that have been accepted by City, when accepted Shop Drawings are required before proceeding with the Work, City may deduct an amount based on the estimated cost to correct unsatisfactory Work or diminution in value.

(I) For fines, payments, or penalties assessed under the Labor Code, City may deduct from payments due to Contractor as required by Laws and as directed by the Division of Labor Standards Enforcement.

(J) For any other fines, payments, or penalties assessed against the City relating to Contractor's acts or omissions, including violations of Laws, City may withhold or deduct such amounts from payment otherwise due to Contractor.

(K) For any other costs or charges that may be withheld or deducted from payments to Contractor, as provided in the Contract Documents, including liquidated damages, City may withhold or deduct such amounts from payment otherwise due to Contractor.

8.4 Early Occupancy. Neither City's payment of progress payments nor its partial or full use or occupancy of the Project constitutes acceptance of any part of the Work.

8.5 Retention. City will retain five percent of the full amount due on each progress payment (i.e., the amount due before any withholding or deductions pursuant to Section 8.3, Adjustment of Payment Application), or the percentage stated in the Notice Inviting Bids, whichever is greater, as retention to ensure full and satisfactory performance of the Work.

Contractor is not entitled to any reduction in the rate of withholding at any time, nor to release of any retention before 35 days following City's acceptance of the Project.

(A) ***Substitution of Securities.*** As provided by Public Contract Code § 22300, Contractor may request in writing that it be allowed, at its sole expense, to substitute securities for the retention withheld by City. Any escrow agreement entered into pursuant to this provision must fully comply with Public Contract Code § 22300 and will be subject to approval as to form by City's legal counsel. If City exercises its right to draw upon such securities in the event of default pursuant to section (7) of the statutory Escrow Agreement for Security Deposits in Lieu of Retention, pursuant to subdivision (g) of Public Contract Code § 22300 ("Escrow Agreement"), and if Contractor disputes that it is in default, its sole remedy is to comply with the dispute resolution procedures in Article 12 and the provisions therein. It is agreed that for purposes of this paragraph, an event of default includes City's rights pursuant to these Contract Documents to withhold or deduct sums from retention, including withholding or deduction for liquidated damages, incomplete or defective Work, stop payment notices, or backcharges. It is further agreed that if any individual authorized to give or receive written notice on behalf of a party pursuant to section (10) of the Escrow Agreement are unavailable to give or receive notice on behalf of that party due to separation from employment, retirement, death, or other circumstances, the successor or delegee of the named individual is deemed to be the individual authorized to give or receive notice pursuant to section (10) of the Escrow Agreement.

(B) ***Release of Undisputed Retention.*** All undisputed retention, less any amounts that may be assessed as liquidated damages, retained for stop notices, or otherwise withheld pursuant to Section 8.3, Adjustment of Payment Application, will be released as Final Payment to Contractor no sooner than 35 days following recordation of the notice of completion, and no later than 60 days following acceptance of the Project by City's governing body or authorized designee pursuant to Section 11.1(C), Acceptance, or, if the Project has not been accepted, no later than 60 days after the Project is otherwise considered complete pursuant to Public Contract Code § 7107(c).

8.6 Payment to Subcontractors and Suppliers. Each month, Contractor must promptly pay each Subcontractor and supplier the value of the portion of labor, materials, and equipment incorporated into the Work or delivered to the Project site by the Subcontractor or supplier during the preceding month. Such payments must be made in accordance with the requirements of Laws pertaining to such payments, and those of the Contract Documents and applicable subcontract or supplier contract.

(A) ***Withholding for Stop Notice.*** Pursuant to Civil Code § 9358, City will withhold 125% of the amount claimed by an unreleased stop notice, a portion of which may be retained by City for the costs incurred in handling the stop notice claim, including attorneys' fees and costs, as authorized by law.

(B) ***Joint Checks.*** City reserves the right, acting in its sole discretion, to issue joint checks made payable to Contractor and a Subcontractor or supplier, if City determines this is necessary to ensure fair and timely payment for a Subcontractor or supplier who has provided services or goods for the Project. As a condition to release of payment by a joint check, the joint check payees may be required to execute a joint check agreement in a form provided or approved by the City Attorney's Office. The joint check payees will be jointly and severally responsible for the allocation and disbursement of funds paid by joint check. Payment by joint check will not be construed to create a contractual relationship between City and a Subcontractor or supplier of any tier beyond the scope of the joint check agreement.

8.7 Final Payment. Contractor's application for Final Payment must comply with the requirements for submitting an application for a progress payment as stated in Section 8.2, above. Corrections to previous progress payments, including adjustments to estimated quantities for unit priced items, may be included in the Final Payment. If Contractor fails to submit a timely application for Final Payment, City reserves the right to unilaterally process and issue Final Payment without an application from Contractor in order to close out the Project. For the purposes of determining the deadline for Claim submission pursuant to Article 12, the date of Final Payment is deemed to be the date that City acts to release undisputed retention as final payment to Contractor, or otherwise provides written notice to Contractor of Final Payment or that no undisputed funds remain available for Final Payment due to offsetting withholdings or deductions pursuant to Section 8.3, Adjustment of Payment Application. If the amount due from Contractor to City exceeds the amount of Final Payment, City retains the right to recover the balance from Contractor or its sureties.

8.8 Release of Claims. City may, at any time, require that payment of the undisputed portion of any progress payment or Final Payment be contingent upon Contractor furnishing City with a written waiver and release of all claims against City arising from or related to the portion of Work covered by those undisputed amounts subject to the limitations of Public Contract Code § 7100. Any disputed amounts may be specifically excluded from the release.

8.9 Warranty of Title. Contractor warrants that title to all work, materials, or equipment incorporated into the Work and included in a request for payment will pass over to City free of any claims, liens, or encumbrances upon payment to Contractor.

Article 9 - Labor Provisions

9.1 Discrimination Prohibited. Discrimination against any prospective or present employee engaged in the Work on grounds of race, color, ancestry, national origin, ethnicity, religion, sex, sexual orientation, age, disability, or marital status is strictly prohibited. Contractor and its Subcontractors are required to comply with all applicable Laws prohibiting discrimination, including the California Fair Employment and Housing Act (Govt. Code § 12900 et seq.), Government Code § 11135, and Labor Code §§ 1735, 1777.5, 1777.6, and 3077.5.

9.2 Labor Code Requirements.

(A) ***Eight Hour Day.*** Pursuant to Labor Code § 1810, eight hours of labor constitute a legal day's work under this Contract.

(B) ***Penalty.*** Pursuant to Labor Code § 1813, Contractor will forfeit to City as a penalty, the sum of $25.00 for each day during which a worker employed by Contractor or any Subcontractor is required or permitted to work more than eight hours in any one calendar day or more than 40 hours per calendar week, except if such workers are paid overtime under Labor Code § 1815.

(C) ***Apprentices.*** Contractor is responsible for compliance with the requirements governing employment and payment of apprentices, as set forth in Labor Code § 1777.5, which is fully incorporated by reference.

(D) ***Notices.*** Pursuant to Labor Code § 1771.4, Contractor is required to post all job site notices prescribed by Laws.

9.3 Prevailing Wages. Each worker performing Work under this Contract that is covered under Labor Code §§ 1720, 1720.3, or 1720.9, including cleanup at the Project site, must be paid at a rate not less than the prevailing wage as defined in §§ 1771 and 1774 of the Labor Code. The prevailing wage rates are on file with the City and available online at http://www.dir.ca.gov/dlsr. Contractor must post a copy of the applicable prevailing rates at the Project site.

(A) ***Penalties.*** Pursuant to Labor Code § 1775, Contractor and any Subcontractor will forfeit to City as a penalty up to $200.00 for each calendar day, or portion thereof, for each worker paid less than the applicable prevailing wage rate. Contractor must also pay each worker the difference between the applicable prevailing wage rate and the amount actually paid to that worker.

(B) ***Federal Requirements.*** If this Project is subject to federal prevailing wage requirements in addition to California prevailing wage requirements, Contractor and its Subcontractors are required to pay the higher of the currently applicable state or federal prevailing wage rates.

9.4 Payroll Records. Contractor must comply with the provisions of Labor Code §§ 1771.4, 1776, and 1812 and all implementing regulations, which are fully incorporated by this reference, including requirements for monthly electronic submission of payroll records to the DIR.

(A) ***Contractor and Subcontractor Obligations***. Contractor and each Subcontractor must keep accurate payroll records, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed in connection with the Work. Each payroll record must contain or be verified by a written declaration that it is made under penalty of perjury, stating both of the following:

(1) The information contained in the payroll record is true and correct; and

(2) Contractor or the Subcontractor has complied with the requirements of Labor Code §§ 1771, 1811, and 1815 for any Work performed by its employees on the Project.

(B) ***Certified Record.*** A certified copy of an employee's payroll record must be made available for inspection or furnished to the employee or his or her authorized representative on request, to City, to the Division of Labor Standards Enforcement, to the Division of Apprenticeship Standards of the DIR, and as further required by the Labor Code.

(C) ***Enforcement.*** Upon notice of noncompliance with Labor Code § 1776, Contractor or Subcontractor has ten days in which to comply with the requirements of this section. If Contractor or Subcontractor fails to do so within the ten-day period, Contractor or Subcontractor will forfeit a penalty of $100.00 per day, or portion thereof, for each worker for whom compliance is required, until strict compliance is achieved. Upon request by the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement, these penalties will be withheld from payments then due to Contractor.

9.5 Labor Compliance. Pursuant to Labor Code § 1771.4, the Contract for this Project is subject to compliance monitoring and enforcement by the DIR.

Article 10 - Safety Provisions

10.1 Safety Precautions and Programs. Contractor and its Subcontractors are fully responsible for safety precautions and programs, and for the safety of persons and property in the performance of the Work. Contractor and its Subcontractors must at all times comply with all applicable health and safety Laws and seek to avoid injury, loss, or damage to persons or property by taking reasonable steps to protect its employees and other persons at any Worksite, materials and equipment stored on or off site, and property at or adjacent to any Worksite.

(A) ***Reporting Requirements.*** Contractor must immediately notify the City of any death, serious injury or illness resulting from Work on the Project. Contractor must immediately provide a written report to City of each recordable accident or injury occurring at any Worksite within 24 hours of the occurrence. The written report must include: (1) the name and address of the injured or deceased person; (2) the name and address of each employee of Contractor or of any Subcontractor involved in the incident; (3) a detailed description of the incident, including precise location, time, and names and contact information for known witnesses; and (4) a police or first responder report, if applicable. If Contractor is required to file an accident report with a government agency, Contractor will provide a copy of the report to City.

(B) ***Legal Compliance.*** Contractor's safety program must comply with the applicable legal and regulatory requirements. Contractor must provide City with copies of all notices required by Laws.

(C) ***Contractor's Obligations.*** Any damage or loss caused by Contractor arising from the Work which is not insured under property insurance must be promptly remedied by Contractor.

(D) ***Remedies.*** If City determines, in its sole discretion, that any part of the Work or Project site is unsafe, City may, without assuming responsibility for Contractor's safety program, require Contractor or its Subcontractor to cease performance of the Work or to take corrective measures to City's satisfaction. If Contractor fails to promptly take the required corrective measures, City may perform them and deduct the cost from the Contract Price. Contractor agrees it is not entitled to submit a Claim for damages, for an increase in Contract Price, or for a change in Contract Time based on Contractor's compliance with City's request for corrective measures pursuant to this provision.

10.2 Hazardous Materials. Unless otherwise specified in the Contract Documents, this Contract does not include the removal, handling, or disturbance of any asbestos or other Hazardous Materials. If Contractor encounters materials on the Project site that Contractor reasonably believes to be asbestos or other Hazardous Materials, and the asbestos or other Hazardous Materials have not been rendered harmless, Contractor may continue Work in unaffected areas reasonably believed to be safe, but must immediately cease work on the area affected and report the condition to City. No asbestos, asbestos-containing products or other Hazardous Materials may be used in performance of the Work.

10.3 Material Safety. Contractor is solely responsible for complying with § 5194 of Title 8 of the California Code of Regulations, including by providing information to Contractor's employees about any hazardous chemicals to which they may be exposed in the course of the Work. A hazard communication program and other forms of warning and training about such exposure must be used. Contractor must also maintain Safety Data Sheets ("SDS") at the Project site, as required by Laws, for materials or substances used or consumed in the performance of the Work. The SDS will be accessible and available to Contractor's employees, Subcontractors, and City.

(A) ***Contractor Obligations.*** Contractor is solely responsible for the proper delivery, handling, use, storage, removal, and disposal of all materials brought to the Project site and/or used in the performance of the Work. Contractor must notify the Engineer if a specified product or material cannot be used safely.

(B) ***Labeling.*** Contractor must ensure proper labeling on any material brought onto the Project site so that any persons working with or in the vicinity of the material may be informed as to the identity of the material, any potential hazards, and requirements for proper handling, protections, and disposal.

10.4 Hazardous Condition. Contractor is solely responsible for determining whether a hazardous condition exists or is created during the course of the Work, involving a risk of bodily harm to any person or risk of damage to any property. If a hazardous condition exists or is created, Contractor must take all precautions necessary to address the condition and ensure that the Work progresses safely under the circumstances. Hazardous conditions may result from, but are not limited to, use of specified materials or equipment, the Work location, the Project site condition, the method of construction, or the way any Work must be performed.

10.5 Emergencies. In an emergency affecting the safety or protection of persons, Work, or property at or adjacent to any Worksite, Contractor must take reasonable and prompt actions to prevent damage, injury, or loss, without prior authorization from the City if, under the circumstances, there is inadequate time to seek prior authorization from the City.

10.6 Confined Space Operations. If the Work requires a confined space entry, including, but not limited to, manhole or water storage tank entry, Contractor must obtain a confined space entry permit pursuant to Cal/OSHA regulations, as set forth in 8 CCR § 5156 et seq. For any confined space entry for construction operations regulated by 8 CCR § 1502, Contractor must comply with 8 CCR § 5158. For any other confined space operations, Contractor must comply with 8 CCR § 5157. With respect to entry to any City-maintained confined space, Contractor is responsible for obtaining any available information regarding hazards and operations for any City-maintained confined spaces, pursuant to 8 CCR § 5157. The City-maintained Confined Space Entry Manual is available for viewing at the Water Department or Transportation and Public Works Department office. Contractor must immediately notify the Engineer of any previously unidentified hazards confronted or created during confined space entry.

Article 11 - Completion and Warranty Provisions

11.1 Final Completion.

(A) ***Final Inspection and Punch List.*** When the Work required by this Contract is fully performed, Contractor must provide written notification to City requesting final inspection. The Engineer will schedule the date and time for final inspection, which must include Contractor's primary representative for this Project and its superintendent. Based on that inspection, City will prepare a punch list of any items that are incomplete, missing, defective, incorrectly installed, or otherwise not compliant with the Contract Documents. The punch list to Contractor will specify the time by which all of the punch list items must be completed or corrected. The punch list may include City's estimated cost to complete each punch list item if Contractor fails to do so within the specified time. The omission of any non-compliant item from a punch list will not relieve Contractor from fulfilling all requirements of the Contract Documents. Contractor's failure to complete any punch list item within the time specified in the punch list will not waive or abridge its warranty

obligations for any such items that must be completed by the City or by a third party retained by the City due to Contractor's failure to timely complete any such outstanding item.

(B) ***Requirements for Final Completion.*** Final Completion will be achieved upon completion or correction of all punch list items, as verified by City's further inspection, and upon satisfaction of all other Contract requirements, including any commissioning required under the Contract Documents and submission of all final submittals, including instructions and manuals as required under Section 7.10, and complete, final as-built drawings as required under Section 7.11, all to City's satisfaction.

(C) ***Acceptance.*** The Project will be considered accepted upon the date of the Engineer's issuance of a written notice of acceptance. In order to avoid delay of Project close out, the City may elect, acting in its sole discretion, to accept the Project as complete subject to exceptions for punch list items that are not completed within the time specified in the punch list.

(D) ***Final Payment and Release of Retention.*** Final Payment and release of retention, less any sums withheld pursuant to the provisions of the Contract Documents, will not be made sooner than 35 days after recordation of the notice of completion. If Contractor fails to complete all of the punch list items within the specified time, City may withhold up to 150% of City's estimated cost to complete each of the remaining items from Final Payment and may use the withheld retention to pay for the costs to self-perform the outstanding items or to retain a third party to complete any such outstanding punch list item.

11.2 Warranty.

(A) ***General.*** Contractor warrants that all materials and equipment will be new unless otherwise specified, of good quality, in conformance with the Contract Documents, and free from defective workmanship and materials. Contractor further warrants that the Work will be free from material defects not intrinsic in the design or materials required in the Contract Documents. Contractor warrants that materials or items incorporated into the Work comply with the requirements and standards in the Contract Documents, including compliance with Laws, and that any Hazardous Materials encountered or used were handled as required by Laws. At City's request, Contractor must furnish satisfactory evidence of the quality and type of materials and equipment furnished. Contractor's warranty does not extend to damage caused by normal wear and tear, or improper use or maintenance.

(B) ***Warranty Period.*** Contractor's warranty must guarantee its Work for a period of one year from the date of Project acceptance (the "Warranty Period"), except when a longer guarantee is provided by a supplier or manufacturer or is required by the Specifications or Special Conditions. Contractor must obtain from its Subcontractors, suppliers and manufacturers any special or extended warranties required by the Contract Documents.

(C) ***Warranty Documents.*** As a condition precedent to Final Completion, Contractor must supply City with all warranty and guarantee documents relevant to equipment and materials incorporated into the Work and guaranteed by their suppliers or manufacturers.

(D) ***Subcontractors.*** The warranty obligations in the Contract Documents apply to Work performed by Contractor and its Subcontractors, and Contractor agrees to be co-guarantor of such Work.

(E) ***Contractor's Obligations.*** Upon written notice from City to Contractor of any defect in the Work discovered during the Warranty Period, Contractor or its responsible Subcontractor must promptly correct the defective Work at its own cost. Contractor's obligation to correct defects discovered during the Warranty Period will continue past the expiration of the Warranty Period as to any defects in Work for which Contractor was notified prior to expiration of the Warranty Period. Work performed during the Warranty Period ("Warranty Work") will be subject to the warranty provisions in this Section 11.2 for a one-year period that begins upon completion of such Warranty Work to City's satisfaction.

(F) ***City's Remedies.*** If Contractor or its responsible Subcontractor fails to correct defective Work within ten days following notice by City, or sooner if required by the circumstances, City may correct the defects to conform with the Contract Documents at Contractor's sole expense. Contractor must reimburse City for its costs in accordance with subsection (H), below.

(G) ***Emergency Repairs.*** In cases of emergency where any delay in correcting defective Work could cause harm, loss or damage, City may immediately correct the defects to conform with the Contract Documents at Contractor's sole expense. Contractor or its surety must reimburse City for its costs in accordance with subsection (H), below.

(H) ***Reimbursement.*** Contractor must reimburse City for its costs to repair under subsections (F) or (G), above, within 30 days following City's submission of a demand for payment pursuant to this provision. If City is required to initiate legal action to compel Contractor's compliance with this provision, and City is the prevailing party in such action, Contractor and its surety are solely responsible for all of City's attorney's fees and legal costs expended to enforce Contractor's warranty obligations herein, in addition to any and all costs City incurs to correct the defective Work.

11.3 Use Prior to Final Completion. City reserves the right to occupy or make use of the Project, or any portions of the Project, prior to Final Completion if City has determined that the Project or portion of it is in a condition suitable for the proposed occupation or use, and that it is in its best interest to occupy or make use of the Project, or any portions of it, prior to Final Completion.

(A) ***Non-Waiver.*** Occupation or use of the Project, in whole or in part, prior to Final Completion will not operate as acceptance of the Work or any portion of it, nor will it operate as a waiver of any of City's rights or Contractor's duties pursuant to these Contract Documents, and will not affect nor bear on the determination of the time of substantial completion with respect to any statute of repose pertaining to the time for filing an action for construction defect.

(B) ***City's Responsibility.*** City will be responsible for the cost of maintenance and repairs due to normal wear and tear with respect to those portions of the Project that are being occupied or used before Final Completion. The Contract Price or the Contract Time may be adjusted pursuant to the applicable provisions of these Contract Documents if, and only to the extent that, any occupation or use under this Section actually adds to Contractor's cost or time to complete the Work within the Contract Time.

11.4 Substantial Completion. For purposes of determining "substantial completion" with respect to any statute of repose pertaining to the time for filing an action for construction defect, "substantial completion" is deemed to mean the last date that Contractor or any Subcontractor performs Work on the Project prior to City acceptance of the Project, except for warranty work performed under this Article.

Article 12 - Dispute Resolution

12.1 Claims. This Article applies to and provides the exclusive procedures for any Claim arising from or related to the Contract or performance of the Work.

(A) ***Limitations.*** A Claim may only include the portion of a previously rejected demand that remains in dispute between Contractor and City. With the exception of any dispute regarding the amount of money actually paid to Contractor as Final Payment, Contractor is not entitled to submit a Claim demanding a change in the Contract Time or the Contract Price, which has not previously been submitted to City in full compliance with Article 5 and Article 6, and subsequently rejected in whole or in part by City.

(B) ***Scope of Article.*** This Article is intended to provide the exclusive procedures for submission and resolution of Claims of any amount and applies in addition to the provisions of Public Contract Code § 9204 and § 20104 et seq., which are incorporated by reference herein.

(C) ***No Work Delay.*** Notwithstanding the submission of a Claim or any other dispute between the parties related to the Project or the Contract Documents, Contractor must perform the Work and may not delay or cease Work pending resolution of a Claim or other dispute, but must continue to diligently prosecute the performance and timely completion of the Work, including the Work pertaining to the Claim or other dispute.

(D) ***Informal Resolution.*** Contractor will make a good faith effort to informally resolve a dispute before initiating a Claim, preferably by face-to-face meeting between authorized representatives of Contractor and City.

12.2 Claims Submission. The following requirements apply to any Claim subject to this Article:

(A) ***Substantiation.*** The Claim must be submitted to City in writing by registered or certified mail with return receipt requested and clearly identified as a “Claim” submitted pursuant to this Article 12. The Claim must include all of the documents necessary to substantiate the Claim including the Change Order request that was rejected in whole or in part, and a copy of City’s written rejection that is in dispute. The Claim must clearly identify and describe the dispute, including relevant references to applicable portions of the Contract Documents, and a chronology of relevant events. Any Claim for additional payment must include a complete, itemized breakdown of all known or estimated labor, materials, taxes, insurance, and subcontract, or other costs. Substantiating documentation such as payroll records, receipts, invoices, or the like, must be submitted in support of each component of claimed cost. Any Claim for an extension of time or delay costs must be substantiated with a schedule analysis and narrative depicting and explaining claimed time impacts.

(B) ***Claim Format and Content.*** A Claim must be submitted in the following format:

(1) Provide a cover letter, specifically identifying the submission as a “Claim” submitted under this Article 12 and specifying the requested remedy (e.g., amount of proposed change to Contract Price and/or change to Contract Time).

(2) Provide a summary of each Claim, including underlying facts and the basis for entitlement, and identify each specific demand at issue, including the specific Change Order request (by number and submittal date), and the date of City's rejection of that demand, in whole or in part.

(3) Provide a detailed explanation of each issue in dispute. For multiple issues included within a single Claim or for multiple Claims submitted concurrently, separately number and identify each individual issue or Claim, and include the following for each separate issue or Claim:

a. A succinct statement of the matter in dispute, including Contractor's position and the basis for that position;

b. Identify and attach all documents that substantiate the Claim, including relevant provisions of the Contract Documents, RFIs, calculations, and schedule analysis (see subsection (A), Substantiation, above);

c. A chronology of relevant events; and

d. Analysis and basis for claimed changes to Contract Price, Contract Time, or any other remedy requested.

(4) Provide a summary of issues and corresponding claimed damages. If, by the time of the Claim submission deadline (below), the precise amount of the requested change in the Contract Price or Contract Time is not yet known, Contractor must provide a good faith estimate, including the basis for that estimate, and must identify the date by which it is anticipated that the Claim will be updated to provide final amounts.

(5) Include the following certification, executed by Contractor's authorized representative:

"The undersigned Contractor certifies under penalty of perjury that its statements and representations in this Claim submittal are true and correct. Contractor warrants that this Claim submittal is comprehensive and complete as to the matters in dispute, and agrees that any costs, expenses, or delay not included herein are deemed waived."

(C) ***Submission Deadlines.***

(1) A Claim disputing rejection of a request for a change in the Contract Time or Contract Price must be submitted within 21 days following the date that City notified Contractor in writing that a request for a change in the Contract Time or Contract Price, duly submitted in compliance with Article 5 and Article 6, has been rejected in whole or in part. A Claim disputing the terms of a unilateral Change Order must be submitted within 21 days following the date of issuance of the unilateral Change Order. These Claim deadlines apply even if Contractor cannot yet quantify the total amount of any requested change in the Contract Time or Contract Price. If the Contractor cannot quantify those amounts, it must submit an estimate of the amounts claimed pending final determination of the requested remedy by Contractor.

(2) With the exception of any dispute regarding the amount of Final Payment, any Claim must be filed on or before the date of Final Payment or will be deemed waived.

(3) A Claim disputing the amount of Final Payment must be submitted within 21 days of the effective date of Final Payment, under Section 8.7, Final Payment.

(4) Strict compliance with these Claim submission deadlines is necessary to ensure that any dispute may be mitigated as soon as possible, and to facilitate cost-efficient administration of the Project. ***Any Claim that is not submitted within the specified deadlines will be deemed waived by Contractor.***

12.3 City's Response. City will respond within 45 days of receipt of the Claim with a written statement identifying which portion(s) of the Claim are disputed, unless the 45-day period is extended by mutual agreement of City and Contractor or as otherwise allowed under Public Contract Code § 9204. However, if City determines that the Claim is not adequately substantiated pursuant to Section 12.2(A), Substantiation, City may first request in writing, within 30 days of receipt of the Claim, any additional documentation supporting the Claim or relating to defenses to the Claim that City may have against the Claim.

(A) ***Additional Information.*** If additional information is thereafter required, it may be requested and provided upon mutual agreement of City and Contractor. If Contractor's Claim is based on estimated amounts, Contractor has a continuing duty to update its Claim as soon as possible with information on actual amounts in order to facilitate prompt and fair resolution of the Claim.

(B) ***Non-Waiver.*** Any failure by City to respond within the times specified above will not be construed as acceptance of the Claim, in whole or in part, or as a waiver of any provision of these Contract Documents.

12.4 Meet and Confer. If Contractor disputes City's written response, or City fails to respond within the specified time, within 15 days of receipt of City's response or within 15 days of City's failure to respond within the applicable 45-day time period under Section 12.3, respectively, Contractor may notify City of the dispute in writing sent by registered or certified mail, return receipt requested, and demand an informal conference to meet and confer for settlement of the issues in dispute. If Contractor fails to notify City of the dispute and demand an informal conference to meet and confer in writing within the specified time, Contractor's Claim will be deemed waived.

(A) ***Schedule Meet and Confer.*** Upon receipt of the demand to meet and confer, City will schedule the meet and confer conference to be held within 30 days, or later if needed to ensure the mutual availability of each of the individuals that each party requires to represent its interests at the meet and confer conference.

(B) ***Location for Meet and Confer.*** The meet and confer conference will be scheduled at a location at or near City's principal office.

(C) ***Written Statement After Meet and Confer.*** Within ten working days after the meet and confer has concluded, City will issue a written statement identifying which portion(s) of the Claim remain in dispute, if any.

(D) ***Submission to Mediation.*** If the Claim or any portion remains in dispute following the meet and confer conference, within ten working days after the City issues the written statement identifying any portion(s) of the Claim remaining in dispute, the Contractor may identify in writing disputed portion(s) of the Claim, which will be submitted for mediation, as set forth below.

12.5 Mediation and Government Code Claims.

(A) ***Mediation.*** Within ten working days after the City issues the written statement identifying any portion(s) of the Claim remaining in dispute following the meet and confer, City and Contractor will mutually agree to a mediator, as provided under Public Contract

Code § 9204. Mediation will be scheduled to ensure the mutual availability of the selected mediator and all of the individuals that each party requires to represent its interests. If there are multiple Claims in dispute, the parties may agree to schedule the mediation to address all outstanding Claims at the same time. The parties will share the costs of the mediator and mediation fees equally, but each party is otherwise solely and separately responsible for its own costs to prepare for and participate in the mediation, including costs for its legal counsel or any other consultants.

(B) ***Government Code Claims*.**

(1) Timely presentation of a Government Code Claim is a condition precedent to filing any legal action based on or arising from the Contract. Compliance with the Claim submission requirements in this Article 12 is a condition precedent to filing a Government Code Claim.

(2) The time for filing a Government Code Claim will be tolled from the time Contractor submits its written Claim pursuant to Section 12.2, above, until the time that Claim is denied in whole or in part at the conclusion of the meet and confer process, including any period of time used by the meet and confer process. However, if the Claim is submitted to mediation, the time for filing a Government Code Claim will be tolled until conclusion of the mediation, including any continuations, if the Claim is not fully resolved by mutual agreement of the parties during the mediation or any continuation of the mediation.

12.6 Tort Claims. This Article does not apply to tort claims and nothing in this Article is intended nor will be construed to change the time periods for filing tort-based Government Code Claims.

12.7 Arbitration. City does not consent to arbitration unless required by Laws. It is expressly agreed, under Code of Civil Procedure § 1296, that in any arbitration to resolve a dispute relating to this Contract, the arbitrator's award must be supported by law and substantial evidence.

12.8 Burden of Proof and Limitations. Contractor bears the burden of proving entitlement to and the amount of any claimed damages. Contractor is not entitled to damages calculated on a total cost basis, but must prove actual damages. Contractor is not entitled to speculative, special, or consequential damages, including home office overhead or any form of overhead not directly incurred at the Project site or any other Worksite; lost profits; loss of productivity; lost opportunity to work on other projects; diminished bonding capacity; increased cost of financing for the Project; extended capital costs; non-availability of labor, material or equipment due to delays; or any other indirect loss arising from the Contract. The Eichleay Formula or similar formula will not be used for any recovery under the Contract. The City will not be directly liable to any Subcontractor or supplier.

12.9 Legal Proceedings. In any legal proceeding that involves enforcement of any requirements of the Contract Documents, the finder of fact will receive detailed instructions on the meaning and operation of the Contract Documents, including conditions, limitations of liability, remedies, claim procedures, and other provisions bearing on the defenses and theories of liability. Detailed findings of fact will be requested to verify enforcement of the Contract Documents. All of the City's remedies under the Contract Documents will be construed as cumulative, and not exclusive, and the City reserves all rights to all remedies available under law or equity as to any dispute arising from or relating to the Contract Documents or performance of the Work.

12.10 Other Disputes. The procedures in this Article 12 will apply to any and all disputes or legal actions, in addition to Claims, arising from or related to this Contract, including disputes regarding suspension or early termination of the Contract, unless and only to the extent that compliance with a procedural requirement is expressly and specifically waived by City. Nothing in this Article is intended to delay suspension or termination under Article 13.

Article 13 - Suspension and Termination

13.1 Suspension for Cause. In addition to all other remedies available to City, if Contractor fails to perform or correct Work in accordance with the Contract Documents, including non-compliance with applicable environmental or health and safety Laws, City may immediately order the Work, or any portion of it, suspended until the circumstances giving rise to the suspension have been eliminated to City's satisfaction.

(A) ***Notice of Suspension.*** Upon receipt of City's written notice to suspend the Work, in whole or in part, except as otherwise specified in the notice of suspension, Contractor and its Subcontractors must promptly stop Work as specified in the notice of suspension; comply with directions for cleaning and securing the Worksite; and protect the completed and in-progress Work and materials. Contractor is solely responsible for any damages or loss resulting from its failure to adequately secure and protect the Project.

(B) ***Resumption of Work.*** Upon receipt of the City's written notice to resume the suspended Work, in whole or in part, except as otherwise specified in the notice to resume, Contractor and its Subcontractors must promptly re-mobilize and resume the Work as specified; and within ten days from the date of the notice to resume, Contractor must submit a recovery schedule, prepared in accordance with the Contract Documents, showing how Contractor will complete the Work within the Contract Time.

(C) ***Failure to Comply.*** Contractor will not be entitled to an increase in the Contract Time or Contract Price for a suspension occasioned by Contractor's failure to comply with the Contract Documents.

(D) ***No Duty to Suspend.*** City's right to suspend the Work will not give rise to a duty to suspend the Work, and City's failure to suspend the Work will not constitute a defense to Contractor's failure to comply with the requirements of the Contract Documents.

13.2 Suspension for Convenience. City reserves the right to suspend, delay, or interrupt the performance of the Work in whole or in part, for a period of time determined to be appropriate for City's convenience. Upon notice by City pursuant to this provision, Contractor must immediately suspend, delay, or interrupt the Work and secure the Project site as directed by City except for taking measures to protect completed or in-progress Work as directed in the suspension notice, and subject to the provisions of Section 13.1(A) and (B), above. If Contractor submits a timely request for a Change Order in compliance with Articles 5 and 6, the Contract Price and the Contract Time will be equitably adjusted by Change Order pursuant to the terms of Articles 5 and 6 to reflect the cost and delay impact occasioned by such suspension for convenience, except to the extent that any such impacts were caused by Contractor's failure to comply with the Contract Documents or the terms of the suspension notice or notice to resume. However, the Contract Time will only be extended if the suspension causes or will cause unavoidable delay in Final Completion. If Contractor disputes the terms of a Change Order issued for such equitable adjustment due to suspension for convenience, its sole recourse is to comply with the Claim procedures in Article 12.

13.3 Termination for Default. City may declare that Contractor is in default of the Contract for a material breach of or inability to fully, promptly, or satisfactorily perform its obligations under the Contract.

(A) ***Default.*** Events giving rise to a declaration of default include Contractor's refusal or failure to supply sufficient skilled workers, proper materials, or equipment to perform the Work within the Contract Time; Contractor's refusal or failure to make prompt payment to its employees, Subcontractors, or suppliers or to correct defective Work or damage; Contractor's failure to comply with Laws, or orders of any public agency with jurisdiction over the Project; evidence of Contractor's bankruptcy, insolvency, or lack of financial capacity to complete the Work as required within the Contract Time; suspension, revocation, or expiration and nonrenewal of Contractor's license or DIR registration; Contractor's failure to procure, maintain, or renew insurance coverage or provide notice of any modifications or reductions in insurance coverage; dissolution, liquidation, reorganization, or other major change in Contractor's organization, ownership, structure, or existence as a business entity; unauthorized assignment of Contractor's rights or duties under the Contract; or any material breach of the Contract requirements.

(B) ***Notice of Default and Opportunity to Cure.*** Upon City's declaration that Contractor is in default due to a material breach of the Contract Documents, if City determines that the default is curable, City will afford Contractor the opportunity to cure the default within ten days of City's notice of default, or within a period of time reasonably necessary for such cure, including a shorter period of time if applicable.

(C) ***Termination.*** If Contractor fails to cure the default or fails to expediently take steps reasonably calculated to cure the default within the time period specified in the notice of default, City may issue written notice to Contractor and its performance bond surety of City's termination of the Contract for default.

(D) ***Waiver.*** Time being of the essence in the performance of the Work, if Contractor's surety fails to arrange for completion of the Work in accordance with the Performance Bond within seven calendar days from the date of the notice of termination pursuant to paragraph (C), City may immediately make arrangements for the completion of the Work through use of its own forces, by hiring a replacement contractor, or by any other means that City determines advisable under the circumstances. Contractor and its surety will be jointly and severally liable for any additional cost incurred by City to complete the Work following termination, where "additional cost" means all cost in excess of the cost City would have incurred if Contractor had timely completed Work without the default and termination. In addition, City will have the right to immediate possession and use of any materials, supplies, and equipment procured for the Project and located at the Project site or any Worksite on City property for the purposes of completing the remaining Work.

(E) ***Compensation.*** Within 30 days of receipt of updated as-builts, all warranties, manuals, instructions, or other required documents for Work installed to date, and delivery to City of all equipment and materials for the Project for which Contractor has already been compensated, Contractor will be compensated for the Work satisfactorily performed in compliance with the Contract Documents up to the effective date of the termination pursuant to the terms of Article 8, Payment, subject to City's rights to withhold or deduct sums from payment otherwise due pursuant to Section 8.3, and excluding any costs Contractor incurs as a result of the termination, including any cancellation or restocking charges or fees due to third parties. If Contractor disputes the amount of compensation determined by City, its sole recourse is to comply with the Claim Procedures in Article 12, by submitting a Claim no later than 30 days following notice from City of the total compensation to be paid by City.

(F) ***Wrongful Termination.*** If Contractor disputes the termination, its sole recourse is to comply with the Claim procedures in Article 12. If a court of competent jurisdiction or an arbitrator later determines that the termination for default was wrongful, the termination will be deemed to be a termination for convenience, and Contractor's damages will be strictly limited to the compensation provided for termination for convenience under Section 13.4, below. Contractor waives any claim for any other damages for wrongful termination including special or consequential damages, lost opportunity costs, or lost profits, and any award of damages is subject to Section 12.8, Burden of Proof and Limitations.

13.4 Termination for Convenience. City reserves the right, acting in its sole discretion, to terminate all or part of the Contract for convenience upon written notice to Contractor.

(A) ***Compensation to Contractor.*** In the event of City's termination for convenience, Contractor waives any claim for damages, including for loss of anticipated profits from the Project. The following will constitute full and fair compensation to Contractor, and Contractor will not be entitled to any additional claim or compensation:

(1) *Completed Work.* The value of its Work satisfactorily performed as of the date notice of termination is received, based on Contractor's schedule of values and unpaid costs for items delivered to the Project site that were fabricated for incorporation in the Work;

(2) *Demobilization.* Demobilization costs specified in the schedule of values, or if demobilization costs were not provided in a schedule of values pursuant to Section 8.1, then based on actual, reasonable, and fully documented demobilization costs; and

(3) *Termination Markup.* Five percent of the total value of the Work performed as of the date of notice of termination, including reasonable, actual, and documented costs to comply with the direction in the notice of termination for convenience, and demobilization costs, which is deemed to cover all overhead and profit to date.

(B) ***Disputes.*** If Contractor disputes the amount of compensation determined by City pursuant to paragraph (A), above, its sole recourse is to comply with the Claim procedures in Article 12, by submitting a Claim no later than 30 days following notice from City of total compensation to be paid by City.

13.5 Actions Upon Termination for Default or Convenience. The following provisions apply to any termination under this Article, whether for default or convenience, and whether in whole or in part.

(A) ***General.*** Upon termination, City may immediately enter upon and take possession of the Project and the Work and all tools, equipment, appliances, materials, and supplies procured or fabricated for the Project. Contractor will transfer title to and deliver all completed Work and all Work in progress to City.

(B) ***Submittals.*** Unless otherwise specified in the notice of termination, Contractor must immediately submit to City all designs, drawings, as-built drawings, Project records, contracts with vendors and Subcontractors, manufacturer warranties, manuals, and other such submittals or Work-related documents required under the terms of the Contract Documents, including incomplete documents or drafts.

(C) ***Close Out Requirements.*** Except as otherwise specified in the notice of termination, Contractor must comply with all of the following:

(1) Immediately stop the Work, except for any Work that must be completed pursuant to the notice of termination and comply with City's instructions for cessation of labor and securing the Project and any other Worksite(s).

(2) Comply with City's instructions to protect the completed Work and materials, using best efforts to minimize further costs.

(3) Contractor must not place further orders or enter into new subcontracts for materials, equipment, services or facilities, except as may be necessary to complete any portion of the Work that is not terminated.

(4) As directed in the notice, Contractor must assign to City or cancel existing subcontracts that relate to performance of the terminated Work, subject to any prior rights, if any, of the surety for Contractor's performance bond, and settle all outstanding liabilities and claims, subject to City's approval.

(5) As directed in the notice, Contractor must use its best efforts to sell any materials, supplies, or equipment intended solely for the terminated Work in a manner and at market rate prices acceptable to City.

(D) ***Payment Upon Termination.*** Upon completion of all termination obligations, as specified herein and in the notice of termination, Contractor will submit its request for Final Payment, including any amounts due following termination pursuant to this Article 13. Payment will be made in accordance with the provisions of Article 8, based on the portion of the Work satisfactorily completed, including the close out requirements, and consistent with the previously submitted schedule of values and unit pricing, including demobilization costs. Adjustments to Final Payment may include deductions for the cost of materials, supplies, or equipment retained by Contractor; payments received for sale of any such materials, supplies, or equipment, less re-stocking fees charged; and as otherwise specified in Section 8.3, Adjustment of Payment Application.

(E) ***Continuing Obligations.*** Regardless of any Contract termination, Contractor's obligations for portions of the Work already performed will continue and the provisions of the Contract Documents will remain in effect as to any claim, indemnity obligation, warranties, guarantees, submittals of as-built drawings, instructions, or manuals, record maintenance, or other such rights and obligations arising prior to the termination date.

Article 14 - Miscellaneous Provisions

14.1 Assignment of Unfair Business Practice Claims. Under Public Contract Code § 7103.5, Contractor and its Subcontractors agree to assign to City all rights, title, and interest in and to all causes of action it may have under section 4 of the Clayton Act (15 U.S.C. § 15) or under the Cartwright Act (Chapter 2 (commencing with § 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the Contract or any subcontract. This assignment will be effective at the time City tenders Final Payment to Contractor, without further acknowledgement by the parties.

14.2 Provisions Deemed Inserted. Every provision of law required to be inserted in the Contract Documents is deemed to be inserted, and the Contract Documents will be construed and enforced as though such provision has been included. If it is discovered that through mistake or otherwise that any required provision was not inserted, or not correctly inserted, the Contract Documents will be deemed amended accordingly.

14.3 Waiver. City's waiver of a breach, failure of any condition, or any right or remedy contained in or granted by the provisions of the Contract Documents will not be effective unless it is in writing and signed by City. City's waiver of any breach, failure, right, or remedy will not be deemed a waiver of any other breach, failure, right, or remedy, whether or not similar, nor will any waiver constitute a continuing waiver unless specified in writing by City.

14.4 Titles, Headings, and Groupings. The titles and headings used and the groupings of provisions in the Contract Documents are for convenience only and may not be used in the construction or interpretation of the Contract Documents or relied upon for any other purpose.

14.5 Statutory and Regulatory References. With respect to any amendments to any statutes or regulations referenced in these Contract Documents, the reference is deemed to be the version in effect on the date that bids were due.

14.6 Survival. The provisions that survive termination or expiration of this Contract include Contract Section 11, Notice, and subsections 12.1, 12.2, 12.3, 12.4, 12.5, and 12.6 of Section 12, General Provisions; and the following provisions in these General Conditions: Section 2.2(J), Contractor's Records, Section 2.3(C), Termination, Section 3.7, Ownership, Section 4.2, Indemnity, Article 12, Dispute Resolution, and Section 11.2, Warranty.

END OF GENERAL CONDITIONS

Special Conditions

1. ***Pre-Construction Conference.*** City will designate a date and time for a pre-construction conference with Contractor following Contract execution. Project administration procedures and coordination between City and Contractor will be discussed. Contractor must present City with the following information or documents at the conference, unless otherwise specified in the Notice to Proceed, for City's review and acceptance before the Work commences:

1.1 Name, 24-hour contact information, and qualifications of the proposed on-site superintendent;

1.2 List of all key Project personnel and their complete contact information, including email addresses and telephone numbers during regular hours and after hours;

1.3 Staging plans that identify the sequence of the Work, including any phases and alternative sequences or phases, with the goal of minimizing the impacts on residents, businesses and other operations in the Project vicinity;

1.4 If required, traffic control plans associated with the staging plans that are signed and stamped by a licensed traffic engineer;

1.5 Draft baseline schedule for the Work as required under Section 5.2 of the General Conditions, to be finalized within ten days after City issues the Notice to Proceed;

1.6 Breakdown of lump sum bid items, to be used for determining the value of Work completed for future progress payments to Contractor;

1.7 Schedule with list of Project submittals that require City review, and list of the proposed material suppliers;

1.8 Plan for coordination with affected utility owner(s) and compliance with any related permit requirements;

1.9 Videotape and photographs recording the conditions throughout the pre-construction Project site, showing the existing improvements and current condition of the curbs, gutters, sidewalks, signs, landscaping, streetlights, structures near the Project such as building faces, canopies, shades and fences, and any other features within the Project area limits;

1.10 If requested by City, Contractor's cash flow projections; and

1.11 Any other documents specified in the Special Conditions or Notice of Award.

2. Authorized Work Days and Hours.

2.1 **Authorized Work Hours.** Except as expressly authorized in writing by City, Contractor is limited to performing Work within the public right of way that impacts vehicular movement shall remain within 8:30 a.m. to 4:00 p.m.

3. Normal Weather Delay Days. This provision is intended to supplement the requirements of General Conditions Section 5.2 on Schedule Requirements and Section 5.3 on Delays and Extensions of Contract Time. Based on historic records for the Project location, Contractor's schedule should assume the following number of normal Weather Delay Days for each month:

Month	**# Normal Weather Delay Days**
January	10
February	10
March	12
April	8
May	4
June	2
July	1
August	1
September	2
October	5
November	8
December	13

Weather Delay Days which do not occur during a given month based on the number of days allocated for that month (above) do not carry over to another month.

4. Close Out Requirements. Contractor's close out requirements include the following, if applicable:

4.1 Contractor must replace, with thermoplastic, any existing striping within and adjacent to the Project site that is damaged during the Work. Partially damaged striping must be replaced in its entirety.

4.2 Contractor must replace any survey monuments that are damaged or removed during the Work, with a Record of Survey filed by a licensed land surveyor as required by California law.

4.3 Before removing any traffic control or street signs on the Project site, Contractor must take photographs showing their original locations. Upon completion of each phase of construction, Contractor must temporarily reset the signs at those locations. Contractor must then replace the signs permanently upon completion of the Work and the cost of their removal and replacement must be included in the Bid Proposal.

END OF SPECIAL CONDITIONS

APPENDIX A

CITY OF SANTA ROSA COMMUNITY WORKFORCE AGREEMENT

CONTRACTOR AGREEMENT TO BE BOUND

The undersigned, as a Contractor or Subcontractor ("Contractor") for the_____Project, (hereinafter the "Covered Project"), for and in consideration of the award to it of a contract to perform work on said Covered Project, and in further consideration of the mutual promises made in the "City of Santa Rosa Community Workforce Agreement" (hereinafter "Agreement"), a copy of which was received and is acknowledged, hereby:

(1) Accepts and agrees to be bound by the terms and conditions of the Agreement, together with any and all amendments and supplements now existing or which are later made thereto.

(2) Agrees to be bound by the legally established local trust agreements as set forth in Article 17 of this Agreement.

(3) Authorizes the parties to such local trust agreements to appoint trustees and successor trustees to administer the trust funds and hereby ratifies and accepts the trustees so appointed as if made by the Contractor;

(4) Certifies that it has no commitments or agreements which would preclude its full and complete compliance with the terms and conditions of the Agreement.

(5) Agrees to secure from any Contractor(s) (as defined in said Agreement) which is or becomes a subcontractor (of any tier) to it, a duly executed Agreement to be Bound in form identical to this document.

The obligation to be a party to and bound by the Agreement shall extend to all work for the Covered Project undertaken by the Contractor.

This letter shall constitute a subscription agreement, to the extent of the terms of the letter.

CONTRACTOR/SUBCONTRACTOR:_____

California Contractor State License No. or Motor Carrier (CA) Permit No.: _____

Name of Authorized Person (print): _____

Signature of Authorized Person: _____

Title of Authorized Person: _____

Telephone Number of Authorized Person:_____

Address of Authorized Person:_____

State Public Works Registration Number: _____

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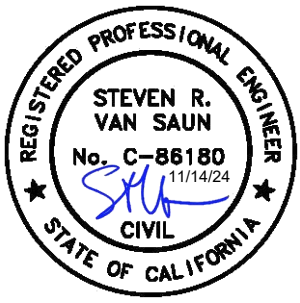
TECHNICAL SPECIFICATIONS

FOR

DUTCH FLOHR NEIGHBORHOOD PARK

CONTRACT NO. C02461



2023

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Dutch Flohr – Landscape Specifications

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32 91 19	Landscape Finish Grading
32 92 00	Turf and Grasses
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32 94 00	Planting Accessories

10 GENERAL CONSTRUCTION

10-3 Mobilization: Mobilization shall conform to Section 9-1.16D(2) of the Standard Specifications, and any modifications herein.

Mobilization shall include the obtaining of all permits; moving onto the site of all equipment and materials; and other construction facilities as required for the proper performance and completion of the work. Mobilization shall include demobilization as defined herein.

Mobilization shall include but not be limited to the following principal items:

- Preparation of Contract by the Contractor.
- Completion of all tasks and submittal of all documents (bonds, insurance, schedule, etc.) required as conditions of issuing the Notice to Proceed.
- Obtaining all required permits.
- Installation of project identification signs as required. The Contractor shall consult with the Engineer for placement.
- Installing temporary construction water supply, power, wiring, and lighting facilities, as required at individual sites.
- Providing field office trailers if needed by the Contractor.
- Moving onto the site of all Contractor's equipment required for operations.
- Having all OSHA required notices and establishment of safety programs.
- Attendance at Pre-Construction Conference of Contractor's principal construction personnel.

Demobilization shall include, but not limited to, removal of all equipment, unused materials, all temporary utilities, job trailers and all temporary communication facilities.

12 TEMPORARY TRAFFIC CONTROL

12-1 General

12-1.01 General: Construction area traffic control devices shall be installed and maintained in accordance with the applicable sections of these Technical Specifications., the Standard Specifications, the current Edition of the California Manual on Uniform Traffic Control Devices (CA MUTCD), the Americans with Disabilities Act (ADA) and as directed by the Engineer.

12-1.03 Flagging Costs: Section 12-1.04, "Payment," of the Standard Specifications is amended to read:

> The cost of furnishing all flaggers, including transporting flaggers, to provide for passage of public traffic through the work under the provisions in Section 7-1.03, "Public Convenience," and Section 7-1.04, "Public Safety," shall be considered as included in the contract lump sum price paid for traffic control and no additional allowance will be made therefor.

12-3 Traffic-Handling Equipment and Devices

12-3.01 General: Prior to commencing construction which will affect existing vehicular and pedestrian traffic, the Contractor shall submit for review by the Engineer, Traffic Control Plans on 11" x 17" sheets of paper which contains only information specifically related to work zone vehicular and pedestrian traffic control. If the Contractor propose to use the current edition of the CA MUTCD published by Caltrans in lieu of a traffic control plan, in specific work operations, they shall submit in writing for consideration which Typical Application Diagram will be used and how it will be applied for each work operation. Traffic Control Plans or proposals shall be submitted for review at least two weeks prior to implementation.

Traffic Control Plans shall contain a title block which contains the Contractor's name, address, phone number, project superintendent's name, contract name, dates and hours traffic control will be in effect, and a space for review acknowledgment.

The content of the Traffic Control Plan shall include, but is not limited to, the following:

1. Show location and limits of the work zone.
2. Give dimensions of lanes affected by traffic control that will be open to traffic.
3. Indicate signing, cone placement, and other methods of delineation and reference to appropriate City or Caltrans Standards.
4. Dimension location of signs and cone tapers.
5. Identify side streets and driveways affected by construction and show how they will be handled.
6. Show how pedestrian traffic will be handled through the construction site. Pedestrian pathways through the work zone shall be in compliance with the requirements of ADA during and after work hours.
7. Identify message board locations. A minimum of 3 changeable message boards shall be required. Location to be determined by Engineer.
8. Demonstrate how two-way traffic will be maintained.

No work except for installation of project identification signs will be allowed to commence prior to approval of the Work Zone Traffic Control Plans.

12-4 Maintaining Traffic

12-4.01 Maintaining Traffic:

1. The full width of the traveled way shall be open for use by public traffic on Saturday, Sundays and designated legal holiday(s), after 4:00 p.m. on Fridays and the day preceding designated legal holidays, and when construction operations are not actively in progress; unless work has specifically been authorized by the Engineer.
2. The location of traffic control signing, barricades, and other facilities shall be monitored frequently (four to five times per day) by the Contractor to verify their proper location. All traffic signal and other traffic control devices shall be maintained at all times.
3. The Contractor shall conduct these operations so as to cause the minimum obstruction and inconvenience to traffic and to places of business, multiple dwelling units and residences adjacent to the work. The Contractor shall notify the Engineer of his planned work and utility service interruption at least five working days in advance to allow time to notify residents and businesses.
4. When construction activities will prevent vehicle access to individual driveways, the Contractor shall notify and receive permission from the affected businesses and residents. Attention is directed to Section 7-1.03, "Public Convenience." **Full access shall be provided to all driveways during non-working hours.**
5. At locations where traffic is routed perpendicular to trench excavation, the excavation shall be conducted in a manner to provide a surface reasonably satisfactory for traffic at all times. Substructure installation or construction shall be conducted on only one-half the width of the roadway at a time, and that portion of the roadway being used by traffic shall be kept open and unobstructed until the opposite side of the roadway is ready for use. Upon completion of the rough grading, the surface of the roadbed shall be brought to a smooth, even condition free from humps and depressions and made satisfactory for traffic.

12-4.01A Construction Traffic: The Contractor shall submit a trucking route along with the traffic controls plans for approval by the Engineer. The route must minimize traffic on residential streets that are not part of the project.

Existing pavement damaged by the Contractor's operations and not shown to be replaced shall be replaced at the Contractor's expense, per City Standards and to the satisfaction of the Engineer.

12-4.02 Closure Requirements: Attention is directed to Section 7-1.03, "Public Convenience," and Section 5-1.05, "Order of Work," of these Technical Specifications..

Exact locations of Project Identification signs and Advance Notice signs (7-1.03, "Public Convenience") shall be determined in the field by the Engineer.

Lane closures will be permitted between the hours of 8:30 a.m. and 4:00 p.m. only. Only one lane at a time may be closed and no lanes shall be closed at any other hours unless specifically approved by the Engineer. The Contractor shall maintain vehicle access to homes and other properties at all times while work is in progress.

The Contractor shall not park construction vehicles, contractor employee vehicles, stage materials or stockpiles in front of any business or residential driveway access and the Contractor shall maintain access to private parking lots within the block where work is in progress. Construction vehicles shall not be left running for any length of time if parked in front of a business or residential unit.

On identified local/residential streets, the Contractor will normally be allowed use of each block (between nearest intersections) for their sole use, without the need to provide 2-way traffic through that block. The Contractor will be required to maintain vehicle access to homes and other properties within the block where work is in progress.

The Contractor shall keep the City of Santa Rosa Fire Department informed regarding the closure of any traveled way. At a minimum, the Contractor shall call the Fire Department at 543-3535 **and** the Communications Center at 543-3666 **daily** to report any traveled way closure. This means immediately upon closure for that day and again immediately after removal of the closure. For closures over multiple days, the daily notification still applies. This requirement does not apply for single lane closures on multiple lane streets.

The Contractor shall notify Sonoma County Transit at (707) 585-7516, Superintendent of Golden Gate Transit at (415) 257-4442, Santa Rosa City Bus at (707) 543-3922, Sonoma County Airport Express at (707) 837-8700, the local Postal Service at (707) 526-0113, and Recology at (800) 243-0291 5 calendar days prior to any lane closures or restrictions in turning movements.

If the Contractor has been given an approved Traffic Control Plan that includes road closures, they shall maintain vehicular access to homes and other properties where work is in progress within the closure area.

Where necessary, and only after receiving written approval from the Engineer, the Contractor may temporarily suspend curb side parking in their immediate work zone. Notification to businesses and residents shall be hand delivered at least 72 hours prior to construction in the affected areas.

Notification shall be as follows:

1. A notice placed on the front door of each home or business where curb side parking will be suspended and attempt made to notify each business or resident verbally that work will be underway within the block and that curb side parking will be suspended during stated working hours and request that vehicles be parked out of the roadway by 8:00 a.m. Service of notice shall not bar use of cars within the block, as individual plans change and emergencies arise.

2. Type 1 barricades every 100 feet adjacent to the curb where parking will be suspended with a notice posted on the barricade stating specific dates and times that curb side parking will be temporarily suspended. If work will not take place in the posted area, then the Contractor shall remove “No Parking” notices.

The Contractor shall maintain vehicle access to all homes and other properties along the work zone. During paving operations, the Contractor will be allowed to temporarily suspend vehicle access to a limited number of driveways when approved by the Engineer. When approved by the Engineer and at least 72 hours prior to suspending access to any driveway, the Contractor shall give both written and verbal notice to the affected businesses and residents and place barricades adjacent to the driveways with posted notices stating the specific dates and times of the suspension for that area. The notice shall also indicate an alternate parking location. Suspension of access to driveway will be permitted only as approved by the Engineer and only between the hours of 8:00 am and 4:30 pm.

Cross streets will require maintenance of at least one-half (1/2) width of each street for traffic purposes, unless a parallel route is approved by the Engineer. Flagging will only be allowed between the hours of 8:30 am and 4:00 pm.

Barricades and flaggers shall be positioned to allow safe turns at intersections and curves.

The Contractor shall maintain or provide traffic control as necessary and as directed by the Engineer for any project related operations that require the presence of City forces. Flaggers, barricades, signing, etc., shall remain in place for protection of City personnel until such time as all temporary lane delineation is complete.

12-4.04 Temporary Pedestrian Access Routes

12-4.04A(1) Summary: The Contractor is directed to Chapter 6D, "Pedestrian and Worker Safety," in the CA MUTCD, the improvement plans, and these Technical Specifications.

Pedestrians shall be provided with a safe convenient and accessible path that, at a minimum, replicates the most desirable characteristics of the existing sidewalk, path or footpath. At no point along the road shall the sidewalks on both sides of the road be closed at the same time.

The Contractor shall construct and maintain temporary pedestrian pathways through the work zone, where required, that shall be in compliance with the requirements of the Americans with Disabilities Act (ADA), and the CA MUTCD.

Pedestrian routes shall not be impacted for the purposes of any non-construction activities such as parking of vehicles or equipment, or stock piling of materials. Pedestrians shall not be led into conflicts with work site vehicles, equipment, or operations.

Pedestrian routes shall be open and accessible at the end of the work day unless an alternate ADA compliant route has been approved by the Engineer. The construction of curb ramps and/or long sections of sidewalk do not alleviate the Contractor from this requirement.

[Version: 09/08/19 CDA STD2018]

13 WATER POLLUTION CONTROL

13-1 General

13-1.01A: Water Pollution Control shall be performed in accordance with Section 13, Water Pollution Control, of the Standard Specifications and these technical specifications. In addition, construction activities shall comply with:

The current California Water Quality Control Board, North Coast Region Order No. 2022-0057-DWQ National Pollutant Discharge Elimination System Municipal Storm Water Permit No. CA0025054, commonly referred to as the "Storm Water Permit". A copy of the Storm Water Permit is available for review at the City of Santa Rosa Transportation and Public Works Department, 69 Stony Circle, Santa Rosa, CA, and at www.srcity.org/stormwaterpermit.

The California Stormwater Quality Association Storm Water BMP Handbook for Construction (CASQA Handbook). BMPs shall be selected, installed and maintained in accordance with the latest edition. A copy of the handbook can be viewed at the City of Santa Rosa Department of Transportation and Public Works office at 69 Stony Circle or downloaded from CASQA, http://www.casqa.org/.

In this technical specification the CASQA Handbook BMP numbers are appended to the associated Standard Specification sections. If a conflict occurs the CASQA Handbook BMP's shall govern.

13-3 Storm Water Pollution Prevention Plan

13-3.01 General

Section 13-3 includes specifications for developing, implementing and maintaining a Storm Water Pollution Prevention Plan (SWPPP) required by this General Permit.

A Notice of Intent for coverage under the General Permit will be filed by the City. This project has been determined to be a risk level 2 traditional construction project. The City will pay the fee associated with the Notice of Intent.

It is the Contractor's responsibility to develop and implement the SWPPP. Included in the SWPPP will be a project description, site map, erosion control plan, construction site monitoring program, reporting and inspection forms, contact list, and all other information necessary to comply with the requirements of the General Permit. The work under this section also includes updating the SWPPP.

The SWPPP shall reference CASQA BMP fact sheets and follow the format suggested in Appendix B of the CASQA handbook. The Contractor may substitute another format if approved by the Engineer and it complies with all requirements of the General Permit.

All discharges of storm water from the project must comply with the General Permit.

A storm water annual report shall be prepared and submitted by the Contractor. The annual report must cover the preceding period from July 1st to June 30th (or Notice of Completion).

This work includes collecting and submitting all required data to SMARTS to comply with the Annual Report requirements of the General Permit and SMARTS.

Do not start job site activities until:

1. The SWPPP is authorized.
2. The waste discharge identification number (WDID) is issued.
3. SWPPP review requirements have been fulfilled. If the RWQCB requires time for review, allow 30 days for the review.

A current copy of the SWPPP shall be kept on site when the Contractor or its subs are working.

13-3.02 SWPPP Preparation and Implementation

The SWPPP shall be written, amended and certified by a Qualified SWPPP Developer (QSD) as defined in the General Permit, Section VII.B.1.

The Contractor shall provide a Qualified SWPPP Practitioner (QSP), as defined in the General Permit, Section VII.B.3, to ensure full compliance with the General Permit and implementation of all elements of the SWPPP, including all storm water inspections and visual observations, Rain Event Action Plans, sampling and analysis and record keeping. The QSP shall ensure that all BMPs required by this SWPPP are implemented. The QSP shall notify the QSD of needed revisions to the SWPPP to reflect current conditions and all proposed changes.

This work includes gathering and presenting, in an approved format, all information necessary to produce a SWPPP that complies with the General Permit. The SWPPP shall be developed by a QSD and include, but not limited to: project description, site maps, erosion control plans, construction site monitoring program, contact information, monitoring and reporting forms, project specific BMP fact sheets, schedule, training documentation, designated QSD and QSP qualifications, SWPPP amendment log sheet and all other information necessary to comply with the General Permit and these Special Provisions.

The SWPPP shall be updated to reflect current project conditions, personnel, schedule, alterations to plans, BMP modifications or substitutions, relocation of staging and material stockpiling areas and any other changes that are not reflected in the SWPPP.
Prepare and revise SWPPP shall be paid for at the contract lump sum price, which price shall include full compensation for preparing and revising the SWPPP and no additional allowance will be made therefor.

13-3.03 Submittals

Within 20 days of Contract approval:

1. Submit 1 copy of your SWPPP for review. Allow 10 days for the City's review. The Engineer provides comments and specifies the date when the review stopped if revisions are required.
2. Change and resubmit a revised SWPPP within 5 days of receiving the Engineer's comments. The City's review resumes when a complete SWPPP has been resubmitted.
3. When the Engineer authorizes the SWPPP, upload an electronic copy to the State's Storm Water Multiple Application and Report Tracking System (SMARTS) and submit 2 printed copies of the authorized SWPPP to the City.
4. If the Engineer requests changes to the SWPPP based on the RWQCB's comments, amend the SWPPP within 5 days.

13-3.04 Training

Employees must receive initial water pollution control training before starting work at the job site. For project managers, supervisory personnel, subcontractors, and employees involved in water pollution control work:

1. Provide storm water training in the following subjects:
    a. Water pollution control rules and regulations
    b. Implementation and maintenance for:
        i. Temporary soil stabilization
        ii. Temporary sediment control
        iii. Tracking control
        iv. Wind erosion control
        v. Material pollution prevention and control
        vi. Waste management
        vii. Non-storm water management

2. Conduct weekly training meetings covering:
    a. Deficiencies and corrective actions for water pollution control practices
    b. Water pollution control practices required for work activities during the week
    c. Spill prevention and control
    d. Material delivery, storage, usage, and disposal
    e. Waste management
    f. Non- storm water management procedures

Storm Water training shall be documented in the SWPPP.

13-3.05 Construction Site Monitoring Program

The SWPPP includes a Construction Site Monitoring Program containing instructions and forms. Monitoring and inspections will take place during normal working hours.

BMP inspection shall be performed by a QSP and documented on an approved form. A copy of the inspections will be kept in the SWPPP on site. An additional copy shall be given to the City. Noted deficiencies shall be brought to the Project Superintendent or Foreman's attention and Engineer and corrective action take within 2 working days or before any rain event.

Monitor the National Weather Service's forecast on a daily basis. For the National Weather Service's forecast, go to the Web site for the National Weather Service. Printed copies of the forecast shall be kept in the SWPPP.

The QSP shall prepare all Rain Event Action Plans (REAP) 48 hours in advance of predicted rain event with a 50% or greater probability. The REAP shall be kept on site.

Use the *Storm Water Site Inspection Repod* form for documenting site inspections.

1. Inspections of BMPs identified in SWPPP:
    a. On a predetermined schedule of at least once a week;
    b. Before a forecasted storm event;
    c. After a qualifying rain event that produces site runoff;
    d. At 24-hour intervals during extended storm events;
2. Daily inspections of (if applicable):
    a. Storage areas for hazardous materials and waste
    b. Hazardous waste disposal and transporting activities
    c. Hazardous material delivery and storage activities
3. Inspections of:
    a. Vehicle and equipment cleaning facilities:
        i. Daily if vehicle and equipment cleaning occurs daily

ii. Weekly if vehicle and equipment cleaning does not occur daily

b. Vehicle and equipment maintenance and fueling areas:

i. Daily if vehicle and equipment maintenance and fueling occur daily

4. Pre and post rain inspections

a. pre-rain event inspection within 48 hours of predicted qualifying storm to verify the site and the BMPs are ready for the predicted rain.

b. post-rain event inspection within 48 hours after a qualifying storm to observe the discharge locations and the discharge of any stored or contained rainwater; determine if BMPs functioned as designed; and identify if any additional BMPs are required.

This work includes providing a QSP, performing weekly BMP inspections, documentation, coordinating with Contractor and project inspector, providing QSD with SWPPP update information and all other work necessary to comply with the inspection requirements of the SWPPP.

Qualifying Rain Event Inspections, include both pre-rain and post-rain inspection, include providing a QSP, performing pre-rain inspections and post-rain inspections for qualified rain events as required in the SWPPP, documentation, coordinating with Contractor and project inspector and all other work necessary to comply with the qualifying rain event inspection requirements of the SWPPP.

13-3.05a Sampling

The QSP will sample for pH and turbidity during each qualifying rain event at all locations where runoff from the project is discharged offsite. Samples must be representative of the runoff flow and characteristics of the site's discharges. All locations discharging runoff from the site must be sampled. Additional samples for non-visible pollutants may be collected for lab analysis if required.

Three measurements will be taken at each discharge location for each working day of a qualified rain event. Measurements will be taken at the beginning of the work day or discharge, in the middle and one near the end of the discharge or work day. All measurements will be documented on sampling forms with a copy kept in the SWPPP and one given to the City. Discharge locations shall be marked on the site map in the SWPPP.

Measurements will be made using portable field meters. Each meter shall have been calibrated prior to use. A meter calibration log sheet shall be kept in the SWPPP. Measurements will be made during normal working hours.

This work includes collecting samples, measuring pH and turbidity, documentation, maintaining and calibrating pH and turbidity meters, submitting data to SMARTS and all other work necessary to comply with the sampling requirements of the SWPPP and the General Permit.

13-3.06 Construction

The SWPPP shall be updated to reflect current project conditions, personnel, schedule, alterations to plans, BMP modifications or substitutions, relocation of staging and material stockpiling areas and any other changes that are not reflected in the SWPPP or on the plans. A printed copy of the authorized SWPPP shall be at the job site whenever there is project related activity at the site.

The Contractor shall:

1. Install appropriate BMP materials and devices as listed in the SWPPP, before performing work activities.
2. Install soil stabilization materials (BMPs) in all work areas that are inactive or before storm

events.

3. Repair or replace water pollution control practices within 48 hours of discovering any damage, unless a longer period is authorized by the Engineer.
4. The City does not pay for the cleanup, repair, removal, disposal, or replacement of BMP devices due to improper installation or Contractor negligence.

The QSP shall report all non-compliance to the City.

13-3.07 Definitions

Active Area: Area where soil-disturbing work activities have occurred at least once within 15 days.

Construction Phase: Includes (1) highway construction phase for building roads and structures, (2) plant establishment and maintenance phase for placing vegetation for final stabilization, and (3) suspension phase for suspension of work activities or winter shutdown. The construction phase continues from the start of work activities to Contract acceptance.

Inactive Area: Area where soil-disturbing work activities have not occurred within 15 days.

Normal Working Hours: Hours specified in the Special Provisions.

Qualifying Rain Event: Storm that produces at least 0.5 inch of precipitation with a 48-hour or greater period between rain events.

Storm Event: Storm that produces or is forecasted to produce at least 0.10 inch of precipitation within a 24-hour period.

14 ENVIRONMENTAL STEWARDSHIP

14-9.03 Dust Control

14-9.03A General: Sweeping per section 14-9.03C shall also be performed to prevent and alleviate dust.

Sweeping, covering stockpiles, applying water, and/or dust palliative, to control dust caused by public traffic is not change order work.

14-9.03C Construction: All dust-producing work and unpaved construction sites shall require a minimum watering in the middle and ending of each workday. The frequency of watering shall increase if dust is airborne. Watering shall not produce runoff.

Contractor shall maintain dust control to the satisfaction of the Engineer, 7 days a week, 24 hours per day.

At the end of each work day the Contractor shall thoroughly sweep all streets in the work zone to minimize airborne dust.

At the end of each work week the Contractor shall sweep all streets in the work zone with a commercial street sweeping truck equipped with a rear pick up broom.

At the Engineer's discretion additional sweeping or watering may be required, including the use of a commercial street sweeping truck equipped with a rear pick up broom, at any time or place.

14-9.03D Payment: Full compensation for conforming to this section shall be considered as included in the prices paid for the **various contract items** of work and no additional compensation will be allowed.

14-10.01 General: The Contractor shall dispose of all portland cement concrete and asphalt concrete, generated from removal or demolition activities on the project, at a recycler for these materials.

All other excess materials from the project shall become the property of the Contractor and shall be disposed of by him, at his expense.

14-10.02 Solid Waste Disposal and Recycling Report: Submit a Solid Waste Disposal and Recycling Report prior to final acceptance of work performed under the Contract. Show the types and amounts of project-generated solid waste taken to or diverted from landfills or reused on the project.

Submit a Solid Waste Disposal and Recycling Report prior to Contract acceptance. Show the types and amounts of project-generated solid waste taken to or diverted from landfills or reused on the project.

The Contractor shall provide receipts verifying delivery and approximate quantity (in tons) of the material delivered to a material recycler.

14-10.03 Payment: Full compensation for conforming to this section shall be considered as included in the prices paid for the **various contract items** of work and no additional compensation will be allowed.

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15 EXISTING FACILITIES

15-1.03A General: Existing facilities disturbed by construction shall conform to the applicable provisions of Section 5-1.36A. All existing active utilities found to reside in excavated areas shall be supported in place with service maintained during construction. The Contractor shall be responsible for any damage caused by their operations and any needed repairs shall be completed to the Engineer's satisfaction.

Existing storm drains found to reside in excavated areas shall be supported, removed, or replaced at the Contractor's option and at no additional cost to the City. The Contractor shall be responsible for maintaining the existing line and grade of the storm drains. If the Contractor elects to remove and replace, it shall be done per applicable City Standards and Specifications.

Existing utility trenches and/or structures that are in close proximity to proposed trenches shall be safeguarded in an appropriate manner from damage.

15-1.04 Payment: Full compensation for supporting, removal and disposal of existing utilities and their appurtenances is considered as included in the contract prices paid for **various contract items** of work and no additional allowance will be made therefor.

15-2.02C Traffic Stripes and Pavement Markings: All traffic stripes, pavement markings or any other traffic markings shall be removed by the Contractor to the satisfaction of the Engineer and in accordance with Section 84 of the Standards and the Plans.

15-2.02D Pavement Markers: All raised pavement markers shall be removed by the Contractor to the satisfaction of the Engineer and in accordance with Sections 82 of the Standard Specifications, City Standards, and the Plans.

15-2.02E Payment: Full compensation for the replacement of all traffic stripes, pavement markings, and other traffic markings and all raised pavement markers disturbed by construction and not specifically shown to be replaced on the Project Plans shall be considered as included in the prices paid for **various contract items** of work and no additional allowance will be made therefor.

15-3.03 Construction: All removed concrete and asphalt concrete shall become the property of The Contractor and shall be immediately off-hauled. None of the removed concrete shall be dumped or stockpiled on the work site. The Contractor shall dispose of all removed concrete and asphalt concrete at a recycler for this material. Burying of broken concrete or asphalt concrete within the limits of the project will not be allowed.

All concrete which is to be removed from sidewalk, curb, and gutter areas shall be removed to the nearest score mark or construction joint as directed by the Engineer unless otherwise noted on Project Plans. The edge of existing concrete to remain shall be neat and free of defects. Saw cutting may be required to achieve this.

Concrete removal includes removal of any reinforcing steel embedded in the concrete and no additional allowance will be made for the removal of such steel.

Aggregate base shall be removed as required to accommodate the proposed improvements.

Irrigation facilities may be encountered during concrete removal and replacement. The Contractor shall exercise care in areas where irrigation facilities are to remain and repair any damage done by their operations at no additional cost to the City.

Landscaping and other surfaces or structures that are to remain that are damaged or destroyed during the removal of existing concrete or asphalt concrete shall be restored to original condition at no additional cost to the City. Your attention is directed to Section 5-1.36A “Property and Facility Preservation” of these Technical Specifications.

15-8 Tree Root Pruning: All tree roots two inches and greater which are encountered during excavation must be pruned by hand. The root shall be cut cleanly with a saw to avoid splits. When digging within the drip line of trees, the Contractor shall exercise extreme caution to avoid pulling on roots with excavation equipment. Hand dig around all roots greater than one inch in diameter. The Contractor shall notify the Engineer when encountering roots within the drip line of trees which are greater than one inch. If the Engineer elects to get direction from an arborist, the Contractor shall redirect crews to other contract work after safeguarding the area.

15-9 Remove Tree and Grind Stump: The workmanship shall be performed to the best general standards in the industry. All precautions shall be taken to ensure the protection of existing adjacent public or private property.

The successful bidder or the successful bidder's subcontractor must be able to demonstrate knowledge and abilities to perform the required work by possessing a valid California D49 Tree Service Contractor's License and possess the tools and equipment necessary to perform the required work.

Stumps and roots in the planter area shall be removed to a full 16-inch depth below the finish grade. The stump and root holes shall be backfilled and compacted with approved native or fill material.

[Revised: 09/10/19-CDA STD2018]

19 EARTHWORK

19-1 General

19-1.01 General:
Non-contaminated site: See Section 19-2.03B, “Surplus Material,” of these Technical Specifications.

19-1.01A Summary: Earthwork shall also include excavation for trenching.

19-1.03B Unsuitable Material: Stabilization of unsuitable material shall comply with the following provisions:

A. Unsuitable material may be processed in place, may be excavated and placed on the grade or other locations suitable for further processing, or may be partially excavated and partially processed in place.

B. Processing may consist of drying to provide a stable replacement material..

C. Stabilized material shall be placed and compacted in layers as hereinafter specified for constructing embankments.

19-1.03C Grade Tolerance: When aggregate subbase or aggregate base are to be placed on the grading plane, the grading plane shall not vary more than 0.05' above or 0.1' below the grade established by the Engineer.

19-2.03B Surplus Material: None of the excavated material shall be disposed of on the work site. All material excavated from trenches in the project area shall be the property of the Contractor. Prior to disposal of any excess material from the work site, the Contractor shall submit to the Engineer written authorization for such disposal and entry permission signed by the approved disposal site. Contractor shall comply with all disposal regulations such as City, County, and/or State permits and licenses, as may be required.

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20-10 BIORETENTION

20-10 GENERAL

20-10.01A General:

A. This work will consist of constructing bioretention areas, to the lines, grades, and dimensions shown on the plan in accordance with these technical specifications. Bioretention areas will include excavation, grading, bioretention soil mix, moisture barriers, conforming to the City Standards, the Standard Specifications, and these Technical Specifications.
B. Refer to related technical specifications for constructure drainage structures, storm drain, and other appurtenances to the bioretention areas.
C. All work will be performed in compliance with the current City of Santa Rosa Low Impact Development Technical Design Manual.

20-10.01B Submittals:

A. Submit Product Data for the following:
    a. Bioretention soil mix
    b. Moisture barrier

20-11.01C Quality Assurance: Conform to the quality control requirements of the product manufacturer, the City Standards, the Standard Specifications, the established reference documents, and these Special Provisions.

20-11.02 Materials:

A. Bioretention soil mix shall be a Sandy Loam Soil mix will be a commercially blended mix of: 50% Sand, 30% loam, 20% compost, as available from Stony Point Rock Quarry, Inc. 707-795-1775, or equal. Bioretention soil mix will meet the following requirements:
    • The percolation rate of the mix will be between 5” and 10” per minute.
    • The organic content will be 2.5% minimum by total weight
    • Fine gravel content to be between 5-8% total by weight.
    • Coarse sand content to be less than 2% total by weight
    • Ph and nutrients in a range preferable for plant growth.
B. Moisture barrier within the bioretention areas will be a 20-mil minimum thickness non-reinforced polyvinyl chloride (PVC) geomembrane for use in buried applications and will conform to ASTM Standard D7176, the Standard Specifications, all Amendments, and these special provisions.
C. PVC geomembrane sampling frequency will be in accordance with ASTM D4354, or as approved by the Engineer. The geomembrane subgrade will have a smooth, finished surface, free form pockets, ruts, sharp objects or other discontinuities that, in the judgment of the Engineer, may contribute to puncture or bridging of the material. You and the Engineer will inspect the subgrade surface immediately prior to the deployment of each geomembrane panel.
D. Joints in the geomembrane will be minimized. Panels will be joined utilizing approved seaming methods. Dual-track fusion welding will be required where feasible. Chemical welds will be made only where approved by the Engineer. Any damaged caused to the geomembrane by you will be repaired or replaced, as approved by the Engineer, at the expense of the contractor.

20-11.03 Construction:

A. Bioretention areas will not be constructed until all contributing drainage areas are stabilized as shown on the Contract Plans and to the satisfaction of the Engineer. Bioretention areas will not be used as sediment control facilities. No heavy equipment will operate within the perimeter of a bioretention facility during excavation, underdrain and moisture barrier placement, backfilling, or mulching of the bioretention areas.
B. The bioretention areas will be excavated to the dimensions, side slopes, and depths shown on the plans. The method of excavation will minimize the compaction of the bottom of the bioretention areas. Excavators and backhoes, operating on the ground adjacent to the bioretention areas, will be used to excavate the areas if possible. Low ground-contact pressure equipment may also be used for excavation. No heavy equipment will be allowed on the bottom of the bioretention facility.
C. Excavated materials will be removed from the bioretention areas. Excavated materials will be used or disposed of in conformance with the Standard Specifications and these Special Provisions.
D. Prior to placing the bioretention soil mix, the bottom of the excavation will be scarified to a minimum depth of 6 inches to alleviate any compaction of the areas bottom. Any substitute method for scarifying must be approved by the Engineer prior to use. Any ponded water will be removed from the bottom of the areas and the soil will be friable before scarifying.
E. The bioretention soil mix will be placed and graded using low ground contact pressure equipment or by excavators and/or backhoes operating on the ground adjacent to the bioretention areas. No heavy equipment will be used within the perimeter of the bioretention areas before, during, or after the placement of the bioretention soil mix. The bioretention soil mix will be placed in horizontal layers not to exceed 12 inches for the entire area of the bioretention areas. The bioretention soil mix will be compacted by saturating the entire bioretention areas after each lift of bioretention soil is placed. Water for saturation will be applied by spraying or sprinkling. Saturation of each lift will be performed in the presence of the Engineer. An appropriate sediment control device will be used to treat any sediment-laden water discharged from the underdrain. If the bioretention soil mix becomes contaminated during the construction of the areas, the contaminated material will be removed and replaced with uncontaminated material at no additional cost to the City. Final grading of the bioretention area will be performed after a 24-hour settling period.
F. The final grade of the bioretention area will be inspected by the Engineer prior to placement of topsoil lift and will be within 1” of the lines and grades identified on the plan.
G. Additional execution guidelines from Reference Document E from City of Santa Rosa and County of Sonoma LID Technical Design Manual regarding bioretention soil mix will be applied and adhered to during the construction of the bioretention area.

26 AGGREGATE BASE

26-1.01 General

26-1.01A Summary: Aggregate base shall be Class 2 conforming to and placed in accordance with the requirements of Section 26 of the Standard Specifications, with the following modifications and additional requirements.

Rolling shall commence immediately after spreading of the damp material and before the material has dried sufficiently to allow separation between the fine and coarse particles.

26-1.02B Class 2 Aggregate Base: The minimum sand equivalent shall be 31 for any individual test.

26-1.03E Compacting: The surface of the finished aggregate base shall be firm and unyielding. Any visible movement vertically or horizontally of the aggregate base under the action of construction equipment or other maximum legal axle loads shall be considered as evidence that the aggregate base does not meet this requirement.

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39 HOT MIX ASPHALT

39-1.01 General:

39-1.01A Summary:

Section 39 includes specific specifications for producing and placing Hot Mix Asphalt (HMA) by mixing aggregate and asphalt binder at a mixing plant and spreading and compacting the HMA mixture.

39-1.01B Definitions: For these specifications, HMA and asphalt concrete shall be the same.

At the Contractor's option, and at no additional expense to the City, a Cal-trans approved Warm Mix Asphalt (WMA) technology may be added to the HMA. However, the asphalt concrete shall be manufactured at HMA temperatures (300F +/- 25F) at a dosage rate approved by the Engineer. All other HMA project specifications shall be adhered to.

Use Section 39-3 Method construction process of these specifications for HMA production and construction.

39-1.01C Description: Asphalt concrete shall be placed in separate lifts as shown on the Project Plans.

Roadway excavation and asphalt concrete base paving shall be completed for half the street width before beginning excavation of the remaining street.

All existing asphalt concrete that is adhered to the top of gutters shall be removed prior to placement of new asphalt concrete surface in a manner satisfactory to the Engineer and that does not damage the gutter.

Asphalt concrete base shall be placed on the same day the area is excavated so that all areas will either have existing asphalt surface or new asphalt concrete base by the end of each working day. No subgrade areas shall be exposed or open to traffic during non-working hours.

Asphalt concrete base paving shall be accomplished by use of a paving machine. The asphalt mix shall be transferred from the trucks to the hopper of the paving machine by means of a shoulder machine equipped with a side caster. Any equipment used to transfer asphalt concrete to the paving machine shall not exceed the load capacity of any surface it is driven over and shall not produce rutting or pumping of the existing roadway surface or newly placed asphalt concrete base at any time.

Construction vehicles/equipment shall not be allowed on the newly placed asphalt concrete base until the day after it is placed. Super Dumps or other trucks with liftable trailing load bearing axles shall not be allowed on the newly placed asphalt concrete base at any time. All trucks or other construction equipment to be driven on the newly placed asphalt concrete base shall not exceed the surface load bearing capacity and shall not produce rutting or pumping at any time.

All longitudinal surface paving joints shall fall on a lane line. Longitudinal Subsurface paving joints shall be offset by at least 6 inches.

No longitudinal vertical drop offs will be allowed between the lanes when the roadway is opened to traffic. Where a longitudinal vertical drop off occurs along the roadway crown between the existing street surface and the new asphalt concrete base, the Contractor shall grind a 10:1 taper in the existing surface to make a temporary conform to accommodate traffic. The temporary taper shall be ground after the asphalt concrete base paving has been completed each day.

Where a vertical drop off will occur between the top of the new asphalt concrete base and a valley gutter, driveway, or side street conform, the Contractor shall install a temporary 10:1 asphalt taper.

Where a vertical drop off would occur between the asphalt concrete base and a pedestrian ramp, the Contractor shall install a temporary 12:1 asphalt taper.

All ground edges adjacent to curb ramps and driveways shall have temporary asphalt concrete ramps (tapers) installed if the asphalt concrete surfacing cannot be placed back the same day the existing pavement is removed. Kraft paper or other bond breaker shall be placed under the conform ramps to facilitate removal when paving operations start.
Kraft paper or other bond inhibitor shall be placed under the temporary asphalt taper to facilitate removal when paving operations resume.

Temporary asphalt tapers and associated bond breaker material shall be removed prior to placement of the asphalt concrete surface lift. Where the bond breaker material adheres to the asphalt concrete base course it shall be fully removed with a method, approved by the Engineer that will in no way degrade the quality of the final product.

The Engineer shall provide reference points and cut sheets for the placing of asphalt concrete base and asphalt concrete surface.

The Contractor shall furnish an excavation and paving plan which shall include the following:

1. Requested location for survey staking of reference points
2. Asphalt plant supplying mix including aggregate source
3. Disposal site for spoils
4. Type of trucks and equipment to be used
5. Haul routes through adjacent residential streets
6. Staging locations
7. Sequencing
8. Taper grind locations

The Contractor shall set a string line based on the reference points to control the grade of the paving machine along the crown line. A rotary laser level may be used in lieu of a string line provided the level can be accurately set to the design centerline slope, and the detector is directly mounted to the paving machine screed to control the grade of the paving along the crown line. The Contractor shall also furnish a grade setter to insure that the asphalt concrete base and asphalt concrete surface paving conforms to the lines and grades established by the Engineer.

A tack coat of SS-1h or SS-1 emulsified asphalt shall be applied to all asphalt concrete and concrete surfaces, and allowed to break immediately in advance of placing all lifts of asphalt concrete. Tack coat applied to horizontal surfaces shall be applied with a tack truck, at a minimum residual rate of 0.02 gal/sqyd. Unless otherwise shown on the Plans, tack coat shall also be applied to all vertical mating surfaces and conforms to existing pavement, curbs, gutters, and construction joints, and allowed to break immediately in advance of placing all lifts of asphalt concrete. The tack coat shall be reapplied 1) where it becomes contaminated, and 2) where it is significantly tracked (removed) from the surface.

The asphalt concrete base and asphalt concrete surface courses shall be allowed to cool to 160° F at mid depth before the roadway is opened to traffic each day.

At the end of each working day the Contractor shall place retro reflectorized signs and delineators, as required for night time use in accordance with the Standard Specifications and Section 12 of these Technical Specifications to warn the public of the existing conditions.

At the end of each work day during paving operations the location of all valves, manholes, monuments and any other facility overlaid with asphalt concrete and required to be raised to grade shall be marked in white paint.

All ground edges adjacent to curb ramps and driveways shall have a temporary asphalt concrete ramps (tapers) installed if the asphalt concrete surfacing cannot be placed back the same day the existing pavement is removed. Kraft paper or other bond breaker shall be placed under the conform ramps to facilitate removal when paving operations start.

39-1.01D Asphalt Concrete Conform: Asphalt concrete conform will be used where shown on plans and as directed by the Engineer and shall conform to these Technical Specifications. Asphalt Concrete Conform shall consist of removal of existing asphalt concrete and aggregate base as required to provide an asphalt concrete conform a minimum two feet in width and a minimum six inches thick.

Existing asphalt concrete pavement and aggregate base course shall be removed to accommodate the asphalt concrete conform and disposed of as specified in these Technical Specifications. Existing asphalt concrete shall be sawcut and removed at the locations and to the dimensions shown on the plans. Any removal performed by the Contractor beyond the limits of the asphalt concrete conform shown on the Project Plans shall be replaced to match existing.

39-1.02 Materials:

39-1.02B Tack Coat: Tack coat must comply with the specifications for asphaltic emulsion or asphalts. Tack coat shall be diluted SS1 or SS1h.

39-1.02C Asphalt Binder: Asphalt binder in HMA must comply with the specifications for asphalts.

Asphalt binder to be mixed with aggregate for asphalt concrete surface, leveling and base shall be PG64-16 grade paving asphalt.

The amount of asphalt binder to be mixed with the aggregate shall be specified by the Engineer at the time of paving. Different asphalt binder content may be specified for each lift and each location.

Liquid anti-stripping agent (LAS) shall be added to the asphalt binder at a rate of 0.5 to 1.0% by weight of asphalt binder. The LAS shall be AD-here LOF 65-00 or equivalent, and shall be stored, measured, and blended with the asphalt binder in accordance with the anti-stripping agent manufacture's recommended practice.

The LAS can be added at the asphalt plant or at the refinery. When added at the asphalt plant, the equipment shall indicate and record the amount of LAS added. If added at the refinery, the shipping ticket from the refinery shall certify the type and amount of LAS added.

39-1.02E Aggregate: The aggregate grading of the various types of asphalt concrete shall conform to one of the following as directed by the Engineer:

Surface or Leveling Course ½-inch Coarse HMA Type A,

Base Course ¾-inch HMA Type A

Aggregates should be of high abrasion resistance and durability. Excessively soft and friable aggregates are not allowed.

The specified aggregate gradation must be determined before the addition of asphalt binder and includes supplemental fine aggregate.

The proposed aggregate gradation must be within the TV limits for the specified sieve sizes shown in the following tables:

Aggregate Gradation
(Percentage Passing)
HMA Types A

3/4-inch HMA Type A

Sieve sizes	TV limits	Allowable tolerance
1"	100	--
3/4"	95–100	TV ± 5
3/8"	65–80	TV ± 5
No. 4	49–54	TV ± 5
No. 8	36–40	TV ± 5
No. 30	18–21	TV ±5
No. 200	2.0–8.0	--

1/2-inch Coarse HMA Type A

Sieve sizes	TV limits	Allowable tolerance
3/4"	100	—
1/2"	94–100	--
3/8"	70–90	--
No. 4	55–61	TV ± 5
No. 8	40–45	TV ± 5
No. 30	20–25	TV ± 5
No. 200	2.0–8.0	--

Before the addition of asphalt binder and lime treatment, aggregate must have the values for the quality characteristics shown in the following table:

Quality characteristic	Test method	HMA Type A
Percent of crushed particles Coarse aggregate (% min.) One fractured face Two fractured faces Fine aggregate (% min) (Passing no. 4 sieve and retained on no. 8 sieve.) One fractured face	California Test 205	 90 75 70
Los Angeles Rattler (% max.) Loss at 100 rev. Loss at 500 rev.	California Test 211	 10 45
Sand Equivalent (min.)[a]	California Test 217	50[b]
Fine aggregate angularity (% min.)	California Test 234	45
Flat and elongated particles (% max. by weight @ 5:1)	California Test 235	10

[a] Reported value must be the average of 3 tests from a single sample.
[b]Minimum Sand Equivalent of 45 for asphalt concrete base.

39-1.02F Reclaimed Asphalt Pavement: Reclaimed Asphalt Pavement (RAP) may be used at the Contractor's option. If RAP is used, the Contractor shall provide the proposed mix design and the quality control for all HMA that includes RAP, in accordance with the following requirements:

1. Contractor shall provide City with a mix design per California Test 384 for the proposed RAP HMA.
2. As part of City's evaluation of RAP HMA, Contractor and City shall perform bitumen ratio tests on at least six split samples of Contractor's RAP to establish correlation between respective binder ignition ovens.
3. RAP shall be processed from reclaimed Asphalt Concrete pavement only.
4. RAP pile(s) shall be separate from the stacker pile, not intermingled with other materials, and stored on smooth surfaces free from debris and organic material.
5. The project RAP pile shall be processed and mixed, identified, and of adequate quantity for the proposed project. "Live" piles shall not be permitted.
6. Contractor shall sample the RAP pile and determine the bitumen ratio (using same binder ignition oven used in #2 above) and provide the test results to the City at least one week prior to producing RAP HMA.
7. A minimum of three samples shall be tested for bitumen ratio for RAP pile of 1500 tons, or portion thereof.
8. RAP pile shall be mixed such that individual bitumen ratio test results of RAP pile so not vary more than +/- 0.5%.
9. During RAP HMA production, RAP shall be sampled by the Contractor off of the belt (into the batch plant), per method established by the City, and samples provided to the City.
10. Bitumen ratio of RAP sampled off of the belt shall be 4.0% minimum, as determined by City binder ignition oven. City shall select binder content for RAP HMA mix per Specifications.

11. RAP content shall be no more than 20% by dry aggregate mass in the HMA. If proposing a change in the RAP content, the Contractor shall notify the Engineer. If the content changes more than 5%, the Contractor shall submit a new mix design.
12. Moisture content of RAP pile shall be 4.0% maximum, and shall be tested the day prior to the day of paving and tested/monitored during each day of HMA production.
13. RAP pile(s) shall be protected from exposure to moisture.
14. RAP HMA shall comply with all the specifications for HMA.
15. If batch mixing is used, RAP shall be kept separate from the virgin aggregate until both ingredients enter the weigh hopper or pugmill. After introduction to the pugmill and before asphalt binder is added, the mixing time for the virgin aggregate and RAP shall not be less than five seconds. After asphalt binder is added, the mixing time shall not be less than 30 seconds.
16. If continuous mixing is used, the RAP shall be protected from direct contact with the burner flame with a device such as a shield, separator, or second drum.
17. If any of the above criteria are not satisfied, or if the RAP HMA test result determined by the City are inconsistent, RAP HMA production shall stop for City projects until the issue(s) are corrected.

39-1.03 HOT MIX ASPHALT MIX DESIGN REQUIREMENTS:

39-1.03E Job Mix Formula Verification:

(Not Applicable)

39-1.08 Production:

39-1.08A General: During production, with approval of the Engineer, you may adjust hot or cold feed proportion controls for virgin aggregate and RAP.

39-1.12 Smoothness:

39-1.12A General: Determine HMA smoothness with a straightedge. The completed surfacing shall be thoroughly compacted, smooth and free from ruts, humps, depressions or irregularities. Any ridges, indentations or other objectionable marks left in the surface of the asphalt concrete by blading or other equipment shall be eliminated by rolling or other means. The use of any equipment that leaves ridges, indentations or other objectionable marks in the asphalt concrete shall be discontinued, and acceptable equipment shall be furnished by the Contractor.

39-1.13 Hot Mix Asphalt over Concrete Culvert: The aggregate grading of the asphalt concrete shall be ½-inch Coarse HMA Type A.

39-1.14 Miscellaneous Areas: The aggregate grading for asphalt concrete placed on miscellaneous areas shall conform to that specified for the asphalt concrete placed on the traveled way, unless otherwise directed by the Engineer.

39-1.15 Minor Hot Mix Asphalt: **(Not Applicable)**

39-3.02 Acceptance Criteria:

39-3.02A Testing: The acceptance testing requirement for Sand Equivalent shall be 50 (minimum) for asphalt concrete surface and 45 (minimum) for asphalt concrete base. HMA shall meet the following requirements.

Aggregate Micro-Deval (ASTM D6928-10)[1]	Tensile Strength Ratio, TSR (ASTM D7870)[2]
≤16.0%	Not Required
16.1-18.0%	70 (minimum)
18.1-21.0%	80 (minimum)

[1] Asphalt concrete with an aggregate Micro-Deval loss greater than 21.0% shall be removed and replaced at the Contractor's expense. In addition, no single source of asphalt concrete aggregate shall have a Micro-Deval loss greater than 21.0%.

[2] TSR testing shall be performed on re-compacted asphalt concrete (per ASTM D7870), obtained from field cores, and tested within 30 days of asphalt concrete placement. Specimens tested shall include 1 unconditioned sample, and 2 conditioned samples as follows:

a) 20.0 hour Adhesion cycle @ 60˚C
b) 3500 cycles @ 40 psi and 60˚C

A single TSR test shall not represent more than 750 tons of asphalt concrete.
Asphalt concrete not meeting the above requirements shall be removed and replaced at the Contractor's expense.

39-3.04 Transporting, Spreading, and Compacting:
Test sections shall be approved on the basis of the attainment of 93% relative compaction and a satisfactory surface condition following final rolling. The number of coverages required shall be the minimum number required to obtain 93% relative compaction. Relative density shall be the ratio of in-place density (ASTM Test Method D2950) to test maximum density (California Test 309, Method of Test for Determining Theoretical Maximum Specific Gravity and Density of Hot Mix Asphalt) determined during production paving.

The HMA may be cored during paving of the test sections, and the in-place density for each test section shall be the average of three core densities determined per California Test 308.

[Revised: 03/07/17 Lab STD2010]

51 CONCRETE STRUCTURES

51-7.01A General: Minor Structures shall be constructed in accordance with Section 51 of the City Standards, Section 51-7 of the Standard Specifications, the details shown on the plans, and these Technical Specifications. Minor concrete structures are drainage inlets.

Storm drain structures shall be per the details on the plans.

Concrete shall be cured in accordance with Section 90-1.03B of the Standard Specifications.

Minor Concrete shall conform to the provisions of Section 90-2 of the Standard Specifications.

Placing of concrete under water will not be permitted.

[Version: 07/02/19 CDA STD2018]

64 PLASTIC STORM DRAIN PIPE

64-1.01 Description: All plastic storm drain pipes and associated appurtenances shall be constructed in accordance with the City Standards.

64-1.02 Materials: Plastic pipe for use in the park storm drain system shall be SDR 26 polyvinyl chloride (PVC) or High Density Polyethylene (HDPE). HDPE storm drain pipe shall conform to the provisions of Section 64, "Plastic Pipe" of the Standard Specifications. PVC solid wall pipe shall be made from all new, rigid unplasticized polyvinyl chloride in accordance with ASTM D-3034 and ASTM F-679 and shall have a minimum pipe stiffness of 46 psi. Joints shall be gasketed and conform to the requirements of ASTM D-3139 and ASTM F-477. Gaskets shall be installed by the pipe manufacturer and covered with a removable wrap to ensure the gasket is free from debris. A joint lubricant supplied by the manufacturer shall be used on gasket and bell during assembly. The spigot shall be pushed into the bell to the "home line" on the pipe.

64-1.03 Excavation and Backfill: Excavation and backfill shall be in accordance with Section 64-1.05 of the City Standards. All trench excavation material from trenches, including any removed portions of the existing storm drain pipe, shall be the property of the Contractor. Excavated material shall not be disposed of on the work site. Prior to disposal of any material, the Contractor shall submit to the Engineer written authorization for such disposal of material and entry permission signed by the owners of the disposal site, and shall comply with any other requirements of disposal, such as City and County permits, as may be required.

Excavation and backfill shall be as shown on Standard 215 Standard Trench Detail of the City of Santa Rosa Standard Plans and the following provisions.

Pipe bedding will be placed in 6-inch (maximum) lifts to six inches above the top of pipe with each lift hand or mechanically tamped. The final lift can be compacted with a plate type vibrating compactor.

64-1.03C Laying Pipe: Laying Pipe shall be in accordance with Section 64-1.07 of the City Standards. Plastic storm drain pipe shall be installed in accordance with the Standard Specifications, generally accepted practice and on the alignment and grade as shown on the plans. When long radius curves are permitted, adjustments in horizontal alignment will be achieved through adjustments at each coupling, within manufacture's specification, and not by bending of the pipe.

Unless otherwise specifically permitted by the Engineer, all pipe shall be laid upgrade.

Where ground water or surface drainage occurs, pumping shall continue until backfilling has progressed to a sufficient height to prevent floatation of the pipe.

64-1.03D Television Inspection of Plastic Storm Drain Pipe: The contractor shall hire an independent television inspection service to perform a closed circuit television inspection of all newly constructed storm drain systems. The video camera shall be able to pan and tilt and shall be equipped with high intensity lights. The video camera shall be mounted on a transporter at a height equal to the radius of the pipe. A video tape of the television inspection shall be produced and delivered to the Engineer in color VHS format, together with a typed log of the inspection.

The video tape shall display the following information:

The camera's location via a continuously updated footage counter measuring the distance from point of entry. At the beginning of each run of storm drain pipe, between adjacent

structures, the video shall display the project name, date, company performing the inspection and the structure's number (as labeled on the plans) at each end.

The following conditions shall exist prior to the television inspection:

All storm drain pipes shall be installed, grouted, backfilled and compacted;

All structures shall be in place and grouted;

Flow line wetted with clean water immediately before televising.

When the above work has been completed the contractor shall notify the Engineer 48 hours in advance of the date for television inspection. During this inspection, the contractor or authorized representative shall be present to observe the video as provided by the television camera.

The following video tape observation shall be considered defects in the construction of the storm drain system and will require corrections prior to acceptance.

a. Off grade - 0.08 foot or more deviation from grade.
b. Joint separation - greater than one corrugation.
c. Cracked or damaged pipe or evidence of the presence of an external object bearing upon the pipe (rock, root, etc).
d. Pipe deflection of 7.5 percent or greater, measured inside the pipe.
e. Debris or other foreign objects;
f. Other obvious deficiencies when compared to approved Plans and Specifications, these Standards and Standard Drawings.

The contractor shall be notified in writing of any deficiencies revealed by the television inspection that will require repair, following which the contractor shall excavate and make the necessary repairs and request a television re-inspection. Television re-inspection shall be at the contractor's expense.

64-1.04 Trench Shoring and Bracing - Storm Drain: All bracing and shoring shall conform to Section 7-1.02K(6)(b)(1) of the Standard Specifications and the Division of Industrial Safety Construction Safety Orders which are currently in use.

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.

73 CONCRETE CURBS AND SIDEWALKS

73-1.01 General: This work shall consist of curbs, gutters, sidewalks and curb ramps shall be constructed in accordance with the details and at the location shown on the plans, City Standards, and in conformance to the requirements of Section 73 of the City Specifications, and Standard Specifications.

Soft or spongy material shall be removed and replaced with suitable material as required by the Engineer.

All new concrete construction joints shall be of the same type as those removed with the existing concrete unless otherwise stated herein or on the plans.

All oil, paint, tire marks, and other discoloring due to the Contractor's operations shall be removed from concrete by sandblasting prior to acceptance by the Engineer. Cement mortar will not be an acceptable substitute for sandblasting. Vandalism to uncured concrete surface shall be removed. If it cannot be removed from the surface, then the vandalized concrete shall be removed and replaced to the nearest scoremark.

73-1.02D Color: A colored pigment designed for the integral coloring of concrete shall be added to the concrete mix. The pigment shall contain pure concentrated mineral pigments specifically processed for mixing into concrete and complying with ASTM C979.

The colored pigment shall be Davis Colors color #860, applied in a dosage of 1/3 pound per 94 pound sack of cement (approximately 2 pounds per cubic yard of concrete for a 6 sack mix), or L. M. Scofield color #SG860 applied in a dosage to produce an equivalent color, or an approved equal.

73-2.03 Curb Construction: Curb construction shall be in accordance with Section 73-1.05 of the City Standards.

Curb and gutter shall be constructed per City STD-241, the details and locations shown on the plans and in accordance with the City Specifications.

Expansion joint material shall be installed on at least one side of new curb and gutter when length of the new install is over ten feet, and on both sides when over 15 feet.

When length of new curb and gutter is 7 feet or less, both sides shall be dowelled to the adjacent existing curb and gutter. Dowels shall be 8 inch long #4 dowels with two equally spaced in the curb (vertical) and two in the gutter (horizontal).

All concrete which is to be removed from curb and gutter, areas shall be removed to the nearest transverse score mark or construction joint or as directed by the Engineer.

73-3.03 Sidewalk and Curb Ramp Construction: Sidewalk and , curb ramps shall be constructed in accordance with the details and at the location shown on the plans and in conformance to the requirements of Section 73-1.07 of the City Specifications with the following modifications and additional requirements.

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All concrete which is to be removed from sidewalk and driveway areas shall be removed to the nearest transverse score mark across the full width of sidewalk or construction joint or as directed by the Engineer.

Curb Ramp shall be constructed in accordance with the details and at the locations shown on the plans per Caltrans Standard Plan A88A except the thickness shall be 4" minimum. For purposes of payment, curb ramp will be measured between the outside border of the ramp and landing, and exclude the curb and gutter. The area of concrete beneath the detectable warning surface shall be paid for at the contract price per square foot of curb ramp.

Expansion joint material shall be installed full width from gutter to back of sidewalk on both sides of the curb ramp structure.

Curb ramp detectable warning surfaces shall consist of prefabricated raised truncated domes constructed with curb ramps in conformance with the details shown on the plans and Caltrans Standard Plan A88 and these Technical Specifications. The color of the detectable warning surface shall be yellow conforming to Federal Standard 595B, Co. No. 335838. Prefabricated detectable warning surfaces shall be installed in accordance with the manufacturer's recommendations.

Cobbles embedded in concrete shall be set in four inches of Class A, six sack pea gravel concrete. Cobbles shall be four to six inches in size with a smooth texture, with 1/3 exposed above the top of curb as shown on the plans. Concrete shall be poured over four inches of Class 2 aggregate base prior to cobbles being placed. Cobbles shall then be placed in a timely manner to allow for proper embedment into the concrete. Contractor to provide samples of cobbles to the Engineer for review and approval prior to placement.

[Version: 12/12/2019 CDA STD2018]

82 SIGNS AND MARKERS

82-1.01 General: This work shall consist of installation, removal, and relocation of roadside signs as shown on the plans, where directed by the Engineer, and shall conform to the City Specifications.

Signs and hardware which are not to be mounted on traffic signal mastarms or poles shall be provided and installed by the Contractor at the locations shown on the plans per Part II of the City Traffic Standards.

Existing signs which are not on traffic signal mastarms or poles shall be relocated as shown on the plans by the Contractor.

Where signs are shown on the plans as relocated or removed, the sign post and foundation shall be removed if no longer in use. Existing sign posts removed from sidewalks shall be ground flush with the existing sidewalk surface, and the void filled with grout.

Salvaged signs shall be returned to the City of Santa Rosa Sign Shop at 55 Stony Point Road. All poles being removed and not relocated shall become the property of the Contractor.

Where traffic regulatory signs (i.e. STOP and crosswalk warning) are removed for construction, Temporary Signs shall be placed and maintained on barricades at stop controlled intersections and the crosswalk until permanent traffic regulatory signs are installed. Temporary stop bars and crosswalks shall be installed in accordance with Section 84 of these specifications.

If existing signs and poles are in good and re-useable condition as determined by the Engineer, the existing signs and poles may be able to be reused on site or may not require removal for replacement depending on existing site conditions at each location. If no new sign and pole is installed and the existing pole and sign are reused, there will be no bid item payment and no additional allowance will be made therefor for reusing the existing pole and sign.

84 TRAFFIC STRIPES AND PAVEMENT MARKINGS

84-1.01 General: Attention is directed to Section 12, "Temporary Traffic Control," and Section 15, "Existing Facilities," of these Technical Specifications. Traffic stripes and pavement markings shall conform to the applicable provisions of Section 84 of the Standard Specifications, the City Traffic Standards, and these Technical Specifications and shall be placed at the locations shown on the Plans.

The Contractor shall provide and install temporary retro-reflective pavement markings on the same day as the existing permanent markings are removed or destroyed, or as directed by the Engineer, and maintain them until the new permanent markings are in place.

Temporary striping on all ground surfaces shall be paint (white and/or yellow) with retro-reflective glass beads or an approved equivalent and shall be installed the same day as the existing permanent striping is removed, or as directed by the Engineer. Temporary striping shall be maintained until new permanent striping is in place.

Existing pavement markings, including crosswalks, disturbed by construction activities shall be replaced in their entirety.

All striping to be replaced shall match existing sections in kind unless approved by the Engineer.

The Contractor shall remove all existing traffic striping and pavement marking in conflict with proposed improvements, as shown on the Plans, and as directed by the Engineer, and shall be responsible for the proper disposal of their grindings away from site work.

Permanent traffic stripes and pavement markings shall be installed after all iron has been raised for that particular street section, but no more than five days after final paving for that section of roadway.

Existing stripes and pavement markings to remain, which are damaged by the work shall be replaced at the Contractor's expense. This includes areas outside the immediate project limits.

Painted curbs which are damaged or replaced as part of the work shall be repainted to match existing conditions.

84-1.02 Inspection: The Engineer shall inspect completed lines and markings as conditions may require and may inform the Contractor of any faulty methods or unsatisfactory results.

[Updated: 12/19/2019 CDA STD2018]

90 CONCRETE

90-1.01C(6) Mix Design: The proportions of the water, sand and aggregate shall be regulated so as to produce a plastic, workable and cohesive mixture.

90-1.01D(2) Cementitious Material Content: Concrete shall contain a minimum of 564 pounds of cementitious material per cubic yard. The amount of cement by weight of the specified cementitious material shall be 75 to 85 percent.

90-1.01D(5) Compressive Strength: The 28-day compressive strength of concrete shall be 4000 pounds per square inch (psi) or greater.

90-1.01D(6) Curing Compound: Concrete shall be cured per Section 90-1.03B of the Standard Specifications. Pigmented curing compound or any other material that will leave a noticeable residue shall not be allowed.

90-1.02E(2) Chemical Admixtures: An admixture shall not be used to reduce the amount of cementitious material content.

12/23/2019 CDA 2018 STD

112 TREE PROTECTION

112-1.01 General: The following requirements shall apply to any contractor who works on any property upon which a protected tree is located.

Protected tree means any tree, including a Heritage tree, designated to be preserved on the plans, or as directed by the Engineer. Heritage tree is any of the trees listed under Section 17-24.010 of the City of Santa Rosa Tree Ordinance.

112-1.02 Scope: Before the start of any clearing, excavation, construction or other work on the site, every protected tree shall be securely fenced off at the protected perimeter. Protected perimeter shall be either the root zone or other limit as directed by the Engineer. Such fences shall remain continuously in place for the duration of all work undertaken in connection with this project. The area so fenced off shall not be used as a storage area, altered, or disturbed except as may be permitted under this section.

If any of the site work encroaches upon the protected perimeter of a protected tree, special measures shall be utilized as approved by the Engineer to ensure that the roots obtain oxygen, water, and nutrients as needed. Any excavation, cutting, filling, or compaction of the existing ground surface within the protected perimeter, if authorized by the Engineer, shall be minimized and subject to such conditions as may be imposed by the Engineer. No significant change in existing ground level shall be made within the drip line of the protected tree except as directed by the Engineer and as shown on the plans. No burning or use of equipment with an open flame shall occur near or within the protected perimeter. All brush, earth, and other debris shall be removed in a manner which prevents injury to the protected tree.

No oil, gas, chemicals, or other substances that may be harmful to trees shall be stored or dumped within the protected perimeter or any other location on the site from which such substances might enter the protected perimeter.

Underground trenching for utilities shall avoid major support and absorbing tree roots of protected trees. If avoidance is impracticable, tunnels shall be made below the roots. Trenches shall be consolidated to serve as many units as possible. Trench within the drip line of the tree shall be avoided and only be done at the approval and direction of the Engineer.

APPROVAL OF TRENCHING AND EXCAVATION

The Contractor shall obtain written approval from the Landscape Architect and a certified Arborist prior to start of excavation work within the drip line of trees. A Certified Arborist shall be retained as needed to provide written direction at the Contractor's expense.

The Contractor is prohibited from using equipment for trench and excavation work within the tree drip line.

In the event pruning is required for roots greater than 2" in diameter the Contractor shall receive written direction from the project Arborist prior to continuation of work.

No concrete or asphalt paving shall be placed over the root zones of protected trees. No artificial irrigation shall occur within the root zone of oaks.

No compaction of the soil within the root zones of protected trees shall occur.

121 NOTIFICATION

121-1.01: The Contractor shall notify the Engineer of any work to be performed on any given work day either on the afternoon of the prior working day or before 8:30 a.m. on the given working day. Any work completed for which the Engineer has not received prior notification of its scheduling may not be accepted for payment.

The Contractor shall provide a written notice of pending construction to, and attempt to make personal contact with all businesses and residents in the vicinity of the project 5 working days prior to mobilizing to the site. The notice shall inform the recipients of the type of work, the scheduled date(s) and work hours, and the potential impacts for the neighborhood, such as road closures and/or detours. Provide a map for any approved detour. The notice shall inform all recipients that they will be allowed access to their property at all times. The notice shall also request that cars be parked out of the roadway by 7:30am and shall have contact information for the following personnel; Contractor's onsite Supervisor, Contractor's Project Manager and the City of Santa Rosa's onsite Inspector.

If loading or unloading of equipment and/or materials has the possibility to impact access to private property, the Contractor shall notify and coordinate this work with the business or resident.

The Contractor shall keep the City of Santa Rosa Fire Department, City Bus, Postal Service, Recology and other related City services informed of any roadway and lane closures in accordance with Section 12-4.02 of these Technical Specifications.

If unanticipated work requires the Contractor to access private property the Contractor shall first notify the business or resident and the Engineer, and all work shall be coordinated through the Engineer or their representative.

All written notices to residents or businesses shall be submitted to the Engineer for approval prior to distribution. The Engineer shall be allowed two working days to review notices.

[Version: 10/13/14-CDA STD2010]

124 MATERIAL RECYCLING

124-1.01 Description: The Contractor shall dispose of all portland cement concrete and asphalt concrete, generated from removal or demolition activities on the project, at a recycler for these materials. The Contractor shall provide receipts verifying delivery and approximate quantity (in tons) of the material delivered to a material recycler.

All other excess materials from the project shall become the property of the Contractor and shall be disposed of by him, at his expense.

[Version: 11/6/14CDA STD2010]

132 WATER DISTRIBUTION SYSTEM

132-1.01 Description: Water Distribution System and related appurtenances shall conform to the requirements as specified in the City of Santa Rosa Water Distribution System Construction Standard Specifications Section 132, the Project Plans, and modifications herein.

132-1.11 Excavation, Backfill, and Resurfacing: The Contractor shall remove and replace sidewalk and planter strips as required for all water work to the nearest transverse score mark on both sides and full sidewalk width. All areas of sidewalk removed for construction shall be backfilled and compacted level with temporary asphalt concrete or covered with 1-inch thick plywood, laid flat with ADA compliant temporary asphalt concrete taper on both ends.

132-1.15A Water Services: All existing meter box lids to be removed shall be salvaged and delivered to the City's Corporation Yard located at 55 Stony Point Road.

New service laterals shall be installed with a minimum horizontal clearance of 3 feet from gas laterals and a minimum of 5 feet from sewer laterals. Water services shall be installed via 'open trench' construction methods only, unless otherwise specified herein.

Version Date: 11/28/17

APPROVED LIST OF BACKFLOW CONTRACTORS
INSTALLATION, TESTING & REPAIR

ACCO ENGINEERED SYSTEMS 1111 ALADDIN AVE. SAN LEANDRO, CA 94577 PHONE: (510) 346-4300 LICENSE #: 120696	**AIR SYSTEMS SERVICE** 1900 BATES AVE., SUITE E CONCORD, CA 94520 PHONE: (888) 504-2772 LICENSE#: 406794	**ALL OUT PLUMBERS/C. CROSS** P.O. BOX 599 CLOVERDALE, CA 95425 PHONE: (707) 894-8434 LICENSE #: 812540
ALL PRO BACKFLOW/J.LOTITO P.O. BOX 2193 FOLSOM, CA 95763 PHONE: (916) 276-7162 FAX: (916) 435-4167 LICENSE #: 934557	**APB BACKFLOW, INC.** 1599 FELTA RIDGE ROAD HEALDSBURG, CA 95448 PHONE: (888) 356-7761 LICENSE: 1032328	**A.S.T.I SERVICES/M.DESCHLER** 102 COUCH ST. VALLEJO, CA 94590 PHONE: (707) 645-1782 FAX: (707) 645-1807 LICENSE #: 742693
C.V. PLUMBING/C. VINE P.O. BOX 219 CLOVERDALE, CA 95425 PHONE: (707) 894-8580 FAX: (707) 894-9642 LICENSE #: 843366	**CAGWIN & DORWARD** P.O. BOX 1600 NOVATO, CA 94948-1600 PHONE: (800) 891-7710 FAX: (415) 897-7864 LICENSE #: 202399	**CARRIER CORPORATION** 600 MCCORMICK ST., SUITE B SAN LEANDRO, CA 94577 PHONE: (510) 347-2000 FAX: (510) 347-2099 LICENSE #: 499642
CHECKRITE BACKFLOW SERV. 3618 CHANATE RD. SANTA ROSA, CA 95404 PHONE: (707) 575-5296 FAX: (707) 578-6595 LICENSE #: 836022	**DEVOTO PLUMBING*** 1345 TRIPLE OAK WAY FULTON, CA 95439 PHONE: (707) 545-0734 LICENSE #: 824608	**ECONOMY PLUMBING** P.M.B. #287, 1275 4TH ST. SANTA ROSA, CA 95404 PHONE: (707) 545-4455 FAX: (707) 543-8111 LICENSE #: 748220
GROUND HOG CONSTRUCTION 5353 HESSEL RD. SEBASTOPOL, CA 95472 PHONE: (707) 529-2085 FAX: (707) 823-9389 LICENSE #: 723766	**JV PLUMBING & BACKFLOW*** 2911 MONTECITO AVE. SANTA ROSA, CA 95404 PHONE: (707) 799-2692 LICENSE #: 955698	**LEDUC & DEXTER PLUMBING** 2833 DOWD DR., SUITE A SANTA ROSA, CA 95407 PHONE: (707) 575-1500 FAX: (707) 527-0281 LICENSE #: 651401
NORTHBAY BACKFLOW P.O. BOX 2765 PETALUMA, CA 94953 PHONE: (707) 484-3949 LICENSE #: 878332	**NORTHWOOD BACKFLOW** 911 LAKEVILLE ST., #369 PETALUMA, CA 94952 PHONE: (800) 750-4547 LICENSE #: 749187	**ONGARO AND SONS PLUMBING** 2995 DUTTON AVE. SANTA ROSA, CA 95407 PHONE: (707) 579-3511 LICENSE #: 215233
PUMPMAN NORCAL 4000 S. MOORLAND AVE. SANTA ROSA, CA 95407 PHONE: (707) 584-9191 LICENSE: 200068	**RH & SONS WATER SERVICES** 225 GOLDEN RIDGE AVE. SEBASTOPOL, CA 95472 PHONE: (800) 675-3569 LICENSE #: 698774	**ROBERTS MECHANICAL ELECTRICAL, INC.** 4649 DOWDELL AVE. SANTA ROSA, CA 95407 PHONE: (707) 584-5880 LICENSE #: 556014
ROBERTSON'S BACKFLOW 6229 SPECKLED RD. POLLOCK PINES, CA 95726 PHONE: (530) 306-1056 FAX: (530) 303-1497 LICENSE #: 972547	**SCOTT CRAMER PLUMBING** P.O. BOX 750084 PETALUMA, CA 94975 PHONE: (707) 778-8789 FAX: (707) 658-1043 LICENSE #: 889152	**STEAD BACKFLOW PREVENTION** 2715 W. KETTLEMAN LN., #203-321 LODI, CA 95242 PHONE: (209) 327-3900 LICENSE #: 848490

NOTE: These contractors have a C-16 or C-36 State Contractor's License or an A-General Engineering License. They are licensed and certified to test, repair, and install any type of backflow device. They are also licensed to work on fire protection backflow devices or fire protection systems. When installing a backflow device, a City Plumbing Permit is required, and if working in the City right-of-way, an Encroachment Permit is needed. All testers are required to have a City Business License.

Spanish speaking

(Updated List Only: 8/6/2020)

SECTION 01 56 39 – TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section includes the requirements for the protection of existing trees and shrubs, including entire structure of plant material above and below ground impacted by all demolition and construction work under this contract.

B. Contractor is prohibited from stockpiling any excavation or construction materials within the canopy of trees, on lawn areas or near shrubs.

C. Contractor shall immediately clean and remove any construction residue that falls within the canopy of a tree or near shrubs.

D. The following requirements shall apply to any contractor who works on any property upon which a protected tree is located.

E. Protected tree means any tree, including a Heritage tree, designated to be preserved on the plans, or as directed by the Engineer. Heritage tree is any of the trees listed under Section 17-24.010 of the City of Santa Rosa Tree Ordinance.

1.2 RELATED SECTIONS

A. Section 01 11 00 - Summary of Work
B. Section 01 71 33 - Protection of Adjacent Construction

1.3 JOB CONDITIONS

A. Pre-construction Meeting:
   1. Prior to commencement of work, the Contractor shall arrange a meeting on the site with the Owner, General Contractor, Arborist, and Landscape Architect to review the proposed schedule, the “Trees of Concern”, the tree and landscape protection, submittals for this Section, the coordination with work of other trades, and the selective thinning and clearing requirements.
   2. Adjustments to the type and extent of the protection shall be addressed at the time of the meeting.
   3. Contractor shall coordinate the meeting and inform all parties in writing (5) business days in advance of the scheduled meeting.

B. Environmental Requirements: Perform work only during suitable weather conditions. Do not disc, rototill, or work soil when frozen, excessively wet, or in otherwise unsatisfactory condition.

C. Sequencing and Scheduling: Adjust, relate together, and otherwise coordinate work of this Section with work of Project and all other Sections of Project Specifications.

1.4 QUALITY ASSURANCE

A. Contractor shall employ a certified Arborist who is a member of the American Society of Consulting Arborists, Inc. (ASCA). The name and qualifications of the Arborist shall be submitted for approval by the Landscape Architect and Owner.
   1. Arboricultural work including tree removal, pruning and care for trees to remain shall be performed by personnel familiar with arboricultural work, under the supervision of an experienced professional Arborist and foreman at all times.
   2. Work in this Section shall be by a firm which has successfully completed landscape work similar in quality and extent to that indicated for this project for a period of not less than five (5) years. Supervisory personnel with experience on projects of similar size and extent shall supervise the work.

1.5 APPROVAL OF TRENCHING AND EXCAVATION

A. The contractor shall obtain written approval from the Landscape Architect and a certified Arborist prior to start of excavation work within the drip line of trees. A Certified Arborist shall be retained as needed to provide written direction at the Contractor's expense.

B. The Contractor is prohibited from using equipment for trench and excavation work within the tree drip line or where root intrusion exists on asphalt pathways to be reconstructed.

C. In the event pruning is required for roots greater than 2" in diameter the Contractor shall receive written direction from the arborist in coordination with Landscape Architect prior to continuation of work.

1.6 NON-APPROVED TRENCHING

A. In the event trenching or excavation is performed by the Contractor without the approval or not as shown on the Contract Drawings; the Contractor shall be subject to a fine equal to one half (½) day liquidated damages for every 50-feet.

B. The only exception to paragraph 1.07A above is for trenching to a maximum of 3-feet as measured horizontally without approval at any particular location for the placement of pipe fittings and quick couplers outside the drip line of any tree.

1.7 DAMAGE TO TREES AND PAYMENT FOR DAMAGE

A. If the Contractor should cause minor damage as defined by nicked tree trunks, limbs and branches or broken branches to trees or shrubs during the course of construction, the Contractor shall pay the following penalties at the beginning of each billing period:
   1. The Contractor will be penalized the sum of One Hundred dollars ($100) for the first incident which causes minor damage to trees or shrubs.
   2. The Contractor will be penalized the sum of Two Hundred dollars ($200) for the second incident which causes minor damage to trees or shrubs.
   3. The Contractor will be penalized the sum of Five Hundred dollars ($500) for the third and subsequent incidents which cause minor damage to trees or shrubs.

B. The Contractor shall replace any trees or shrubs that suffer more serious damage, including damage to roots 2-inches in diameter or larger, during construction at no additional cost to the Owner. The Owner shall determine the value of such replacement trees or shrubs. In addition to the Contractor's restoration approved by the Owner's Representative, the Contractor will be assessed damages for the difference in the dollar value of the damaged tree or other plant material, and the dollar value of the replacement.

1. The dollar value will be determined by the Owner's Representative from the "Guide for Establishing Values of Trees and Other Plants," prepared by the Council of Tree and Landscape Appraisers, current edition. Damages assessed will be deducted from moneys due or that may become due to the Contractor.

C. The Contractor shall in addition be liable for the cost to the Owner for removing the damaged tree(s). This cost will cover 1.5 times the hourly wage of all person(s) at the site for the required hours to remove the tree(s) and haul offsite as directed by the Owner Representative.

1.8 EXCAVATION WORK UNDER LOW HANGING BRANCHES

A. In areas where trenching is required under low hanging tree branches (8 to 12-feet off the ground), the Contractor shall operate equipment to a maximum height of 10-feet to avoid contact and possible damage to the tree branches.

B. In bidding the work, the Bid Items which include piping and conduit trenching work shall include the use of machinery that will not extend above 10-feet vertically for 5% of the linear trenching performed.

1.9 MANUAL EXCAVATION

A. In areas where tree branches hang below 12-feet over the area to be excavated, adjacent to elderly trees or as directed by the Landscape Architect, the Contractor shall manually excavate the trench. No machinery shall be used in the areas so designated for manual excavation.

1.11 EXCAVATION FOR CONCRETE PATHWAYS

A. The Contractor's vehicles and equipment shall not be driven off-road except along designated routes as far away as practical from tree root zones.

B. Vehicles and equipment shall be operated in such a manner as to avoid damage to tree and bush trunks, leaves and branches.

1.12 ASPHALT PAVING AND TRENCHING AND INSTALLATION OF UNDERGROUND UTILITIES NEAR TREE ROOTS

A. The Contractor shall place all piping 3 ½-inches and smaller and all conduits a minimum of 18-inch below the existing finished grade. New conduits shall be located at least 25-feet

away from all tree trunks, 20-feet away from all buildings, 10-feet away from any pathway lighting, and 5 feet away from and parallel to any asphalt or concrete paths.

B. The Contractor shall place all piping 4-inches and larger a minimum of 3-feet below the existing finished grade except when approved by the project Arborist and Landscape Architect to clear root systems. In no case shall the 4-inch and larger pipe placed less than 2-feet below the finished grade. Refer to the drawings for additional information when pipes cross over or under other pipes or conduit.

C. The Contractor shall not cut any tree roots over 2-inch in diameter unless an approved arborist is consulted. The Contractor shall bend and/or transition underground conduit and piping so that the conduit or piping will thread between tree roots. This 2-inch diameter tree root guideline is dependent of the species of tree or bush. Various trees and bushes have a more fibrous root system, consequently, severing a large number of these roots can be as detrimental to certain species of trees as severing a fewer number of larger tree roots.

D. When possible, trenches shall not be run of the side of the tree exposed to prevailing winds as roots are primarily anchored on the windward side. Trenches shall not be cut across more than on quadrant of the tree root zone.

E. Excavated material (fill and overlay) shall not be deposited under the leaf/needle canopy of established trees. The excavated material shall be placed in piles along one side of a paved surface. In no case shall the Contractor place the excavated material closer than 6-feet from the base of a tree.

F. The Contractor shall be responsible for identifying all underground lighting, electrical control, and irrigation utilities within the project site area. As part of the contract work, the Contractor shall be required to locate, probe, determine, and flag or mark all underground facilities including, but not limited to, metal and plastic conduits and pipelines, sprinkler heads, quick couplers, valves boxes, controller boxes, pull boxes, prior to excavation.

G. The Contractor shall replace all affected areas with new sod grass, decomposed granite, new concrete, or asphalt paving within 10 calendar days after beginning trench excavation. All trenches in pathways and planting areas shall be temporarily covered for immediate use. The Contractor shall not accumulate affected areas for group planting of sod or group paving of trench.

H. The Contractor shall locate quick couplers and lateral lines. The Contractor shall cap tees as shown on the drawings unless located in the field directly under the tree drip line. In these cases, obtain the project Arborist's approval for relocating the fitting(s).

PART 2 - PRODUCTS

2.1 TEMPORARY PROTECTION OF EXISTING TREES AND LANDSCAPE PLANTING

A. Tree Protection fencing shall be composed of 6’ tall chain link fence and posts, refer to drawings for additional information.

B. Protection bedding mulch: Recycled wood chips to conform to the following:
   1. Mulch pieces should typically be heavy toothpick-like, 2-inch dimension.

PART 3 - EXECUTION

3.1 GENERAL

A. Provide protection for existing landscape planting to remain including, but not limited to, trees, shrubs, and ground cover.

B. Contractor shall provide Temporary Protection suitable for the protection of the landscape planting immediately adjacent to the construction limit of work line, and as directed by the Landscape Architect.

C. The Contractor shall coordinate all other trades and work.

D. All trees to be retained shall be enclosed by fencing on the work side when Tree Protection Zone is located inside, adjacent to, or within 10 feet of the limit of work, prior to demolition, grubbing, or grading.

E. Trees to be retained shall be pruned for clearance as required under supervision of a certified Arborist.

F. Temporary Protection shall be kept in place for the duration of the Project, maintained during construction, and temporarily relocated as required by the progress of the construction at no additional cost to the Owner.

3.2 PREPARATION

A. Stake the location of Temporary Protection barriers and fencing as noted above for the approval of the Landscape Architect prior to installation of Temporary Protection fencing. Place location stakes at corners and ends and 30 feet on center maximum.

B. Notify the Landscape Architect at least two weeks in advance of the date for on-site review of the staking.

C. Place six inches (6") of organic mulch over existing grade within Temporary Protection fencing for existing trees to remain.

3.3 INSTALLATION

A. Install Temporary Protection for tree and landscape planting, as specified herein and as approved in the field by the Landscape Architect. Install all other Temporary Protection in locations approved in the field by the Landscape Architect.
   1. Install posts at 10-foot intervals maximum, at corners, and at other changes in direction. Posts shall be set firmly in undisturbed soil, plumb and with a minimum of exposed height as specified. Securely attach fencing at a minimum of three points.
   2. On pavement, provide self-supporting chain link fencing that does not require anchorage into the pavement.
   3. Install hay bales or rolls of erosion control wattling, secured around trunk to a height of 6 feet.

B. Fencing to be relocated closer to trees to remain to accommodate the sequence of construction shall be reviewed by the Arborist prior to relocation. No removals or construction shall occur without the Arborist's approval of the new fence location.

C. Completely remove Temporary Protection, including foundations, associate materials and equipment at the completion of the Project or as directed by the Arborist.

D. Restore and recondition areas of site damaged or disturbed by barrier installation and removal.

3.4 PROHIBITED ACTIVITIES:

A. The following are activities prohibited under existing tree canopies and within protected landscape planting areas:
   1. Excavating or trenching under tree canopies is prohibited and shall be permitted only under the following conditions:
   2. When excavating or trenching within the canopy of trees to remain, the Owner shall be given 48 hours' notice. Exercise extreme care during excavation to prevent damage to roots and in a manner that will cause minimum damage to the root system. Such work shall not occur without a professional arborist to perform compensatory root and branch pruning.
   3. Prune injured roots cleanly. Backfill as soon as possible.
   4. Where tunneling around roots is not practical, roots shall be cut off approximately six inches (6") from construction.
   5. Exposed roots shall not be allowed to dry out before permanent backfill is placed. Temporary earth cover shall be provided, or exposed roots shall be packed with wet peat moss or four (4) layers of wet untreated burlap and temporarily supported and protected from damage until permanently covered with backfill.
   6. Thinning shall not remove more than thirty percent (30%) of the existing leaf surface.
   7. Ripping or tearing of roots will not be allowed.

B. Placing backfill under protected trees unless indicated otherwise. Where fill is required for grading, and as indicated on the Drawings, do not fill above existing grade line at trunks. Fill soil must percolate at a rate of 1" per hour minimum.

C. Damage to trunk, canopy, or limbs caused by maneuvering of vehicles or equipment, or stacking of materials and equipment.

D. Driving or parking vehicles; storage of vehicles, equipment, or supplies.

E. Disposing of paint, petroleum products, dirty water, soil sterilants, concrete slurry or other deleterious materials on or around roots or on any landscape areas.

F. Changing site grades which cause drainage to flow into or to collect near protected trees.

G. Using protected trees as support posts, power poles, crane stays, sign posts, or anchorage for ropes, guy wires, power lines, or other similar functions.

H. Damage to root system from flooding, erosion, excessive wetting or drying resulting from dewatering or other operations.

I. Excessive water or heat from equipment, utility line construction, or burning of trash under or near shrubs or trees.

3.5 REPLACEMENT OF DAMAGED LANDSCAPE PLANTING

A. Trees and plants destroyed or damaged beyond repair due to Contractor's negligence, failure to provide adequate protection, or failure to perform recommended selective pruning shall be compensated by the Contractor at no additional cost to the Owner.
   1. Damage beyond repair that requires replacement shall be determined by the Arborist and Landscape Architect.
   2. Replacement shall include the replacement plant material, transportation, installation, a 30-day maintenance period, and a one year warranty.
   3. Planting location for replacements may be different from the original location and shall be determined by the Landscape Architect.

B. Replace shrubs, ground cover and turf with plants similar in species, size and shape.

C. Replace trees with plants of same species, size and shape.

D. Replacements for trees of 2"-8" caliper shall be replaced with similar sized plants; trees over 8" caliper shall be 60" box size.

E. Since age and size of existing tree may prohibit replacement with same size tree, the difference in caliper between size of damaged tree and replacement of tree shall be compensated by the Contractor.

F. Contractor shall fell trees to be removed so that trees to remain are not injured.

END OF SECTION

SECTION 03 11 00 – CONCRETE FORMING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes:
   1. Formwork for cast-in-place concrete and shotcrete.
   2. Installation of cast-in anchors, sleeves and similar items furnished under other Sections.

B. Related Sections include the following:
   1. Section 03 20 00: Concrete Reinforcing
   2. Section 03 30 00: Cast-in-Place Concrete
   3. Section 03 33 00: Architectural Concrete
   4. Section 32 13 13: Concrete Paving

1.2 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 designated in this Section. Use applicable year of adoption or revision as published in the "Annual Book of ASTM Standards".

C. American Concrete Institute's
   1. ACI 117 - Specifications for Tolerance for Concrete Construction, 2010.
   2. ACI 301 - Specifications for Structural Concrete for Buildings, 2010.
   3. ACI 347 - Guide to Formwork for Concrete, 2014.

D. Product Standards
   1. PS1 Construction and Industrial Plywood.

1.3 DEFINITIONS

A. Architectural Concrete: Concrete surfaces that are shown in the Drawings. Refer to Specification Section 03 30 00: Cast-in-Place Concrete.

B. Exposed to View Concrete: Includes all exposed to view in finished condition concrete in the Drawings.

1.4 SUBMITTALS

A. Submittal procedures and administrative provisions are established by Division 01 Section "Submittals".

B. Product data for manufactured products, including Form Liner and accessories.

C. Schedule showing Contractor's proposed location of construction joints not indicated on Drawings. For exposed concrete surfaces, indicate type and location of reveals, form joints, sleeves, finished surface textures, tie holes or plugs, embedded items, and other features that will be exposed on the finished wall.

1.5 QUALITY ASSURANCE

A. Standards: Comply with provisions of ACI 301 and ACI 347, except where more stringent requirements are shown or specified in this Section.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

A. General: Use materials suitable for exterior exposure and which have the strength to produce required tolerances. Material in contact with concrete shall not react with fresh concrete to cause loss of strength or durability. Form materials shall not stain concrete surfaces that are exposed to view.

B. Form Facing Material: Wood, metal, plastic or other materials that do not exceed the roughness of dressed lumber.
   1. Smooth Form Finish: PS1 plywood intended for concrete formwork, edge sealed. Type B-B Plyform, MDO or HDO overlain plywood.
   2. Exposed to View Finish: Refer to specification section 03 33 00.

2.2 FORM ACCESSORIES

A. Form Ties: Snap off metal ties of fixed length with plastic cone, designed to prevent spalling of concrete upon removal. Provide units that will leave no metal within 1-inch of concrete surface, except as otherwise designated.
   1. Refer to specification Section 03 33 00: Cast-in-Place Concrete for form ties at exposed to view concrete.

B. Chamfer and Rustication Strips: Plastic or polymer wood composite (P-W-F) strips fabricated to produce uniform smooth lines. At exposed conditions, provide in longest lengths practical.

C. Form Release Agents: Commercial formulation compounds, that will not bond with or stain concrete surfaces and will not impair bonding of paint or other coatings intended for use.
   1. Use compounds specifically formulated for use on overlain plywood, where surfaces remain exposed to view.

PART 3 - EXECUTION

3.1 CONSTRUCTION

A. Construct forms to sizes, shapes, lines and dimensions shown and to obtain accurate alignment, level and plumb work in finished structure. Finished work shall conform to tolerances of ACI 117.
   1. Tolerance for offsets at panel edges in as-cast condition shall conform to ACI 117, Class B for surfaces exposed to view, Class D for surfaces scheduled to receive rough formed finish, and Class C for all other surfaces.
   2. Refer to specification Section 03 33 00: Cast-in-Place Concrete for tolerances at exposed to view concrete.

B. Select form-facing materials to obtain required finishes. Solidly butt and back joints to prevent leakage of cement paste.

C. Provide, erect, support, brace and maintain formwork and shoring to safely support loads caused by concrete placement and other loads that might be applied, until such loads can be supported by hardened concrete in the completed structure.

D. Earth Forms: Footing forms may be omitted and foundation concrete may be placed directly into neatly and accurately cut excavations, provided the excavation walls are stable.
   1. Form footings to minimum extent shown on Drawings, but not less than 12” below finish grade at surfaces areas exposed to view.

E. Make provisions in formwork for removal of debris from formed spaces. Locate temporary openings in inconspicuous locations at bottom of forms. Close ports with tight fitting panels, flush with inside face of forms.

F. Plywood Forms at Exposed to View Surfaces:
   1. Keep number of panel joints to practical minimum.
   2. Ensure vertical joints are plumb and horizontal joints are level.
   3. Align form ties vertically and horizontally.
   4. Refer to specification Section 03 33 00: Cast-in-Place Concrete for further requirements.

G. Plastic Form Liner Attachment: Contractor shall verify the Symons by Dayton Superior recommended Attachment System best suited for the form work and liner system.

H. Shoring: Shores and struts shall be provided with positive means of vertical adjustment and corrections for formwork deflection and settlement shall be taken up during construction.

I. Form Release Agent: Apply a coating of form release agent immediately prior to installation of reinforcing steel and embedded items.
   1. Coat steel surfaces with a non-staining, rust preventative coating.

2. Plastic form liners should be sprayed with Liner Kote, Magic Kote, or Action Kote form release before each use and within the same day that concrete is placed. (If plasticizers or micro silica are in the concrete, Action Kote should be used.) A form release sprayer should be used and the spraying angle varied to insure complete coverage of all pattern features.

J. Provision for Other Trades: Provide openings in formwork and sleeves to accommodate work of other trades. Determine size and location of openings and recesses from trades requiring them.

3.2 JOINTS

A. Construction Joints:
1. Provide where shown on the Drawings or as approved by the Owner's Representative.
2. Provide 1-1/2" deep key indentations at formed joints in walls. Make key 1/3 of the wall thickness at widest portion of kerfed form.
3. Provide rustication strips at exposed to view surfaces. Where no reveal remains in completed construction, install 3/4 inch x 1-1/2 inch kerfed strip centered on joint. Remove strip prior to making second pour.

3.3 EMBEDDED ITEMS

A. Accurately place and securely support anchorage devices and other embedded items required for other work that is attached to cast in place concrete.
1. Use setting templates, drawings, and instructions provided by supplier of items.
2. Temporarily fill voids with readily removable material to prevent entry of concrete.
3. Use only stainless steel fasteners for securing built in items to formwork, where end of fastener is exposed to view or weather in completed construction. Cut back and grind fasteners flush with concrete surface.

B. Anchor rods (bolts) for steel columns shall be set to tolerances of Section 7.5.1 of AISC "Code of Standard Practice" (2010), which are more stringent than the requirements of ACI 117.

C. Aluminum Items: Aluminum surfaces in contact with concrete shall be painted with a bituminous paint complying with SSPC Paint 12, "Cold Applied Asphaltic Mastic", 1/8-inch minimum thickness; or other approved coating system.

3.4 FORM REMOVAL

A. Do not remove forms and shores until concrete has hardened and attained sufficient strength to permit safe removal and adequate support of inherent and imposed loads.

B. Carefully remove forms to avoid spalling concrete surfaces, in particular at corners and edges of exposed to view concrete. Prying against the face of concrete shall not be allowed.

C. After concrete is placed, forms and shores shall remain in place for not less than the following period of time, subject to requirements for additional curing:
   1. Formwork not supporting the weight of concrete: For surfaces such as the sides of walls, columns, and beams, 24 hours at not less than 50 degrees F, except as otherwise noted.
   2. Where forms are removed in less than 7 days, continue curing in accordance with provisions of specification Section 03 30 00: Cast-in-Place Concrete.

3.5 REUSE OF FORMS

A. Reuse of forms is allowed if they are straight, clean, free from nails, dirt, hardened concrete, rust, and other injurious matter and edges and surfaces are in good condition.

B. Clean and repair all damage caused by placing, removal, or storage. Reuse of formwork that would reduce quality of exposed-to-view concrete will not be permitted.

END OF SECTION

SECTION 03 20 00 – CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes
   1. Reinforcement for cast-in-place concrete and shotcrete.
   2. Accessories as required to support and secure reinforcement.
   3. Couplers used to mechanically splice reinforcement.

B. Related Sections
   1. Section 03 11 00: Concrete Forming
   2. Section 03 30 00: Cast-in-Place Concrete
   3. Section 03 33 00: Architectural Concrete
   4. Section 32 13 00: Concrete Paving
   5. Section 73 Concrete Curbs and Sidewalks

1.2 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 designated in this Section. Use applicable year of adoption or revision as published in the “Annual Book of ASTM Standards”.

C. American Concrete Institute's
   1. ACI 301 - Specifications for Structural Concrete for Buildings, 2010.
   2. ACI 315 - Details and Detailing of Concrete Reinforcing.
   3. ACI 318 - Building Code Requirements for Structural Concrete, 2014.

D. American Welding Society
   1. AWS D1.4 - Structural Welding Code - Reinforcing Steel, 2011.

E. CBC - 2022 California Building Code.

F. Concrete Reinforcing Steel Institute's
   1. CRSI Manual - "Manual of Standard Practice", 29th Edition.

G. IAPMO Evaluation Service (IAPMO-ES)
   1. IAMPO-ES "Evaluation Reports" and "Acceptance Criteria" for proprietary products are available at www.iapmoes.org.

H. ICC Evaluation Service (ICC-ES)
   1. ICC-ES "Evaluation Reports" and "Acceptance Criteria" for proprietary products are available at www.icc-es.org.

1.3 SUBMITTALS

A. Test Reports: Furnish test reports evidencing and certifying compliance with specified standards to Testing Laboratory for record purposes.
   1. Reinforcing steel.

B. Product data for proprietary items, including bar couplers, headed bars, stud-rails, and welding electrodes.
   1. Furnish manufacturer's installation instructions and Evaluation Reports indicating quality control and special inspection requirements to Testing Laboratory for their information.

1.4 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of ACI 301 and CRSI's "Manual of Standard Practice", except where more stringent requirements are shown or specified.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store reinforcement in a manner that will prevent excessive rusting or fouling with grease, oil, dirt, and other bond weakening materials.

B. Store in a manner to maintain identification of bars after bundles are broken.

1.6 SOURCE QUALITY CONTROL

A. Testing Laboratory will:
   1. Review plant quality assurance procedures for fabrication of end headed bars, stud-rails and mechanical couplers for conformance with requirements of applicable ICC-ES or IAPMO-ES evaluation report. Special inspect fabrication as required by evaluation report.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Bar reinforcement: ASTM A615, Grade 60, or ASTM A706 deformed bars, except as otherwise designated.
   1. Furnish only ASTM A706, where designated on drawings.

B. Headed bar reinforcement: Deformed bar reinforcement (#11 and smaller) with forged, welded, or mechanically attached heads conforming to the requirements of ACI 318-08, Sections 3.5.9 and 12.6. Acceptable systems shall have an active ICC-ES or IAPMO-ES Evaluation Report evidencing compliance with specified criteria and establishing quality assurance and special inspection requirements. Subject to compliance with requirements, provide one of the following, or approved equal:
   1. HRC 555 Headed Bar, by Headed Reinforcement Corp. (ICC ESR 2935)
   2. Bartech Mechanical Anchor, by Dextra Manufacturing Co. (ICC ESR-2166)

3. Lenton Terminator D16 (taper threaded); by Erico (IAPMO ESR-0129)

C. Bar couplers: Capable of producing Type 1 or Type 2 mechanical splice in accordance with Section 21.1.6 of ACI 318-08, as specified herein. Select coupler type considering conditions of installation and space limitations; maintain specified cover and reinforcement position acceptable to Owner's Representative. Acceptable coupler systems shall have an active ICC-ES or IAPMO-ES Evaluation Report evidencing compliance with the specified criteria and establishing quality assurance and special inspection requirements.
   1. Type 2 couplers.
   2. Subject to compliance with requirements, provide one of the following mechanical splice systems:
      a. Lenton, Erico Inc. (IAPMO ESR-0129)
      b. Bartec, Dextra America, Inc. (ICC ESR-1705)
      c. Taperlock, Dayton Superior (ICC ESR-2481)
      d. HRC 500/510, Headed Reinforcement Corp (ICC ESR-2764)
      e. Bar-Lock, Dayton Superior (ICC ESR-2495)

D. Bar Supports:
   1. Supports placed against ground or atop vapor retarder shall be precast concrete blocks with base not less than 3 inches square.
   2. CRSI Class 1 plastic or plastic protected supports shall be used at surfaces exposed to view or weather in completed construction. Select support type to provide minimum surface contact. Refer to specification Section 03 33 00: Architectural Concrete for further requirements.
   3. CRSI Class 2 wire supports and precast bar supports shall be acceptable at other surfaces not exposed to view in completed construction.
   4. CRSI Class 3 wire supports shall be acceptable where support is no closer than 1/2 inch to surface or where support is placed atop steel deck.
   5. Supports and tie wire for coated bars shall be plastic or coated with epoxy or other polymer, and shall be of configuration approved by Owner’s Representative.

2.2 FABRICATION

A. Shop fabricate reinforcement to standard fabrication tolerances indicated in ACI 315.

B. Spirals: Provide 1 finishing turn with 90-degree hook at each end unless otherwise noted on structural drawings. At splices provide 80 bar diameter lap splice with 90-degree hooks at ends.

C. Headed bars: Headed bars will be allowed to be substituted for 90 deg hooked bars, subject to meeting the requirements specified herein.
   1. Bars are designated to be ASTM A615, Gr. 60 or ASTM A706.
   2. Clearance between headed bars shall be at least 4 bar diameters in accordance with ACI 318, Section 12.6.
   3. A minimum cover of 2 bar diameters, 1-1/2 inches minimum, shall be provided to all faces of head.
   4. Headed bars shall not be substituted for stirrups and ties that serve to confine beam and column reinforcing.

5. No additional cost to Owner.
6. Contractor shall pay the cost of any additional testing and inspection associated with use of headed bars.

2.3 SOURCE QUALITY CONTROL

A. Contractor shall furnish materials that meet all standards can codes listed above.

3.1 PLACEMENT

A. Place and maintain bars at locations shown on Drawings to the tolerances of ACI 117, including but not limited to the following:
   1. Clear distance to formed surfaces: Plus or minus 1/4 inch.
   2. Top bars in slabs 8 inches deep or less: Plus or minus 1/4 inch.
   3. Top bars in foundations, beams and slabs over 8 inches deep: Plus 1/2 inch and minus 1/2 inch.

B. Maintain minimum coverage as indicated for concrete protection. Conform to requirements of ACI 301 where not indicated.
   1. Cover shall not be reduced at mechanical couplers and headed reinforcing.

C. Place reinforcement with 1-1/2 bar diameters minimum clear distance between bars, but not less than 1-1/2 inches. Where specified clearance cannot be achieved, bundle bars.
   1. Conform to additional requirements for spacing of headed bars.

D. Support and securely fasten bars with chairs, spacers and ties to prevent displacement by construction loads or placement of concrete beyond the tolerances specified. Conform to CRSI "Manual" as a minimum standard.

E. Take precautions to protect vapor retarder beneath slab-on-ground from damage during installation of reinforcement.

F. Lap splices:
   1. Contact splice: Lapped bars shall be placed in contact and securely tied. Lap shall be oriented to maintain bars in their designated layer, except where offset bent bars are used at splices. Stagger lap splices where necessary to maintain minimum 1 bar diameter and 1 inch clearance between bars at splice.
   2. Noncontact splice: Lapped bars shall be spaced apart a minimum of 1 bar diameter and 1 inch minimum to permit the encasement of the entire surface of the bar in concrete. Bars shall not be spaced farther apart than one-fifth of the lap and 6 inches maximum. Whenever practical, use noncontact splices, with 4 inch minimum clear spacing between bars, for shotcrete construction.
   3. Wire Fabric: Overlap outermost cross wires of each piece one wire space plus 2 inches. Wire or clip together at maximum 3-foot spacing. Stagger splices in one direction.

G. Welding:

1. Welding is not permitted unless specifically detailed on plans or approved by Landscape Architect.

H. Reinforcement shall be free of mud, oil or other materials that may reduce bond at the time concrete is placed. Reinforcement with tightly adhered rust or mill scale will be accepted without cleaning provided that rusting has not reduced dimensions and weights below applicable standards. Remove loose rust.

I. Field straightening: Bar reinforcement shall not be field bent after being embedded in hardened concrete. Reinforcement that is accidentally bent, up to a 1:2 bend (30 deg) and not severely kinked, will be permitted to be straightened subject to the approval of the Owner's Representative. #7 and smaller bars may be straightened cold. Larger bars shall be preheated prior to bending in accordance with the provisions of ACI 301.

END OF SECTION

SECTION 03 30 00 – CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete and reinforcing for the following:
   1. Sign and site furniture footings.
   2. Cast-in-Place curbs and mow bands.
   3. Control, expansion and construction joint devices.

B. Related Sections:
   1. Section 03 33 00: Architectural Concrete
   2. Section 32 11 23: Aggregate Base Course
   3. Section 32 13 13: Concrete Paving
   4. Section 26 Aggregate Base
   5. Section 51 Concrete Structures
   6. Section 73 Concrete Curbs and Sidewalks

1.2 REFERENCES

A. City of Santa Rosa Department of Public Works
   1. Standard Specifications, most current
   2. Standard Plans, most current

B. State of California, Department of Transportation (Caltrans)
   1. Standard Specifications, October 2022

C. American Concrete Institute
   1. ACI 117-10 – Specifications for Tolerances for Concrete Construction and Materials and Commentary
   2. ACI 301-10 – Specifications for Structural Concrete
   3. ACI 318-14 – Building Code Requirements for Structural Concrete
   4. ACI 347R-14 – Guide to Formwork for Concrete
   5. ACI SP-66 – ACI Detailing Manual

D. ASTM International
   1. ASTM A82 – Standard Specification for Steel Wire, Plain, for Concrete Reinforcement
   2. ASTM A185 – Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
   3. ASTM A615 – Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
   4. ASTM C31 – Standard Practice for Making and Curing Concrete Test Specimens in the Field
   5. ASTM C33 – Standard Specification for Concrete Aggregates

6. ASTM C39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
7. ASTM C94 – Standard Specification for Ready-Mixed Concrete
8. ASTM C150 – Standard Specification for Portland Cement
9. ASTM C260 – Standard Specification for Air-Entraining Admixtures for Concrete
10. ASTM C309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
11. ASTM C494 – Standard Specification for Chemical Admixtures for Concrete
12. ASTM C618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
13. ASTM C685 – Standard Specification for Concrete Made By Volumetric Batching and Continuous Mixing
14. ASTM C881 – Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
15. ASTM C1017 – Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
16. ASTM C1107 – Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink)
17. ASTM D1751 – Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)

E. American Welding Society
1. AWS D1.4 – Structural Welding Code – Reinforcing Steel

F. Concrete Reinforcing Steel Institute (CRSI)
1. Manual of Standard Practice, Latest Edition

1.3 SUBMITTALS

A. Submit the following for review and approval by Landscape Architect prior to commencing work:
1. Formwork and Accessories: ACI 301- Section 2:
a. Submit location and detail of construction and contraction joints if different from those indicated in Contract Documents.
b. Manufacturer’s data sheet for the following:
1) Form facing materials.
2) Formwork release agent or form liner.
3) Form ties.
4) Expansion joint materials.

2. Reinforcement Materials: ACI 301 - Section 3:
a. Reinforcement: Submit manufacturer’s certified test report.
b. Certification: Submit copy of current Concrete Reinforcing Steel Institute (CRSI) Plant Certification.

c. Welding: Submit description of reinforcing bar weld locations, welding procedure specifications, and AWS welder certification when welding is permitted.

3. Concrete Mix Design and Components: ACI 301 - Section 4:
   a. Mixture proportions:
      1) Submit concrete mixture proportions and characteristics.
      2) Submit test data used to establish the average compressive strength of the mixture.
   b. Concrete materials: Submit the following:
      1) Cementitious materials: Type, manufacturing location, shipping location, and certificates showing compliance with ASTM C150.
      2) Aggregate: Type, pit or quarry location, producer's name, gradation, specific gravity, and evidence not more than 90 days old demonstrating compliance with the Specifications.
      3) Admixtures: Type, brand name, producer's name, manufacturer's technical data sheets, and certificates showing compliance with ASTM C260 and ASTM C494.
      4) Water: Supply source.
   c. Mixture Proportion Adjustments: Submit adjustments to mixture proportions or changes in materials, along with supporting documentation, made during the course of the Work.
   d. Volumetric Batching: If concrete production by volumetric batching method is desired, submit request to Landscape Architect along with description of proposed method for approval prior to commencing Work.

B. Design Data: Submit concrete mix design for each concrete strength.

1.4 QUALITY ASSURANCE

A. Comply with Sections 1 – 5 of ACI 301, and Section 90 of the Caltrans Standard Specifications, unless modified by requirements in the Contract Documents.

B. Ready-Mix-Concrete Manufacturer Qualifications: Provide a firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94 requirements for production facilities and equipment.

C. Prepare shop drawings in accordance with ACI SP-66.

D. Comply with ACI 117 – Specifications for Tolerances for Concrete Construction and Materials.

E. Slump tests: Have available at job site equipment required to perform slump tests. Make one slump test for each cylinder sample, from same concrete batch in accordance with ASTM C143.

F. Welders: AWS qualified within previous 12 months.

G. Maintain records verifying that materials used are the specified and accepted types and sizes and are in conformance with these Specifications.

H. Ensure that production and delivery of concrete conform to the requirements of these Specifications.

I. Ensure that concrete produced has the specified characteristics in the freshly mixed state and that these characteristics are maintained during transport and delivery.

1.5 JOB CONDITIONS

A. The use of mineral admixtures shall be approved by Landscape Architect.

B. Concrete designated by compressive strength shall be proportioned such that the concrete will conform to the strengths shown on the plans and in this Special Provision.

C. Contractor shall give the Landscape Architect 36 hours' notice prior to placing Portland Cement Concrete.

1.6 TESTING

A. Provide testing in accordance with ACI 301.

1.7 MATERIAL STORAGE AND HANDLING

A. Cementitious Materials: Keep cementitious materials dry and free from contaminants.

B. Aggregates:
1. Store and handle aggregate in a manner that will avoid segregation and prevents contamination by other materials or other sizes of aggregates.
2. Store aggregates in locations that will permit them to drain freely.

C. Water and Ice: Protect mixing water and ice from contamination during storage and delivery.

D. Admixtures:
1. Protect stored admixtures against contamination, evaporation, or damage.
2. To ensure uniform distribution of the constituents, provide agitating equipment for admixtures used in the form of suspensions or unstable solutions.
3. Protect liquid admixtures from freezing and from temperature changes that would adversely affect their characteristics.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

A. Cement: One of the following:
   1. Type II: ASTM C150
   2. Replace a minimum 25% and maximum 50% of cement with fly ash confirming to ASTM C618 Class C or F or ground blast furnace slag conforming to ASTM C989, Class 100 or 120.

B. Aggregate: Conform to ASTM C33. Maximum size of aggregate not to exceed 3/4 inch.

C. Water: Clean, potable, concrete mixing water free from injurious amounts of salts, oils, acids, alkalis, organic materials or other deleterious materials.

2.2 ADMIXTURES

A. Admixtures:
   1. Admixtures shall conform to the requirements of the following ASTM designations:
      a. Chemical Admixtures: ASTM C494
      b. Air-entraining Admixtures: ASTM D98
      c. Calcium Chloride: ASTM C618
      d. Mineral Admixtures: ASTM C618, except loss of ignition shall not exceed four percent.

   2. If more than one admixture is used, admixtures shall be compatible with one another so that the desirable effects of the admixtures used will be realized.

   3. Optional Use of a Chemical Admixture:
      a. The Contractor is permitted to use Type A or F water reducing; Type B, retarding; or type D or G, water-reducing and retarding admixture as described in ASTM C494.
         1) When concrete is designated by compressive strength, no reduction in minimum cement content will be allowed.
         2) When concrete in not designated by compressive strength and a water-reducing admixtures or a water-reducing and retarding admixture is used, the cement specified or ordered may be reduced by a maximum of five percent by weight except that the resultant cement content shall not be less than 470 pounds per cubic yard.
         3) When a reduction in cement content is made, the dosage of admixture shall be the dosage used in determining approval of the admixture.

   4. Required Use of Air-entraining Admixtures:

a. Air-entrainment shall be used in amounts to produce concrete having specified air content as determined by California Test 504.
b. The Contractor will be permitted to use and air-entraining admixture to aid any construction procedure or equipment provided that the average air content of three successive tests shall not exceed four percent and no single test value shall exceed 5-1/2 percent.

5. Optional Use of Mineral Admixtures:
   a. The Contractor shall be permitted to replace up to 15 percent of required Portland cement, other than Type IP (MS) Modified with a mineral admixture in all cement except where high early strength is specified or where the use is specified as being prohibited.
   b. The weight of the admixture shall be equal to or greater than the weight of the Portland cement replaced

2.3 REINFORCEMENT

A. Reinforcement: per Section 03 20 00: Concrete Reinforcing.

2.4 ACCESSORIES

A. Epoxy Bonding Adhesive: ASTM C881: Two-component, filed mixed, Class B or C:
   1. Load Bearing Applications: Type IV, Grade 1.
   2. Non-load Bearing Applications: Type I, Grade 1.
   3. Bonding Freshly-Mixed to Hardened Concrete: Type V, Grade 2.
   4. Standard Set for Pavement Markers: Type IV, Grade 3.
   5. Sealant for Inductive Loops: Type I, Grade 2.

B. Non-Shrink Grout: ASTM C1107, high strength, non-staining
   1. Mix, handle, and place in accordance with manufacturer's recommendations.

C. Mortar Mixture:

Class	Use	Cement (sacks)	Sand (cu ft)
A	Finish mortar for curbs and steps, caulking for pipe joints.	1	1-1/2
C	Manhole joints and inverts.	1	2

   1. Use only the quantity of water necessary to produce a sufficiently workable for mortar for the specified use.
   2. Re-tempering of mortar shall not be permitted.

D. Expansion Joint Fillers: per Drawings.

2.5 FORMWORK

A. Forms: per Section 03 11 00: Concrete Forming

2.6 CURING MATERIALS

A. Curing Compound: Conform to Section 800.16 of the CCSF Standard Specifications.

2.7 CONCRETE MIX

A. Portland Cement Concrete: Conform mix specifications, unless otherwise noted in Structural Drawings:

Type of Construction	**Concrete Class**	**Cementitious Materials (sacks/CY) min**	**Combined Aggregate Grading (in) max**	**Design Compressive Strength (psi) min**	**Max. Allowable Slump (in)**
Foundations	6-3500-3/4	6	3/4	3500	4
Concrete not otherwise specified	6-3000-3/4	6	3/4	3000	4

B. Concrete designated by compressive strength shall be proportioned such that the concrete will attain the strength shown on the Contract Drawings or as specified herein.

C. Air Content: Maintain within range permitted by ACI 301.

D. Moisture Content: Maximum water-cement ration of 0.48 for foundations and 0.45 for slabs.

E. Ready Mixed and Site-Produced Concrete: Measure, batch, mix, and deliver in accordance with ASTM C94.
   1. Site mixing shall only be permitted with prior approval of the Landscape Architect.

F. Hand mixing of Portland Cement Concrete shall not be allowed without prior written approval by the Landscape Architect

2.8 SCHEDULE OF FINISHES

A. As specified in Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify compacted subgrade and aggregate base are acceptable and ready to support concrete structures.

B. Verify gradients and elevations of base are correct.

3.2 FORMING

A. Design, construct, erect, brace, and maintain formwork in accordance with Section 03 11 00, ACI 301, and ACI 347 – Chapter 3.

B. Construct forms true to line and grade, mortar-tight, and of sufficient rigidity to prevent deflection during concrete placement.

C. Provide anchoring and bracing to control upward and lateral movement of formwork system.

D. Place sleeves, inserts, anchors, and embedded items required for adjoining work or for support of adjoining work before concrete placement.

E. Position and support expansion joint materials and other embedded items to prevent displacement.

F. Fill voids in sleeves, inserts, and anchor slots temporarily with removable material to prevent concrete entry into voids.

G. Fasten form wedges in place after final adjustment of forms and before concrete placement.

H. Thoroughly treat inside face of forms with approved form release agent prior to placing concrete.
   1. Do not allow formwork release agent to puddle on forms.
   2. Do not allow formwork release agent to contact reinforcement or hardened concrete against which fresh concrete is to be placed.

I. Clean forms and remove dirt and foreign material prior to placing reinforcement.

3.3 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.4 REINFORCEMENT

A. Before placing reinforcing bars in position, thoroughly clean steel of loose mill and rust scale, dirt, and other foreign material that may reduce the bond between concrete and reinforcing.
   1. If concrete placement is delayed after reinforcement is in place, re-inspected bars and clean when required.

B. Place, support, and fasten reinforcement in conformance with ACI 301 and as indicated in the Contract Drawings.
   1. Do not exceed tolerances specified in ACI 117 before concrete is placed.
   2. Discard any bar that is kinked or shows cracks after bending.
   3. Do not weld crossing reinforcement bars for assembly.
   4. Accommodate placement of formed openings.
   5. Space reinforcement bars in accordance with ACI 318 with minimum clear spacing of one-bar-diameter but not less than one inch.
      a. Where bars are indicated in multiple layers, place upper bars directly above lower bars.
      b. Bar Spacing: Center to center of bars.
   6. Splices of reinforcement shall be made only as required or permitted on Drawings or as authorized by the Engineer in accordance with ACI 318.
      a. Where spliced, lap bars at least 40 bar diameters.
   7. Maintain minimum concrete cover around reinforcement as indicated in Drawings. If no information is specified in Drawings, provide minimum concrete cover in accordance with ACI 318 – Tables 3.3.2.3 as follows:

Reinforcement Location	**Minimum Concrete Cover**
Footings and Concrete Formed Against Earth	3 inches
Concrete Exposed to Earth or Weather	2 inches

      a. Bar Cover: Clear distance between surface of bar and face of concrete.

3.5 PREPARATION

A. Comply with requirements of ACI 301 – Section 5.3.1.

B. Notify Landscape Architect sufficiently in advance of start of operation to allow preliminary inspection of the Work, including subgrade, forms, and reinforcing steel.

C. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent and remove laitance, coatings, and unsound materials.

D. Existing concrete, earth, and other water-permeable material against which new concrete is to be placed shall be thoroughly damp when concrete is placed.
   1. There shall be no free water on surface.

3.6 CONCRETE PLACING

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Protect adjacent work from stain and damage.
   1. Repair or replace damaged and stained areas to equal or better than their original conditions.

C. Join fresh concrete to concrete that has attained full set in the following manner:
   1. Clean set concrete of foreign matter and remove mortar laitance by chipping and washing.
   2. Saturate clean, roughened base with water, but leave no free water on surface.
   3. Apply a coat of 1:1 cement-sand grout, approximately 1/8-inch thick, into the thoroughly dampened concrete base.
   4. Place new concrete immediately, before grout has dried or set.

D. Adverse Weather Conditions:
   1. Temperature at time of delivery shall meet ACI 301 - Section 4.2.2.6.
   2. Do not place concrete when atmospheric temperatures are below 40 or above 95 degrees Fahrenheit without approval of Engineer.
      a. Hot and cold weather concreting shall be in accordance with ACI 305R and 306R.
   3. Do not place concrete while rain is falling unless protection is provided and approved by the Landscape Architect.
      a. Do not allow rainwater to increase mixing water or damage concrete surface.

3.7 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Install expansion joints at locations shown on the Drawings.

C. Provide construction joints at interface between new concrete and existing concrete as shown in the Drawings or as required by CCSF standard specifications.

D. Introduce new construction joints only upon approval of the Landscape Architect.

3.8 FINISHING

A. Strike off exposed surfaces of consolidated concrete to the lines and grades shown. Provide a uniform surface texture having the specified finish without undulations or irregularities.

B. Provide surfaces finishes as specified in Drawings.

C. Patching:
1. Allow Landscape Architect to inspect concrete surfaces immediately upon removal of forms.
2. Excessive honeycomb or embedded debris in concrete is not acceptable, notify Landscape Architect upon discovery.
3. Patch imperfections as directed by Landscape Architect in accordance with ACI 301.

3.9 CURING AND PROTECTION

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

C. Protect concrete from traffic or damage until surfaces have hardened sufficiently.

3.10 TOLERANCES

A. Conform to ACI 117-10.

3.11 FIELD QUALITY CONTROL AND TESTING

A. Comply with requirements of Section 014000 – Quality Requirements, Section 017300 – Execution, and Section 017700 Closeout Procedures.

B. Concrete Inspections:
1. Continuous Placement: Inspect for proper installation procedures.
2. Periodic Curing: Inspect for specified curing temperature and procedures.

C. Reinforcement Inspection:
1. Placement Acceptance: ACI 117.
2. Welding: AWS D1.1.
3. Periodic Placement: Inspect for correct materials, fabrication, sizes, locations, spacing, concrete cover, and splicing.

D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C172 shall be performed according to the following requirements:
   1. Testing Frequency: ACI 318 5.6.2.
   2. Slump: ASTM C143.
   3. Air content: ASTM C231.
   4. Concrete temperature: ASTM C1064.
   5. Compression test specimens shall be taken in accordance with ASTM C31 and tested in accordance with ASTM C39.
      a. A valid strength test according to ACI 318 5.6.2.4 shall be conducted at 7 days and 28 days.

E. Maintain records of concrete placement, record date, location, quantity, air temperature, and test samples taken.

3.12 DEFECTIVE CONCRETE

A. Defective Concrete: Work not conforming to required lines, details, dimensions, tolerances, or specified requirements:
   1. Repair or replacement of defective concrete will be determined by the Landscape Architect.
   2. Remove and replace rejected materials and installed work.
   3. Do not patch, fill, touch-up, repair, or replace exposed concrete without direction of the Landscape Architect.

END OF SECTION

SECTION 03 30 50 - ARCHITECTURAL CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes:
   1. This section includes requirements for Cast-in-Place Architectural Concrete Site work, for all exposed to view walls.
   2. Requirements for Architectural Site Concrete, including formwork, reinforcement and cast-in-place concrete, affecting the finished appearance of the Work.

B. Related Sections include:
   1. Section 03 11 00 Concrete Forming
   2. Section 03 20 00 Concrete Reinforcing
   3. Section 03 30 00 Cast-in-Place Concrete

1.2 DEFINITIONS

A. Architectural Site Concrete, Formed:

   1. Concrete that is exposed to view on surfaces of completed structure and that requires special concrete materials, formwork, placement, or finishes to obtain specified architectural appearance.

1.3 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 designated in this Section. Use applicable year of adoption or revision as published in the 2022 “Annual Book of ASTM Standards”.

C. American Concrete Institute’s ACI 303.1 - Specification for Cast-in-Place Architectural Concrete, 1997.

D. ASTM D-1557-Compaction

1.4 SUBMITTALS

A. Product Data: For each type of product indicated, including but not limited to form facing material, form release agent, form ties, reinforcing bar supports, waterproofing admixtures, curing compound and cleaning solutions.

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
   1. Indicate amounts of mixing water to be withheld for later addition at the site.

D. Samples:
   2. Formwork contact materials, each type, 12 inches square
   3. Reveal form strips, each size, 12 inches long
   4. Form ties, one each type
   5. Color and finish sample tile, 12 inches square, for each color and finish indicated.

1.6 QUALITY ASSURANCE

A. Comply with applicable provisions of following codes and specifications, except where more stringent requirements are shown or specified.
   1. ACI 303.1, "Specification for Cast-in-Place Architectural Concrete."

B. Source Limitations: Obtain concrete mixture from one manufacturer with resources to provide cast-in-place architectural concrete of consistent quality in appearance and physical properties.

C. The cast-in-place concrete Subcontractor, carpenter foreman, labor foreman and the reinforcing erector foremen shall have successful experience in performing architectural cast-in-place concrete work and shall be approved for work on project. Submit projects, including name, description of responsibilities, scope of work, and references.

D. Mock-ups for Architectural Site Concrete Work:

   1. After all samples, product data, and the design mixtures are approved, construct mock-ups in locations and configurations as directed by the Landscape architect.
   1. Mock-ups shall consist of the following:
      a. 2 foot long portion of all site walls.
      b. Use approved form face material, reinforcement and accessories and assemble formwork as intended for the building construction.
      c. Finish exposed hardened surfaces of the walls with specified finishes.
      d. Samples of all joint types and reveals as shown in plans.
   2. If mock-up is not approved by the Landscape Architect, remove and replace with others and no additional cost to the Owner.

1.7 PERFORMANCE REQUIREMENTS

A. Responsibility for the design of Cast-in-Place Architectural Concrete in conformance with the requirements of the drawings and specifications and performed using the highest standards of quality for visual and durable concrete rests with the Contractor.

B. Design of the mix and formwork shall be performed by Contractor.

C. Performance Criteria: All cast-in-place architectural concrete formwork shall be performed so that no evidence of the following will be evident when the concrete is subject to imposed loads, temperature and weather conditions:
   1. Damage of any kind.
   2. Formwork fastening penetrations or formwork anchoring devices or projections other

than approved form ties and specified embedded items.
3. Cracking, other than at control joints, due to improper forming and placing.
4. Out of alignment or incorrect profiles.
5. Surface voids not completely covered by a circle 11/16 inches in dia. (10 cent coin) or more than 25 surface voids larger than 1/8 inch, in longest dimension, in any area 1 ft. square.
6. Voids, sand pockets or discoloration due to fluid loss through the formwork.
7. Rock pockets and honeycombs.
8. Discoloration caused from staining and from improper placing of the concrete.

D. If any of the above-mentioned deficiencies occur, the Landscape Architect may order the affected concrete replaced or repaired with acceptable concrete. Repair only when directed by the Landscape architect. Corrected deficiencies must meet with the Landscape Architect approval.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

A. Smooth-flat form surfaces shall be plastic coated, birch plywood, minimum 14 plies per inch, 3/4-inch-thick panels in sizes to cover surface areas between joint lines shown on the drawings.

C. Form Ties: Shall be manufactured specifically for use as concrete ties and shall be designed to seal tightly to the form face material without fluid loss. Ties shall be of sufficient strength to resist fluid concrete placing pressures at the longest span of support used in project. Ties shall be one of the following as selected by the landscape architect in the first install structure:
1. Cone/Tube/Rod or Cone/Coil/Rod tie system with screw tie clamps. Cone size shall be maximum 1-3/4” diameter.
2. Tapered He-bolt/Stud tie. Size of stud at contact face shall be 5/8” in diameter.
3. Ties shall be as supplied by Engineered Devices Corp., Ridgefield Park, NJ.

2.2 STEEL REINFORCEMENT AND ACCESSORIES

A. Per Structural Drawings.

B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire fabric in place; manufacture according to CRSI's "Manual of Standard Practice."

C. Where legs of wire bar supports contact forms, use CRSI Class 1, gray, plastic-protected or CRSI Class 2, stainless-steel bar supports.

2.3 CONCRETE MATERIALS

A. General: Comply with Division Section 03 30 00 Architectural Cast-in-Place Concrete, except as designated in this Section.

B. Portland Cement: ASTM C 150, Type I, standard gray concrete.

C. Cementitious Material: Comply with Section 03 30 00 Architectural Cast-in-Place Concrete.

D. Normal-Weight Aggregates: ASTM C 33, Size 57; from one of the following sources recognized for producing low shrinkage concrete: Sechelt, Orca, or Clayton.

E. Water: Potable, free of wash water from mixer washout operations.

2.4 CONCRETE MIXTURES

A. Comply with the requirements of Section 03 30 00 for Cast-in-Place Concrete, and as specified herein. Architectural concrete shall be self-consolidating except where designated on the drawings or where regular concrete is submitted and approved for use

B. Proportion concrete mixtures as specified in section 03 30 00, Cast-in-Place Concrete to achieve 4,000 psi compressive strength.

C. Limit water to cement ratio to 0.45 and total water content to 275 pounds per yard, including liquid admixtures and water added on site.

D. Provide 600 pounds per cubic yard minimum cement content. Avoid the use of increased cement to minimize thermal effects.

E. Mix shall contain specified high range water reducing admixture (superplasticizer) to provide 8-inch slump at point of placement.

F. Fly Ash Replacement allowed up to 30% by weight maximum.

2.5 CONCRETE MIXING

A. Clean equipment used to mix and deliver cast-in-place architectural concrete to prevent contamination from other concrete.

B. Before test sampling and placing concrete, water may be added at the site, subject to limitations of total mix design water, design slump, mix temperature and elapsed time from batching.
   1. Dose with high-range water reducing admixture, when slump loss is result of HRWR reaction.

2.6 MISCELLANEOUS MATERIALS

A. Joint Sealing Materials: As specified in plans.

B. Patching Additive: Shall be a liquid, acrylic-polymer bonding agent specifically made to be integrally mixed with mortar.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Verify that subgrade has been rough graded for concrete and accepted under another Section prior to commencement of work.

3.2 PREPARATION

A. Subgrade Preparation: Prepare and Compact subgrade to 95% relative compaction.

3.3 FORMWORK

A. Fabrication:

1. General: Comply with Division 03 Section Formwork, except where more stringent requirements are specified herein. Requirements for formwork apply only at exposed to view surfaces; other surfaces shall conform to requirements for structural concrete.
2. Design formwork to permit easy removal. Prying against the concrete will not be permitted. Care shall be taken so as not to mar the concrete surface in cutting or removal of the forms.
3. Design formwork for a full liquid head of pressure. The forms shall be completely rigid and strong enough to withstand without deflection, movement or leakage the placing pressures that result from rapid filling and vibration.
4. Forms shall be fabricated so the concrete can be adequately placed, vibrated and finished to achieve the specified finishes.
5. Layout form ties, form joints, reveals and exposed embedments as shown on the drawings. In areas not shown form joints and tie holes shall be laid out symmetrically and as near the pattern shown as possible and shall be submitted for approval by the landscape architect
6. Smooth surfaces:
   a. Edges of plastic overlay form panels shall be square, flat and sealed. Seal all cut edges (end grain, including tie holes) with liquid polyurethane.
   b. Install sealant in all fabricated butt joints of plastic overlay form panels to prevent fluid loss. At butting plywood panel edges place a bead of sealant (1/8" max) at back edge (away from contact face) of one panel prior to butting interface edge surfaces. Take care not to allow sealant to come in contact with form surface. Contact form surface shall be free of sealant prior to casting concrete.
   c. Back fasten plastic face panels with screws to minimize the penetrations through the plastic faced panels, achieving a rigid gang form. Use on of the following:
      1) Install a full backing sheet
      2) Install wood or metal clips at supports where face panel seams are located and in other locations to maintain panel stability.
7. Reveals:
   a. Back screw horizontal reveals. Release screws prior to stripping and leave reveal form in concrete to be removed later.
   b. Vertical reveals may be back screwed as in “a” above or fastened securely to form face to be stripped with the form panel.
   c. Face nailing is not acceptable.
8. Foam inserts: Back Fasten laser cut foam inserts to inside face of form and/or use adhesive

to attach foam insert.

B. Form Erection:
1. Use only form units where face panels are in undamaged condition. Replace damaged panels as required to maintain surface in a condition to achieve the specified treatment.
2. Use screw type fastening devises to maintain alignment, and to tightly close joints at corners, end forms, square columns and at bulkheads. Apply pressure at joint to resist concrete placing pressure as close to the joint as possible.
3. Construction joints and control joints shall be at locations indicated on the drawings.
4. At corner joints, assembled and disassembled in field, place a gasket in the form joint. Install gasket away from contact edge 1/16” to 1/8”.
5. All corners shall be formed with a tight seal (see item above) and with back-up support secured with screw connectors at sufficient intervals to maintain the seal under placing pressures.
6. Align the vertical joints at round columns as directed by the landscape architect. The horizontal reveal plate splices at the column shall align with the vertical joint
7. Reveals on the exposed form surfaces shall be of the shape, width and depth shown on the drawings.

C. Coating of Forms: Prior to use, all forms shall be coated with the specified form release coating in accordance with the manufacturer's written instructions.
1. Coat evenly and remove excess material from form surface with a damp absorbent cloth.
2. Surface applied with specified release agent shall not be oily to the touch.
3. Do not allow coating to come in contact with previously placed concrete or with reinforcing steel.

3.4 FORMWORK TOLERANCES

A. Hydraulic pressures: Design forms to limit deflections of members supporting facing panels to L/400. Formwork shall be designed for full liquid head.

B. Finish Lines: Fabricate and position formwork to maintain hardened concrete finish lines within the following allowable variations.
1. From designed edge elevation in 10 ft. 1/4 inch
2. From designed vertical plane in 10 ft. 1/4 inch
3. Cross-Sectional Dimensions:
Plus or Minus 1/4 inch
4. Form surface to surface at butt joint 1/32 inch
5. It is the intent of this specification that the formwork will be erected in such a manner that lines and surfaces are visually presentable without obvious defects. Where lines and planes require adjusting from one placement to another humor the forms to realign in a visually acceptable manner.

3.5 REINFORCEMENT

A. Cover: Minimum concrete cover for reinforcing and tie wires shall be 2 inches, unless specifically detailed otherwise.

B. Tie Wires: Set wire ties with ends directed into concrete, not toward exposed concrete surfaces. Keep tails as short as practical, so that concrete placement will not force ends to exposed surface.

C. Provide bar supports at exposed face only as absolutely necessary to maintain cover. Use a combination of internal bracing and chairs and ties at concealed face to hold reinforcement securely in position.

3.6 PLACING CONCRETE

A. Before placing concrete in the forms, verify that all forms have met all requirements specified; that reinforcing steel, embedded materials are in place and securely anchored; that forms are absolutely clean; and that entire preparation has been approved by the Concrete Quality Control Technician and has been reviewed by the Landscape architect.

B. Cleaning and Protecting Forms: Immediately prior to placing concrete, clean all form interiors free of foreign material and debris.
1. Force debris out of forms prior to closing the last section with a jet stream of compressed air and/or water. Where form openings are not available, collect debris with vacuum cleaners and heavy-duty magnets. Remove all wire clippings, sawdust and other debris from wall, beam and soffit bottoms.
2. Protect cleaned forms if placing does not commence immediately, covering openings with tarpaulins.
3. Do not allow direct sunlight to heat forms.

C. Depositing Concrete:
1. Concrete for walls, columns and spandrels more than 3 ft deep shall be placed with trunks, or pump hoses inserted onto the form cavity.
2. Deposit concrete as nearly as practical at its final position, but not farther than 5 ft. horizontally from the final position.
3. Do not drop concrete more than 12 inches.
4. Place concrete by inserting pump hose, or trunks into form to face of fresh concrete. Place an adequate number of trunks in wall and deep spandrel forms to enable a continuous placement without causing delays in moving trunks.
5. Deposit layers in walls shall not exceed 30 inches in height. Top deposit lift of placement shall not exceed 18 inches in height.
6. Deposits of concrete in walls shall have a subsequent deposit place on top and/or adjacent to the fresh face and consolidated within 15 minutes. Plan construction joints and placements so that the placing sequence will follow this requirement.

D. Consolidating Concrete:
1. All concrete shall be consolidated by internal vibration using two vibrators at each placement. One vibrator shall follow deposit location and consolidate concrete after deposit is leveled. Optimum diameter of vibrator head at shall be 1” to 1½”. Vibrators shall be placed into the concrete vertically at a consistent spacing that will thoroughly blend the deposits, remove entrapped air, and consolidate the concrete. Vibrator head shall be inserted rapidly and withdrawn slowly and evenly to remove maximum amount of entrapped air (optimum withdrawal speed approximately 2” to 4” per second). Do not jiggle vibrator up and down during consolidation, use continuous and even insertion and withdrawal of vibrator.

2. After top out leveling in walls and spandrels, the concrete shall be allowed to set 10 to 15 minutes and then shall be given a final vibration of the top 20 inches. Immediately thereafter the top surface shall be finished as required.
3. Caution must be exercised in using vibrators to prevent injury to the form surface material or displacement of embedded items.
4. Keep one spare working vibrator on site at all times.

3.7 CURING AND FORM REMOVAL

A. General: Comply with Section 03 30 00 Architectural Cast-in-Place Concrete, except where more stringent requirements are specified herein.

B. Use consistent stripping time and curing method for exposed surfaces. Maintain surface appearance that matches approved field sample panels and mockups.

C. For surfaces exposed to weather, leave formwork securely in place for 7 days and cover exposed top surface tightly with impervious sheeting.

D. In hot weather, cover forms during curing period to protect from direct sunlight.

E. Thoroughly wet surface immediately after loosening forms and again after form removal.

3.8 FINISHES FOR FORMED PLACEMENTS

A. All exposed work shall be finished with the approved finishes determined from reviewed sample submittals and on-site mock-ups. Finishes shall be as specified herein where indicated on the drawings. Minor defects may require fins to be removed (i.e. top edges) or minor patching performed, however, it is the intent of this specification that the work will be performed in such a manner that only the specified etch-clean treatment, water repellent application, and tie hole finishing will be required after stripping.

B. General: Prior to treating, all surfaces shall receive the following preparation and cleanup.
1. All surfaces to receive treatment shall be a minimum of 21 days old. All surfaces can be treated at end of project.

2. Remove all stains using an appropriate non-abrasive stain remover for each type.

3. During operations, protect all adjacent work. At completion of day's work, leave area clean. At completion of work, remove all equipment, waste and excess material and leave area clean.

C. Abrasive Blast Treatment: All Surfaces exposed to view shall have an abrasive blast treatment. Treat the out-of-form concrete surfaces including exposed wall tops, as follows:
1. Remove all projections that protrude beyond the designed profile.

D. Acid Wash Finish
1. Obtain even finish by applying muriatic acid to concrete with the following process:
   a. Day 1 - Pour Concrete
   b. Day 2 - Strip forms
      i. Apply full acid. Then wipe down with water and a sponge. Hose down with

water.

ii. Apply acid for a 2nd time. Hose down again and use baking soda to neutralize the acid and to remove efflorescence.

c. Day 3 - Apply acid for a third time and this time power wash it off.

2. Finish shall be as approved in the mock-up.

E. Formed Square Corner Edge Treatment: After concrete is hard use a fine masons stone or fine grit sanding block on the edge to achieve an eased edge with a 1/16 inch radius. Take care not to scar the adjacent surface. This applies to two adjacent vertically formed corner surfaces and to a formed surface adjacent to a trowel finished top surface.

F. Tie Hole Treatment:

1. At abrasive blasted surfaces, at surfaces designated by the landscape architect, fill hole with grout containing aggregate consistent with the cast mix. Finish flush with the surface. Allow to cure a minimum of 21 days prior to blasting.
2. At Cone/Coil tie holes, where designated by the landscape architect, bond a plastic plug into the hole with silicone adhesive. Exposed plug surface to be recessed from face of concrete as determined by the landscape architect. Color as selected by Landscape architect.
3. At Cone/Tube tie holes (through the wall holes), where designated by the landscape architect, place an oversized foam rope (bond breaker) into tie hole so face is 1-1/2” from concrete surface. Bond a plastic plug into the hole with silicone adhesive. Exposed plug surface to be recessed from face of concrete as determined by the Landscape Architect. Color as selected by Landscape architect.

3.9 PROTECTION

A. Protect all Architectural Cast-in-Place Concrete surfaces from damage of any kind. Pay special attention to surfaces near work of other trades. All Architectural Concrete surfaces shall be free of damage at the time of acceptance. Allowing damage and patching or cleaning at end of project is not acceptable. Protection shall assure protection from paint, oils, rust, stains, impact, or any other kind.

END OF SECTION

SECTION 05 50 00 – METAL FABRICATIONS

PART 1 - GENERAL

1.2 SUMMARY

A. This Section includes the following:
   1. General Site Metal Fabrications
   2. Galvanized Steel Handrail
   3. Park Signage
   4. Fences
   5. Custom Table Tennis
   6. Custom Cornhole Set

B. Related Sections include:
   1. Section 03 30 00: Cast-in-Place Concrete
   2. Section 03 30 50: Architectural Concrete
   3. Section 06 20 14: Finish Carpentry
   4. Section 09 90 00: Painting and Coating
   5. Section 09 96 23: Anit-Graffiti Coating
   6. Section 10 14 55: Site Signage
   7. Section 12 93 00: Site Furnishings

1.3 SUBMITTALS

A. Product Data:
   1. Non-Shrink Grout
   2. Galvanizing
   3. Hardware

B. Shop Drawings: Detail fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
   1. Provide templates for anchors and bolts specified for installation under other Sections.
   2. Provide Shop Drawings for:
      a. Concrete Stair Handrails
      b. Sandbox Transfer Bar
      c. Custom Table Tennis
      d. Custom Cornhole Set

C. Welding Certificates: Copies of certificates for welding procedures and personnel.

D. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm experienced in producing metal fabrications similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

B. Welding: Qualify procedures and personnel according to the following:
1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.2, "Structural Welding Code--Aluminum."
3. AWS D1.3, "Structural Welding Code--Sheet Steel."
4. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.5 PROJECT CONDITIONS

A. Field Measurements: Where metal fabrications are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.6 WARRANTY

A. Warranty: Manufacturer's standard warranty in which manufacturer agrees to replace painted surfaces that fail in materials or workmanship within specified warranty period.
1. Warranty Period: Fifteen (15) years from date of Substantial Completion.

1.7 COORDINATION

A. Coordinate installation of anchorages for metal fabrications. 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.

B. Paint Coordination:
1. Provide finish coats which are compatible with prime paint used. Review other sections of these specifications in which prime paint are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information in characteristics of finish materials proposed for use, to ensure compatible prime coats are used.
2. Provide barrier coats over incompatible primers or remove and re-prime as required. Notify Landscape Architect in writing of any anticipated problems using specified coating systems with substrates primed by others.
3. The warranty shall be set up prior to the purchase of any coating material. Contact the coatings representative to establish a specific warranty for this project.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: For metal fabrications exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

2.2 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304.

C. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304. Satin #4 Brush Finish. Provide sample of finished material.

D. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

E. Rolled-Stainless-Steel Floor Plate: ASTM A 793.

F. Steel Tubing: Cold-formed steel tubing complying with ASTM A 500.

G. Steel Pipe: ASTM A 53, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.

I. Cast-in-Place Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials capable of sustaining, without failure, the load imposed within a safety factor of 4, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
   1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47 (ASTM A 47M) malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.

J. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.3 FASTENERS

A. General: Provide Type 304 or 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, where built into exterior walls. Select fasteners for type, grade, and class required.

B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.

C. Anchor Bolts: ASTM F 1554, Grade 36.

D. Machine Screws: ASME B18.6.3 (ASME B18.6.7M).

E. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).

F. Wood Screws: Flat head, carbon steel, ASME B18.6.1.

G. Plain Washers: Round, carbon steel, ASME B18.22.1 (ASME B18.22M).

H. Lock Washers: Helical, spring type, carbon steel, ASME B18.21.1 (ASME B18.21.2M).

I. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
   1. Material: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5. Subparagraph above and below are examples only. Above protects against corrosion in an indoor atmosphere. Revise to suit other conditions after verifying availability of thicker coatings.
   2. Material: Alloy Group 1 or 2 stainless-steel bolts complying with ASTM F 593 (ASTM F 738M) and nuts complying with ASTM F 594 (ASTM F 836M).

J. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as needed.

2.4 HARDWARE FOR METAL FABRICATIONS

B. Specialty manufactured products according to approved product data submittals and shop drawing.

2.5 GROUT

A. Sikaflex Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for exterior applications. Or approved equal.

2.7 CONCRETE FOOTINGS

A. Concrete Materials and Properties: Comply with requirements in Section 03 30 00: Cast-in-Place Concrete for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi, unless otherwise indicated.

2.8 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Shear and punch metals cleanly and accurately. Remove burrs.

C. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Weld corners and seams continuously to comply with the following:
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove welding flux immediately.
   4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

E. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

F. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

G. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

H. Allow for thermal movement resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening up of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

   1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

I. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.

J. Remove sharp or rough areas on exposed traffic surfaces.

K. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.

2.9 FINISHES, GENERAL

A. Finish metal fabrications after assembly.

2.10 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items after fabrication as indicated to comply with applicable standard listed below:
   1. ASTM A 123, for galvanizing steel and iron products.
   2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.
   3. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

2.11 PAINTED FINISHES: As indicated in Drawings. Refer to Section 09 90 00: Painting and Coating for additional requirements not referenced in this Section.

A. Surface treatments and finishes to be as indicated in Drawings.

B. Color Pigments:
1. Pure, non-fading, application types to suit substrates and service indicated.
2. No lead content in pigment allowed.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

E. Field Welding: Comply with the following requirements:
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

3.2 SETTING BEARING AND LEVELING PLATES

A. Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of plates.

B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.
   1. Use nonshrink grout, either metallic or nonmetallic, in concealed locations where not exposed to moisture; use nonshrink, nonmetallic grout in exposed locations, unless otherwise indicated.
   2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.3 INSTALLING SITE METAL FABRICATIONS

A. Install as indicated in Drawings.

3.4 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas as specified in Section 09 91 00 “Painting and Coating”

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION

SECTION 06 20 14 - FINISH CARPENTRY

PART 1 - GENERAL

1.2 SUMMARY

A. This Section includes the following:
   1. Fences

B. Related Sections include:
   1. Section 05 50 00 Metal Fabrications

1.3 SUBMITTALS

A. Product Data: For each type of product and process indicated and incorporated into items of exterior architectural woodwork during fabrication, finishing, and installation.

B. Samples for Verification: Lumber for natural finish, not less than 50 sq. in., for each species, with 1/2 of exposed surface finished.

C. Shop Drawings: Show location of wood members, including dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1.4 QUALITY ASSURANCE

A. Workmanship: Perform work in accordance with best standards of practice using workers experienced in type of work specified.

1.5 WARRANTY

A. In addition to manufacturer's warranties, warrant Work for a period of one year from the date of Substantial Completion for entire Project against defects in materials and workmanship.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Wood Members:
   1. Material: As indicated on drawings
   1. Sizes as indicated on drawings
   2. Finish Surface: As noted on drawings

B. Stainless Steel Screws and fasteners as indicated on drawings.

PART 3 - EXECUTION

3.1 FABRICATION

A. Shop fabricate members by cutting and restoring exposed surfaces to match specified surfacing. Predrill for fasteners and assembly of units.
   1. Finish exposed surfaces to remove planing or surfacing marks and to provide a finish equivalent to that produced by machine sanding with No. 120 grit sandpaper.

3.2 INSTALLATION

A. General: Install wood carpentry true and plumb. Provide temporary bracing to maintain lines and levels until permanent supporting members are in place.

B. Fit members by cutting and restoring exposed surfaces to match specified surfacing. Predrill for fasteners and assembly of units.
   1. Finish exposed surfaces to remove planing or surfacing marks and to provide a finish equivalent to that produced by machine sanding with No. 120 grit sandpaper.

C. Install connectors as indicated.
   1. Install bolts with orientation as indicated or, if not indicated, as directed by Landscape Architect.

D. Repair damaged surfaces and finishes after completing erection. Replace damaged members if repairs are not approved by Landscape Architect.

3.3 ATTACHMENTS

A. Bolting:
   1. Drill holes 1/32 inch to 1/16 inch, (0.07938 cm to 0.15875 cm), larger than the bolts being used. Drill straight and true from one side only.
   2. Do not bear bolt threads on wood; use washers under head and nut where both bear on wood; use washers under all nuts.
   3. Bolts: Unfinished bolts conforming to ASTM A307.

B. Screws:
   1. For lag screws and wood screws, pre-bore holes 60 percent to 70 percent of shank diameter as root of threads, enlarging holes to shank diameter for length of shank.
   2. Do not drive lag screws and wood screws.
   3. Pre-drill holes for lag screws.
   4. Self-tapping, stainless steel trim head screws.

C. Hidden Fasteners:
   1. Install per manufacturer’s recommendations.

3.4 PROTECTION

A. Protect all wood and composite surfaces from damage of any kind. Pay special attention to surfaces near work of other trades. All wood surfaces shall be free of damage at the time of acceptance. Allowing damage and patching or cleaning at end of project is not acceptable. Protection shall assure protection from paint, oils, rust, stains, impact, or any other kind.

END OF SECTION

SECTION 09 90 10 - PAINTING AND COATING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Surface preparation, painting and finishing of exposed exterior items and surfaces for opaque and transparent painting.

1.2 DEFINITIONS

A. "Paint": As used herein, means coating systems materials including primers, emulsions, epoxy, enamels, sealers, fillers, and other applied materials whether used as prime, intermediate or finish coats.

1.3 SYSTEM DESCRIPTION

A. Performance Requirements
   1. Paint exposed surfaces except where a surface or material is specifically indicated not to be painted or is to remain natural. Where an item or surface is not specifically mentioned, paint the same as similar adjacent materials or surfaces.
   2. Painting is not required on prefinished items, finished metal surfaces, concealed surfaces, operating parts and labels.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's product data for each paint system specified, including block fillers and primers.
   1. Provide manufacturer's technical information including label analysis and instructions for handling, storage and application of each material proposed for use.
   2. List each material and cross reference the specific coating, finish system and application. Identify each material by the manufacturer's catalog number and general classification.

B. Samples: Following the selection of colors and glosses by the Landscape Architect, submit samples for the Landscape Architect's review.
   1. Provide 3 samples of each color and finish for each material on which the finish is specified to be applied.
   2. Except as otherwise directed by the Landscape Architect, make samples approximately 8 inches by 10 inches in size.
   3. Do not commence finish painting until approved samples are on file at the Project Site.

C. Quality Control Submittals: Provide certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).

1.5 EXTRA MATERIAL

A. Provide 10% of total primer, paint, and finish as unopened cans for Owner to use for future touch-up and repair. Clearly label cans with all batch mixture numbers required to duplicate finishes.

1.6 QUALITY ASSURANCE

A. Provide primers and undercoat paint produced by the same manufacturer as finish coats.
   1. Review other Sections of these Specifications as required, verifying the prime coats to be used and assuring compatibility of the total coating system for the various substrates.
   2. Upon request, furnish information on the characteristics of the specific finish materials to assure that compatible prime coats are used.
   3. Provide barrier coats over non-compatible primers, or remove the primer and re-prime as required.
   4. Notify the Landscape Architect in writing of anticipated problems in using the specified coating systems over prime coatings supplied under other Sections.

B. Qualifications
   1. Applicator: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

C. Provide field mockups for final paint color and texture approval in the form of actual application of the materials on actual surfaces to be painted for approval by the Landscape Architect.
   1. Field mockups, when approved, will become standards of color and finish for accepting or rejecting the work of this Section.

D. CalGreen Requirements: As indicated on the Drawings, Section 01 35 20, and the following.
   1. Use low VOC coatings that meet SCAQMD Rule 1113.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Acceptance at Site: Deliver materials to the job site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:
   1. Product name or title of material.
   2. Product description (generic classification or binder type).
   3. Manufacturer's stock number and date of manufacture.
   4. Contents by volume for pigment and vehicle constituents.
   5. Thinning instructions.
   6. Application instructions.
   7. Color name and number.

B. Storage and Protection
   1. Store materials not in use in tightly covered containers in well ventilated area at minimum ambient temperature of 45 degrees Fahrenheit. Maintain containers used in storage in clean condition, free of foreign materials and residue.
   2. Protect from freezing. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

1.8 PROJECT CONDITIONS

A. Environmental Requirements
   1. Apply water based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 and 90 degrees Fahrenheit, unless otherwise permitted by the manufacturers' printed instructions as approved by the Landscape Architect.
   2. Do not apply solvent-thinned paints when the temperature of surfaces to be painted and the surrounding air temperatures are below 45 degrees Fahrenheit, unless otherwise permitted by the manufacturers' printed instructions as approved by the Landscape Architect.
   3. Do not apply paint in rain, fog or mist; or when the relative humidity exceeds 85 percent. Do not apply paint to damp or wet surfaces, unless otherwise permitted by the manufacturers' printed instructions as approved by the Landscape Architect.

PART 2 - PRODUCTS

2.1. MANUFACTURERS

A. Acceptable Manufacturers: Tnemec; Rustoleum; C.I.M. Industries, Inc., or equal.

2.2. PAINT MATERIALS

A. Paint Materials, General: Provide block fillers, primers, finish coat materials, and related materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by the manufacturer, based on testing and field experience.
   1. Provide paint containers labeled on top and side of the containers

B. Material Quality: Provide manufacturer's best quality trade sale paint material of the various coating types specified. Paint material containers not displaying manufacturer's product identification will not be acceptable.

C. Colors: As selected by the Landscape Architect.

2.3. APPLICATION EQUIPMENT

D. For application of the approved paint, use only such equipment as is recommended for application of the particular paint by the manufacturer of the particular paint, and as approved by the Landscape Architect.

E. Prior to use of application equipment, verify that the proposed equipment is compatible with the material to be applied, and that integrity of the finish will not be jeopardized by use of the proposed equipment.

2.4. OTHER MATERIALS

A. Provide other materials not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Landscape Architect.

PART 3 - EXECUTION

3.1. EXAMINATION

A. Examine the areas and surface conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work.

B. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. General
1. Mix and prepare paint materials in strict accordance with the manufacturers' recommendations as approved by the Landscape Architect.
2. When materials are not in use, store in tightly covered containers.
3. Maintain containers used in storage, mixing and application of paint in a clean condition, free from foreign materials and residue.

B. Stirring
1. Stir materials before application, producing a mixture of uniform density.
2. Do not stir into the material any film which may form on the surface, but remove the film and, if necessary, strain the material before using.

C. Surface Preparation
1. Perform preparation and cleaning procedures in strict accordance with the paint manufacturers' recommendations as approved by the Landscape Architect.
2. Remove removable items which are in place and are not scheduled to receive paint finish; or provide surface applied protection prior to surface preparation and painting operations.
3. Following completion of painting in each space or area, reinstall the removed items by using workmen who are skilled in the necessary trades.
4. Clean each surface to be painted prior to applying paint or surface treatment.
5. Remove oil and grease with clean cloths and cleaning solvent of low toxicity and flash point in excess of 200 degrees Fahrenheit prior to start of mechanical cleaning.

6. Schedule the cleaning and painting so that dust and other contaminants from the cleaning process will not fall onto wet newly painted surfaces.
7. Provide barrier coats over incompatible primers or remove and reprime.

D. Ferrous Metals: Clean ungalvanized ferrous metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC recommendations.
   i) Blast steel surfaces clean as recommended by paint system manufacturer and according to requirements of SSPC SP 10.
   ii) Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
   iii) Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with the same primer as the shop coat.

E. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.

3.3 PAINT APPLICATION

A. General:
   1. Touch-up shop-applied prime coats which have been damaged, and touch-up bare areas prior to start of finish coats application.
   2. Slightly vary the color of succeeding coats.
      (1) Do not apply additional coats until the completed coat has been inspected and approved.
      (2) Only the inspected and approved coats of paint will be considered in determining the number of coats applied.
   3. Sand and dust between coats to remove defects visible to the unaided eye from a distance of 5 feet.

B. Drying
   1. Allow sufficient drying time between coats, modifying the period as recommended by the material manufacturer to suite adverse weather conditions.
   2. Consider oil base and oleo-resinous solvent-type paint as dry for re-coating when the paint feels firm; does not deform or feel sticky under moderate pressure of the thumb, and when the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

C. Brush Applications
   1. Brush out and work the brush coats onto the surface in an even film.
   2. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness and other surface imperfections will not be acceptable.

D Spray Application

1. Where spray application is used, apply each coat to provide the hiding equivalent of brush coats.
2. Do not double back with spray equipment to build up film thickness of 2 coats in 1 pass.
3. Protect all adjacent buildings, cars, plants, floors, etc., from over spray.

E. For completed work, match the approved samples as to texture, color and coverage. Remove, refinish or repaint work not in compliance with the specified requirements.

F. Miscellaneous Surfaces and Procedures
1. Exposed Mechanical Items
a. Finish electric panels, conduits, pipes, and items of similar nature to match the adjacent surfaces, or as directed.
b. Wash metal with solvent and prime.
2. Hardware
a. Except for stainless steel bolts and nuts, paint prime coated hardware to match adjacent surfaces.

3.4 EXTERIOR PAINT SCHEDULE

A. Exterior Ferrous Metals
1. Primer is not required on shop-primed items.
2. Semigloss, Acrylic-Enamel Finish - Option 1: 2 finish coats over aromatic urethane, zinc-rich primer.
a. Prime Coat: 2 component moisture cured, zinc rich primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of 2.5 mils to 3.5 mils.
(a) Product: Tnemec, “90-97 Tneme-Zinc”, or equal.
b. Intermediate Coat: Satin, polyamidoamine epoxy applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of 2.0 mils to 10 mils per coat.
(a) Product: Tnemec, “L69 Epoxoline”, or equal.
c. Finish Coat: Satin, low VOC fluoropolymer coating applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of 2.0 mils to 3.0 mils.
(a) Product: Tnemec, “1072V Fluoronar”, or equal.

B. Semigloss, Acrylic-Enamel Finish - Option 2: 2 finish coats over aromatic urethane, zinc-rich primer.
1. Prime Coat: 2 component moisture cured, zinc rich primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of 2.5 mils to 3.5 mils.
a. Product: Tnemec, “90-97 Tneme-Zinc”, or equal.
2. Intermediate Coat: Satin, polyamidoamine epoxy applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of 2.0 mils to 10 mils per coat.
a. Product: Tnemec, “L69 Epoxoline”, or equal.

3. Finish Coat: Gloss, low VOC fluoropolymer coating applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of 2.0 mils to 3.0 mils.
   a. Product: Tnemec, “1070V”, or equal.

END OF SECTION

SECTION 10 14 55 - SITE SIGNAGE

PART 1 - GENERAL

1.01 SECTION INCLUDES BUT IS NOT LIMITED TO:

A. Park regulatory signs.

1.02 RELATED SECTIONS

A. Section 32 33 00: Concrete Work
B. Section 05 50 00: Metal Fabrications

1.03 QUALITY ASSURANCE

A. Workmanship and materials: All workmanship and materials within this Section shall conform strictly to the manufacturer's specifications, installation instructions and guarantees.

1.04 SUBMITTALS

A. Shop Drawings

1. Provide shop drawings showing construction details for approval before proceeding with fabrication. Include scaled details of footings, exposed edges, joints between materials, hanging, hinging and locking systems and any other details which would affect sign appearance.

2. Fasteners: Detail methods of fastenings and provide exact specifications for all fasteners noted on shop drawings.

4. Sign Location: Provide Graphic Schedule and location plans to identify and locate all signs. Item numbers listed in the Graphic Schedule shall be found on location plans and shall identify locations of specific sign items.

B. Operation and Maintenance: Provide the Owner with proper cleaning instructions required for continued maintenance of signs.

PART 2 - PRODUCTS

2.01 SIGNS

A. Contractor shall install park regulatory signs per Recreation and Parks Department’s standards as follows:

1. Signs to be post mounted per the Contract Drawings and these specifications. Exact location to be field determined.

2. Sign inserts are to be provided by the Recreation and Parks Department.

B. Submit for City Representative's approval shop drawings and installation details by manufacturer.

PART 3 - EXECUTION

3.01 INSTALLATION OF SIGNS

A. Install signs with vandal proof bolt and nut and fiber washer. All hardware to be hot-dipped galvanized or stainless steel.

B. Install according to manufacturer's specifications and contract documents.

END OF SECTION

SECTION 11 68 13 - PLAYGROUND EQUIPMENT

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. PlayBooster Play System.
   2. PlayShaper Play System.

B. Related Sections include the following:
   1. Section 32 18 16.13: Playground Protective Surfacing

1.3 REFERENCES

A. ASTM International (ASTM):
   1. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
   2. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
   3. ASTM A635 - Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Hot-Rolled, Alloy, Carbon, Structural, High-Strength Low-Alloy, and High-Strength Low-Alloy with Improved Formability, General Requirements for.
   4. ASTM A1011 - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
   5. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.
   6. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
   7. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
   8. ASTM C947 - Standard Test Method for Flexural Properties of Thin-Section Glass-Fiber-Reinforced Concrete (Using Simple Beam with Third-Point Loading).
   9. ASTM D522 - Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings.
   10. ASTM D638 - Standard Test Method for Tensile Properties of Plastics,
   11. ASTM D1505 - Standard Test Method for Density of Plastics by the Density-Gradient Technique.
   12. ASTM D1654 - Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.
   13. ASTM D2794 - Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
   14. ASTM D3359 - Standard Test Methods for Rating Adhesion by Tape Test.

15. ASTM D3363 - Standard Test Method for Film Hardness by Pencil Test.
16. ASTM F879 - Standard Specification for Stainless Steel Socket Button and Flat Countersunk Head Cap Screws.
17. ASTM F1487 - Standard Consumer Safety Performance Specification for Playground Equipment for Public Use.
18. ASTM G154 - Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials.

B. Industrial Fasteners Institute (IFI): IFI 125 - Test Procedure for the Performance of Chemical Coated Prevailing-Torque Screws.

C. ADA Standard for Accessible Design.

D. European Standards (EN Standard).

E. Canadian Standards Association (CSA Standard).

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 25 year experience manufacturing similar products.

B. Installer Qualifications: Minimum 5 year experience installing similar products.

C. All play structures shall be certified and validated to be in conformance with the ASTM F1487 Standard.

D. To the best of manufacturer's belief and knowledge play structures conform to the U.S. Consumer Products Safety Commission (CPSC) Guidelines.

E. Unless otherwise noted, all play structures are considered accessible according to the 2010 ADA Standard for Accessible Design. (See the play components listing for each structure to determine the number of additional play components required to meet the guidelines.)
1. Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for playground equipment designated as accessible.

F. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
1. Finish areas designated by Landscape Architect.
2. Do not proceed with remaining work until workmanship is approved by Landscape Architect.
3. Refinish mock-up area as required to produce acceptable work

1.5 SUBMITTALS

A. Submit per Submittal Procedures, and Standard Specifications.
1. Playground Equipment: Manufacturer's literature, specifications, installation, footing instructions and warranties.

2. Paint: Eight-inch square, or linear (where applicable) samples of each specified color, including powder coated metal colors.

B. Shop Drawings:
1. Horizontal and vertical layout of play equipment; plan and section drawings to scale.

C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

D. Installation Documentation: All shipments shall include a packet of order-specific, step-by-step instructions for assembly of each component, including equipment assembly diagrams, estimated hours for assembly, footing dimensions, concrete quantity for direct bury components, fall height information, and area required information.

1.6 PRE-INSTALLATION MEETINGS

A. Convene minimum two weeks prior to starting work of this section.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.

B. Packaging: Components shall be individually wrapped or bulk wrapped to provide protection during shipment. Small parts and hardware packages will be placed in crates for shipment. The components and crates are then shrink-wrapped to skids (pallets) to ensure secure shipping.

C. Handling: Handle materials to avoid damage.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.9 SUBSTITUTIONS, ADDITIONS AND DELETIONS

A. General: Submit proposals for substitutions in accordance with Division 1 Specification Sections. Acceptance by the Owner Representative and Landscape Architect is required prior to proceeding with the work under this section.

1.10 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

B. Hardware Packages: Each hardware package shall be labeled with the part number, description, package weight, a bar code linking the hardware package to the job number,

assembler's name, date and time the package was assembled, work center number, and work order number.

1.11 EXTRA EQUIPMENT

A. Maintenance Kit: A maintenance kit shall be provided for each Play Structure design ordered. The kit will include a maintenance document with recommendations on how often to inspect, what to look for and what to do to keep the equipment in like-new condition. The kit also includes appropriate color touch-up paint and additional installation tools for the tamperproof fasteners.

1.12 WARRANTY

A. Landscape Structures Inc. ("Manufacturer") warrants that all play structures and/or equipment sold will conform in kind and in quality to the specifications manual for the products identified in the Acknowledgment of Order and will be free of defects in manufacturing and material. Manufacturer further warrants:
   1. 100-Year Limited Warranty: On all PlayBooster and PlayShaper and PlaySense aluminum posts, stainless steel fasteners, clamps, beams and caps against structural failure due to corrosion/natural deterioration or manufacturing defects, and on PlayBooster steel posts against structural failure due to material or manufacturing defects.
   2. 15-Year Limited Warranty: On all Evos and Weevos steel arches, all plastic components (including TuffTimbers edging), all aluminum and steel components not covered above, Mobius climbers, Rhapsody Outdoor Musical Instruments, decks and TenderTuff coatings (except Wiggle Ladders, Chain Ladders and Swing Chain) against structural failure due to material or manufacturing defects.
   3. 10-Year Limited Warranty: On concrete products against structural failure due to natural deterioration or manufacturing defects. Does not cover minor chips, hairline cracks or efflorescence.
   4. 5-Year Limited Warranty: On Rhapsody cables and mallets against defects in materials or manufacturing defects.
   5. 3-Year Limited Warranty: On all other parts, i.e.: Pulse products, all swing seats and hangers, Mobius climber handholds, Wiggle Ladders, Chain Ladders and ProGuard Swing Chain, Track Ride trolleys and bumpers, all rocking equipment including Sway Fun gliders, belting material, HealthBeat resistance mechanism, Seesaws, etc., against failure due to corrosion/natural deterioration or manufacturing defects.
   6. The environment near a saltwater coast can be extremely corrosive. Some corrosion and/or deterioration is considered "normal wear" in this environment. Product installed within 500 yards (457 meters) of a saltwater shoreline will only be covered for half the period of the standard product warranty, up to a maximum of five years, for defects caused by corrosion. Products installed in direct contact with saltwater or that are subjected to salt spray are not covered by the standard warranty for any defects caused by corrosion.
   7. This warranty does not include any cosmetic issues or wear and tear from normal use. It is valid only if the playstructures and/or equipment are erected to conform with Landscape Structures' installation instructions and maintained according to the maintenance procedures furnished by Landscape Structures Inc.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Design: Landscape Structures Design #1164071-01-10.

B. Acceptable Manufacturer: Landscape Structures Inc., available through Ross Recreation Equipment. Contact: Nick Philibin, nickp@rossrec.com or 707-538-3800.

2.2 MANUFACTURERS

A. Material: All materials shall be structurally sound and suitable for safe play.

B. Fasteners: Primary fasteners shall be socketed and pinned, tamperproof in design, stainless steel (SST) per ASTM F879 unless otherwise indicated. All primary fasteners shall include a locking patch-type material that will meet the minimum torque requirements of IFI-125. Manufacturer shall provide special tools for pinned tamperproof fasteners.

C. TenderTuff Coating: Metal components to be TenderTuff coated shall be thoroughly cleaned in a hot phosphatising wash system, then primed with a water-based thermosetting solution. Primed parts shall be preheated prior to dipping in UV stabilized, liquid polyvinyl chloride (PVC), and then salt cured at approximately 400 degrees F (204 degrees C). The finished coating shall be approximately .080 inch (2 mm) thick at an 85 durometer with a minimum tensile strength of 1700 psi and a minimum tear strength of 250lbs/inch. (Colors: Handhold/Leg Lifts, Grab Bars and D-Rings available in Brown only. Decks in Brown or Gray. Wiggle Ladders, Loop Ladders and Steering Wheels available in standard colors).

D. ProShield Finish: All metal components with ProShield finish shall be thoroughly cleaned and pretreated through a multi-stage wash system. Parts are then thoroughly dried, preheated and processed through a set of powder spray guns where a minimum .002 inch (.05 mm) of epoxy primer is applied. A minimum .004 inch (0.10 mm) of architectural-grade Super Durable polyester TGIC powder is applied. The average ProShield film thickness is .006 inch (0.15 mm).
   1. ProShield is formulated and tested per the following ASTM standards. Each color must meet or exceed the ratings listed below:
      a. Hardness (D3363) rating 2H.
      b. Flexibility (D522) pass 1/8 inch (3 mm) mandrel.
      c. Impact (D2794) rating minimum 80 inch-pounds.
      d. Salt Fog Resistance (B117 and D1654) 4,000 hours and rating 6 or greater.
      e. UV Exposure (G154, 340 bulb) 3,000 hours, rating delta E of 2, and 90 percent gloss retention. Certain colors may exceed delta E of 2. Contact manufacturer for exceptions.
      f. Adhesion (D3359, Method B) rating 5B.
   2. The Paint Line shall employ a "checkered" adhesion test daily.
   3. Standard colors are available.

E. Decks: Decks shall be of modular design and have 5/16 inch (7.9 mm) diameter holes on the standing surface. There shall be a minimum of four slots in each face to accommodate face

mounting of components. Decks shall be manufactured from a single piece of low carbon 12 Ga. (.105 inch (2.7 mm)) sheet steel conforming to ASTM specification A1011. The sheet shall be perforated with a return flange formed on the perimeter to provide the reinforcement necessary to ensure structural integrity. There shall be no unsupported area larger than 3.5 square feet (.33 square meters). The unit shall then be TenderTuff coated in brown or gray only.

1. Play System Decks shall be designed so that all sides are flush with the outside edge of the supporting posts.

F. Concrete Products: Two processes are used to produce concrete products.
   1. Glass Fiber Reinforced Concrete (GFRC) Products: Glass fiber is alkali-resistant (AR) with high tensile properties formulated for concrete. GFRC nominal product thickness is 1 inch (25 mm) with a unit weight of about 12 lbs per square foot and an average ultimate flexural strength of 2,100 psi per ASTM C947. Finish: Exterior latex paint suited for concrete applications.
   2. Precast Concrete Products: Wet-cast solid, molded concrete with an average compressive strength of 5,000 psi per ASTM C39. Unit weight range of about 115 to 145 lbs per cubic foot. Finish: Exterior latex paint suited for concrete applications.

G. Rotationally Molded Polyethylene Parts: These parts shall be molded using prime natural linear low-density polyethylene with a tensile strength of 2400 psi per ASTM D638. Rotational molding resin is compounded with color and UV-stabilizing additives with a nominal wall thickness typically 1/4 inch (6 mm) with some variation depending upon product type. Standard colors are available.

H. Recycled Permalene Parts: These parts shall be manufactured from 3/4 inch (19 mm) high-density polyethylene that has been specially formulated for optimum UV stability and color retention. Products shall meet or exceed density of .960 G/cc per ASTM D1505, tensile strength of 2400 PSI per ASTM D638. Available in a three-layer product with (2) .100 inch (2.5 mm) thick colored exterior layers over a .550 inch (14mm) thick recycled Black interior core. Standard colors are available.

I. Footings: Unless otherwise specified, the depth on all footings shall be 34 inches (864 mm) below Finished Grade (FG) on all in-ground play events/posts.

2.3 PLAYBOOSTER PLAY SYSTEM

A. Description:
   1. Ages 5 to 12 Years.
   2. The PlayBooster playground structure, the original post-and-clamp system, combines exciting ground-level components with climbing events and overhead activities for kids ages 5 to 12. The PlayBooster family includes the interconnected cables of Netplex, the contemporary Vibe, the nature-inspired Tree House, the double-decker PlayOdyssey Tower and the GeoPlex climbing panels.
   3. U.S. Patent number 9,375,609 and other patents pending.

B. Material:

1. Posts: Post length shall vary depending upon the intended use and shall be a minimum of 42 inches (1067 mm) above the deck height. All posts shall be ProShield finished to specified color. All posts shall have a "finished grade marker" positioned on the post identifying the 34 inches (864 mm) bury line required for correct installation and the top of the loose fill protective surfacing. Top caps for posts shall be aluminum die cast from 369.1 alloy and ProShield finished to match the post color. All caps shall be factory installed and secured in place with self-sealing rivets. A molded low-density polyethylene cap, with drain holes, shall be pressed onto the bottom end of the post to increase the footing area.
2. Steel Posts: All steel PlayBooster posts are manufactured from 5 inches (127 mm) O.D. tubing with a wall thickness of .120 inches (3.0 mm) and shall be galvanized after rolling and shall have both the I.D. and the cut ends sprayed with a corrosion resistant coating.
3. Steel Post Mechanical Properties:
    a. Yield Strength (min): 50,000 PSI.
    b. Tensile Strength (min): 55,000 PSI.
    c. Elongation: 25% in 2 inches (51 mm).
    d. Modulus of Elasticity: 29.5 x 1,000,000 PSI.
4. Aluminum Posts: All aluminum PlayBooster posts are manufactured from 6005-T5 extruded tubing conforming to ASTM B-221. Posts shall have a 5 inches (127 mm) outside diameter with a .125 inches (3.2 mm) wall thickness.
5. Aluminum Post Mechanical Properties:
    a. Yield Strength (min): 35,000 PSI.
    b. Tensile Strength (min): 38,000 PSI.
    c. Elongation: 10% in 2 inches.
    d. Modulus of Elasticity: 10 x 1,000,000 PSI.
6. Clamps: All clamps are ProShield finished and, unless otherwise noted, shall be die cast using a 369.1 aluminum alloy and have the following mechanical properties:
    a. Ultimate Tensile: 47,000 PSI.
    b. Yield Strength: 28,000 PSI.
    c. Elongation: 7% in 2 inches (51 mm).
    d. Shear Strength: 29,000 PSI.
    e. Endurance Limit: 20,000 PSI.
7. Clamps: Each functional clamp assembly shall have an appropriate number of half clamps and shall be fastened to mating parts with (2) 3/8 inch x 1-1/8 inches (9.5mm x 28.6 mm) pinned button head cap screws (SST) and (2) stainless-steel (SST) recessed "T" nuts. A 1/4 inch (6 mm) aluminum drive rivet with stainless steel pin is used to ensure a secure fit to the post.
8. PlayBooster clamps have three functional applications and shall be named as follows:
    a. Offset hanger clamp assembly.
    b. Deck hanger clamp assembly.
    c. Hanger clamp assembly.
9. Steel-reinforced cables: Made of tightly woven, polyester-wrapped, six-stranded galvanized steel cable. These abrasion-resistant, color-stable cables are extremely durable and vandal resistant. Available in Black or Red. Some products available in Black only or Red only.

2.4 Swings

A. Single Post Swing Frame
   1. Product: Single Post Swing Frame.
   2. Model 177332.
   3. Model (Additional Bay) 177333.
   4. Description: Model numbers are for swing frames only, order swing seats with chains separately.
   5. Material:
      a. Post: See PlayBooster (PB) General Specifications.
      b. Swing Beam: Weldment comprised of tee clamps and 5 inches (127 mm) O.D. extruded 6005-T5 aluminum alloy tube with a .125 inch (3 mm) wall. Finish: ProShield, color specified.
      c. Clamp: Cast aluminum. Finish: ProShield, color specified.
      d. Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/ specifications).
      e.

B. Belt Seat:
   1. Product: Belt Seat.
      a. Model 174018. Seat.
   2. Description: Belt seat elliptical shape measures 7 inches wide x 26 inches long x .700 inch thick (178 mm x 660 mm x 18 mm).
   3. Material:
      a. Chain Spacer: Made from white nylon measuring .080 inch x .785 inch (2 mm x 19 mm) O.D.
      b. Chain/ProGuard: Steel 3/16 inch (4.8 mm) straight link chain, 800 lb. working load limit. Finish: ProGuard.
      c. Chain/Coated: Steel 3/16 inch (4.8 mm) straight link chain, 800 lb. working load limit. Finish: TenderTuff, color specified.
      d. Belt Seats: Molded from U.V. stabilized black EPDM rubber encapsulating a weldment comprised of a 22 GA (.029 inch) (0.74 mm) spring stainless steel sheet, and (4) .105 inch (2.7 mm) thick stainless steel washers. The belt seat elliptical shape measures 7 inches wide x 26 inches long x .700 inch thick (178 mm x 660 mm x 18 mm).
      e. Bolt Link: Stainless Steel.

PART 3 - EXECUTION

3.1 LAYOUT OF PLAY EQUIPMENT

A. Layout: Layout play equipment according to the locations shown on the drawings and per manufacturer’s requirements.

B. Final Layout: Final layout shall meet contract drawings and manufacturer's requirements in regards to fall zones and safety requirements.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 PROTECTION

A. Protect play equipment during the construction period to prevent damage and wear. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

3.4 REPLACEMENT

A. Replace all defective or damaged play equipment prior to acceptance.

3.5 INSTALLATION

A. Installation procedures shall be according to manufacturer's directions.

B. All components of the equipment shall be installed accurately to produce true plumb and level installation.

C. Prior to final inspection and acceptance, remove all rubbish and excess material for disposal as approved, and leave area in a neat, satisfactory condition.

3.6 INSPECTIONS

A. 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 the signed documentation of compliance certification at no cost to the Owner.

END OF SECTION

SECTION 31 13 00 – SELECTIVE TREE AND SHRUB REMOVAL AND TRIMMING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Provide all material, labor, equipment, and service necessary for the safe removal of existing plant material, as shown on the Drawings and as specified herein. The work of this Section includes but is not limited to:

B. Removal and demolition of trees and tree stumps.

C. Removal and disposal of all tree trunks and other plant material remaining with in limit of work areas.

D. Removal of large roots and tree trunk to a minimum of 24 inch below rough grade.

1.02 RELATED SECTIONS

A. Section 112: Tree Protection

B. Section 32 90 00: Planting

1.03 REFERENCE STANDARDS

A. Refer to Section 32 90 00: Planting

PART 2 – PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 PROTECTION OF EXISTING IMPROVEMENTS

A. Provide protections necessary to prevent damage to existing improvements indicated to remain in place.

B. Provide protections necessary to prevent damage to existing and proposed utilities.

C. Protect existing trees and vegetation indicated to remain in place, against unnecessary, cutting breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excessive foot, or vehicular traffic, or parking of vehicles within drip line. Provide temporary guard to protect trees and vegetation to be left standing.

3.02 SITE CLEARING

A. General: Remove trees, shrubs, grass and other vegetation, improvements or obstruction as required to permit installation of new construction. Remove similar items elsewhere on site of premises as indicated. Removal includes digging out and off-site disposing of stumps and roots.

B. Cut minor roots and branches of trees indicated to remain in a clean and careful manner, where such roots and branches obstruct installation of new construction.

C. Topsoil is defined as friable clay loam surface soil found in a depth of not less than 5 inches. Satisfactory topsoil is reasonable free of subsoil, clay lumps, stones, and other objects over 2 inches in diameter and without weeds, roots, and other objectionable material.

1. Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material.
2. Remove heavy growths of grass from areas before stripping.
3. Where existing trees are indicated to remain, leave existing topsoil in place within drip lines to prevent damage to root system.
4. Stockpile topsoil in storage piles in areas indicated or as directed by Engineer. Construct storage piles to provide free drainage of surface water. Cover storage, as required to prevent erosion.
5. All topsoil stockpiled for re-use is to be tested. One test minimum per 50 yards. See Section 39 19 19 - Landscape Grading.
6. Dispose of unsuitable or excess topsoil same as specified for disposal of waste material.

D. Completely remove stumps, roots, and other debris protruding through the ground surface to a minimum depth of 24 inches below rough grade.

E. Use only hand methods for grubbing and clearing work within the drip line of trees indicated to remain.

END OF SECTION

SECTION 32 01 90 - LANDSCAPE OPERATION AND MAINTENANCE

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes: Provide continuous Landscape Maintenance, complete as specified during progress of the work, after installation, and for a minimum period of 90 days after Preliminary Acceptance, and as required by warranty and Termination of the Maintenance Period provisions.

B. Related Sections:

1. Section 32 33 00: Site Furnishings
2. Section 32 84 00: Planting Irrigation
3. Section 32 91 13: Landscape Soils
4. Section 32 91 19: Landscape Finish Grading
5. Section 32 93 00: Planting
6. Section 32 94 00: Planting Accessories

1.2 SUBMITTALS

A. Quality Control Submittals:

1. Schedule of maintenance operations and monthly status report including list of equipment, materials proposed for the job.
2. Licenses, permits and insurances required by City, County, State or Federal government pertaining to maintenance work.
3. Monthly record of all organic herbicides, insecticides and disease control chemicals used for the project.
4. Written application recommendation by a licensed agricultural pest control advisor for all weed, pest and disease controls restricted by the Director of Agriculture proposed for this work.
5. Schedule of recommended annual fertilizer and soil conditioning program provided by Soils Testing Lab based on plant schedule.

B. Project Close-out Submittal: Include in a single, 3-ring binder a landscape maintenance manual containing an indexed collection of all schedules, records and permits listed above, as well as a documentation of accepted condition of planting and irrigation at Final Acceptance.

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Experience: The landscape contractor or maintenance subcontractor shall have a full-time employee assigned to the job as foreman for the duration of the contract. They shall have a minimum of four (4) years' experience in landscape maintenance supervision, with

experience or training in turf management, entomology, pest control, soils, fertilizers and plant identification.

2. Labor Force: The landscape maintenance labor force shall be thoroughly familiar with, and trained in, the work to be accomplished and shall perform the task in a competent, efficient manner acceptable to the Owner.

B. Requirements:

1. Supervision: The foreman shall directly supervise the work force at all times. Notify Owner of all changes in supervision.
2. Identification: Provide proper identification at all times for landscape maintenance firm's vehicles and labor force. Be uniformly dressed in a manner satisfactory to the Owner.

1.4 PROJECT/SITE CONDITIONS

A. Site Visit: At beginning of maintenance period, visit and walk the site with the Landscape Architect to clarify scope of work and understand existing project/site conditions.

B. Documentation of Conditions: Document general condition of existing trees, shrubs, vines, groundcovers and lawn recording all plant materials which are healthy, thriving, damaged, dead or dying.

C. Irrigation System: Document general condition of existing irrigation system, making sure that faulty electrical controllers, broken or inoperable sprinkler heads or emitters are reported.

1.5 SEQUENCING AND SCHEDULING

A. Perform all maintenance during hours mutually agreed upon between Owner and Contractor.

B. Work force shall be present at the project site at least once a week and as often as necessary to perform specified maintenance in accordance with the approved maintenance schedule.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: All materials and equipment, shall be provided by the Contractor, except as specified below.

B. Water: Clean, potable and fresh, as available from Owner

C. Fertilizers:

1. Tightly compressed, slow-release and long-lasting complete fertilizer tablets bearing manufacturer's label of guaranteed analysis of chemicals present.

2. No petrochemical fertilizers can be used for the operation and maintenance of the on-site landscape, including urban agriculture. Compounds included in soil amendments should also be petrochemical-free.

3. Balanced, once-a-season application, controlled-release fertilizers with a blend of coated pills which supply controlled-release nitrogen, phosphorus and potassium, and uncoated, rapidly soluble pills containing nitrogen and phosphorus.

D. Herbicides, Insecticides, and Fungicides:

1. Best quality organic materials with original manufacturers' containers, properly labeled with guaranteed analysis.
2. No petrochemical pesticides can be used for the operation and maintenance of the on-site landscape. Pesticides include any chemicals used to control weeds, mold, fungus, insects, diseases, and other pests. Compounds included in soil amendments should also be petrochemical-free.
3. Reference the Organic Materials Review Institute Products List and Generic Materials List: https://www.omri.org/omri-lists for products
4. Use non-staining materials.

E. Perennials/groundcovers: Nursery-grown in 4 in. pots, full, healthy plants just ready to bloom.

F. Replacement Tree Stakes and Ties: Match originally accepted existing materials on the site.

2.2 EQUIPMENT

A. General: Use only the proper tool for each job. Maintain all tools in sharp, properly-functioning condition. Clean and sterilize pruning tools prior to usage.

B. Insect/Disease Prevention: Take all acceptable measures to prevent introduction of insect or disease-laden materials onto the site.

PART 3 - EXECUTION

3.1 ESTABLISHING THE MAINTENANCE PERIOD

A. Preliminary Review: As soon as planting is substantially completed per documents, hold a preliminary review to determine the condition of the work.

B. Date of Review: Notify Landscape Architect at least five (5) workings days prior to anticipated date of review.

C. Beginning of the Maintenance Period: The date on which the Landscape Architect issues a letter of Preliminary Acceptance to the Contractor.

D. Ending of the Maintenance Period: The date on which the Landscape Architect issues a letter of Final Acceptance to the Contractor.

3.2 PREPARATION

A. Protection:

1. Protect all new planting areas from damage of all kinds from beginning of work until sufficiently established or until Final Acceptance.
2. Provide temporary protection fences, barriers and signs as required for protection.

B. Replacements:

1. Immediately treat or replace all plants, which become damaged or injured as a result of Contractor's operations or negligence, as, directed by Landscape Architect, at no cost to Owner.
2. Replacement plants shall match size, condition and variety of plants replaced.

3.3 PLANTING

A. Watering Basins:

1. For supplemental hand watering of watering basins, use a water wand to break the water force. Do not permit use of "jet" type watering equipment. Do not permit crown roots to become exposed to air through dislodging of soil and mulch.
2. Maintain originally called for depth of mulch to reduce evaporation and frequency of watering.
3. In rainy season, open basins to allow surface drainage away from the root crown where excess water may accumulate. Restore watering basins at end of rainy season.

B. Resetting: Reset plants to proper grades and upright position.

C. Weed Control:

1. All areas between plants, including watering basins, shall be weed free at all times.
2. Use only products as noted above to control weed growth.
3. Avoid frequent soil cultivation that destroys shallow roots and breaks the seal of pre-emergent herbicides.

D. Pruning:

1. Prune trees to select and develop permanent scaffold branches that are smaller in diameter than the trunk or branch to which they are attached, and which have vertical spacing of 18 in. to 48 in. and radial orientation so as not to overlay one another.
2. Prune trees to eliminate diseased or damaged growth, and narrow V-shaped branch forks that lack strength. Reduce toppling and wind damage by thinning out crowns.
3. Prune trees to maintain growth within space limitations, maintaining a natural appearance and balancing crown with roots.
4. No stripping of lower branches ("raising up") of young trees will be permitted.
5. Retain lower branches in a "tipped back" or pinched condition to promote caliper trunk growth (tapered trunk). Do not cut back to fewer than six buds or leaves on such branches.

Only cut lower branches flush with the trunk after the tree is able to stand erect without staking or other support.

6. Thin out and shape evergreen trees when necessary to prevent wind and storm damage. Do primary pruning of deciduous trees during the dormant season. Do not permit any pruning of trees prone to excessive "bleeding" during growth season.
7. Prune damaged trees or those that constitute health or safety hazards at any time of year as required.
8. Make all cuts clean and close to the trunk, without cutting into the branch collar. "Stubbing" will not be permitted. Cut smaller branches flush with trunk or lateral branch. Make larger cuts (1 in. in diameter or larger) parallel to shoulder rings, with the top edge of the cut at the trunk or lateral branch.
9. Branches too heavy to handle shall be precut in three stages to prevent splitting or peeling of bark. Make the first two cuts 18 in. or more from the trunk to remove the branch. Make the third cut at the trunk to remove the resulting stub.
10. Do not prune or clip shrubs into balled or boxed forms unless specifically called for by design.
11. Take extreme care to avoid transmitting disease from one infected plant to another. Properly sterilize pruning tools before going from one infected plant to all other plants.
12. Pruning Season: Prune tree’s during dormant season consistent with arboricultural standards for species to be pruned.

E. Staking and Guying of Trees: Inspect stakes at least once a month to check for rubbing that causes bark wounds.

3.4 GROUNDCOVERS

A. Watering:

1. Check for moisture penetration throughout the root zone at least twice a month.
2. Water as frequently as necessary to maintain healthy growth of groundcovers.

B. Weed Control:

1. Control weeds, preferably with pre-emergent herbicides and with selective systemic herbicides.
2. Minimize hoeing of weeds in order to avoid plant damage.

C. Fertilization:

1. Verify specific plant requirements, if any.
2. Recently installed plant materials: Verify with Owner actual completion date of planting installation and rate of prior application of fertilizers.
3. New plant materials: Place one (1) 5-gram tablets (20-10-5; N-P-K) beside the root ball about an inch from root tips.
4. Established Plant Materials: Do not use complete fertilizers unless soil test shows specific nutrient deficiencies.

D. Mowing and Edging:

1. Edge groundcovers to keep in bounds. Trim top growth as necessary to achieve an overall even appearance.
2. Groundcovers, which lend themselves to mowing, shall be mowed to specified height above finished grade in order to renew growth, improve density and attractiveness.

E. Replace dead and missing plants after obtaining Owner's agreement to pay for replacement. Damages due to Contractor's negligence shall be paid for without charge to Owner.

3.5 ANNUALS, PERENNIALS AND SUCCULENTS

A. Watering:

1. Species, sizes of plants, container sizes and orientation shall dictate frequency of watering. Submit to Owner a watering schedule for different seasonal requirements.

B. Weed Control: All planters with annuals and perennials shall be weed-free at all times.

C. Pruning:

1. Limit pruning to removal of damaged or dead twigs and foliage.
2. Remove spent flowers on a weekly basis.

E. Fertilization: Incorporate slow release fertilizers per manufacturer's current specifications and rake smooth.

3.6 INSECTS, PESTS, AND DISEASE CONTROL

A. Inspection: Inspect all plant materials for signs of stress, damage and potential trouble from the following:

1. Presence of insects, moles, gophers, ground squirrels, snails and slugs in planting areas.
2. Discolored or blotching leaves or needles.
3. Unusually light green or yellowish green color inconsistent with normal green color of leaves.

B. Personnel: Only licensed, qualified, trained personnel shall perform spraying for insect, pest and disease control.

C. Application: Apply with extreme care to avoid all hazards to any person or pet in the area or adjacent areas.

3.7 IRRIGATION SYSTEM

A. General:

1. Repair without additional charge to Owner all damages to system caused by Contractor's operations. Perform all repairs within one (1) watering period.

2. Report promptly to Owner all accidental damage not resulting from Contractor's negligence or operations.
3. Set and program automatic controllers for seasonal water requirements.
4. Twice a month, use a probe or other acceptable tool to check the rootball moisture of representative plants as well as the surrounding soil.

B. Cleaning and Monitoring the System:

1. Continually monitor the irrigation systems to verify that they are functioning properly as designed. Make program adjustments required by changing field conditions.
2. Clear irrigation systems once a year and as often as necessary to keep the irrigation systems free of sand and other debris.
3. Prevent spraying on windows, building walls, (game courts) by balancing the throttle control on the remote-control valves and the adjustment screws on the sprinkler heads. Do not allow water to atomize and drift.

3.8 TERMINATION OF THE MAINTENANCE PERIOD

A. Final Acceptance Procedure:

1. Work will be accepted by the Landscape Architect upon satisfactory completion of all work, including maintenance period, but exclusive of replacement of materials under the Warranty Period.
2. Submit a written request to Landscape Architect for review for Final Acceptance at least five (5) working days prior to anticipated Final Review date, which is at the end of the Maintenance Period.
3. Submit maintenance operations manual to Owner.

B. Corrective Work:

1. Work requiring corrective action or replacement shall be performed within ten (10) calendar days after the Final Review.
2. Perform corrective work and materials replacement in accordance with the Drawings and Specifications and shall be made by the Contractor at no cost to the Owner.
3. After corrective work is completed, the Contractor shall again request a Final Review for Final Acceptance as outlined above.
4. Continue maintenance of all landscaped areas until such time as all corrective measures have been completed and accepted.

C. Conditions for Acceptance of Work at End of Maintenance Period:

1. Each plant shall be alive and thriving, showing signs of growth and no signs of stress, disease, or any other weaknesses.
2. Replace all plants not meeting these conditions. An additional Warranty Period equal in length to the original shall be commenced for all such plants and planted areas.

D. Final Acceptance Date: The date on which the Landscape Architect issues a Letter of Final Acceptance. Upon Final Acceptance, the Owner will assume responsibility for maintenance of the work.

3.9 CLEANING

A. Dispose of all pruned materials, vacuum all lawn clippings and leaves, sweep all walkways and rake smooth all mulched areas.

B. Remove from the site all containers and evidence of maintenance activities.

3.10 CLOSE OUT

A. Landscape Maintenance and Operations Manual: Submit binder to Owner with all documentation and records required and utilized during the maintenance period with recommended operations and maintenance procedures and schedules.

B. Keys and Identification: Return all keys and identification materials supplied by Owner for the purpose of site access.

END OF SECTION

SECTION 32 13 13 - CONCRETE PAVING

PART 1 - GENERAL

1.2 SUMMARY

A. This Section specifies cast-in place site concrete paving, formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes and joint sealants, for the following:
   1. Concrete walks.

B. Related Sections include:
   1. Section 03 30 50: Architectural Concrete

1.3 REFERENCES

A. Standard Specifications - Standard Specifications of the State of California, Business and Transportation Agency, Department of Transportation, (CDT).

B. ASTM - American Society for Testing and Materials
   1. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.
   2. ASTM C979 - Pigments for Integrally Colored Concrete.
   3. ASTM D-1557-Compaction

C. ACI - American Concrete Institute, Manual of Concrete Practice.

D. ASTEM E303-93 Dynamic Slip Resistance Pendulum Test and ANSI B101.3 Flooring Slip Resistance

1.4 DEFINITIONS

A. Percent Compaction: ASTM D1557, percentage of the maximum in-place dry density of the same material as determined by Soils Engineer.

1.5 SUBMITTALS

A. Product Data: Manufacturers' current printed specifications and catalogue cuts of the following:
   1. Expansion joint filler, backer rod and bond breaker and/or zip strip.
   2. Joint Sealant
   3. Material Certificates:
      a. Sub-base material
      b. Cementitious materials and aggregates.
      c. Steel reinforcement and reinforcement accessories.
      d. Admixtures.

B. Paving Concrete Mix Design:
   1. Mixture proportions
      a. Submit concrete mixture proportions and characteristics.

b. Submit test data used to establish the average compressive strength of the mixture.

C. Samples:
1. Joint Sealant Samples

1.6 QUALITY ASSURANCE

A. Mix Standards: Conform to the ACI Manual and the Portland Cement Association's "Design and Control of Concrete Mixes". Perform work in accordance with ACI 301, Section 6 - Architectural Concrete.

B. All reinforcing steel shall be accompanied by producer's certificates of mill analysis in accordance with California Building Code 1929A.2.

D. Aggregate tests per California Building Code 1903A.3.

E. Owner's Testing Agency will perform concrete compression tests and other quality control testing and inspection as indicated.

F. Maintain records verifying that materials used are the specified and accepted types and sizes and are in conformance with these Specifications.

E. Lines and Levels: To be established by a licensed Surveyor or registered Civil Engineer.

F. Slip Resistance: All paving surfaces shall be slip resistant consistent with California Building Code Title 24 requirements.

1.7 MOCK-UPS

A. Mock-ups for Architectural Site Concrete Work: After all samples, product data, and the design mixtures are approved, construct mock-ups in locations and configurations as directed by the Landscape Architect.

a. 6 weeks prior to construction of concrete pavement (to allow for 28 days of curing) cast mockups of full-size sections of concrete pavement to demonstrate typical joints, surface finish, texture, color, exposed aggregate/pebble (if applicable), and standard of workmanship.

b. Provide (2) 4-foot x 4-foot sample of each concrete Paving Type. Contractor to allow for mock-ups with (2) color and finish options.

c. Construct all mock-ups adjacent to each other, so they all can be reviewed at the same time.

B. Each mock-up is to contain all joint types specified on project, including construction, contraction, and expansion and finishes as indicated.

C. If mock-up is not approved by the Landscape Architect, remove and replace with others and no additional cost to the Owner.

D. Mock-ups to remain on site for duration of project.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Cement Products:
   1. Mixed On-Site: Protect all packaged materials from dampness. Segregate all stockpiled accessories to prevent contamination or accidental mixing.
   2. Delivered Mixes: Coordinate delivery so that mixes may be immediately poured upon arrival at site.

B. Components and Accessories:
   1. Fittings and Reinforcements: Protect from rust, soil and oil contamination at all times. Store on pallets above ground.

1.9 SEQUENCING AND SCHEDULING

A. Coordination: Coordinate all items of other trades to be furnished and set in place. Coordinate proper installation of all accessories embedded in the concrete and for the provision of holes, and openings necessary to the execution of the work of the trades.

B. Attachments: Ensure that such portions of their work which are all or in part embedded, built-in, attached to, supported by or covered over by the concrete work are executed by them in ample time that progress of the work is not delayed.

C. Cutting or Patching: Perform as necessary to comply with above injunction.

D. Reinforcing Steel: Install progressively with work of other trades. Coordinate each other's schedules so as to avoid disturbing or moving work already installed by one trade to admit the work of another. Each trade shall be entirely responsible for proper installation and securing of their accessories and components during placing of concrete.

PART 2 – PRODUCTS

2.1 AGGREGATE BASE

A. Aggregate Base meeting requirements for Class 2 Aggregate Base in conformance with Standard Specification 26-1.02B.

2.2 FORMS

A. Form Materials: Wood or metal materials to provide full-depth, continuous, straight, smooth exposed surfaces.
   1. Use flexible or curved forms for curves with a radius 100 feet (30.5 m) or less.

2.3 STEEL REINFORCEMENT

A. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets. See concrete paving details.

B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420); deformed.

C. Plain Steel Wire: ASTM A 82, as drawn.

D. Deformed-Steel Wire: ASTM A 496.

E. Steel Bar Mats: ASTM A 184/A 184M; with ASTM A 615/A 615M, Grade 60 (Grade 420), deformed bars; assembled with clips.

F. Joint Dowel Bars: Plain steel bars, ASTM A 615/A 615M, Grade 60 (Grade 420). Cut bars true to length with ends square and free of burrs.

G. Hook Bolts: ASTM A 307, Grade A internally and externally threaded. Design hook-bolt joint assembly to hold coupling against pavement form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.

H. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice."

2.4 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout the Project:

1. Portland Cement: ASTM C 150, Type II

B. Normal-Weight Aggregates: ASTM C 33, Class 4M or 1N coarse aggregate, uniformly graded. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.

C. Water: ASTM C 94/C 94M.

D. Air-Entraining Admixture: ASTM C 260.

E. Chemical Admixtures: ASTM C 494/C 494M, of type suitable for application, certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.

2.5 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth.

A. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

B. Water: ASTM C 94/C 94M.

C. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.

D. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

E. White Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 2, Class B.

F. Chemical Surface Retarder: Water-soluble, liquid-set retarder with color dye, for horizontal concrete surface application, capable of temporarily delaying final hardening of concrete to a depth of 1/8 to 1/4 inch (3 to 6 mm).
   1. Products:
      a. Burke by Edeco; True Etch Surface Retarder.
      b. ChemMasters; Exposee.
      c. Conspec Marketing & Manufacturing Co., Inc.; Delay S.
      d. Euclid Chemical Company (The); Surface Retarder S.
      e. Kaufman Products, Inc.; Expose.
      f. Metalcrete Industries; Surftard.
      g. Scofield, L. M. Company; Lithotex.
      h. Sika Corporation, Inc.; Rugasol-S.

2.6 CONCRETE MIXTURE

A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.
   1. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs for the trial batch method.

B. Proportion mixtures to provide normal-weight concrete with the following properties:
   1. Pedestrian pavements:
      a. Compressive Strength (28 days): 3000 psi.
      b. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45
      c. Slump Limit: 4 inches (100 mm, plus or minus 1 inch (25 mm).
   2. Vehicular pavements:
      a. Compressive Strength (28 days): 4500 psi.

C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:
   1. Air Content: 4-percent plus or minus 1.5 percent for 3/4-inch (38-mm) nominal maximum aggregate size.

D. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.

E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing admixture, water-reducing and retarding admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

2.7 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.
   1. When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

2.9 EXPANSION JOINT MATERIALS

A. Pre-molded Joint Filler: ASTM D1751, non-extruding and bituminous type resilient filler, compatible with sealant and backer rod.

B. Sealant Backer Rod:
   1. 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.
   2. 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.
   3. 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.

C. Snap Cap: Seal tight Snap Cap by W.R. Meadows or similar.

D. Joint Sealer
   1. Type: Multi-component polyurethane sealant, FS TT-S-00227, Class A, type as recommended by manufacturer for exterior locations subject to foot traffic.
   2. Product: ASTM C290, non-snag sealant "Dynatred" by Pecora Corporation, (214) 278-8158, or "Sonolastic Sealant Two-Part" by Sonneborn, (612) 835-3434.
   3. Color: Submit Samples

E. Bond Breaker: Polyethene tape as recommended by joint sealant manufacturer where bond to joint filler must be avoided for proper performance of joint sealer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Verify that subgrade has been rough graded for concrete paving and accepted under another Section prior to commencement of work.

B. Surface Drainage:
   1. Report in writing conflicts discovered on the site or prior work done by others, which would prevent drainage.
   2. No "birdbaths" or other surface irregularities will be permitted. Properly correct irregularities.

3.2 PREPARATION

A. Subgrade Preparation: Prepare and Compact subgrade to 95% relative compaction.

B. Aggregate Base Course: Install and Compact Aggregate Base as required by Standard Specifications for Class 2 Aggregate Base.

C. Templates: Use templates for all anchor plates, bolts, inserts and other items embedded in concrete. Accurately secure so that they will not be displaced during placing of concrete.

3.3 INSTALLATION

A. Formwork:
   1. Construct forms accurately to dimensions, plumb and true to line and grade. Use forms that are substantial, mortar tight and braced so as to maintain position and shape during placing of reinforcing and concrete. Concrete work showing wavy slab surfaces will be rejected.
   2. Carefully verify and check all forms for alignment and level as the work proceeds. Promptly make all needed adjustments or additional bracing.
   3. Extend wood forms for all exposed concrete at least 6 in. below finish grade.
   4. Construct forms and assemble them in such a manner that joints occur at accepted locations. Install metal key joints at locations indicated on submittal drawings.
   5. Coat form surfaces in contact with concrete with form release agent. Clean forms after each use and coat with form release agent as necessary to assure separation from concrete without damage.

B. Edges: Except where tooled corners are indicated, provide all exposed concrete finish work with smooth, even surfaces of dense concrete with clean sharp rises and outside corners. Provide 24-gauge splice plates at butt joints.

C. Sleeves, Recesses and Openings: As shown on the Drawings or as directed at the site. Install pipe sleeves for irrigation system under walks and driveways. One per each walk or driveway, and pin for future identification.

D. Reinforcements:
   1. Supports: Hang footing bars from forms. Support with suitable metal cradles.
   2. Placement: Clean, bend and place reinforcements per ACI Manual of Concrete Practice. Accurately and securely fasten to prevent displacement before or during pouring.
   3. Reinforcement Splices: 24 bar diameters minimum, except as otherwise noted.

3.4 CONCRETE PLACEMENT

A. Comply with ACI 304 "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete", and as specified.

B. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placing, and curing. In cold weather comply with ACI 306, "Recommended Practice for Cold Weather Concreting". In hot weather comply with ACI 305, "Recommended Practice for Hot Weather Concreting".

C. Moisten base to provide a uniform dampened condition at the time concrete is placed.

D. Construction tolerances do not permit the violation of dimensions or grades and slopes and their relationships required by code. Adjust work as required to comply with such requirements.

E. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a [1/4-inch (6-mm)] radius. Eliminate tool marks on concrete surfaces and finishes.

3.5 JOINTS

A. General: Construct control, expansion, and construction joints properly aligned with face perpendicular to concrete surface. Except as indicated otherwise.

B. Expansion Joints and Isolation Joints at Walls
   1. Locations: Provide joints at locations and intervals shown on the Drawings, and where concrete work abutting curbs, walls, structures, walks, boulders and other fixed objects.
   2. Locate expansion joints as indicated. When not indicated, provide joints at maximum 20'-0" on center for curbs and walks. Align expansion joints in abutting curbs and walks.
   3. Install joint fillers full-width and depth of joint. Recess top edge below finished surface to depth indicated on Drawings.
   4. Provide joint fillers in single lengths for the full slab width, whenever possible. Fasten joint filler sections together when multiple lengths are required.
   5. Forming: Form joints and other edges in the fresh concrete using an edging tool to provide a smooth uniform impression.
   6. Sealing: After the curing period, carefully clean expansion joints and fill with joint compound to 1/4 in. below adjacent paved surface. Do not permit spillage on paved surfaces or overflow from joint.

C. Sawcut Control Joints:
   1. Locate Joints as indicated on drawings.
   2. Sawcutting for control joints should be performed
      a. Before concrete starts to cool.
      b. As soon as the concrete surface is firm enough not to be torn or damaged by the blade, and
      c. Before random drying-shrinkage cracks can form in the concrete slab.

d. Cutting should be undertaken sequentially to reduce the longest length of the slab, avoiding the creation of long, thin panels. Then cutting across the width of the slab/panel from the middle of one long side to the middle of the opposite long side.

3.6 FINISHES

A. Slip Resistance Requirements: All exposed exterior paving finishes shall meet the requirements of California Building Code (2007) Section 1133B.7.1.

B. Finish Schedule as shown in the Drawings.

C. Acid Wash Finish
1. Obtain even finish by applying muriatic acid to concrete with the following process.
    a. Day 1 - Pour Concrete
    b. Day 2 - Strip forms
        1) Apply full acid. Then wipe down with water and a sponge. Hose down with water.
        2) Apply acid for a 2nd time. Hose down again and use baking soda to neutralize the acid and to remove efflorescence.
    c. Day 3 - Apply acid for a third time and this time power wash it off.
2. Finish shall be as approved in the mockup.

3.7 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
1. Moist Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    a. Water.
    b. Continuous water-fog spray.
    c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.8 PAVEMENT TOLERANCES

A. Comply with tolerances of ACI 117 and as follows:
1. Elevation: 1/4 inch.
2. Thickness: Plus 3/8 inch, minus 1/4 inch.
3. Surface: Gap below 10-foot- long, unleveled straightedge not to exceed 1/4 inch.
4. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch.
5. Vertical Alignment of Tie Bars and Dowels: 1/4 inch.
6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch.
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches.
8. Joint Spacing: 3 inches.
9. Contraction Joint Depth: Plus 1/4 inch), no minus.
10. Joint Width: Plus 1/8 inch, no minus.

3.9 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. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.

C. 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.

D. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

E. 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.

F. 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.

G. 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.

H. Provide recessed joint configuration for silicone sealants of recess depth and at locations indicated.

3.10 FIELD QUALITY CONTROL

A. Rejected Materials: Remove off the site all concrete below specified strength.

B. Cost of Removal and Retesting: Pay for all costs of removal of rejected concrete, and its replacement with concrete of specified strength and retesting.

3.11 CLEANING AND PATCHING

A. Cleaning:
1. Removal: Remove all projecting fins, bolts, wire, nails, etc., not necessary for the work, or cut them back 1 in. from the surface and patch in an inconspicuous manner.
2. Voids: Fill holes with a 1:3 cement and sand mortar with the same color as the adjoining concrete. Mix and place the mortar as dry as possible and finish flush with the adjacent surface.

B. Patching:
1. Corrective Patching: Correct all defects in concrete work. Chip all voids to a depth of at least 1 in. with the edges perpendicular to the surface and parallel to form markings. Fill all voids, surface irregularities, or honeycombing by patching or rubbing. Ensure that all concrete surfaces so repaired duplicate the appearance of the unpatched work.
2. Defective Work: Remove in its entirety and replace all defective concrete work, which after corrective patching, rubbing, etc., fails to duplicate the appearance of unpatched work and/or conform to the standards set forth in these Specifications.

END OF SECTION

SECTION 32 18 16.13 – PLAYGROUND PROTECTIVE SURFACING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Engineered Wood Fiber Play Surfacing
   2. Sand Playground Surfacing
   3. Geosynthetics

B. Related Sections include the following:
   1. Section 03 33 00: Architectural Concrete
   2. Section 11 68 13: Playground Equipment
   3. Section 32 13 13: Concrete Paving
   4. Section 32 91 19: Landscape Finish Grading

1.2 DEFINITIONS

A. Critical Height: Standard measure of shock attenuation. According to CPSC No. 325, this means "the fall height below which a life-threatening head injury would not be expected to occur."

1.3 PERFORMANCE REQUIREMENTS

A. Impact Attenuation: According to ASTM F 1292.

B. Accessibility of Surface Systems: According to ASTM F 1951- 08 and ASTM F 1292-09.

C. Area Safety: Engineered wood fiber surfacing within the playground equipment use zones shall meet or exceed the performance requirements of the CPSC, ADA and Fall Height Test ASTM F 1292-09. The surface must yield both a peak deceleration of no more than 200 G-max and a Head Injury Criteria (HIC) value of no more than 1,000 for a head-first fall from the highest accessible portion of play equipment being installed as shown on Drawings.

D. TPV material shall be angular granules with a (Shore A) hardness of 65°A ±5 and particle size between .5-1.5mm. Binder shall be not less than 15 percent of the total weight of TPV material used in the wear surface and shall provide 100 percent coating of the particles. No other granule sizes are acceptable.

1.4 SUBMITTALS

A. Product Data: For playground surfacing systems.

B. One original copy of the submittal package will be provided.

C. Manufacturer’s descriptive data and installation instructions.

D. Manufacturer’s details showing depths of Wear Course and sub-base materials, anchoring systems and edge details.

E. Upon request, a listing of at least five installations where products similar to those proposed for use have been installed and have been in service for a minimum period of 3 years. This list shall include owner or purchaser, address of installation, date of installation, contact person, and phone number.

F. A signed statement by an authorized official certifying that the surfacing system meets the requirements of ASTM-F1292-09 for a head-first fall from the highest accessible portion of the specified playground equipment.

G. A signed statement from the manufacturer of the poured in place surfacing attesting that all materials under this section shall be installed only by the Manufacturer's Trained Installers.

H. A certificate of Insurance shall be provided by TotTurf® for engineered wood fibar surfacing for use as playground safety surfacing, covering general and product liability, of not less than $1,000,000 for each occurrence, $2,000,000 general aggregate, with an excess/ umbrella liability of $25,000,000. The issuing underwrite shall be AA rated.

I. IPEMA certification mandatory.

J. Samples for Selection and Verification: For each type of playground surface system indicated.
1. Engineered wood fibar play surfacing
2. Sand playground surfacing.

K. Warranty: For playground surfacing systems.

L. Products submitted as equal must include hard copies of manufactures written specifications and warranty.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: play surfaces shall be manufactured and installed by trained, experienced company employees or certified installers who have successfully completed the "Certified Installers Training Program" required by manufacturer.

B. Testing Agency Qualifications: An independent agency qualified according to ANSI Z34.1 for testing indicated.
1. Accessibility of Surface Systems - ASTM F1951: Determination of accessibility of surface systems under and around playground equipment.
2. Impact Attenuation - ASTM F1292: Impact attenuation of surface systems under and around playground equipment.
3. Standard for Engineered Wood Fiber - ASTM F2075: Minimum characteristics for those factors that determine particle size, consistency, purity and ability to drain.
4. IPEMA Certification: Manufacturer must provide proof of certification. "In the interest of public playground safety, IPEMA provides an independent laboratory which validates a manufacturer's certification of conformance to ASTM F1292 and ASTM F2075. A list of current validated products, their thickness and critical heights may be viewed at www.ipema.org."

C. Source Limitations: Obtain playground surface system materials, through one source from a single manufacturer.

D. Delivery, Storage and Handling: Materials and equipment shall be delivered and stored in accordance with the manufacturer's recommendations.

1.6 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit playground surface system installation to be performed according to manufacturers' written instructions and warranty requirements.

B. Surfacing shall be installed on a dry sub-surface, with no prospect of rain within the initial drying period, and within the recommended temperature range of the manufacturer. Installation in weather condition of extreme heat, less than 55 degrees (F), and/or high humidity may affect cure time, and the structural integrity of the final product. Immediate surroundings of the site must be reasonably free of dust conditions as this could affect the final surface appearance. The manufacturer's Service Center Manager reserves the right to control the installation based on such factors without penalty to the company.

1.7 COORDINATION

A. Coordinate installation of playground surface systems with installation of playground equipment specified in landscape drawings.

B. Surfacing shall be installed after all playground equipment, signs and any other items within the surfacing area. Surface installation shall be coordinated by a manufacturer-approved representative.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of playground surface system that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Reduction in impact attenuation.
      b. Deterioration of surface and other materials beyond normal weathering.
   2. Warranty Period: Minimum (7) seven years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ENGINEERED WOOD FIBER

A. Product and Manufacturer
   1. TotTurf® Engineered Wood Fiber, manufactured and installed by TotTurf®, or it's Certified Installers. Telephone: 800-858-0519. TOTTURF, 1354 14th street, Oakland CA 94607; (510) 433-0655, or approved equal.

B. General

1. Product is manufactured of a ground wood fiber comprised of softwoods and/or hardwoods, consisting of randomly sized wood fibers the majority of which do not exceed 2” in length and no more than 15% fines to aid in compaction.
2. Product to have minimal bark and to be free of twigs, leaf debris and other organic material.
3. Product depth, after installation, must be in accordance with the procedure described in ASTM F1292 and meet guidelines for critical height as set forth by the Consumer Product Safety Commission for use of wood products for protective surfacing.

2.2 SAND SAFETY SURFACING

A. Product and Manufacturer
   1. As specified in Drawings.
   2. Sand to be clean, debris free play sand.

2.3 GEOSYNTHETICS

A. Drainage/Separation Geotextile for subsurface drainage application at sand box: Nonwoven, needle-punched geotextile, manufactured for subsurface drainage applications and made from polyolefins or polyesters; complying with the following minimum properties determined according to ASTM D 4759 and referenced standard test methods:
   1. Weight: 4 oz./sq. yd. according to ASTM D 5261.
   2. Water Flow Rate: [150 gpm/sq. ft. (102 L/s per sq. m) according to ASTM D 4491.

PART 3 - EXECUTION

3.1 PREPARATION

A. General: Prepare substrates to receive surfacing products according to playground surface system manufacturer's written instructions. Verify that substrates are sound and without high spots, ridges, holes, and depressions.

B. Finished Grade: Verify that finished elevations of adjacent areas are as indicated on the drawings, that the appropriate sub-grade elevation has been established for the particular safety surface to be installed, and that the subsurface has been installed in a true, even plane, and sloped to drain as indicated in drawings. Both in-ground and above-ground systems must be properly graded. A (1) percent grade is recommended for proper drainage. Engineered wood fiber systems should not be installed on grades exceeding 10 percent. Substrate (for both in-ground and above-ground systems) must be firmly compacted, especially when additional fill material has been provided. The substrate should be free of stones, roots and other vegetation.

C. Subbase: Engineered Wood Fiber may be installed over compacted earth. If it is deemed that additional drainage is necessary; a layer of gravel can also be a suitable substrate. For in-ground (i.e. on grade) installations, excavate area to proper depth (12 in. for 12 in. system, 8 in. for 8 in. system).

D. Drainage: Verify that sub-surfacing drainage, if required, has been installed to provide positive drainage

3.2 INSTALLATION OF ENGINEERED WOOD FIBER

A. Install playground equipment

B. For above-ground systems, install retaining wall.

C. Install applicable drainage system.

D. If manufactured drainage is being used, the Terraflow should be laid out in parallel strips on six-foot centers. The strips must run from the high side of the playground to the low side. Terraflow drains should be placed directly on the sub-grade and should be covered with geotextile cloth after layout is complete. As an option for playgrounds with poor drainage, a Terraflow header strip may be cut and placed perpendicularly to the parallel strips already in place. This header strip should be placed on the low end of the playground. Any joints can be taped with a waterproof tape to maximize drainage.

E. If gravel drainage is used, place 3 in. of drainage gravel on a layer of geotextile fabric. The lower end of the site should be connected to drainage to channel collected water away from the site. Overlap all seams a minimum of 3 in. Slit fabric to fit around equipment uprights. Where possible, overlap all slits with next piece of fabric.

F. Cover drainage system (either manufactured drainage or gravel) or earth substrate with geotextile fabric. Overlap all seams a minimum of 3 in. Slit fabric to fit around equipment uprights. Where possible, overlap at slits with next piece of fabric.

G. With permanent marker or warning label, mark uprights of equipment with compacted system depth (i.e. 8 in. or 12 in.).

H. Install the engineered wood fiber to the proper depth, mounding in the center of the play areas of the playground. Extra materials will be provided to allow for compaction. Use a small front-end loader to spread surfacing. Operator should be careful not to travel on the fabric or turn sharply on the engineered wood fiber. It will also be necessary to spread manually. Install all the material delivered and please note that the surfacing will be several inches above grade until it compacts. engineered wood fiber needs to be compacted to be considered handicapped accessible. This can be achieved over time and usage, or with a mechanical compactor. Saturating the initial load with water will help with compaction.

I. For a smooth finished surface, hand rake. After two weeks of active use, surface should be raked again. Periodical adjustments of engineered wood fiber are required under slides, swings and other concentrated use zones. Installing Robertson Industries, Inc., mats in these areas will help control displacement in these high use zones. WARNING: Failure to maintain engineered wood fiber at the initial installation depth may result in an injury and void your warranty.

3.3 FIELD QUALITY CONTROL

A. Manufacturer’s Services: a manufacturer’s representative who is experienced in the installation of playground safety surfacing shall be provided. The representative shall supervise

the installation to ensure that the system meets the impact attenuation requirements as specified herein.

B. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

C. Testing Services: Testing and inspecting of completed applications of playground surface system shall take place according to ASTM F 1292.

D. Remove and replace applications of playground surface system where test results indicate that it does not comply with requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with requirements.

END OF SECTION

SECTION 32 31 00 - FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Fences and Gate

B. Related Sections include the following:
   1. Section 32 91 19: Landscape Finish Grading

1.2 DEFINITIONS

A. CLFMI: Chain Link Fence Manufacturers Institute.

B. Zn-5-Al-MM Alloy: Zinc-5 percent aluminum-mesh metal alloy.

C. A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

D. B117 - Practice for Operating Salt-Spray (Fog) Apparatus.

E. D523 - Test Method for Specular Gloss.

F. D822 - Practice for Conducting Tests on Paint and Related Coatings and Materials using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus.

G. D1654 - Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.

H. D2244 - Test Method for Calculation of Color Differences from instrumentally Measured Color Coordinates.

I. D2794 - Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).

J. D3359 - Test Method for Measuring Adhesion by Tape Test.

1.3 REFERENCES

A. State of California, Department of Transportation (Caltrans)

B. ASTM International:
   1. ASTM A116 - Standard Specification for Metallic-Coated, Steel Woven Wire Fence Fabric
   2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

3. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
4. ASTM A392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.
5. ASTM F567 - Standard Practice for Installation of Chain-Link Fence.
6. ASTM F668 - Standard Specification for Poly (Vinyl Chloride) (PVC)-Coated Steel Chain Link Fence Fabric.
7. ASTM F900 - Standard Specification for Industrial and Commercial Swing Gates.
8. ASTM F934 - Standard Specification for Standard Colors for Polymer-Coated Chain Link Fence Materials.
9. ASTM F1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.
10. ASTM F1184 - Standard Specification for Industrial and Commercial Horizontal Slide Gates.

C. AASHTO:
1. AASHTO M 181 - Standard Specification for Chain-Link Fence

1.4 SYSTEM DESCRIPTION

A. Fence Height: As indicated on Drawings or specified in this section.

B. Line Post Spacing: as indicated on the Drawings, unless otherwise recommended by manufacturer.

1.5 SUBMITTALS

A. Product Data: Material descriptions, construction details, dimensions of individual components and profiles, and finishes for the following:
1. Fence and gate posts, rails, and fittings.
2. Welded wire infill, reinforcements, and attachments.

B. Shop Drawings:
1. Shop drawings to include layout with dimensions, details, and finishes of all fence and/or gate components, accessories, and post foundations.

C. Product Data: Manufacturer’s catalogue cuts for all hardware, indicating material compliance and specified options.

D. Samples:

1. Welded wire infill with specified finish.

E. Product Certificates
1. Signed by manufacturers of ornamental metal fences and gates certifying that products furnished comply with requirements.

F. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names

and addresses, names and addresses of engineers and owners, and other information specified.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with State and local Standards Specifications.

B. Perform installation in accordance with ASTM F567.

1.7 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
   1. Do not proceed with utility interruptions without Engineer's written permission.

B. Field Measurements: Verify layout information for fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

1.8 CLOSEOUT SUBMITTALS

A. Execution and Closeout Requirements: Closeout procedures per Division 01 or as directed by owner.

B. Project Record Documents: Accurately record actual locations of property perimeter posts relative to property lines and easements.

1.9 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing work of this section with minimum three years documented experience and approved by manufacturer.

1.10 DELIVERY, STORAGE AND HANDLING

A. Deliver fence materials and accessories in packed cartons or firmly tied rolls.

B. Identify each package with manufacturer’s name.

C. Store fence materials and accessories in secure and dry place.

PART 2 PRODUCTS

2.1 MATERIALS AND COMPONENTS

A. Fences and Gate

B. Concrete: In accordance with Section 03 30 00 Cast-in-Place Concrete of these specifications.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting performance.
   1. Verify areas to receive fencing are completed to final grades and elevations.
   2. Do not begin installation before final concrete work is completed, unless otherwise permitted by Engineer.
   3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Stake locations of fence lines, gates, line posts and terminal posts.

3.3 INSTALLATION, GENERAL

A. Post Excavation: Core drill holes for posts to achieve layout.
   1. Posts Set into Concrete in Voids: Form or core drill holes not less than 5 inches deep and 3/4 inch larger than OD of post. Clean holes of loose material, insert posts, and fill annular space between post and concrete with non-shrink grout mixed and placed to comply with anchoring material manufacturer's written instructions, and finished sloped to drain water away from post.

B. Excavate holes for posts to diameter and spacing indicated on Drawings without disturbing underlying materials.

C. Center and align posts. Place concrete around posts, and vibrate or tamp for consolidation. Verify vertical and top alignment of posts and make necessary corrections.

D. Set posts plumb, in concrete footings unless otherwise indicated in the Drawings. Slope top of concrete for water runoff.

E. Allow footings to cure minimum 7 days before installing panels and other materials attached to posts. The use of admixture materials is permitted to enhance the curing time of the concrete mix. Refer to Paragraph 2.2 Admixtures in Section 03 30 00 Cast-In-Place Concrete.

F. All required fittings and hardware shall be fastened to the posts in the proper manner.

G. Install fence in accordance with manufacturer’s instructions.

H. Space posts uniformly at spacing as indicated on the Drawings, unless otherwise indicated per fence manufacturer’s requirements.

I. Concrete Footings: per the Drawings and Section 03 30 00 Cast-In-Place Concrete.

J. Check each post for vertical and top alignment and maintain in position during placement and finishing operation.

K. Where posts are attached to wall tops, align fence panels and posts at the centerline of the wall.

L. Demonstrate that all gates swing smoothly and freely without binding or dragging, that all gates are lockable, and that all gate hardware operates properly.

M. Maximum Variation from Plumb: ¼ inch.

N. Maximum Offset from Indicated Position: 1 inch.

3.4 CLEANING

A. The contractor shall clean the jobsite of excess materials; post-hole excavations shall be scattered uniformly away from posts.

END OF SECTION

SECTION 32 33 00 - SITE FURNISHINGS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Site Furnishings.
   2. Trash and Recycling Receptacles.

B. Related Sections include:
   1. Section 03 30 00 Cast-in-Place Concrete for concrete footings, sleeves, and anchor bolts.

C. Products furnished, but not installed under this Section, include pipe sleeves, anchor bolts, to be cast in concrete footings.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
   1. Size: As provided by manufacturer.

C. Product Schedule: For site furnishings. Use same designations indicated on Drawings.

D. Maintenance Data: For site furnishings to include in maintenance manuals.

1.3 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Trash Receptacle Inner Containers: [5] full-size units for each type.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Anchors, Fasteners, Fittings, and Hardware: Manufacturer's standard, corrosion-resistant-coated or noncorrodible materials.
   1. Galvanized Angle Anchors: For inconspicuously bolting legs of site furnishings to below grade substrate.
   2. Antitheft Hold-Down Brackets: For securing site furnishings to substrate; Manufacturer's standard.

B. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107; recommended in writing by manufacturer, for exterior applications.

C. 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.

D. Galvanizing: Where indicated for steel 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.

2.2 SITE FURNITURE

A. See Materials Schedule on drawings

2.3 TRASH AND RECYCLING RECEPTACLES

A. See Materials Schedule on drawings

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.

B. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed.

C. Install site furnishings level, plumb, true, and securely anchored at locations indicated on Drawings.

D. Post Setting: Set cast-in support posts in concrete footing with smooth top, shaped to shed water. Protect portion of posts above footing from concrete splatter. Verify that posts are set

plumb or at correct angle and are aligned and at correct height and spacing. Hold posts in position during placement and finishing operations until concrete is sufficiently cured.

E. 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 non-shrink, 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.

F. Pipe Sleeves: Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with non-shrink, 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.

3.3 CLEANING

A. After completing site furnishing installation, inspect components. Remove spots, dirt, and debris. Repair damaged finishes to match original finish or replace component.

END OF SECTION

SECTION 32 39 00 – LANDSCAPE STONE

PART 1 - GENERAL

1.1. SUMMARY

A. This section includes the following:

1. Boulders
2. Fabrication of Cut Boulder
3. Clean up.

1.2. RELATED WORK UNDER OTHER SECTIONS

A. Section 32 91 13: Landscape Soils

B. Section 32 91 19: Landscape Finish Grading

C. Section 32 93 00: Planting

1.3. EXAMINATION OF CONDITIONS

A. The Contractor shall fully inform themselves of existing conditions of the site before submitting their bid, and shall be fully responsible for carrying out site work required to fully and properly execute the work of the Contract, regardless of the conditions encountered in the actual work. No claim for extra compensation or extension of time will be allowed on account of actual conditions inconsistent with those assumed by the Contractor.

B. Plans, surveys, measurements and dimensions under which the work is to be performed are believed to be correct to the best of the Landscape Architect's and Owner’s knowledge, but the Contractor shall have examined them for themselves during the bidding period, as no allowance will be made for any errors or inaccuracies that may be found therein.

C. The installer shall examine previous work, related work, and conditions under which this work is to be performed and notify the Owner and Landscape Architect in writing of deficiencies and conditions detrimental to the proper completion of this work. Beginning work means installer accepts substrates, subgrades, previous work, and conditions.

1.4. QUALITY ASSURANCE

A. Materials and methods of construction shall comply with the following standards:

1. ASTM: American Society for Testing and Materials
2. ANSI: American National Standards Institute
3. BSI: Building Stone Institute

B. Qualifications of Workers: Use adequate numbers of skilled workers who are trained in the necessary crafts and who are completely familiar with the specified requirements and methods needed for the proper performance of the work of this Section.

C. Layout and Grading: After staking out the work, and before beginning final construction, obtain the Landscape Architect's approval for layout and grades.

1. The Contractor shall stake out the horizontal and vertical layout in sufficient detail for evaluation by the Landscape Architect.

    a. Adhere to the layout data shown in the Drawings.

2. The Landscape Architect shall be permitted to make reasonable adjustments to layout and grading without further compensation to the Contractor.

1.5. PRE-INSTALLATION CONFERENCE

A. Convene a conference approximately two (2) weeks before scheduled commencement of the Work. Attendees shall include Landscape Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.

1.6. PROJECT CONDITIONS

A. Grade Control: Establish and maintain required lines and elevations in accordance with Article 1.05 of this Section.

B. Stain Protection: Immediately remove mortar and soil to prevent them from staining stone.

C. Protection of work: During erection, cover top of stone with waterproof sheeting at the end of each day's work. Cover partially completed structures when work is not in progress.

1.7. SUBMITTALS

A. Product Data:

1. Stone: Submit (3) different photos of raw boulders representing each category of size ranges indicated on the boulder schedule in the Drawings. Include a tape measure to indicate boulder heights and widths. Indicate name of source and source location on images.

2. Acidic Stone Cleaner.

B. Shop Drawings

1. Boulder with Runnel: Dimensioned shop drawings showing approximate diameter of all indicated boulders and runnel.

PART 2 - PRODUCTS

2.1. STONE

A. Material: As indicated in Drawings.

B. Supplier: As indicated in Drawings.

1. Sizes: As indicated in Drawings.

2. Finishes: As indicated in Drawings.

PART 3 - EXECUTION

3.1. BOULDER CUTTING

A. Saw cut boulders with stone cutting machine large enough to cut boulders to the size and shape indicated on the Drawings in a single pass.

3.2. INSTALLATION

A. The installer shall examine previous work, related work, and conditions under which this work is to be performed and notify the Contractor in writing of deficiencies and conditions detrimental to the proper completion of this work. Beginning work means installer accepts substrates, subgrades, previous work, and conditions.

B. Before installation, boulders shall be reviewed for damage caused by transportation, handling, or delivery. Damaged boulders will be rejected. Replace rejected boulders at no additional cost to the Owner.

3.3. PROCUREMENT, HANDLING, STORAGE AND INVENTORY

A. Procurement: Contractor shall be responsible for sourcing and procuring boulders from quarry/stone supplier and transporting them to a qualified stone fabrication facility.

1. The sorting, inventory and selection shall be done simultaneously with site preparation.

2. Also refer to Part 2 in this Section.

B. Handling: Stone shall be carefully handled when being taken from or delivered to the site. The Contractor shall use all reasonable and customary precautions against damaging stone in transit. No material that may cause staining or discoloration shall be used for transportation, blocking or packing.

C. Site Storage during the Work: The stone shall be set on grade in an organized layout that permits easy access. Extreme care should be taken to prevent breakage and staining during storage. If storage is to be for a prolonged period, polyurethane or other suitable plastic film shall be used as an overall protective covering. Salt shall not be used for melting of ice formed on stone pieces or for any purpose involving its contact with stone.

3.4. PREPARATION AND SETTING

A. Prepare subgrades and setting bed as indicated in drawings.

B. Setting: Setting shall be done by competent stone setters, in accordance with the Drawings.

C. Layout and Pattern: The layout and patterning of the final constructed stonework shall be reviewed by the Contractor and Landscape Architect for conformance to the drawings. Landscape Architect shall reserve the right to modify the layout and pattern as necessary to achieve the design and as necessary to respond to the characteristics of the selected stone.

1. Prior to final constructed stonework the Contractor and Landscape Architect shall establish a schedule for Landscape Architect's review of the work.

2. Contractor shall arrange for stone cutting at the stone yard. Landscape Architect to visit the site to approve cutting work and final order prior to delivery to the site.

3.5. STONE WORK, GENERAL

A. Compact subgrade in accordance with Section 26 Aggregate Base.

B. Setting of Stone shall conform to the following:

1. Replace any chipped, damaged, or permanently stained stones to the satisfaction of the Landscape Architect. Clean dirty or stained stone surfaces by removing soil, stains, and foreign materials before setting.

2. Sort stone before it is placed to ensure that stones that do not comply with the requirements relating to aesthetic effects, physical properties, or fabrication or otherwise unsuitable for intended use, are not used.

3. Arrange stones with color and size variations uniformly dispersed for an evenly blended appearance.

4. Set stone to comply with requirements indicated on the Drawings.

C. Adjusting:

1. Adjust stone placement and setting as directed by the Landscape Architect in a manner that results in stone assemblies matching drawings.

3.6. GRADES AND ELEVATIONS

A. The Drawings indicate, in general, the alignment and finish grade elevations. The Landscape Architect may make such adjustments in grades and alignments as are found necessary to properly complete the work. The Contractor shall not receive further compensation for adjustments.

3.7. PROTECTION

A. Rules and regulations governing respective utilities shall be observed in executing work under this Section. Work shall be executed in such a manner as to prevent any damage to existing trees, curbs, pavement, walls, rails, utility lines, structures, and adjoining property.

B. After the stone work is installed, it shall be the responsibility of the Contractor to see that the stone is properly and adequately protected from damage. Suitable protection shall be required wherever necessary, but no lumber that may stain or deface the stone shall be used. Fastenings and nails used in conjunction with protecting devices shall be non-staining. Stone work in progress shall be protected during construction by use of a suitable strong, impervious film or fabric securely held in place.

3.8. FINAL CORRECTIONS

A. The Landscape Architect reserves the right to inspect the work to determine if adjustments are necessary in grade, alignment or layout. The Contractor shall make such adjusts without further compensation.

3.9. CLEAN –UP

A. The Contractor shall remove debris, construction equipment and scrap material from within the limit of work prior to the final inspection and acceptance.

B. Contractor shall clean stains from the surface of stone. Stone that cannot be cleaned shall be replaced. Landscape Architect shall be sole judge of whether staining is apparent and necessitates remediation.

C. Contractor shall replace cracked, damaged, chipped or irregular stone. Landscape Architect shall be sole judge of whether damage is apparent and necessitate replacement.

3.10. DISPOSAL

A. Excess stone shall be disposed of off-site in a legal manner.

END OF SECTION

SECTION 32 84 00 - PLANTING IRRIGATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: All labor, materials, supplies, tools and transportation to perform all operations in connection with and reasonably incidental to the complete installation of the automatic sprinkler irrigation systems as shown on the Drawings.

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

1.2 RELATED SECTIONS:

A. Final Acceptance for Work of this Section is contingent on completion of Work of Section 32 90 00.

B. Division 26 - Electrical power to controller.

C. Division 32 – Exterior Improvements: Irrigation sleeving under paving.

1.3 REFERENCES

A. ASTM – American Society for Testing and Materials
   1. A53 – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
   2. D1785 – Standard Specification for Poly Vinyl Chloride (PVC) Plastic Pipe, Schedules 40 and 80 and Classes 200 and 315.

B. ICC – International Code Council

C. NEC – National Electric Code

D. State of California, Division of Industrial Safety
   1. Electrical Safety Orders

E. UPC – Uniform Plumbing Code

1.4 QUALITY ASSURANCE

A. OSHA Compliance:
   1. All articles and services covered by this Specification shall meet or exceed the safety standards established under the Federal Occupational Safety and Health Act of 1970, together with all amendments in effect as of the date of this Specification.
   2. The subcontractor shall erect and maintain barricades, guards, warning signs, and lights as necessary or required by OSHA regulations for the protection of the public or workmen.

B. Regulatory requirements: In addition to complying with all pertinent codes and regulations, comply with the latest rules of NEC and the Electrical Safety Orders of the State of California, Division of Industrial Safety, for all electrical work and materials. The materials and methods to be used in constructing the irrigation system shall conform to the applicable provisions of the UPC.

C. When the Specifications call for materials or construction of a better quality or larger size than required by the above-mentioned rules and regulations, the provision of the Specifications shall take precedence over the requirements of the said rules and regulations.

D. The subcontractor shall furnish without any extra charge any additional material and labor when required by the compliance with these rules and regulations, though the work be not mentioned in these particular Specifications or shown on the Drawings.

E. Any existing buildings, equipment, piping, pipe covering sewers, sidewalks, landscaping, etc., damaged by the subcontractor during the course of his work shall be replaced or repaired by the subcontractor in a manner satisfactory to the Owner's Agent and at subcontractor's own expense, and before the final payment is made. The subcontractor shall be responsible for damage caused by leaks in the piping systems being installed by him. He shall repair, at his own expense, all damage so caused, in a manner satisfactory to the Owner's Agent.

F. The subcontractor, personally or through an authorized and competent representative, shall supervise the work constantly, and shall as far as possible keep the same foreman and workmen on the job from commencement to completion. The workmanship of the entire job must in every way be first class, and only experienced and competent workmen will be allowed on the job.

G. The subcontractor shall pay for all permits, licenses, and fees required.

H. Pre-construction conference: Contractor shall schedule and conduct a conference to review in detail quality control and construction requirements for equipment, materials, and systems used to perform the work. The conference shall be scheduled not less than 10 days prior to commencement of work. All parties required to be in attendance shall be notified no later than 7 days prior to date of conference.

1.5 SUBMITTALS

A. Materials List: Within 15 days after award of contract and prior to installation, submit six copies of materials list. Include manufacturer, model number, and description of all materials and equipment. Include sealants, cements, lubricants and other proprietary items.

B. Substitutions: Submit six copies of catalog information on materials which are to be submitted for substitution. No substitution will be permitted without prior written approval by the Architect. A complete material list shall be submitted prior to performing any work.

C. Record Drawings:
1. The subcontractor shall maintain in good order, in the field office, one complete set of

bond prints of all irrigation drawings which form a part of the Contract, showing all water lines, sprinklers, valves, controllers and stub-outs. Any work not installed as indicated on the Drawings, shall be recorded and dimensioned accurately from the building walls on these prints. All as-built markups shall be indicated in red.

2. Two wire system record drawings shall include two wire path.
3. All underground stub-outs for future connections and valves shall be located and dimensioned accurately from building walls on these record drawings.
4. Upon completion of the work, obtain reproducible prints from Architect and neatly correct the prints to show the as-built conditions.

D. Controller Charts:
1. Record Drawings shall be accepted by Architect before controller charts are prepared.
2. Provide one controller chart for each controller supplied.
3. Charts shall be the maximum size that the controller door will allow, showing areas covered by each controller. Chart shall be an electrostatic copy and a different color shall be used to indicate area of coverage for each station. Enlarge valve sequence to be readable when drawing is reduced.
4. After being completed and accepted, seal by plastic laminating. Laminating sheets shall be a minimum of 10 mil thick.

E. Operations and maintenance manuals:
1. Deliver to owner at least 10 days prior to completion of construction, 2 complete sets of the following data. Data shall be on 8 1/2 inch by 11 inch sheets, in a 3-ring binder.
   a. Index sheet stating Contractor's address and telephone number and list of equipment with name and addresses of local manufacturer's representatives.
   b. Catalog and parts sheets on all material and equipment installed under this Section.
   c. Complete operating and maintenance instructions for all equipment.
   d. Complete and dated manufacturer's warranties for all materials used.
2. Irrigation Maintenance Schedule to include, but not be limited to, routine inspection, adjustment, and repair of the irrigation system and its components.
3. Irrigation audit report by an Irrigation Association certified irrigation auditor. Irrigation audit shall be performed by auditor for final inspection and report shall be provided by auditor.

1.6 LAYOUT OF WORK

A. The irrigation contractor shall stake out the irrigation system as shown on the Drawings. Stakes shall be approved by Landscape Architect before construction is started. Any changes, deletions or additions shall be determined at this check.

1.7 INSTRUCTION

A. After the system has been installed and approved, subcontractor shall instruct the Owner's representative in complete operation and maintenance of the irrigation system.

1.8 WARRANTY

A. Provide 1 year guarantee for Work of this Section in accordance with Section 1700.

B. Provide supplemental guarantee, on Contractor's letterhead:
   1. Warrant that irrigation system has been installed according to Drawings and Specifications, and that system will be free of defects in products and installation for 1 year from Substantial Completion. Manufacturer's warranties shall only supplement special warranty.
   2. Agree to repair or replace defective Work, or adjacent work which is damaged by such defects, with the exception of ordinary wear and tear, abuse or neglect. This includes damage to site improvements caused by settlement of improperly compacted trench backfill.
   3. Owner reserves the right to make temporary repairs as required.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

A. Main lines (constant pressure) 2 1/2 inch and larger 1120-315 PSI solvent weld pipe, Type 1, and shall conform to ASTM D1784; 1 to 2 inch shall be 1120 Schedule 40 polyvinyl chloride (PVC) solvent weld pipe, Type 1, and shall conform to ASTM D1785. Use Schedule 40 and Schedule 80 PVC solvent weld fittings.

B. Lateral lines (non pressure) shall be 1120-Schedule 40 polyvinyl chloride (PVC) plastic pipe Type 1, and shall conform to ASTM D1785. Use Schedule 40 PVC solvent weld fittings.

C. Fittings:
   1. Solvent Weld socket fittings: Schedule 40, Type 1, Grade 1, PVC and shall conform to ASTM D2466. Schedule 80, Type 1, Grade 1 PVC and shall conform to ASTM D2467. Solvent cement and primer for PVC solvent-weld pipe and fittings shall be of type recommended by pipe manufacturer.
   2. Class 200 PSI PVC one-piece, molded rubber ring seal fittings: ASTM D1784, gaskets to conform to ASTM F477

D. Connections between main lines and remote control valves shall be of Schedule 80 PVC (threaded both ends) nipples and fittings.

E. Risers shall be as follows: Schedule 80 PVC threaded nipples and Schedule 80 PVC ells as shown on the construction details.

F. Detectable marking tape shall be 3 inch wide and consist of a minimum 5.0 mil overall thickness. The tape shall have a 20 gauge solid aluminum foil core, encapsulated within 2.55 mil polyethylene backing. Tape color shall be purple for recycled water or blue for potable water.

2.2 QUICK COUPLING VALVES

A. Quick Coupling valves shall be brass construction, 1-inch connection, two-piece body, locking

purple vinyl top, single slot and lug. Provide one 1-inch single lug key and 1-inch hose swivel for every 5-6 quick couplers.

B. Quick Coupling valves shall be restrained with ductile iron restrainers that attach securely to the base of the valve. Restrainers shall make contact with the hex flats of the valve and be secured by a single bolt.

2.3 SHUT OFF VALVES

A. Shut-off valves shall be standard port two-piece lead free bronze ball valves blowout proof pressure retaining 316 stainless steel stem, Durafill seats, reinforced PTFE stem packing seal and 316 stainless steel ball. Valve shall have threaded connections.

2.4 BALL VALVES

A. Ball valves at remote control valves shall be full port two-piece lead free bronze construction with chrome plated brass ball, adjustable packing nut, and bottom loaded blow-out proof stem.

2.5 REMOTE CONTROL VALVES

A. Remote control valves shall be globe pattern constructed of heavy duty cast iron, bronze, stainless steel, and copper with metering pin and manual flow stem to adjust closing speed. Operating pressure shall be 3 to 300 psi and flow range shall be .01 to 3000 gpm.

B. Remote control valves shall be installed with the appropriate decoder as listed on the drawings.

C. Each valve shall have a plastic tag denoting its controller and station number.

2.6 MASTER REMOTE CONTROL VALVE

A. Master remote control valve shall be constructed of brass and shall have a brass drain cock for manual operation. Operating pressure shall be 15 to 200 psi and flow range shall be 1 gph to 320 gpm.

B. Master Valve shall be normally closed.

2.7 FLOW SENSOR

A. Flow sensors shall be capable of sensing programmed water flows during the operation of the irrigation system and shall be capable of detecting excess or inadequate water flows as per the operator entered parameters.

B. The flow sensors shall be compatible with the irrigation controller and shall be capable of transmitting water flow information to the irrigation controller.

C. The flow sensor shall meet the following requirements:

1. Tee shall be PVC with sensor pre-installed.
2. Insertion type with a non magnetic, spinning impeller as the only moving part.
3. Rated for a maximum line pressure of 150 psi and a maximum liquid temperature of 140 degrees F.
4. Accuracy of plus or minus 1 percent of full scale, linearity of plus or minus 1 percent, repeatability of plus or minus 1 percent, and a flow range of 1.8 to 108 gallons per minute.

D. Use Sensor Decoder to connect flow sensor to controller. Install per manufacturer's instructions.

2.8 CONTROLLERS

A. Controllers shall be as listed on the Drawings and shall have the following features:
1. Two wire configuration.
2. Utilize either evapotranspiration or soil moisture data for irrigation scheduling.
3. UL listed, solid state, capable of automatic or manual operation.
4. Non-volatile memory.
5. Scheduling with 365 day calendar, odd/even watering, and rain delay of 1-14 days.
6. Cycle and soak feature.
7. Compatible with master valve and flow sensor.
8. Hand held remote ready.

B. Controllers shall be grounded per manufacturer's instructions and ASIC grounding guidelines.

2.9 CONTROL WIRE

A. Twisted pair, solid-core, color-coded red/blue with each conductor in a polyethylene jacket suitable for direct burial. Use only manufacturer recommended wire.

B. All connections in the two-wire path shall be made with 3M DBR/Y-6 waterproof, strain-relieving direct burial connectors.

C. Grounding: Decoders and surge protectors shall be grounded per manufacturer instructions and ASIC grounding guidelines.

2.10 DECODERS

A. Decoders shall be by the same manufacturer as controller.
B. Install decoders per manufacturer's instructions.

2.11 VALVE BOXES

A. High density polyethylene construction with UV inhibitors. Lid shall be green in color and have stainless steel bolt-down mechanism. Boxes, lids, and bolts shall be from the same manufacturer. Plastic valve boxes shall be by Carson, NDS Pro Series, or equal.

B. The lid shall be marked as follows:
1. Remote Control Valves – "Irrigation Control Valve" or "ICV" with the station number in

one inch (1") high white enamel or heat branded numbers and letters.

2. All other valves - "Irrigation Control Valve" or "ICV".

C. Valve box sizes are noted on drawing details.

2.12 SPRINKLER HEADS AND BUBBLERS

A. All sprinkler heads and nozzles shall be as listed on the Drawings.

B. All pop-up sprinkler heads shall have shut-off devices, check valves, and pressure regulation built into the sprinkler head.

C. Bubblers shall be as listed on the Drawings and shall be pressure compensating.

2.13 DRIP SYSTEM

A. Provide all components required for complete system:
1. Wye Filter: Corrosion resistant plastic housing, 1inch FIPT/MIPT connections with removable stainless steel screen and integral flush valve with hose threads. Screen shall be 155 mesh.
2. Pressure regulator: Constructed of thermoplastic with stainless steel compression spring and securing screws. Pre-set to maintain constant outlet pressure of 40 psi.
3. Drip tubing shall be extruded from low-density polyethylene. Tubing shall be UV protected. Fittings shall be by the same manufacturer as the tubing.

2.14 SUBSURFACE IRRIGATION

A. Dripline tubing and pressure compensating emitters shall be extruded from linear low-density polyethylene. The inline emitter shall have a pressure-regulating diaphragm with spring action and automatic check valve that will seal the line at 3.5 psi.. Protection from root intrusion shall be by means of a copper oxide in the emitter.

B. All accessories listed below shall be furnished by the same manufacturer as the dripline.
1. Line Flushing Valves – the subsurface irrigation system shall utilize manual line flush valves at the end of each independent zone area. Manual valve shall be a PVC ball valve connected to polyethylene tubing. The valves shall connect directly to the dripline.
2. Air/Vacuum Relief Valve – each independent irrigation zone shall utilize an air/vacuum relief valve at its high point. The air and vacuum relief valve shall seal effectively from 2 to 10 psi.

2.15 RAIN SENSOR

A. UV resistant, polymer housing with weatherproof switch mechanism and mounting bracket.

B. Fully adjustable shutoff from 1/8 inch to 1 inch of accumulated rainfall with automatic return to normal watering cycle.

C. Shall be wireless with 500 foot transmission range.

2.16 MISCELLANEOUS INSTALLATION MATERIALS

A. Solvent cement and primer for solvent weld joints shall be of make and type approved by manufacturer(s) of pipe and fittings. Use only Weld-On 795 Cement for flexible PVC to rigid PVC connections. Cement shall be maintained at proper consistency throughout use. Assembly practice shall be in accordance with ASTM D2855. Active Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets.

B. Pipe joint compound shall be non-hardening, non-toxic materials designed specifically for use on threaded connections in water carrying pipe. Performance shall be same as Christy Ultra Seal Thread Sealant T10,000..

C. Drain rock: 3/4 inch washed pea gravel.

2.17 MISCELLANEOUS EQUIPMENT

A. Provide all equipment called for by the Drawings.

B. Provide to the Owner, at completion of the Maintenance Period, three (3) each of all operating and servicing keys and wrenches required for complete maintenance and operation of all heads and valves. Include all wrenches necessary for complete disassembly of all heads and valves.

C. Provide two (2) each of quick coupler keys and hose swivels and three (3) sets of keys to both controller cabinets and enclosures.

PART 3 - EXECUTION

3.1 PREPARATION

A. Schedule and coordinate placement of materials and equipment in a manner to effect the earliest completion of work in conformance with construction and progress schedule.

B. Contractor shall field verify the static water pressure at the project site prior to commencing work or ordering irrigation materials. If contractor fails to verify static water pressure prior to commencing work, contractor shall assume responsibility for all costs required to make system operational.

C. Examine areas and conditions under which work of this section is to be performed. Do not proceed with work until necessary conditions have been corrected.

3.2 HANDLING AND STORAGE

A. Protect work and materials from damage during construction and storage as directed by Architect.

B. Handle plastic pipe carefully; especially protecting it from prolonged exposure to sunlight.

C. Store sub-surface dripline and polyethylene tubing in cool dry place out of sunlight during installation.

3.3 LAYOUT

A. Layout work as accurately as possible in accordance with diagrammatic drawings.

B. Where site conditions do not permit location of piping, valves and heads where shown, notify Architect immediately and determine relocation in a joint conference.

C. Run pipelines and automatic control wiring in common trenches whenever practical.

3.4 EXCAVATING AND TRENCHING

A. Excavation shall be in all cases ample in size to permit the pipes to be laid at the elevations intended and to permit ample space for joining.

B. Depth of trenches shall be enough to provide minimum cover from finish grade to top of pipe in trenches, as follows:

1. 24 inch minimum cover over main lines to the control valves and quick coupling valves.
2. 24 inch minimum cover over direct burial control wires from controller to valves.
3. 18 inch minimum cover over the valve controlled lines to sprinkler heads.
4. 24 inch minimum cover over sleeves.

C. Restore surfaces, existing underground installations, etc., damaged or cut as a result of excavations, to original conditions in a manner approved by the Architect.

D. Where other utilities interfere with irrigation trenching and pipe work, adjust the trench depth as instructed by Architect.

3.5 ASSEMBLING PIPELINES

A. All pipes shall be assembled free from dirt and pipe scale. Field cut ends shall be reamed only to full pipe diameter with rough edges and burrs removed.

B. Thrust Blocking:
1. Provide thrust blocks at all changes in size or direction. Bends, reducers, plugs, and the opposite side of tee branches all require thrust blocks.
2. The size of the thrust block is determined by the working pressure, the size and type of fitting and the soil conditions at the job site. To calculate the area of contact with the soil, follow these steps:
Calculate the total thrust by selecting thrust/100 by size and type of fitting from Table 1 and multiplying thrust/100 by system pressure divided by 100.
Divide the total thrust by the bearing capacity of the soil in excavation (from

Table 2) to determine the area (in square feet) of thrust block required to be in contact with the undisturbed soil.

TABLE 1 THRUST/100 TABLE (POUNDS PER 100 PSI)

SIZE	TEES PLUGS	90° BENDS	45° BENDS	22° BENDS
2	363	513	259	141
2 ½	531	751	379	207
3	788	1114	562	207
4	1302	1841	928	307
6	2822	3990	2012	1101

TABLE 2 SOIL BEARING CAPACITY

SOIL TYPE	SAFE BEARING LOAD LBS PER SQ FT
Soft Clay	1,000
Sand	2,000
Sand and Gravel	3,000
Sand and Gravel cemented w/ Clay	4,000
Hard Pan	10,000

The engineer is responsible for determining safe bearing loads. When doubt exists, soil bearing tests should be specified.

C. Solvent Weld Joint:
   1. Prepare joint by first making sure the pipe end is square, then deburring the pipe end and cleaning the pipe and fitting of dirt.
   2. Dry-insert pipe into fitting to check for missizing. Pipe should enter fitting 1/3 to 2/3 depth of socket.
   3. Coat the inside socket surface of the fitting and the external surface of the male end of the pipe with primer, immediately followed by solvent weld cement liberally applied to the male end of the pipe and lightly applied to the inside of the socket. Then, apply a second coat of cement to the pipe end.
   4. Insert pipe immediately into fitting and turn it 90° to distribute cement and remove air bubbles. The pipe must seat to the bottom of the socket and fitting. Check alignment of the fitting. Pipe and fitting shall be aligned properly without strain to either.
   5. Hold joint still for approximately thirty (30) seconds and then wipe the excess cement from the pipe and fitting.
   6. Cure joint a minimum of thirty (30) minutes before handling and at least six (6) hours before allowing water in the pipe.

D. Threaded Joint:
   1. Field threading of plastic pipe or fittings is not permitted. Factory-formed threads only will be permitted.

2. Factory-made nipples shall be used wherever possible. Field-cut threads in metallic pipe will be permitted only where absolutely necessary. When field threading, cut threads accurately on the axis with sharp dies.
3. All threaded joints shall be made up with pipe joint compound. Apply compound to male threads only.
4. Where assembling metallic pipe to metallic fitting or valve, no more than three (3) full threads shall show when joint is made up.
5. Where assembling to threaded plastic fitting, take up joint no more than one full turn beyond hand tightening.
6. Where assembling soft metal (brass or copper) or plastic pipe, use a strap type friction wrench only; do not use a metal-jawed wrench.

E. Cap or plug openings as pipeline is assembled to prevent entrance of dirt or obstruction. Remove caps or plugs only when necessary to continue assembly.

F. Where pipes or control wires pass through sleeves, provide a removable non-decaying plug at ends of sleeve to prevent entrance of earth.

G. Install copper tracer wire on top of the entire mainline, taped every fifteen feet (15'). Stub tracer wire up at backflow and isolation valves.

3.6 REMOTE CONTROL VALVES

A. Install where shown on Drawings and group together where practical. Limit one remote control valve per box with no exceptions. Decoders to be installed in one remote control box per group. Decoders shall be mounted securely to the side of the valve box.

B. Locate valve boxes 12 inches from and perpendicular to walk edges, buildings and walls. Provide 12 inches between valve boxes where valves are grouped together.

C. Thoroughly flush main line before installing the valve.

D. Install in shrub or ground cover areas where possible.

E. Label control line wire at each valve with a 2 1/4" x 2 3/4" polyurethane I.D. tag, indicating identification number of the valve (controller and station number). Attach a label to control wire.

F. Label control line wire at each valve with a Paige 270WMP wire marking tag identifying the decoder numbers and electrical information.

3.7 QUICK COUPLING VALVES

A. Install quick coupling valves on double swing-joint assemblies of Schedule 80 PVC risers and fittings.

B. Thoroughly flush main line before installing the valve.

C. Install 12 inch from hardscape areas.

3.8 VALVE BOXES

A. Install one valve box for each type of valve unless otherwise noted.

B. Install boxes 12 inches from walk or header and 12 inches apart. Short side of rectangular boxes shall be parallel to walk or header. Install 2 inches above finish grade in groundcover areas and flush with grade in lawn areas.

C. Install common bricks as shown and as required to keep box stable. Install gravel sump after compaction of all trenches.

3.9 FLOW SENSOR

A. Install flow sensor a minimum of 10 times pipe diameter upstream and 5 times pipe diameter downstream of any valves, fittings, pipe bends, etc.

B. Use only sensor cable approved by the controller manufacturer. Install cable in a separate 1 inch conduit routed to controller. Leave enough flexibility in the cable to allow for future service of sensor.

3.10 SPRINKLER HEADS AND BUBBLERS

A. Thoroughly flush lines before installing heads, drip tubing, or bubblers.

B. Locate heads and bubblers as shown in the Drawings and Detail.

C. Set sprinkler heads perpendicular to grade unless otherwise shown.

D. Adjust sprinkler heads for proper distribution and trim, providing complete coverage with minimal overspray.

3.11 SUB-SURFACE IRRIGATION

A. Install per manufacturer’s instructions.

B. Install dripline in a grid pattern 2 inch below finish grade.

C. Install manual flush valve at a point farthest away from source or along exhaust header. Install in 6 inch round valve box.

3.12 AUTOMATIC CONTROL WIRING

A. Run two wire path along mains where practical.

B. Loop a minimum of two (2) feet of extra wire in each valve box; both control wire and ground wire.

C. Connections shall be made as shown on plans.

D. Locate all splices at valve locations within valve boxes.

E. All two-wire cable shall be installed in Schedule 40 electrical PVC conduit.

3.13 AUTOMATIC CONTROLLER

A. Provide and install automatic irrigation controller in approximate locations shown on Drawings. The exact location will be determined on the site by Architect. Provide conduit and wire and connect to 120 volt switch accessible to controller for ease of maintenance.

B. Connect control lines to controller in sequential arrangement according to assigned identification number of the valve. Each control line wire shall be labeled at controller with a permanent non-fading label indicating station number of the valve controlled. Attach label to control wire.

C. Program decoders to controller in sequential arrangement according to assigned identification number of the valve. Each decoder shall be labeled indicating station numbers of the valves controlled.

D. Contractor is responsible for programming the controller. Provide optimum amounts of water for each plant type to maintain plants in vigorous healthy condition. Reprogram as required at end of maintenance period.

E. Mount controllers in existing enclosure.

F. Contact controller manufacturer for certification of the installation and purchase and activation of data service.

3.14 BACKFILLING

A. Backfill only after piping has been tested, inspected and approved.

B. Backfill material shall be the earth excavated from the trenches, free from rocks, concrete chunks, and other foreign or coarse materials.

C. A stable and uniform bedding of at least 2” shall be provided for the pipe and any protruding features of its joints and/or fittings. The middle of the bedding, equal to 1/3 of the pipe outside diameter, may be loosely packed with the remainder compacted to a minimum of 90 percent standard proctor density. Pipe bedding material shall be Class II, clean, course grained materials, such as gravel, coarse sands and gravel/sand mixtures (1 ½ inches maximum in size.)

D. All pipe under asphalt paving shall be backfilled with 4 inches of clean sand on all sides of pipe.

E. Place backfill materials in 6 inch layers and compact by jetting or tamping to a minimum compaction of 90 percent of original soil density.

F. Dress off areas to finish grades and remove excess soil, rocks or debris remaining after backfill is completed.

G. If settlement occurs along trenches, and adjustments in pipes, valves and sprinkler heads, soil, sod or paving are necessary to bring the system, soil, sod, or paving to the proper level or the permanent grade, subcontractor, as part of the work under this Contract, shall make all adjustments without extra cost to the Owner.

3.15 PIPE TESTS

A. Notify Architect at least three (3) days in advance of testing.

B. Perform testing at his own expense

C. Center load piping with a small amount of backfill to prevent arching or slipping under pressure. No fitting or joint shall be covered.

D. Do not connect remote control valves, quick couplers or any other valve assembly until testing is satisfactorily complete.

E. Apply the following tests after weld plastic pipe joints have cured at least 24 hours.
1. Test live (constant pressure) and quick coupling valve lines hydrostatically at 125 PSI minimum. Lines shall be filled with water and pressure gauge connected to the pipe line. After lines have reached the 125 PSI, (use hydraulic pump or other safe method – do not use an air compressor) cut off the source of pressure. Lines will be approved if test pressure (with an allowable drop of 2 PSI) is maintained for two (2) hours. Should leaks develop during the test period, they shall be located and repaired and retested in the same method. The subcontractor shall make tests and repairs as necessary until test conditions are met.
2. Test remote control valve controlled lines with water at line pressure and visually inspect for leaks. Retest after correcting defects.

F. Remake faulty joints with new materials. Do not use cement or caulking to seal leaks.

3.16 SYSTEM ADJUSTMENT

A. Adjust pressure regulating modules to proper and similar pressure to provide optimum and efficient coverage.

B. Adjust sprinkler heads by fully opening the sprinkler furthest from control valve. Open manual adjustment of control valve slightly to obtain a 12-inch spray at sprinkler mentioned above. After this condition has been met, adjust all other sprinklers in the section for equal height sprays, regulating the control valve as required to maintain this condition. With a pressure gauge on the sprinkler first opened, adjust control valve to obtain the catalog-rated pressure for sprinkler installed. Adjust nozzle sizes and degree of arc and install pressure compensating screens as required to cover planting areas without overspray. Adjust all sprinklers to keep spray in confines of planted area. Minimize overspray onto paving.

C. Drip System Check
   1. Immediately after installation, flush lateral line piping by opening the shut-off flush valve.
   2. Clean filter screens. Open filter flush valve for at least 10 seconds. Clean or replace clogged elements
   3. Verify that emitters are producing specified water output. If not, replace emitters, check filter element, check pressure at emitters, and review system for clogs and leaks. Correct deficiencies.

D. Spray and Bubbler Check
   1. Perform coverage test in the presence of Architect to establish that coverage of all planting areas is complete and adequate.
   2. Correct deficiencies and repeat test until approved.

3.17 GUARANTEE

A. It shall be the responsibility of subcontractor to fill and repair all depressions and replace all necessary lawn and planting due to the settlement of irrigation trenches for one year following completion and acceptance of the job.

B. The subcontractor shall also guarantee all materials, equipment and workmanship furnished by him to be free of all defects of workmanship and materials, and shall agree to replace at his expense, at any time within one year after installation is accepted, any and all defective parts that may be found.

3.18 CLEANUP

A. When work of this section has been completed, and at such other times as may be directed, remove all trash, debris, surplus materials and equipment from the site.

END OF SECTION

SECTION 32 91 13 - LANDSCAPE SOILS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide all soil and soil amendment products, topsoil, manufactured soil mixes and amendments for Site Level planting areas. Execute all labor to achieve soil production, delivery, and placement.

1. Topsoil
2. Tree Planting Mix
3. Shrub Planting Backfill
4. Amendments, Conditioners

B. Related Sections:
1. Section 32 84 00: Planting Irrigation
2. Section 32 91 19: Landscape Finish Grading
3. Section 32 93 00: Planting

1.2 REFERENCES

A. ASTM — ASTM International: D 1557 — Test method for Laboratory Compaction Characteristic of Soil Using Modified Effort.

B. EPA — Environmental Protection Agency:
1. Method 8015
2. Method 8020
3. Method 3050/3051
4. Method 6010

C. USDA — United States Department of Agriculture:
1. Texture Triangle Classification
2. Handbook No. 60

D. Soil Science Society of America
1. Methods of Soil Analysis, Part 1, Physical and Mineralogical Methods, Soil Science Society of America, Inc., 1986
2. Methods of Soil Analysis, Part 3 Chemical Methods, Soil Science Society of America, Inc 1996.

1.3 DEFINITIONS

A. Existing Soil: Area of undisturbed native soil where no rough grading is to be done. No topsoil is to be placed. Only surface cultivation and soil amending are included in this Section. See Drawings.

B. Subgrade: Soil level resulting from the rough grading work under another Section. Cultivation of all subgrade areas prior to amending is included in this section.

C. Planting Soil Mix: Proposed surface horizon of soil in planting areas that may contain a small proportion of Topsoil. If conforming, sources can include manufactured and/or imported soil mixes, amended or un-amended. Refer to PART 2 for different types.

D. Finished Grades: The soil surface grade elevations and contours indicated on the Drawings.

E. Aesthetic Acceptance of Grades: Acceptance by the Landscape Architect in writing of the aesthetic correctness of the contours as observed without a survey instrument. Aesthetic acceptance does not address whether an area drains properly, whether the areas are at the correct elevation, or whether it has been compacted properly. Refer to Finish Grading Section for Tolerances.

F. Acceptance, Acceptable, or Accepted: Acceptance by the Landscape Architect in writing.

G. Excessive Compaction in Designated No Compaction Planting Areas: Topsoil and other planting area soil compaction greater than 75 percent of maximum dry density as determined by ASTM D 1557.

H. Landscape Architect: Landscape Architect employed by the Owner to provide professional landscape architectural services for the Project.

1.4 SUBMITTALS

A. General Requirements: Refer to Division 1.

B. Product Data and physical Product Samples: Submit Manufacturer's current catalog cuts, specifications, and physical Product Samples (provided in re-sealable labeled plastic bags for the following (as applicable):
1. Planting Soil (Imported / Amended Topsoil)
2. Soil Amendments (for each type used, for Sand, Perlite, Peat Humus, Gypsum, Soil Sulfur, Iron, etc.)
3. Bulk Composted Organic Soil Amendment Material
4. Granular Soil Conditioning Material
5. Mycorrhizal Inoculum
6. Fertilizer (for each type used)
7. Herbicide
8. Filter Fabrics

1.5 SOIL QUALITY CONTROL PROGRAM

A. Testing Agency Qualifications: Agronomic Soil Fertility Analysis shall be conducted by a reputable, certified, agronomic soils laboratory. Laboratory shall be a member of the Council on Soil Testing and Plant Analysis. The same laboratory shall be used throughout the duration of the Contract:
1. Wallace Laboratories, El Segundo, CA. (310) 615-0116. No Substitutions.
2. Contractor shall verify and confirm the selected Testing Laboratory and specific locations of soil samples with the Landscape Architect prior to commencing soil sampling operations.

3. Submit the physical Samples directly to the selected Laboratory for analysis, per the procedures outlined per Part III herein this Section.
    a. In addition to the physical Soil Samples, Contractor shall also provide the Laboratory with a copy of the Soil Amendment and Fertilizer products indicated herein this Section.
4. Along with the testing data results, the Agronomic Soil Fertility Analysis shall include written recommendations by the Laboratory for amending and/or correcting the sampled soil conditions, utilizing the organic-based Soil Amendments and Fertilizer products indicated herein this Section.
    a. The Analysis shall also include Maintenance and Post-Maintenance fertilization programs for planted areas within the Contract.

B. Testing Program: The Landscape Architect and the Project Soils Consultant / Independent Testing Lab will direct and coordinate the soil quality control and testing program.

C. Testing Costs:
1. Planting Area Sub-Soil Tests shall be paid by the Owner.
2. Testing Costs for Import Topsoil and Amendments shall be paid by the Owner. If initial tests indicate non-compliance with contract document requirements, any subsequent testing shall be performed by the independent testing lab and paid for by the contractor.
3. Mix Design Verification Costs shall be paid by the Owner. If initial tests indicate non-compliance with contract document requirements, any subsequent testing shall be performed by the independent testing lab and paid for by the contractor.
4. Post Placement and Amendment Testing shall be paid for by the Owner.

D. Source Quality Control: Soil Quality Control: Coordinate the soils production, testing, delivery and placement process with the Landscape Architect and Soils Consultant prior to the initiation of soil production. Provide a soil mix production, delivery and placement schedule (utilizing project management software) detailing the rate at which soil will be mixed, delivered, conveyed and placed. Design the soil production and delivery schedule to allow adequate time for sample delivery and quality control testing prior to delivery of soil to the job site. Provide soil samples for testing as directed by the Soils Consultant/Testing Lab. The testing schedule (rate and quantity of tests) will be finalized based on the source materials and coordination of the production schedule to ensure both timely production and quality control. Refer to Product Section for testing requirements.
1. Prepare soils in sufficiently sized batches to provide for uniformity.
2. If a different batch or source of soils or amendments needs to be used, analyze representative samples of the material in order to properly characterize the material.
3. Allow sufficient amount of time when new batches or new sources are used to reformulate the preparation of soil and for quality control of the amended soils.
4. Ensure the source streams of soils and or amendments are uniform when not changing batches or sources.
5. Establish a timeline of deliveries and volumes to the job site and the components being delivered to the blending/production site.

E. Samples and Test Reports shall be required on each as follows:
1. Topsoil, Planting Soil and Amendment Tests: Provide tests for Topsoil's and Amendments as specified.

2. Planting Soil Mix Design Verification: Mix a minimum of 5 cubic yards of the specified soil mix and provide samples as directed by the Soils Consultant/Testing Lab for testing and approval. Refer to Product Section for testing requirements.
3. Post-Placement and Amendment Testing: Testing to include random sampling of in-situ material as directed by landscape architect and soils consultant as needed.

F. Contractors Responsibility:
1. General: Coordinate quality control activities to avoid delay.
2. Samples: Provide Samples as directed by the Testing Lab.
3. Access: Furnish free access to the various parts of the work and assist testing and inspection
4. Notice: Furnish notice to Owner and/or Architect and testing and inspection agency not less than 48 hours prior to any time required for such services.
5. Rejected Materials: Remove off site at Contractor's cost. Pay cost of testing of materials, not meeting Specifications.

G. Planting operations shall not commence until the results of the Agronomic Soil Fertility Analysis and Recommendations are reviewed accordingly by the Landscape Architect.

H. The Agronomic Soil Fertility Report/Recommendations shall take precedence over the amendment and fertilizer application rates specified herein or on the Contract Documents.

I. No Work shall proceed under this Section until Submittal requirements indicated herein have been reviewed accordingly by the Landscape Architect.

1.6 SITE CONDITIONS

A. Environmental Requirements:
1. Prior to Work commencement review and clearly mark in field horizontal and vertical location of existing public underground utilities and structures.
2. Do not work soil when moisture content is so great that excessive compaction will occur, or when it is so dry that dust will form in the air or clods will not break readily.

1.7 SEQUENCING

A. Provide a soil mix production, delivery and placement schedule as outlined in paragraph 1.4.

B. Soil Placement: Avoid placing topsoil in areas subject to frequent construction vehicle and equipment traffic until traffic ceases, in order to help avoid the potential for excessive compaction.

PART 2 - PRODUCTS

2.1 PLANTING AREA SUBSOIL

A. General: Provide import subsoil as required to prepare sub-grades for all planting areas.

B. Sub-Soil Material:

1. Soil Texture: Sandy loam – Loam as classified by the USDA Soil Texture Triangle classification method.
2. Deleterious Materials: The soil must be clean and free of excessive gravel, rock, and physical impurities. Free of roots, clods, and stones larger than 1 inch in the greatest dimension, pockets of coarse sand, noxious weeds, sticks, lumber, brush, and other debris.
3. Disease-causing Organisms: Free of infestation of nematodes or other undesirable disease-causing organisms such as insects and plant pathogens.

2.2 TOPSOIL - PLANTING SOIL

A. General: Planting Soil shall be friable and have sufficient structure in order to give good tilth and aeration to the soil. When amended, fertilized, and conditioned, the soil must be friable, be well drained and supportive of vigorous plant growth and contain low concentrations of inhibitory constituents. The soil must have sufficient moisture retention and nutrient retention to avoid excessive frequency of irrigation and frequency of fertilizer application.
   1. Deleterious Materials: The soil must be clean and free of excessive gravel, rock, and physical impurities. Free of roots, clods, and stones larger than 1 inch in the greatest dimension, pockets of coarse sand, noxious weeds, sticks, lumber, brush, and other debris.
   2. Disease-causing Organisms: Free of infestation of nematodes or other undesirable disease-causing organisms such as insects and plant pathogens.

B. Soil Texture: Sandy loam as classified by the USDA Soil Texture Triangle classification method.

C. Saturated Hydraulic Conductivity: Not less than 2 inches per hour, nor more than 8 inches per hour. Testing per USDA Handbook, No. 60, Method 34B or other accepted methods.

D. Water and Air Management

total pore space	>40%
air space at field capacity	>20%
water/moisture holding capacity	>20%
saturated air content % volume	>10% (Will be 0% if saturated.)

E. Chemical Characteristics
   1. Acidity: 6.0 – 7.5 soil pH range measured in the saturation extract (Method 21a, USDA Handbook No. 60).
   2. Salinity: 0.5 – 2.5 dS/m salinity range measured in the saturation extract (Method 3a, USDA Handbook No. 60).
   3. CEC capacity mill equivalents per 100 grams: > 20
   4. Chloride: 150 mg/liter (parts per million) maximum concentration of soluble chloride in the saturation extract (Method 3a, USDA Handbook No. 60).
   5. Boron: 1-mg/liter (parts per million) maximum concentration of soluble boron in the saturation extract (Method 3a, USDA Handbook No. 60).
   6. Sodium Adsorption Ratio (SAR): Maximum of 3.0 measured per Method 20b, USDA Handbook No. 60.
   7. Calcium Carbonate Content: No free calcium carbonate (limestone) present.
   8. Available Aluminum: Less than 3.0 parts per million measured with the Ammonium Bicarbonate/DPTA Extraction.

9. Heavy Metals: The maximum permissible elemental concentration in the soil shall not exceed the following:

Ammonium Bicarbonate / DTPA Extraction Parts per million (mg/kg dry-weight basis)	
Arsenic	1.0
Cadmium	1.0
Chromium	10.0
Cobalt	2.0
Lead	30.0
Mercury	1.0
Nickel	5.0
Selenium	3.0
Silver	0.5
Vanadium	3.0

If the soil pH is between 6.0 and 7.0, the maximum permissible elemental concentration shall be reduced 50 percent. If the soil pH is less than 6.0, the maximum permissible elemental concentration shall be reduced 75 percent. No more than three metals shall be present at 50 percent or more of the above values.

10. Phytotoxic Constituent, Herbicides, Hydrocarbons:
    a. Germination and growth of monocots and dicots shall not be restricted more than 10 percent.
    b. Total petroleum hydrocarbons shall not exceed 50 mg/kg dry soil measured per the modified EPA Method No. 8015.
    c. Total aromatic volatile organic hydrocarbons (benzene, toluene, xylene and ethylbenzene) shall not exceed 0.5 mg/kg dry soil measured per EPA Method No. 8020.

F. Sand: Medium sized, number 16 sand

	% passing
4 mesh	100
10 mesh	98-100
16 mesh	68-82
32 mesh	0-20
60 mesh	0-1

G. Organic Matter
1. Total Soil Organic Matter Content: Sufficient soil organic matter present to impart good physical soil properties, but not be excessive to cause toxicity or cause excessive reduction in the volume of soil due to decomposition or organic matter. The organic matter content shall be 4.0 – 7.0 percent by weight (Test) and X% - X% by volume (Test).
2. Sphagnum Peat:
    a. Medium-sized, minus 10 mesh
    b. Minimum 60% organic matter, must not be excessively hydrophobic
    c. pH 4.0 to 6.5

d. ECe less than 3 millimho/cm, minimum cation exchange capacity is 50 millimoles per 100 grams.
e. Carbon:nitrogen ratio less than 25, minimum cation exchange capacity is 50 millimoles per 100 grams

3. Compost:
a. Free of stones and debris
b. Humus material shall have an acid-soluble ash content of no less than 6% and no more than 20%.
c. The organic matter content shall be at least 50% on a dry weight basis.
d. The pH of the material shall be between 6 and 7.5.
e. The salt content shall be less than 10 millimho/cm @ 25° C. (ECe less than 10) in a saturated paste extract.
f. Boron content of the saturated extract shall be less than 1.0 part per million.
g. Silicon content (acid-insoluble ash) shall be less than 50%.
h. Calcium carbonate shall not be present if to be applied on alkaline soils.
i. Types of acceptable products are composts, manures, mushroom composts, straw, alfalfa, peat mosses etc. low in salts, low in heavy metals, free from weed seeds, free of pathogens and other deleterious materials.
j. Composted wood products are conditionally acceptable [stable humus must be present]. Wood based products are not acceptable which are based on red wood or cedar.
k. Sludge-based materials are not acceptable.
l. Carbon:nitrogen ratio is less than 20:1.
m. The compost shall be aerobic without malodorous presence of decomposition products.
n. The maximum particle size shall be 0.25 inch, 80% or more shall pass a 2-millimeter screen.
o. From 45- to 65-percent moisture measured via wet-weight basis.
p. Tests 5 to 8 on Solvita Test.
q. Maximum total permissible pollutant concentrations in amendment in parts per million on a dry weight basis:

arsenic	20	copper	150	selenium	30
cadmium	15	lead	100	silver	10
chromium	100	mercury	10	vanadium	200
cobalt	50	molybdenum	20	zinc	200
		nickel	100		

H. Fertility
1. Acceptable Fertility Range Prior to Amendment:

Ammonium Bicarbonate / DTPA Extraction Parts per million (mg/kg dry-weight basis)	
Phosphorus:	2.0 – 40.0
Potassium:	40.0 – 220.0
Iron:	2.0 – 35.0
Manganese:	0.3 – 6.0
Zinc:	0.6 – 8.0
Copper:	0.1 – 5.0

Ammonium Bicarbonate / DTPA Extraction Parts per million (mg/kg dry-weight basis)	
Boron:	0.2 – 1.0
Magnesium:	50.0 – 150.0
Sodium:	0 – 100.0
Sulfur:	25.0 – 500.0
Molybdenum:	0.1 – 2.0

2. Final Acceptable Fertility Range After Amendment:

Ammonium Bicarbonate / DTPA Extraction Parts per million (mg/kg dry-weight basis)	
Phosphorus:	10.0 – 40.0
Potassium:	100.0 – 220.0
Iron:	4.0 – 35.0
Manganese:	0.6 – 6.0
Zinc:	1.0 – 8.0
Copper:	0.3 – 5.0
Boron:	0.2 – 1.0
Magnesium:	50.0 – 150.0
Sodium:	0 – 100.0
Sulfur:	25.0 – 500.0
Molybdenum:	0.1 –2.0

2.3 POTENTIAL CHEMICAL AMENDMENTS

A. Potential Chemical Amendments Required by Accepted Amendment Program and Backfill Mix:
1. Ground Limestone: Agricultural limestone containing not less than 85 percent of total carbonate, ground to such fineness that 50 percent will pass No. l sieve and 90 percent will pass No. 20 sieve.
2. Dolomite Lime: Agricultural grade mineral soil conditioner containing 35 percent minimum magnesium carbonate and 49 percent minimum calcium carbonate, 100 percent passing No. 65 sieve.
3. Gypsum: Agricultural grade product containing 80 percent minimum calcium sulfate.
4. Iron Sulfate (Ferric or Ferrous): Supplied by a commercial fertilizer supplier, containing 20 to 30 percent iron and 35 percent to 40 percent sulfur.
5. Sulfate of Potash: Agricultural grade containing 50 to 53 percent of water-soluble potash.
6. Single Superphosphate: Commercial product containing 20 to 25 percent available phosphoric acid.
7. Triple Superphosphate: Commercial product containing 45 percent available phosphoric acid.
8. Ammonium Sulfate: Commercial product containing approximately 21 percent ammoniacal nitrogen.
9. Calcium Ammonium Nitrate: Commercial product containing approximately 17 percent nitrogen as ammoniacal and 17 percent as nitrate nitrogen.
10. Calcium Nitrate: Agricultural grade containing 15-1/2 percent nitrogen.
11. Urea Formaldehyde: Granular commercial product containing 38 percent nitrogen.
12. IBDU (Iso Butyldiene Diurea): Commercial product containing 31 percent nitrogen.

13. Soil Sulfur: Agricultural grade sulfur containing a minimum of 96 percent sulfur.
14. Silicic Acid Calcium: Commercial grade.

2.4 SOIL MIXES

A. Planting Soil and Tree Backfill
   1. 80% Sandy Loam
   2. 10% Peat Moss
   3. 10% Compost
   4. Typical Nutrient Package: Per testing recommendations.

2.5 QUALITY CONTROL TESTING

A. Summary of Agronomic Soil Fertility Analysis to Verify Chemical and Physical Characteristics
   1. Soil Texture: Determine soil texture per commonly used methods.
   2. Hydraulic Conductivity: USDA Handbook No. 60, Method 34b
   3. Acidity: pH measurement in the saturation extract per USDA Handbook No. 60, Method 21.
   4. Salinity (Electrical conductivity) of the saturation extract per USDA Handbook No. 60, Method 2.
   5. Sodium absorption ratio of the saturation extract per USDA Handbook No. 60, Method 20b.
   6. Determination of boron, calcium, copper, iron, magnesium, manganese, molybdenum, phosphorous, potassium, sodium, sulfur, and zinc, via the following test methods: Mehlich Number 3, Bray P1, Bray P2, Olsen P, DTPA, ammonium acetate, ammonium bicarbonate DTPA, and hot water extract from boron.
   7. Analysis of saturation extract for calcium, magnesium, sodium, boron, chloride, phosphorous, nitrate, potassium, and sulfate.
   8. Measurement of following trace metals by the DTPA extract: aluminum, arsenic, cadmium, chromium, cobalt, lead, lithium, nickel, selenium, silver, strontium, tin, and vanadium.
   9. Presence of calcium carbonate and magnesium carbonate.
   10. Exchangeable Ammonium cation.
   11. Base Saturation.
   12. Cation Exchange Capacity.
   13. Carbonates Determination.
   14. Organic Matter: Determine organic matter content based on organic carbon.
   15. Presence of lime.
   16. Parasitic nematodes.
   17. Herbicide contamination.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Subgrade: Verify that the subgrade is at the correct elevation and slope.

B. Underground Utilities and Structures: Verify that the locations of utilities, structures and other underground items have been clearly marked.

C. Notification of Unsuitable Conditions: Before proceeding with work, Notify the Owner's Designated Representative in writing of unsuitable conditions and conflicts.

D. Notification: Before proceeding with Work, notify the Owner's Designated Representative in writing of unsuitable conditions and conflicts.

3.2 PREPARATION

A. Protection:
1. Use every possible precaution to prevent damage to existing conditions to remain such as structures, utilities, lighting, irrigation systems, drainage systems and lightweight fill.
2. Use every possible precaution to prevent excessive compaction of planting area soil within or adjacent to the areas of Work.
3. Provide barricades, fences or other barriers to protect existing conditions to remain from damage, contamination and excessive compaction during construction.
4. Submit written notification of conditions damaged during construction to the Owner's Designated Representative immediately.

3.3 PREPARATION OF SUBGRADE TO RECEIVE IMPOPRTED SOIL MIXES

A. Ripping Subgrade Soil:
1. Prior to placing topsoil, rip areas to receive topsoil on the same day topsoil is placed.
2. Rip subgrade twice to a depth of 6 inches unless indicated otherwise.
3. Space ripping tines at 24 inches on center.
4. Make second ripping pass in a direction 90 degrees to the direction of the first ripping pass.
5. Do not rip closer than 2 feet horizontally and vertically to installed and existing utility lines and structures.

3.4 SOIL PLACEMENT

A. Location and Depths: As indicated on the Drawings.

B. Topsoil Placement:
1. Place topsoil same day that subgrade soil ripping occurs and prior to vehicle or equipment traffic running over the ripped surface.
2. Begin with low areas and place soil in lifts not to exceed 8 inches.
3. Place soil with equipment of appropriate size for area and in a manner that avoids excessive compaction of the topsoil.
4. Avoid repeatedly driving equipment in same tracks so that topsoil does not become excessively compacted.
5. Place topsoil to elevations that allow for settlement, consolidation and finish grading tolerances.
6. Place and install blended soils in such a manner as to maintain the uniformity of the mixes. If stratification or separation occurs, reblend the components prior to planting.

Provide sufficient moisture to prevent dustiness but not excessive moisture to call anaerobiosis or water logging.

3.5 TOLERANCES

A. Finish Grades: Refer to Section 32 91 19 Landscape Finish Grading.

3.6 SOIL AMENDMENTS

A. Preliminary Amendment Program to Establish Bid for Areas Within Drip Lines of Existing Trees to Remain in Planting Areas Not to Receive Topsoil: 3 cubic yards of organic amendment per 1,000 square feet, 10 pounds of granular Micromax per 1,000 square feet, 9 pounds of Nitroform 38-0-0 per thousand square feet, and 2.5 pounds of Triple Superphosphate 0-45-0 per thousand square feet.

B. Preliminary Amendment Program to Establish Bid for Areas with Imported Topsoil: 6 cubic yards of organic amendment per 1,000 square feet, 25 pounds of polymeric soil conditioner per 1,000 square feet, 40 pounds Iron Sulfate per 1,000 square feet, 20 pounds of granular Micromax per 1,000 square feet, 20 pounds of Nitroform 38-0-0 per 1,000 square feet, 10 pounds of Potassium Sulfate 0-0-50 per 1,000 square feet, and 5 pounds of Triple Superphosphate 0-45-0 per 1,000 square feet.

C. Final Amendment Programs for Installation: Determined by Soils Consultant based on soil test report results. Provide documentation of additions and deductions to soil amendment program for purposes of establishing changes to bid cost.

D. Amendment Incorporation:
1. Uniformly Spread dry amendments evenly over surface of dry soil with a drop spreader. Use grade stakes to verify depth of placement.
2. Organic amendment and soil must be dry
3. Incorporate amendments uniformly within top 6 to 8 inches of soil within a few hours after amendment application, except at areas within drip lines of existing trees to remain.
4. At areas within drip lines of existing trees to remain, incorporate amendments uniformly to 1 to 2-inch depth within a few hours after application.
5. Mechanically incorporate the amendments into the soil via a method that will not excessively compact the soil below incorporated amendments.
6. To activate polymeric conditioner, irrigate soil very slowly so that soil surface will not form a crust and until water penetrates 6-inch depth.
7. Allow soil to dry until stringiness disappears.
8. Prior to planting, re-till soil to a 6-inch depth at areas outside of drip lines of existing trees to remain and re-till soil to a 1 to 2-inch depth at areas within drip lines of existing trees to remain. Remove rocks, debris, clods, trash, etc. from depth of incorporation.

3.7 FIELD QUALITY CONTROL

A. Soil Amendment Verification:

1. Schedule Horticultural/Soil Consultant to take up to 15 random composite samples of amended soil surface areas and soil mixes for laboratory testing to verify amendment composition.
2. Submit composite samples collected by the Horticultural/Soil Consultant to the same soil testing laboratory used to test the soil as indicated in Article 3.1 E of this Section.
3. Employ the laboratory to test soil samples and submit test results to Horticultural/Soil Consultant and Landscape Architect.
4. Perform corrective work as recommended by the laboratory soil test reports if directed to do so by the Landscape Architect.
5. When a laboratory soil test indicates that the soil or soil mixes meet the requirements of the Specifications the Contractor will receive written notification of acceptance from the Landscape Architect.
6. Installation of ground cover plants and seed may commence upon Contractor's receipt of the written notification of acceptance.

3.8 PROTECTION OF TOPSOIL

A. Compaction and Contamination:
   1. In handling materials and operating tools and equipment, protect the soil from excessive compaction by laying down planks, plywood, or other accepted protective devices.
   2. Do not store or stockpile materials on the soil.
   3. Loosen excessively compacted soil to the full depth of the excessive compaction, rototill, and grade surface smooth.

3.9 REPAIR

A. Excessively Compacted Topsoil:
   1. Mechanically loosen excessively compacted topsoil to its full depth via a method acceptable to the Landscape Architect and re-grade surface smooth.
   2. Keep topsoil from being excessively compacted until date of Final Completion.

B. Erosion Repair:
   1. Repair erosion that occurs between soil installation and plant or seed installation.
   2. Fill eroded areas with soil and finish grade.

END OF SECTION

SECTION 32 91 19 - LANDSCAPE FINISH GRADING

PART 1 - GENERAL

1.2 SUMMARY

A. Section Includes: Execute finish grades complete, as shown, and as specified.

B. Related Sections:
1. Section 19 Earthwork
2. Section 32 84 00: Planting Irrigation
3. Section 32 91 13: Landscape Soils
4. Section 32 93 00: Planting
5. Section 32 94 00: Planting Accessories

1.3 PROJECT/SITE CONDITIONS

A. Dust Nuisance: Assume full responsibility for alleviation or prevention of dust as a result of grading work.

1.4 SEQUENCING AND SCHEDULING:

A. Complete all finish grading prior to installation of sprinkler irrigation systems in each area graded.

B. Re-grade as required to finish grades established by Landscape Architect once the sprinkler system is installed.

PART 2 - PRODUCTS

2. 1 NOT USED

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Verify that the following items have been completed prior to commencement of finish grading:

1. Rough Grading and sub-grade soil amendments.
2. Installation of stockpiled and import topsoil as required and soil preparation including debris removal.
3. Incorporation of soil amendments.
4. Installation of drainage and subsurface drainage.

3.2 LAYOUT

B. Lines and Elevations: The visual appearance and acceptable tolerances of the design is critically dependent upon the layout of the works. Include all costs and provide all instruments necessary to lay out the works accurately. Establish lines and elevation markers by survey instrumentation for finish grades and locations.

C. Include all costs and provide all calculations necessary to verify the subgrade, substrate and/or structural set-down elevations from the finish grades to earthwork grades. If any discrepancy is found notify the Landscape Architect in writing prior to commencement of rough grading.

D. Provide additional grade stakes and string lines as required to achieve grades and to enable field observations by the Landscape Architect. Re-instate markers/stakes as required throughout the works. The Landscape Architect may direct the layout of the more important landform elements and/or shall review the works when laid out and retains the right to adjust the layout.

3.3 FINISH GRADING

A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
   1. Provide a smooth transition between adjacent existing grades and new grades.
   2. Grade with constant slope between points where elevations are given.
   3. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
   4. Slope grades to direct water away from buildings to drains or subdrains and to prevent ponding.

3.4 TOLERANCES

A. Comply with tolerances for lawn, grass and planting areas as follows:
   1. Elevation: 1 inch.
   2. Surface smoothness: Gap below 10-foot long straightedge not to exceed 1 inch in any direction.
   3. Slope: unless otherwise noted on the Drawings not less than 1percent fall.

B. Comply with tolerances for pavement and against building areas as follows:
   1. Elevation: 1/4 inch.
   2. Surface smoothness: Gap below 10-foot- long straightedge not to exceed 1/2 inch in any direction.
   3. Slope: unless otherwise noted on the Drawings not less than 1percent fall.
   4. Hold finished grades below top of adjacent pavement, headers, curbs or walls as follows: 1 inch at lawn areas and 1-1/2 inch at groundcover areas.

3.5 ADJUSTING EXISTING UTILITY FEATURES

A. Adjust existing utility surface features to suit finish grade. Extend or reduce risers, boxes, chambers, basins and rings and reset castings, frames, grout beds, access doors, lids, covers and similar appurtenances.

3.6 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
   1. Scarify or remove and replace soil material to depth as directed by Landscape Architect.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
   1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.7 DISPOSAL

A. Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION

SECTION 32 92 00 – TURF AND GRASSES

PART 1 - GENERAL

1.2 SUMMARY

A. Work Included: Provide lawns and grasses, complete as shown and as specified.

B. Related Sections:
1. Section 32 01 90: Landscape Operation and Maintenance
2. Section 32 84 00: Planting Irrigation
3. Section 32 90 00: Planting
4. Section 32 91 13: Soil Preparation
5. Section 32 91 19: Landscape Finish Grading

1.3 SUBMITTALS

A. Product Data: Manufacturer's current catalog cuts and specifications for incorporated fertilizer.

B. Product Data: Sod

C. Certificates:
1. Certificates of inspection as required by law for transportation of each shipment of seed and sod along with invoice.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Sod:
1. Harvest and Delivery: Harvest from the source and deliver to project site within 24 hours. Deliver only as much sod as can be installed in one day's work.
2. Review: Sod not transplanted within this time period shall be reviewed prior to installation.

1.5 PROJECT/SITE CONDITIONS

A. Climate Restrictions: Do not install turf and grasses during rainy weather.

1.6 TIMING OF INSTALLATION

A. Sod
1. Immediately after finish grading and irrigation installation are accepted.

2. Allow for a 6-week establishment period prior to park opening event. Contractor shall sequence work and trades accordingly.

1.7 PERFORMANCE CRITERIA

A. Time Period: Warrant that turf and grasses shall be in a healthy and flourishing condition of active growth twelve (12) months from date of Final Acceptance.

B. Appearance: Turf and grasses shall be free of dead or dying patches, and all areas shall show foliage of a normal density, size and color.

C. Delays: Delays caused by the Contractor in completing planting operations, which extend the planting into more than one planting season, shall extend the Warranty Period correspondingly.

D. Coverage: Warrant growth and coverage of seeded planting to the effect that a minimum of 95% of the area planted shall be covered with specified planting after one growing season with no bare spots.

E. Invasive Exotic Plant Species: Invasive exotic plant species are those species classified as List A and List B species by the California Invasive Plant Council (formerly the California Exotic Pest Plant Council). By the end of the 6 month time period, absolute cover by invasive exotic plants in the seeded areas shall not exceed 10 percent of the total seed area in any 100 sf plot. Cover will be estimated by absolute cover class (<5 percent, 5-15 percent, 16-25 percent, 26-50 percent, 51-76 percent, 76-100 percent) for each species (specified and exotic).

F. Exceptions: Contractor shall not be held responsible for failures due to neglect by Owner, vandalism, or Acts of Nature during Maintenance Period. Report such conditions in writing.

1.8 MAINTENANCE: See Section 32 01 90: Landscape Operation and Maintenance.

PART 2 - PRODUCTS

2.1 SOD

A. Grass Species: As specified in Drawings.

B. Supplier: West Coast Turf, Patterson, CA 95363, Tel. (888) 893-8873

C. Prior to harvesting, mow sod to a uniform height of between 1 1/2 to 2 inches for shipment. Roll/fold sod with the soil facing out to protect the grass from damage. Ship sod sufficiently dry for transportation and handling, yet moist enough to facilitate installation.

D. Sod shall be dense, healthy, field-grown on fumigated soil.

E. Sod shall be dark green in color, free of thatch, free from diseases, weeds and harmful insects.

F. Sod shall be reasonably free of objectionable grassy and broadleaf weeds. Sod shall be considered weed free if no more than ten (10) such weeds are found per 100 sq. ft. of sod.

G. Sod shall be rejected if found to contain weeds.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
1. Grades: Verify that grades are within 1 inch plus or minus of the required finished grades. Verify that fertilization and erosion control materials have been installed in other sections. Report all variations in writing.
2. Stones, Weeds, Debris: Verify that all areas are clear of stones larger than 1 in. diameter, weeds, debris and other extraneous materials in the top 6”.

3.2 PREPARATION

A. Sod Area:
1. Refer to Section 32 91 13: Soil Preparation and Section 32 91 19: Landscape Finish Grading for soil preparation and grading.
2. Pre-Plant Fertilizer: 16-20-0, 5-6 lbs per 1000 sq. ft. The fertilizer should be lightly raked into the soil prior to sodding.

B. Excessive Soil Moisture: Do not commence work of this section when soil moisture content is so great that excessive compaction will occur.

C. Inadequate Soil Moisture: Apply water, as necessary, to bring soil to optimum moisture content for planting. Do not work soil when it is so dry that dust will form in air or that clods will not break readily.

3.4 SOD INSTALLATION

A. Sod Bed Preparation:
1. Clearing: Clear the sod surface of all debris, including dirt clods, rocks and root segments turned up.
2. Raking: Rake to level the area, making sure that the soil level is about 1" below the level of paving.
3. Rolling: Roll amended soil with 200-pound water-ballast roller. Level any low or high spots and fine-grade the area with a rake and roll again.
4. Moistening: After all unevenness in the soil surface has been corrected, lightly moisten the soil immediately prior to laying the sod.
5. Timing: Sod immediately thereafter, provided the sod bed has remained in friable condition.

B. Sodding Operations:
1. Starter Strip: Lay first row of sod in a straight line, with subsequent rows parallel to and tightly against each other. Stagger lateral joints. Do not stretch or overlap sod. Butt all joints tightly to eliminate all voids.

2. Cutting: Use a sharp knife to cut sod to fit curves.
3. Tamping and Rolling: Thoroughly tamp and roll sod to make contact with sod bed. Roll each entire section of completed sod.
4. Watering: Start watering immediately after first strips of sod is installed. Thoroughly soak sod, and then roll the sod to smooth out bumps and air pockets. Water frequently for the first 10-14 days; use enough water to saturate soil to a depth of 4”.
5. Top-Dress Fertilizer: Apply at the rate of (6) to (8) pounds per 1,000 square feet at 25 days and at 50 days after sodding.

3.5 FIELD QUALITY CONTROL

A. Satisfactory Seeded Lawn: At the end of the maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 95 percent over any 10 sq. ft. and bare spots not exceeding 3 by 3 inches.

B. Tests: Samples of materials may be taken and tested for conformity to Specifications at any time.

C. Rejected Materials: Remove rejected materials immediately from the site at Contractor's expense. Pay cost of testing of materials not meeting Specifications.

3.6 CLEANING

A. Erosion: Immediately restore eroded areas. Keep all adjacent paved surfaces cleaned of dirt, mud or stains and organic debris.

B. Upon completion of work or as directed by Owner, remove all trash, debris, surplus materials and equipment from site and legally dispose of off the project site.

END OF SECTION

SECTION 32 93 00 - PLANTING

PART 1 – GENERAL

1.1 SUMMARY

A. This section includes:
   1. Trees
   2. Shrubs, Vines
   3. Annuals, Perennials

B. Related Sections include:
   1. Section 19: Earthwork
   2. Section 32 01 90: Landscape Maintenance
   3. Section 32 84 00: Planting Irrigation
   4. Section 32 91 13: Landscape Soils
   5. Section 31 91 19: Landscape Finish Grading
   6. Section 32 94 00: Planting Accessories

1.2 REFERENCES

A. "An Annotated Checklist of Woody Ornamental Plants of California, Oregon and Washington, (Number 4091)", McClintock and Leiser, Division of Agricultural Sciences, University of California, 1979.

A. "American Standard for Nursery Stock", ANZI z.60.1-2004 Edition, American Association of Nurserymen, Inc.

1.3 SUBMITTALS

A. Certificates of Inspection: As required by law for transportation of each shipment of plants along with invoice.

B. Plant Material Photographs:
   1. Submit color photographs each of representative plants of each tree and all 15 gallon and 5-gallon plant materials as directed and required by the Landscape Architect.
   2. Include a measuring rod in each photograph to clearly indicate plant heights.

C. Plant Material Location Data: Quantities and sizes of each plant material type at each nursery or other place of growth, and address, phone number, and contact person for each nursery or other place of growth.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Do not deliver disease-infected plant materials to the site.

B. Labeling: Furnish standard products in manufacturer's standard containers bearing original labels legibly showing quantity, analysis, genus/species and name of manufacturer/grower.

C. Storage: Protect metal containers from sun during summer months with temperatures above 80 degrees F. Keep plants that cannot be planted immediately upon delivery in the shade, well-protected and well-watered.

D. Heel in and protect with burlap all B & B plant materials which cannot immediately be planted upon delivery.

E. Handling: Do not lift or handle plants by tops, stems or trunks at any time. Do not bind or handle plants with wire or rope at any time (except wrapped rootball of field dug material).

F. Anti-Desiccant: At Contractor's option, immediately before transporting, spray deciduous plant materials in full leaf or evergreens with anti-desiccant. Apply an adequate film over trunks, branches, twigs and foliage.

G. Digging: Dig B & B plants with firm, natural balls of earth of diameter not less than that recommended by USDA Standard for Nursery Stock, and of sufficient depth to include the fibrous and feeding roots. Wrap and tie as required to prevent all cracking or loss of soil from rootball.

1.5 SEQUENCING AND SCHEDULING

A. Acceptance: Do not install plant materials prior to acceptance of finish grades (and main line trenching/installation of irrigation system).
B. Coordination: Coordinate with work of other sections to insure the following sequence of events:
   1. General: Irrigation system to be installed and operable prior to installation of plant materials. Schedule hand watering of all plant materials installed prior to irrigation system.
   2. Trees in Paving: As necessary, install prior to installation of paving.
   3. Trees in Lawn: As necessary, install prior to installation of lawn.
   5. Pruning: Do not prune plant materials prior to installation and acceptance. Request review by Landscape Architect prior to pruning.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful establishment of exterior plants.
   1. Sourcing: Require an experienced plant finder whose work has resulted in successful sourcing, selection and delivery of quality plants. Hire a plant broker if necessary.
   2. Delivery Supervision: Require an experienced person who can assess the condition of the plants at the time of loading and unloading and who can resolve any disputes on site.
   3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when exterior planting is in progress.

1.7 WARRANTY

A. Warrant that all plants planted under this Contract will be healthy and in flourishing condition of active growth one (1) year from date of Final Acceptance. Similarly warrant (annuals), groundcover for a period of one (1) year from date of Final Acceptance.

B. Correct Species: Warrant that all plant materials are true to species and variety.

C. Delays: Delays caused by the Contractor in completing planting operations which extend the planting into more than one planting season shall extend the Warranty Period correspondingly.

D. Condition of Plants: Plants shall be free of dead or dying branches and branch tips, with foliage of normal density, size and color.

E. Replacements: As soon as weather conditions permit, replace, without cost to Owner all dead plants and all plants not in a vigorous, thriving condition, as determined by Landscape Architect during and at the end of Warranty Period.

F. Exclusions: Contractor shall not be held responsible for failures due to neglect by Owner, vandalism, and acts of Nature, during Warranty Period. Report such conditions.

1.8 MAINTENANCE PERIOD AND FINAL ACCEPTANCE: See Section 32 01 90 Landscape Maintenance.

1.9 REPLACEMENTS

A. Failed Materials:
1. Repair and/or replace at no cost to the Owner all plant materials exhibiting conditions which are determined as unacceptable due to workmanship by the Contractor.
2. Closely match replacements to adjacent specimens of the same species. Apply requirements of this Specification to replacements.
3. Contractor shall be held responsible for a maximum of two (2) replacements for each failed tree, shrub and vine, and same area of groundcover planting after final acceptance during warranty period.

B. Incorrect Materials:
1. During Warranty Period, replace at no cost to Owner plants revealed as being untrue to name and species.
2. Provide replacements of a size and quality to match the planted materials at the time the mistake is discovered.

PART 2 - PRODUCTS

2.1 PLANT MATERIALS

A. Plant Materials: Verify that all container stock (excluding annuals) has been grown in the containers in which delivered for at least one growing season, but not over two (2) years.

1. Growing Conditions: Plants shall be nursery-grown in accordance with good horticultural practices and AAN standards under climatic conditions similar to those of the project for at least two years unless otherwise specifically authorized.
2. Appearance: Trees shall be exceptionally heavy, symmetrical, tightly knit, and so trained or favored in development and appearance as to be superior in form for their species, with regard to number of branches, compactness and symmetry.
3. Vigor: Plants shall be sound, healthy and vigorous, well branched and densely foliated when in leaf. They shall be free of disease, insect pests, eggs, or larvae. They shall have healthy, well-developed root systems. Plants shall be free from physical damage or adverse conditions which would prevent thriving growth.

B. Condition of Root System: Samples must prove to be completely free of circling, kinked or girdling trunk surface and center roots and show no evidence of a pot-bound condition. Upon inspection by Landscape Architect at the job site, if five (5) percent or more of the plants of each species are found to contain kinked, circling or girdling roots, all plants of that species will be rejected.

C. Measurements:
1. General: Plant material shall be classified and measured according to ANSI Z60.1 standards for each type or grade of plant and stock i.e. containers, boxes, B&B.
2. Size Range: Caliper, height, Spread, branch height, shall meet ANSI standard for container or box size. If a range of size is given, do not use plant materials less than the minimum size. The measurements specified are the minimum size acceptable and are the measurements after pruning, where pruning is required. Plants that meet the measurements specified, but do not possess a normal balance between height and spread shall be rejected.
3. Substitutions: Substituted plants shall be true to species and variety and shall conform to measurements specified except that plants larger than specified may be used if accepted. Use of such plants shall not increase Contract price. If larger plants are accepted, increase the ball of earth in proportion to the size of the plant. Plants overgrown for their container size will be rejected.

D. Unacceptable Trees: Trees which have damaged or crooked leaders will be rejected. Trees having a main leader shall not have been headed back. Trees with abrasions of the bark, sunscalds, disfiguring knots, or fresh cuts of limbs over 3/4 in. which have not completely callused, will be rejected.

E. Pruning: Do not prune plants before delivery. Consult Landscape Architect for pruning after installation.

F. Field Dug Stock: Prior to digging of field grown plant materials, insure that excess loose fill resulting from cultivation around stems and over roots be removed down to natural finish grade at crown of plant materials. During digging, verify that size of tree spade or other equipment is adequate to encompass the actively-growing root zone of all plants. Plants which, after digging, show mostly large fleshy roots and few fibrous roots will be rejected.

2.2 SOIL MIXES

A. Planting Soil Mixes: As required by Section 32 91 13 Landscape Soils.

2.3 Commercial Fertilizers:

A. Slow-release Fertilizer Tablet: "Agriform" 21 gram tablets with 20-10-5 (N-P-K) by Sierra Chemical Co., (408) 263-8080.

2.4 WATER

A. Clean, fresh and potable.

B. Transport as required.

2.5 ANTI-DESSICANT/TRANSPIRANT

A. Type: Sprayable, water-soluble pine oil complex that will produce a moisture-retarding barrier not removable by rain (or snow).

B. Product: "Wilt-Pruf" by Wilt-Pruf Products, Inc., Greenwich, CT.

2.6 SOURCE QUALITY CONTROL

A. Advanced Tree and Shrub and Ornamental Grass Procurement:
   1. Within 90 days of award of Contract, notify Landscape Architect in writing of the availability or lack thereof of the specified plant material.
   2. Procure trees and all 15 gallon and 5 gallon plant materials and arrange for contract growing as required to ensure that plant material is available in the quantities and sizes specified, and of the quality specified, at time of installation.
   3. Note that the construction schedule will allow ample time for contract growing of required. Substitutions for plant materials shall be provided as part of the plant material location submittal.
   4. Verify plant branching requirements with Landscape Architect prior to contract growing.
   5. Landscape Architect will review advanced procured trees prior to initial purchase and at end of the first growing season.
   6. Prior to delivery of advanced procured plant material to site, coordinate and schedule a final review of the plant material at the place of growth.
   7. Review and acceptance of the advance-procured plant material at the place of growth does not cancel the right of the Landscape Architect to reject plant material at the site, if damage or unacceptable conditions are found that were not detected at the place of growth.
   8. Allowance for losses: Grow additional plants to ensure that the contract quantities shall be achieved after normal production losses from natural causes, breakage, natural random non-conformities, transplant shock and/or delivery damage. Replace any plants that are damaged, fail or are rejected.

B. Specimen Tree Sourcing: Source specimen's from qualified specimen tree nurseries with experience digging and preparing large trees for transplant.

C. Groundcovers and Perennials: No source review required. If contractor requires source review, submit a written request for review of selection of materials quantity at place of growth at least (thirty (30) days after award of contract) (sixty (60) calendar days prior to shipment to site (digging). Otherwise, submit representative photographs for each plant type and deliver plant material meeting specifications to installation site for review and approval by Landscape Architect. Owner reserves the right to reject material after delivery to site.

D. Plant Material Review and Tagging:
   1. Coordinate with the Landscape on the schedule of plant tagging and which plant material shall by tagged by the Landscape Architect.
   2. At the discretion of the landscape architect trees will be reviewed, photographed and tagged at the nursery or other place of growth prior to delivery of trees to site.
   3. At the Landscape Architect's discretion, shrubs may or may not be reviewed, photographed, and tagged by the Landscape Architect at the nursery or other place of growth.
   4. Tagging of plant material at the nursery or place of growth does not affect the right of the Landscape Architect to reject plant material at the site, if damage or unacceptable conditions are found that were not detected at the nursery or place of growth, or in the submitted photographs.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
   1. Finish Grades: Finish grades for planting areas shall have been established per Section 31 91 19 Landscape Finish Grading. Verify that all grades are within 1 in. plus or minus of required finish grade prior to installation of any plant material.
   2. Landscape Soils: Do not commence planting work prior to completion and acceptance of soil preparation.
   3. Irrigation: Verify that irrigation system has been installed and accepted.

3.2 PREPARATION

A. Pre-installation Conference: Conduct conference at Project site

B. Layout and Staking: Lay out plants at locations shown on Drawings. Use 3-ft. lath, color-coded for each species of plant material. Stake each tree, not specifically located by dimension or alignment. Outline shrub and groundcover beds with lime.

C. Review: Locations of plants shall be checked in the field, adjusted to exact position and subject to review and acceptance by Landscape Architect before planting begins. Right is reserved to refuse review at this time if, in the Landscape Architect's opinion, an insufficient quantity of plants is available, or if quality of plants made available is not acceptable per specifications.

D. Digging Plant Pits: Dig tree pits and scarify all sides of the tree pit after excavation - see below. Do not use an auger or tree spade.

E. Containerized Plant Pits: Excavate square plant pits as follows:

	Width	Depth
Boxed Trees	Twice size of Rootball	Box
Canned Trees	Twice size of Rootball	Container
Container Shrubs & Vines	Twice size of Rootball	Container

F. Ball and Burlap Plant Pits: Excavate square plant pits as follows;

	Width	Depth
Trees	Twice size of Rootball	Ball
Shrubs (and Vines)	Ball + 12 in.	Ball
Groundcover Beds	As required	24 inches (per detail)

3.3 DRAINAGE TEST OF PLANT PITS/OBSTRUCTIONS

A. Drainage Testing: Immediately after completion of excavation, test drainage of plant pits by filling with water twice in succession. Give written notification of conditions permitting the retention of water in plant pits for more than twenty-four (24) hours.

B. Drainage Correction: To improve drainage install underdrains as per planting details. Credit: Provide the Owner a credit for under drainage included in Bid, but not required or installed. Underdrains shall be measured by number of pits and linear feet required.

C. Obstructions: If rock, underground construction work, tree roots or other obstructions are encountered in the excavation of plant pits, acceptable alternate locations may be used at direction of Landscape Architect.

3.4 TREE AND SHRUB PLANTING

A. Handling and De-potting of Plant Materials:
   1. Damage: Avoid damage to containers and rootballs. If rootball is cracked or broken during handling and de-potting, plant will be rejected. Do not remove plant from container prior to completion of plant pit preparation.
   2. Container Trees and Shrubs: Metal Containers: Cut can on two sides with accepted cutting tool. Do not use spade. Plastic Containers: Tip container to horizontal orientation and shake carefully to remove shrub. Support rootball during installation to prevent cracking or shedding of soil.
   3. Boxed Trees: Lift from bottom with forklift or from sides with 2 in. x 4 in. rails nailed to each side of box. Do not remove box prior to settling tree in plant pit. Remove sides of box after acceptance by Landscape Architect and prior to backfilling. Bottom of box may be left in place.

4. Balled and Burlapped Plants: Lift and carry by bottom of ball only. Do not remove wrapping until plant is set in plant pit. Cut all wire and peel wire and burlap away from upper 1/3 of rootball prior to backfilling.

B. Installation:
1. Scarification:
   a. Plant Rootball: After removing plant from container, scarify the sides of the rootball to a depth of 1 in. at four to six equally-spaced locations around the perimeter of the ball or at 12 in. intervals on sides of boxed materials. Cut and remove circling roots over 3/8 in. diameter.
   b. Plant Pit: Scarify sides of plant pit, thoroughly breaking up surfaces and eliminating "glazed" areas.
2. Positioning: Backfill plant pit to allow setting crown of tree 2 in. above new finish grade and crown of shrub 1 in. above finish grade. Thoroughly foot tamp all backfill. Position plant in planting pit, maintaining plumb condition. Maintain throughout all planting operations.
3. Backfilling:
   a. Use backfill mix to backfill plant pits as shown on Drawings. Use lightweight permeable planting soil mix to backfill on-structure plant pits. Brace each plant plumb and rigidly in position until planting soil has been tamped solidly around the ball and roots.
   b. When plant pits have been backfilled approximately 2/3 full, water thoroughly and saturate rootball, before installing remainder of the backfill mix to top of pit, eliminating all air pockets.
4. Slow-release Fertilizer Tablets: Place evenly distributed in plant pits when backfilled 2/3 according to the following schedule or per Manufacturer's latest specifications.

   (Container stock)

1 gallon can - 2 tablets	24 in. box - 8 tablets
5 gallon can - 4 tablets	36 in. box - 10 tablets
15 gallon can - 6 tablets	48 in. box - 12 tablets

   (B & B stock)
   1 tablet per 1/2 in. caliper or
   1 ft. of height, whichever is less

D. Watering: Immediately water all plants after completion of planting operations.

3.5 PRUNING: See Section 32 01 90 Landscape Maintenance

3.6 GROUNDCOVER PLANTING

A. Space planting in even triangular spacing pattern at spacing indicated in plant schedule.

B. Top-dress Fertilizer: Apply at the rate of 5 pounds per 1,000 square feet immediately after completion of planting.

C. Watering: Immediately water groundcover areas after fertilizer application to wash fertilizers from leaves of plants.

3.7 FINISH GRADING

A. Refer to Section 31 91 19 Landscape Finish Grading

END OF SECTION

SECTION 32 94 00 - PLANTING ACCESSORIES

PART 1 – GENERAL

1.1 SUMMARY

A. This section includes:
1. Tree Stakes
2. Wood Chip Mulch
3. Gravel Mulch
4. Planting Area Edge Restraints
5. Geotextile Fabric

B. Related Sections include:
1. Section 19: Earthwork
2. Section 32 01 90: Landscape Maintenance
3. Section 32 84 00: Planting Irrigation
4. Section 32 91 13 : Landscape Soils
5. Section 31 91 19: Landscape Finish Grading
6. Section 32 93 00 : Planting

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):

ASTM A 53	Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless.
ASTM A123	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
ASTM A1011	Standard Specification for Steel Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High Strength Low-Alloy with Improved Formability, and Ultra High Strength.
ASTM D 2729	Standard Specification for Polyvinyl Chloride (PVC) Sewer Pipe and Fittings.
ASTM D 3034	Standard Specification for Type PSM PVC Sewer Pipe and Fittings.

1.3 SUBMITTALS

A. Product Data: Manufacturer's current catalog cuts and specifications of the following:

1. Mulch and fertilizer tablets.
2. Tree staking and strapping.

B. Samples:
1. Organic Mulch: 1/2 gal. bag, each type.
2. Crushed Rock Mulch: 1/2 gal. bag, each type.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver all products and specified component parts to project site in appropriate protective packaging as furnished by manufacturer. Packaging for each unit shall be clearly labeled.

B. Store units at project site to prevent exposure to weathering, vandalism or damage from work of other trades. Damaged materials will be rejected. Remove all damaged materials from the job site immediately, and replace at no cost to the Owner.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful establishment of exterior plants.
   1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when exterior planting is in progress.
   2. Specifications for products that include manufacturer's written instructions are described in this Section for Contractor's convenience. Actual components and installation instructions shall be based on the most currently available manufacturer's product literature, unless otherwise noted.

1.6 MAINTENANCE PERIOD AND FINAL ACCEPTANCE

A. Refer to Section 32 01 90 Landscape Maintenance for maintenance of landscape accessory items during the landscape maintenance period.

1.7 REPLACEMENTS

A. Failed Materials:
   1. Repair and/or replace at no cost to the Owner all planting accessory materials exhibiting conditions which are determined as unacceptable due to workmanship by the Contractor.

PART 2 - PRODUCTS

2.1 TREE STAKES: Untreated Lodgepole Pine. Length as specified in drawings.

2.2 WOOD CHIP MULCH

A. Type: Lyngso Wood Chip mulch free of sticks, dirt, dust and other debris; as supplied by Lyngso Garden Materials, Inc., (650) 364.1730.
   1. Size: medium chip 1/2 inch to 1 inch in size.

2.3 GRAVEL MULCH

A. General:
   1. Free from clay lumps, organic matter, and deleterious material.
   2. Use only a single supply source for the entire quantity required.
   3. Supplier: Lyngso Garden Materials, Inc., www.lyngsogarden.com (650) 364-1730.

B. Gravel Mulch: 3/8” Crushed Black Basalt.

2.4 GEOTEXTILE FABRIC

A. Needle-punched nonwoven geotextile composed of polypropylene fibers
1. TenCate Geosynthetics Inc., www.tencate.com, Ph. (888) 795-0808, Model No. Mirafi 1100N.
2. Propex Operating Company, LLC, http://propexglobal.com/, Ph. (800) 621-1273, Model No. GEOTEX 1001 Nonwoven geotextiles.
3. Stainless steel staples, as recommended by Manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
1. Finish Grades: Finish grades for planting areas shall have been established per Section 31 22 19 Landscape Finish Grading. Verify that all grades are within 1 in. plus or minus of required finish grade prior to installation of any plant material.
2. Landscape Soils: Do not commence planting work prior to completion and acceptance of soil preparation.
3. Irrigation: Verify that irrigation system has been installed and accepted.

3.2 STAKING

A. General:
1. Trees shall be able to stand upright without support and shall return to the vertical after their tops have been deflected horizontally and released. Stake or guy trees which do not meet this qualification.
2. Trees shall remain plumb and straight from installation through the warranty period.

B. Staking: Stake according to drawings.
1. Locate stakes as detailed in the Drawings, perpendicular to prevailing wind and as close to the main trunk as is practical, avoiding root injury. Drive stakes at least 36 in. into firm ground.
2. Remove nursery-supplied stake and tie to new stakes using two tree ties. Find proper height for point of tree ties and attach as follows:
    a. Hold trunk in one hand, pull top to one side and release. Height at which trunk will snap back to upright position while hand-held is Base Height. Attach tree ties to trunk 6 in. above Base Height.
    b. If trunk is too "whippy" to support tree plumb, use auxiliary stake as follows:
        1) Attach auxiliary stake as required to support trunk. Extend stake 30 in. below finish grade up to a point no closer than 24 in. from top of leader.
        2) Round and wrap the ends of the stake with friction tape. Attach stake to trunk with 1 in. wide vinyl or polyethylene tape at 10 in. to 15 in. intervals.

3.3 MULCH

A. Install to lines and levels as indicated in the Drawings.

3.4 GEOSYNTHETIC FABRIC

A. Install in accordance with manufacturer's instructions and as shown in the Drawings.

3.6 FINISH GRADING

A. Refer to Section 31 91 19 Landscape Finish Grading

END OF SECTION

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