

**Agreement for Proposition 39 Energy Expenditure Plan (EEP)  
Solar Photovoltaic Design-Build Services**

This AGREEMENT FOR PROPOSITION 39 ENERGY EXPENDITURE PLAN (EEP) SOLAR PHOTOVOLTAIC DESIGN-BUILD SERVICES ("Agreement" or "Contract") is made as of May 13, 2019, by and between the SAN RAFAEL CITY SCHOOLS, a California public school district ("District"), and STE Electric dba Solar Technologies, a California corporation registered to do business in California ("Contractor").

**RECITALS**

**WHEREAS**, the District is preparing an amendment to an approved Proposition 39 Energy Expenditure Plan ("EEP") for energy efficiency measures to change the location for two (of two) Solar Photovoltaic project to be the Glenwood Elementary School and San Pedro Elementary School; and Solar Photovoltaic Projects will be constructed at two (2) school sites (collectively, the "Project Sites"). A copy of the amended EEP is attached hereto as **Exhibit "A"** and incorporated herein; and

**WHEREAS**, District desires to reduce its facilities' energy costs at the Project Sites and improve the Project Sites' facilities' energy quality, reliability, and efficiency by contracting to implement energy efficiency measures identified in the EEP and/or, subject to CEC approval, modified energy efficiency measures that enhance the District's energy and cost savings; and

**WHEREAS**, Contractor is a full-service design-build energy services firm with the technical capabilities to provide services to the District, including, but not limited to, EEP and energy efficiency consultation services, energy and energy system engineering, design, procurement, construction management, installation, construction, commissioning, training, monitoring, measurement and verification, and audit compliance services; and

**WHEREAS**, pursuant to Section 26235, subdivision (c), of the California Public Resources Code, the District shall not use a sole source process to award Proposition 39 funds; and

**WHEREAS**, Government Code section 4217.12 authorizes a public agency to enter into an energy service contract with respect to an energy conservation facility on terms that the public agency's governing board determines are in the best interests of the public agency and if the governing board finds that the anticipated cost to the public agency for the energy provided by the energy conservation facility will be less than the anticipated marginal cost to the District of thermal, electrical or other energy that would have been consumed by the public agency in the absence of those purchases;

**WHEREAS**, the District is a public agency under the provision of Government Code section 4217.10 *et seq.* pertaining to energy service contracts; and

**WHEREAS**, the District has engaged in a process to select a qualified full-service design-build energy services firm based on several criteria, including, without limitation, firm qualifications and financial viability, experience working on energy efficiency projects and with school districts, and proposed scope of work and price; and

**WHEREAS**, the Parties intend to enter into this agreement as provided under those statutory guidelines; and

**WHEREAS**, Solar Technologies, a California Corporation registered to do business in California, was selected by the District by means of responses to the Request for Proposals ("RFP") for Solar Photovoltaic Project (RFP #19-04), dated March 25, 2019.

NOW THEREFORE, in consideration of the mutual covenants set forth herein, Contractor and the District each agree to the following:

### **AGREEMENT**

- 1. Services.** Contractor shall furnish to the District the labor, equipment, material, and services as described in the Contract Documents, defined below in Section 6, including but not limited to **Exhibit "A"** ("EEP"), **Exhibit "B"** ("System Descriptions"), **Exhibit "C"** ("Scope of Work"), **Exhibit "D"** ("Criteria and Codes"), **Exhibit "E"** ("Special Conditions"), **Exhibit "F"** ("Submittals & Project Acceptance"), **Exhibit "G"** ("Site Details"), **Exhibit "H"** ("Specifications"), **Exhibit "I"** ("Education Program Provided") (collectively, "Services" or "Work"), and **Exhibit "K"** ("Contractor Workmanship Warranty").
- 2.** In the event of a conflict or ambiguity relating to the system, the scope of Work, or District or Contractor's obligations under this Agreement, the language of this Agreement, including Exhibits hereto, shall control, then the language of the District's RFP #19-04, dated March 25, 2019.

**2.1.** The Work will be performed at the following locations:

- Glenwood Elementary School, 25 W Castlewood Dr, San Rafael CA 94901
- San Pedro Elementary School, 498 Point San Pedro, San Rafael, CA 94901

Each location is referenced as a "Site" and collectively, "Sites" and the systems to be installed at the Sites are collectively referenced as "System."

### **3. Term and Critical Dates.**

**3.1.** Contractor shall commence providing Services under this Agreement upon the District's issuance of a Notice to Proceed with Design Services, and will diligently perform such Services as required and will achieve "Final Completion" of the Work no later than April 30, 2020 for Project Sites.

**3.1.1.** "Final Completion" occurs when all Work has been completed to the satisfaction of the District. The Work may only be accepted as complete by action of the governing board of the District.

**3.1.1.1.** District, at its sole option, may accept completion of the Contract and have the Notice of Completion recorded when the entire Work shall have been completed to the satisfaction of the District, except for minor corrective items, as distinguished from incomplete items.

**3.1.1.2.** If Contractor fails to complete all minor corrective items within five (5) days of the date of the District's acceptance of completion, District shall withhold from the final payment one hundred fifty percent (150%) of an estimate of the amount sufficient to complete the corrective items, as determined by the District until the item(s) are corrected.

**3.1.1.3.** At the end of the 5-day period, if there are any items remaining to be corrected, District may elect to proceed as provided herein related to adjustments to Contract Price and/or District's right to perform the Work of the Contractor.

### **3.2. Critical Dates**

**3.2.1.** Contractor shall conclude all "Completion of Disruptive Activities" no later than March 6, 2020.

**3.2.1.1.** "Completion of Disruptive Activities" means: (a) that all Site access and Work which would unduly disrupt, delay, or prevent students' and staff's ability to get to and from school and/or into and out of classrooms; or (b) which would disturb or interfere with the educational programs or other activities onsite by distraction or noise or environmental pollution; or (c) which would jeopardize the safety of the students or staff, are wholly completed. Examples of Disruptive Activities include, but are not limited to underground work, demolition work, backfill, compaction, paving and striping, erection of canopy structures, and physical installation of modules.

**3.2.2.** Contractor shall achieve "PTO Ready" status no later than March 31, 2020.

**3.2.2.1.** "PTO Ready" status means: (a) that the Work is wholly installed and operational such that all requirements for Permission to Operate ("PTO") from the local utility company have been completed; (b) Contractor's heavy equipment and vehicles are no longer on-site; (c) DSA has provided sign off on the Work sufficient to achieve PTO; and (d) that PTO has been formally requested from the local utility company. PTO Ready state does not constitute Final Completion, acceptance, or beneficial use or occupancy.

**3.2.3.** Contractor shall achieve a "Commercial Operation Date" no later than April 30, 2020, assuming the local utility company grants PTO within 30 days of Contractor's initial request.

"Commercial Operation Date" ("COD") means the date when the Work and the System: is commissioned and wholly operational, having received PTO from the local utility company, and is capable of being commercially operated. COD shall not constitute Final Completion, acceptance, or beneficial use or occupancy.

**4. Liquidated Damages.** Time is of the essence for all Work under this Agreement. It is hereby understood and agreed that it is and will be difficult and/or impossible to ascertain and determine the actual damage that the District will sustain in the event of and by reason of Contractor's delay; therefore, Contractor agrees that it shall pay to the District the sum of Ten Dollars (\$10) per kilowatt direct current incomplete per day per day as liquidated damages for each and every day's delay beyond the Critical Dates outlined in Section 3 are not achieved. Such Liquidated Damages shall be the sole measure of damages due to solely to delay.

It is hereby understood and agreed that this amount is not a penalty.

In the event any portion of the liquidated damages is not paid to the District, the District may deduct that amount from any money due or that may become due the Contractor under this Agreement, the District may seek recovery of Liquidated Damages from the

Contractor's Performance Bond Surety and/or the District may seek recovery of Liquidated Damages from the Contractor or the Performance Bond Surety without having exhausted remedies against the other.

- 5. Proposition 39 Compliance.** Contractor shall use commercially reasonable efforts to support and assist the District in finalizing the District's Proposition 39 grant requirements, including providing pertinent information for any post-project reporting activities.
- 6. Contract Documents.** The following documents comprise the "Contract Documents" for the Work under this Agreement:

<input checked="" type="checkbox"/> Signed Agreement	<input checked="" type="checkbox"/> Plans
<input checked="" type="checkbox"/> Request for Qualifications/Proposals and all addenda	<input checked="" type="checkbox"/> Project Schedule
<input checked="" type="checkbox"/> Contractor Proposal in response to RFQ/P	<input checked="" type="checkbox"/> Exhibit "A" ("CEC Approved EEP")
<input checked="" type="checkbox"/> Notices to Proceed	<input checked="" type="checkbox"/> Exhibit "B" ("System Descriptions")
<input checked="" type="checkbox"/> Prevailing Wage Certification	<input checked="" type="checkbox"/> Exhibit "C" ("Scope of Work")
<input checked="" type="checkbox"/> Workers' Compensation Certification	<input checked="" type="checkbox"/> Exhibit "D" ("Criteria and Codes")
<input checked="" type="checkbox"/> Drug-Free Workplace Certification	<input checked="" type="checkbox"/> Exhibit "E" ("Special Conditions")
<input checked="" type="checkbox"/> Tobacco-Free Environment Certification	<input checked="" type="checkbox"/> Exhibit "F" ("Submittals & Project Acceptance")
<input checked="" type="checkbox"/> Fingerprinting/Criminal Background Investigation Certification	<input checked="" type="checkbox"/> Exhibit "G" ("Site Details")
<input checked="" type="checkbox"/> Asbestos & Other Hazardous Materials Certification	<input checked="" type="checkbox"/> Exhibit "H" ("Specifications")
<input checked="" type="checkbox"/> Lead-Product(s) Certification	<input checked="" type="checkbox"/> Exhibit "I" ("Education Program Provided")
<input checked="" type="checkbox"/> Iran Contracting Act Certification	<input checked="" type="checkbox"/> Exhibit "J" ("Registered Subcontractors List")
<input checked="" type="checkbox"/> Insurance Certificates and Endorsements	<input checked="" type="checkbox"/> Exhibit "K" ("Contractor Workmanship Warranty")
<input checked="" type="checkbox"/> Performance Bond	
<input checked="" type="checkbox"/> Payment Bond	

The complete Agreement consists of all Contract Documents as defined above and incorporated herein by this reference. Any and all obligations of the District and Contractor are fully set forth and described in the Contract Documents. All Contract Documents are intended to cooperate so that any Work called for in one and not mentioned in the other or vice versa is to be executed the same as if mentioned in all Contract Documents.

Should any question arise concerning the intent or meaning of Contract Documents, including the Drawings or Specifications, the question shall be submitted to the District for interpretation. If a conflict exists in the Contract Documents, modifications, beginning with the most recent, shall control over this Agreement (if any). In no case shall a document calling for lower quality and/or quantity material or workmanship control. The decision of the District in the matter shall be final.

- 7. Submittal of Contract Documents.** Those documents identified in the Notice of Award shall be presented to the District for approval within ten (10) business days after execution of the Agreement. Contractor shall not commence the Work under this Agreement until the Contractor has submitted and the District has approved the performance bond, payment (labor and material) bond, the certificate(s) and affidavit(s), and the endorsement(s) of insurance required and the District issues the Notice to Proceed with Services.
- 8. Project Inspector.** The project inspector on the Project is to be determined by District ("Project Inspector"). Contractor hereby acknowledges that the Construction Manager, the Project Inspector, and the Division of the State Architect have authority to approve and/or stop Work if the Contractor's Work does not comply with the requirements of the Contract Documents, Title 24 of the California Code of Regulations, and all applicable laws. No work shall be carried on except with the knowledge and under the inspection of said Project Inspector. Project Inspector shall have free access to any or all parts of work at any time. Contractor shall furnish Project Inspector reasonable opportunities for obtaining such information as may be necessary to keep Project Inspector fully informed respecting progress, manner of work, and character of materials. The Contractor shall be liable for any delay caused by its non-compliant Work or its failure to provide proper notification for inspection.
- 9.** Inspection and acceptance of the Work shall be performed by Dr. Daniel Zaich, upon the recommendation of the District Project Consultant, and Inspector of Record.
- 10.Compensation.** As compensation for the Work, the District shall pay to the Contractor an amount not to exceed **Seven Hundred Eighty-Eight Thousand, One Hundred and Twenty Dollars (\$788,120)** ("Total Contract Price") allocated by Project Site as follows:

<b>Project Site</b>	<b>Site-Specific Compensation Not To Exceed</b>
Glenwood Elementary School 25 W Castlewood Dr. San Rafael, CA 94901	<b>Three Hundred Fifty-Seven Thousand, Four Hundred and Ninety-One Dollars (\$357,491)</b>
San Pedro Elementary School 498 Point San Pedro Road San Rafael, CA 94901	<b>Four Hundred Thirty Thousand, Six Hundred and Twenty-Nine Dollars (\$430,629)</b>

- 10.1.** The Total Contract Price and Site-Specific Compensation shall not be increased without the express approval of the District's governing board.
- 11.Expenses.** District shall not be liable to Contractor for any costs or expenses paid or incurred by Contractor in performing Services for District.
- 12.Payment.** On a monthly basis, Contractor shall submit an application for payment based upon the estimated value for materials delivered or services performed under the Agreement as of the date of submission pursuant to a separate schedule of values to be agreed upon by the Parties for each Project Site ("Application for Payment"); each Payment Application shall include a separate schedule of values for each Project Site and site-specific backup documentation necessary to substantiate the total amount claimed in the Payment Application. Within thirty (30) days after District's approval of the Application

for Payment, Contractor shall be paid a sum equal to ninety-five percent (95%) of the value of the Work performed (as verified by the District's designated representative and Inspector and certified by Contractor) up to the last day of the previous month, less the aggregate of previous payments and amount to be withheld. The District may deduct from any payment an amount necessary to protect the District from loss because of: (a) any sums expended by the District in performing any of Contractor's obligations under the Agreement which Contractor has failed to perform or has performed inadequately; (b) defective Work not remedied; (c) stop payment notices as allowed by state law; (d) reasonable doubt that the Work can be completed for the unpaid balance of the Total Contract Price or by the scheduled completion date; (e) unsatisfactory prosecution of the Work by Contractor; (f) unauthorized deviations from the Agreement; (g) failure of the Contractor to maintain or submit on a timely basis proper and sufficient documentation as required by the Agreement or by the District during the prosecution of the Work; (h) erroneous or false estimates by the Contractor of the value of the Work performed; (i) cost of purchasing additional insurance due to Contractor's failure to maintain the required insurance coverage set forth herein; (j) any sums representing expenses, losses, or damages, as reasonably determined by the District, incurred by the District for which Contractor is liable under the Agreement; and (k) any other sums which the District is entitled to recover from Contractor under the terms of the Agreement or pursuant to state law, including section 1727 of the Labor Code. The failure by the District to deduct any of these sums from a progress payment shall not constitute a waiver of the District's right to such sums. The District shall retain 5% from all amounts owing as retention. Retention shall be paid pursuant to Public Contract Code sections 7107, 7200 and 7201.

**12.1. Final Payment.** Upon receipt and approval of a valid and final Application for Payment, the District will issue a final Certificate of Payment. The District shall thereupon jointly inspect the Work and either accept the Work as complete or notify Contractor in writing of reasons why the Work is not complete. Upon acceptance of the Work of the Contractor as fully complete by the Governing Board of the District (that, absent unusual circumstances, will occur when the Punch List items have been satisfactorily completed), the District shall record a Notice of Completion with the County Recorder, and the Contractor shall, upon receipt of final payment from the District, pay the amount due Subcontractors.

**12.2. Prerequisites for Final Payment**

The following conditions must be fulfilled prior to Final Payment:

**12.2.1.** A full release of all Stop Payment Notices served in connection with the Work shall be submitted by Contractor.

**12.2.2.** A duly completed and executed conditional waiver and release upon final payment compliant with Civil Code section 8136, from the Contractor and each subcontractor of any tier and supplier to be paid from the final payment.

**12.2.3.** A duly completed and executed unconditional waiver and release upon progress payment compliant with Civil Code section 8134, from the Contractor and each subcontractor of any tier and supplier that was paid from the previous progress payments.

**12.2.4.** A duly completed and executed "AGREEMENT AND RELEASE OF ANY AND ALL CLAIMS" from the Contractor on the form provided by District.

- 12.2.5.** The Contractor shall have made all corrections to the Work that are required to remedy any defects therein, to obtain compliance with the Contract Documents or any requirements of applicable codes and ordinances, or to fulfill any of the orders or directions of District required under the Contract Documents.
- 12.2.6.** Each Subcontractor shall have delivered to the Contractor all written guarantees, warranties, applications, and bonds required by the Contract Documents for its portion of the Work.
- 12.2.7.** Contractor must have completed all requirements set forth in this Agreement and the exhibits hereto, including without limitation, Exhibit C and Exhibit F.
- 12.2.8.** District or its authorized representative shall have issued its written approval that final payment can be made.
- 12.2.9.** The Contractor shall have delivered to the District all manuals and materials required by the Contract Documents, which must be approved by the District.
- 12.2.10.** The Contractor shall have completed final clean-up as provided herein.

**12.3. Retention**

- 12.3.1.** The retention, less any amounts disputed by the District or that the District has the right to withhold pursuant to provisions herein, shall be paid:
- 12.3.1.1.** After approval by the District or its authorized representative of the Application and Certificate of Payment,
- 12.3.1.2.** After the satisfaction of the conditions set forth herein, and
- 12.3.1.3.** After forty-five (45) days after the recording of the Notice of Completion by District.
- 12.3.2.** No interest shall be paid on any retention, or on any amounts withheld due to a failure of the Contractor to perform, in accordance with the terms and conditions of the Contract Documents, except as provided to the contrary in any Escrow Agreement between the District and the Contractor pursuant to Public Contract Code section 22300.

**13.Independent Contractor.** Contractor, in the performance of this Agreement, shall be and act as an independent contractor. Contractor understands and agrees that he and all of his employees shall not be considered officers, employees, agents, partner, or joint venture of the District, and are not entitled to benefits of any kind or nature normally provided employees of the District and/or to which District's employees are normally entitled, including, but not limited to, State Unemployment Compensation or Worker's Compensation. Contractor shall assume full responsibility for payment of all federal, state and local taxes or contributions, including unemployment insurance, social security and income taxes with respect to Contractor's employees. Contractor shall be liable for its own actions, including its negligence or gross negligence, and shall be liable for the acts, omissions, or errors of its agents or employees.

**14.Licensing.** Contractor certifies that the design professional is properly certified or licensed under the laws and regulations of the State of California to provide the professional services that it has herein agreed to perform. Contractor and all Subcontractors shall be properly licensed and regulated by the Contractors State License Board, 3132 Bradshaw Road, Post Office Box 2600, Sacramento, California 98826, <http://www.cslb.ca.gov> throughout the duration of the Work. Contractor hereby acknowledges that it or its subcontractors performing the work hold valid B Classification Contractor's license.

**15.Registration as Public Works Contractor:** Contractor and all Subcontractors currently are registered as public works contractors with the Department of Industrial Relations, State of California, in accordance with Labor Code section 1771.4.

**15.1. SUBMISSION OF UPDATED REGISTERED SUBCONTRACTORS LIST.** Contractor further acknowledges and agrees that it shall timely submit updated Registered Subcontractors List, attached hereto as Exhibit "J," and as detailed further therein.

**16.Standard of Care.** Contractor's Services will be performed, findings obtained, reports and recommendations prepared in accordance with generally and currently accepted principles and practices of the industry and all applicable law, including the applicable provisions of California Code of Regulations, Title 24, Proposition 39, the requirements of the DSA and CEC, and any applicable District Design Guides and Technical Specifications. Contractor represents and warrants that it is fully experienced in projects of the nature and scope of Work, and that it is properly qualified, licensed and equipped to supply and perform the Work. The Work completed herein must meet the approval of the District and shall be subject to the District's general right of inspection and supervision to secure the satisfactory completion thereof.

**17.Originality of Services.** Contractor agrees that all technologies, formulae, procedures, processes, methods, writings, ideas, dialogue, compositions, recordings, teleplays and video productions prepared for, written for, or submitted to the District and/or used in connection with this Agreement, shall be wholly original to Contractor and shall not be copied in whole or in part from any other source, except that submitted to Contractor by District as a basis for such services.

**18.Ownership of Data.** Pursuant to Education Code section 17316, this Agreement creates a non-exclusive and perpetual license for the District to use, at its discretion, all plans including, but not limited to, record drawings, specifications, estimates and other documents that Contractor prepared or cause to be prepared pursuant to this Agreement. Contractor retains all rights to all copyrights over designs and other intellectual property embodied in the plans, record drawings, specifications, estimates, and other documents that Contractor prepares or cause to be prepared pursuant to this Agreement.

In the event the District changes or uses any fully or partially completed documents without Contractor's knowledge or participation or both, the District agrees to release Contractor of responsibility for such changes or use, and shall hold Contractor harmless from and against any and all claims on account of any damages or losses to property or persons, or economic losses, arising out of that change or use. In the event that the District uses any fully or partially completed documents without the Contractor's full involvement, the District shall remove all title blocks and other information that might identify Contractor.



**19. Notice to Proceed with Design.** The District shall provide a Notice to Proceed with Design to Contractor at which time Contractor shall proceed with the applicable Work.

**20. Notice to Proceed with Construction.** After the design of the energy efficiency measures is approved by the District and by DSA, the District shall provide a Notice to Proceed to Contractor at which time Contractor shall proceed with the applicable Work.

**21. Site Examination.** Contractor has examined the Site and certifies that it accepts all measurements, specifications and conditions affecting the Work to be performed at the Site. By submitting its quote, Contractor warrants that it has made all Site examination(s) that it deems necessary as to the condition of the Site, its accessibility for materials, workers and utilities, and Contractor's ability to protect existing surface and subsurface improvements. No claim for allowance of time or money will be allowed as to any other undiscovered condition on the Site.

**22. Materials.** Contractor shall furnish, at his own expense, all labor, materials, equipment, supplies and other items necessary to complete the Services to be provided pursuant to this Agreement. Contractor shall use all new components (photovoltaic panels and inverters) that have not been previously placed in service in any other location or for any other application. Rebuilt, refurbished, or relocated equipment is not acceptable under this Agreement.

**22.1. Anti-Trust Claim.** Contractor and its subcontractor(s) agree to assign to the District all rights, title, and interest in and to all causes of action they may have under section 4 of 15 U.S.C. Title 15 or under the Cartwright Act (commencing with section 16700 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the Agreement or a subcontract. This assignment shall be made and become effective at the time the District tenders final payment to the Contractor, without further acknowledgment by the parties.

**22.2. Substitutions.** No substitutions of material from those specified in the Work Specifications shall be made without the prior written approval of the District.

**22.3. Codes, Standards, and Methodologies.** All products and components outlined in this Agreement must conform to all applicable codes, standards, and rating methodologies, including, without limitation, all applicable building and electrical codes.

**23. Equipment and Labor.** Contractor shall furnish all tools, equipment, apparatus, facilities, transportation, labor, and material necessary to furnish the services herein described, the services to be performed at such times and places as directed by and subject to the approval of the authorized District representative indicated in the Work specifications attached hereto.

**24. Patching and Repairs.** Contractor is responsible for patching and repairing all building penetrations performed by Contractor during installation, including painting to match the existing area. Conduit installed on the exterior of District structures shall be painted to match.

**25. Warranty/Quality.** Unless a longer warranty is called for below, or elsewhere in this Agreement, the Contractor, equipment manufacturer(s), or their assigned agents shall guarantee the workmanship, product or service performed against defective workmanship, defects or failures of materials for a period of one (1) year from filing the Notice of Completion with the county in which the Project is located. All workmanship and

merchandise must be warranted to be in compliance with applicable California energy, conservation, environmental, and educational standards.

**25.1.** Contractor shall provide the following warranties, at a minimum:

- 25.1.1.** Any warranty required to qualify the PV System for Proposition 39 grants and NEM 2.0
- 25.1.2.** 5-year complete PV System warranty
- 25.1.3.** 25-year PV panel warranty
- 25.1.4.** 10-year inverter warranty

**25.2.** Contractor shall provide a copy of the installation and product warranties prior to installation. Upon completion of the Project, Contractor shall transfer and convey to the District, all warranty documentation and shall assist the District in completing any warranty or submittal forms which are required in order to effectuate coverage of the warranties required herein and all my otherwise be available to the District.

**26. Correction of Errors.** Contractor shall perform, at its own cost and expense and without reimbursement from the District, any work necessary to correct errors or omissions which are caused by the Contractor's failure to comply with the standard of care required herein. Notwithstanding the expiration of the warranty period, Contractor may still have liability to District as allowed under California law for breach of the standard of care, or any latent or patent defect pursuant to California Code of Civil Procedure §§337.1 and 337.15.

**27. Trench Shoring.** If this Agreement is in excess of \$25,000 and is for the excavation of any trench deeper than five (5) feet, Contractor must submit and obtain District acceptance, in advance of excavation, of a detailed plan showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation of such trench or trenches. If the plan varies from the shoring system standards, the plan shall be prepared by a registered civil or structural engineer.

**28. Excavations Over Four Feet.** If this Agreement includes excavations over four (4) feet, Contractor shall promptly, and before the following conditions are disturbed, notify the District, in writing, of any: (a) material that the Contractor believes may be material that is hazardous waste, as defined in Section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law; (b) subsurface or latent physical conditions at the site differing from those indicated; or (c) unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Agreement. The District shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, and cause a decrease or increase in the Contractor's cost of, or the time required for, performance of any part of the Work shall issue a change order under the procedures described in the Agreement. In the event that a dispute arises between the District and the Contractor whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in the Contractor's cost of, or time required for, performance of any part of the work, the Contractor shall not be excused from any scheduled completion date provided for by the Agreement, but shall proceed with all Work to be performed under the Agreement. Contractor shall retain any and all rights provided either by the Agreement or by law which pertain to the resolution of disputes and protests between the contracting parties.

**29. Lead-Based Paint.** Pursuant to the Lead-Safe Schools Protection Act (Education Code section 32240 et seq.) and other applicable law, no lead-based paint, lead plumbing and solders, or other potential sources of lead contamination shall be utilized on this Project, and only trained and state-certified contractors, inspectors and workers shall undertake any action to abate existing risk factors for lead. Contractor must execute the Lead-Based Paint Certification, if applicable.

**30. Change in Scope of Work.** Any change in the scope of the Work, method of performance, nature of materials or price thereof, or any other matter materially affecting the performance or nature of the Work shall not be paid for or accepted unless such change, addition, or deletion is approved in advance and in writing by a valid change order executed by the District and Contractor. Contractor specifically understands, acknowledges, and agrees that the District shall have the right to request any alterations, deviations, reductions, or additions to the Project and the cost thereof shall be added to or deducted from the amount of the Total Contract Price by fair and reasonable valuations. Contractor also agrees to provide the District with all information requested to substantiate the cost of the change order and to inform the District whether the Work will be done by the Contractor or a subcontractor. In addition to any other information requested, Contractor shall submit, prior to approval of the change order, its request for a time extension (if any), as well as all information necessary to substantiate its belief that such change will delay the completion of the Work. If Contractor fails to submit its request for a time extension or the necessary supporting information, it shall be deemed to have waived its right to request such extension.

For all approved changes in the scope of work that result in a net increase in costs to Contractor, the following format shall be used, supported by attached documentation.

	<b>WORK PERFORMED BY OTHER THAN CONTRACTOR:</b>	<b>ADD:</b>
(a)	Material (attach itemized quantity & unit cost plus sales tax)	\$
(b)	Add Labor (attach itemized hours & rates, fully encumbered)	\$
(c)	Add Equipment (attach suppliers' invoice)	\$
(d)	Subtotal	\$
(e)	Add overhead and profit for any and all tiers of subcontractor, the total not to exceed 10% of item (d)	\$
(f)	Subtotal	\$
(g)	Add overhead and profit for Contractor, not to exceed 5% of Item (f)	\$
(h)	Subtotal	\$
(i)	Add Bond and Insurance, not to exceed 2% of Item (h)	\$
(j)	TOTAL	\$
(k)	Time	___ Days

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	<b>WORK PERFORMED BY CONTRACTOR:</b>	<b>ADD:</b>
(a)	Material (attach itemized quantity & unit cost plus sales tax)	
(b)	Add Labor (attach itemized hours & rates, fully encumbered)	
(c)	Add Equipment (attach suppliers' invoice)	
(d)	Subtotal	
(e)	Add overhead and profit for Contractor, not to exceed 15% of item (d).	
(f)	Subtotal	
(g)	Add Bond and Insurance, not to exceed 2% of Item (f)	
(h)	TOTAL	
(i)	Time	___ Days

All deductive Change Order(s) must be prepared pursuant to the provisions herein. Where a portion of the Work is deleted from the scope of Work, the reasonable value of the deducted Work less the value of Work performed shall be considered the appropriate deduction. The amount submitted on the Application for Payment shall be used to calculate the credit amount unless the bid documentation is being held in escrow as part of the Contract Documents. Unit Prices, if any, may be used in District's discretion in calculating reasonable value. If Contractor offers a proposed amount for a deductive Change Order(s), Contractor shall include a minimum of five percent (5%) total profit and overhead to be deducted with the amount of the Work of the Change Order(s). If subcontractor work is involved, subcontractors shall also include a minimum of five percent (5%) profit and overhead to be deducted with the amount of its deducted work. Any deviation from this provision shall not be allowed.

**31.Workers.** Contractor shall at all times enforce strict discipline and good order among its employees and the employees of its subcontractors and shall not employ or work any unfit person or anyone not skilled in work assigned to him. The District may evaluate the Contractor in any manner which is permissible under the law. Any person in the employ of the Contractor or a subcontractor whom the District may deem incompetent or unfit shall be dismissed from the Project and shall not again be employed at Project without written consent from the District.

**32.Contract Supervisor.** Contractor shall provide competent supervision of personnel employed on the job Site, use of equipment, and quality of workmanship.

**33.Fingerprinting of Employees.** Pursuant to Education Code section 45125.2, District has determined, on the basis of scope of Work in this Agreement of this Project, that Contractor, subcontractors, and their employees will have only limited contact with pupils at most. Contractor shall promptly notify District in writing of any facts or circumstances which might reasonably lead District to determine that contact will be more than limited as defined by Education Code section 45125.1(d). If Contractor will have contact with any pupils, Contractor shall comply with the provisions of Education Code section 45125.1 regarding the submission of employee fingerprints to the California Department of Justice and the completion of criminal background investigations of its employees. Contractor shall not permit any employee to have any contact with District pupils until such time as the Contractor has verified in writing to the governing board of the District that the employee has not been convicted of a felony, as defined in Education Code section 45122.1. Contractor's responsibility shall extend to all employees, subcontractors, agents, and employees or agents of subcontractors regardless of whether those individuals are paid or unpaid, concurrently employed by the District, or acting as independent

contractors of the Contractor. Verification of compliance with this section and the Criminal Background Investigation Certification that may be required with this Agreement, shall be provided in writing to the District prior to each individual's commencement of employment or performing any portion of the Work and prior to permitting contact with any student.

**34.Employee Identification.** At all times during the Project, while on District property, Contractor, and all of its individual employees, agents, consultants, suppliers and subcontractors shall wear a name badge with their name clearly written as well as the firm with whom they are employed. Contractor shall ensure that only those necessary individual employees, agents, consultants, suppliers and subcontractors possess the name badge and shall collect the name badge from its individual employees, agents, consultants, suppliers and subcontractors once their work has been completed.

**35.Safety and Security.** Contractor is responsible for maintaining safety in the performance of this Agreement. Contractor shall be responsible to ascertain from the District the rules and regulations pertaining to safety, security, and driving on school grounds, particularly when children are present.

**36.Clean Up.** Debris shall be removed from the Site(s). The Site(s) shall be in order at all times when work is not actually being performed and shall be maintained in a reasonably clean condition. District owned dumpsters and trash bins may not be used for storage or disposal.

**37.Access to Work.** District representatives shall at all times have access to the Work wherever it is in preparation or in progress. Contractor shall provide safe and proper facilities for such access.

**38.Protection of Work and Property.** Contractor shall erect and properly maintain at all times, as required by conditions and progress of the Work, all necessary safeguards, signs, barriers, lights, and security persons for protection of workers and the public, and shall post danger signs warning against hazards created by the Work. In an emergency affecting life and safety of life or of Work or of adjoining property, Contractor, without special instruction or authorization from District, is permitted to act at his discretion to prevent such threatened loss or injury.

**39.Occupancy.** District reserves the right to occupy the Site at any time before formal completion and such occupancy shall not constitute final acceptance or approval of any part of the Work covered by this Agreement, nor shall such occupancy extend the date specified for completion of the Work.

**40.Continuous Electrical Service While School in Session.** Contractor shall ensure that school facilities are not without power at any time while school or school-related activities are in session. All work must be closely coordinated with operations staff at the District to ensure continuity of service while the school facilities are in use.

**41.Force Majeure.** Contractor shall be excused from performance hereunder during the time and to the extent that it is prevented from obtaining delivery, or performing by act of God, fire, strike, loss, or shortage of transportation facilities, lock-out, commandeering of materials, product, plant, or facilities by the government, when satisfactory evidence thereof is presented to the District, provided that it is satisfactorily established that the non-performance is not due to the fault or neglect of the Contractor.

## **42.Termination.**

**42.1. For Convenience by District.** District may, at any time, with or without reason, terminate this Agreement and compensate Contractor only for services satisfactorily rendered to the date of termination. Written notice by District shall be sufficient to stop further performance of services by Contractor. Notice shall be deemed given when received by the Contractor or no later than three (3) days after the day of mailing, whichever is sooner. In the event that District terminates this Agreement pursuant to this section, District shall compensate Contractor for work completed to date as a pro-rata amount of the full fees, costs, and expenses.

**42.2. With Cause by District.** District may terminate this Agreement upon giving of written notice of intention to terminate for cause. Cause shall include:

**42.2.1.** material violation of this Agreement by the Contractor; or

**42.2.2.** any act by Contractor exposing the District to liability to others for personal injury or property damage; or

**42.2.3.** Contractor is adjudged a bankrupt, Contractor makes a general assignment for the benefit of creditors or a receiver is appointed on account of Contractor's insolvency.

Written notice by District shall contain the reasons for such intention to terminate and unless within five (5) calendar days after that notice the condition or violation shall cease, or satisfactory arrangements for the correction thereof be made, this Agreement shall upon the expiration of the five (5) calendar days cease and terminate. In the event of this termination, the District may secure the required services from another Contractor. If the expense, fees, and costs to the District exceed the cost of providing the Service pursuant to this Agreement, Contractor shall immediately pay the excess expense, fees, and/or costs to the District upon the receipt of the District's notice of these expense, fees, and/or costs. The foregoing provisions are in addition to and not a limitation of any other rights or remedies available to District.

**42.3.** Upon termination, Contractor shall provide the District with all documents produced maintained or collected by Contractor pursuant to this Agreement, whether or not such documents are final or draft documents.

**43.Indemnification.** To the furthest extent permitted by California law, Contractor shall indemnify and hold harmless the District, its Governing Board, agents, representatives, officers, consultants, employees, trustees, and volunteers (the "Indemnified Parties") from any and all claims arising out of, pertaining to, or relating to the negligence, recklessness, or willful misconduct of the Contractor. Contractor shall also, to the furthest extent permitted by California law, defend the Indemnified Parties at Contractor's own expense, including attorneys' fees and costs, from any and all Claim(s) and allegations relating thereto. The District shall have the right to accept or reject any legal representation that Contractor proposes to defend the indemnified parties.

#### **44. Insurance.**

**44.1.** The Contractor shall procure and maintain at all times it performs any portion of the Services the following insurance:

**44.1.1. General Liability.** One Million Dollars (\$1,000,000) per occurrence and Two Million Dollars (\$2,000,000) general aggregate for bodily injury, personal injury and property damage in the form of Comprehensive General Liability and Contractual Liability. If Commercial General Liability or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to each project/location or the general aggregate limit shall be twice the required occurrence limit.

**44.1.2. Automobile Liability Insurance.** One Hundred Thousand Dollars (\$100,000) per person, Three Hundred Thousand Dollars (\$300,000) per accident, Fifty Thousand Dollars (\$50,000) in property damage, or One Million Dollars (\$1,000,000) combined single limit for any automobile that shall protect the Contractor and the District from all claims of bodily injury, property damage, personal injury, death, and medical payments arising performing any portion of the Services by Contractor.

**44.1.3. Workers' Compensation and Employers' Liability Insurance.** For all of the Contractor's employees who are subject to this Agreement and to the extent required by the applicable state or federal law, Contractor shall keep in full force and effect, a Workers' Compensation policy. That policy shall provide employers' liability coverage with minimum liability coverage of One Million Dollars (\$1,000,000) per accident for bodily injury or disease. Contractor shall provide an endorsement that the insurer waives the right of subrogation against the District and its respective elected officials, officers, employees, agents, representatives, consultants, trustees, and volunteers.

**44.1.4. Professional Liability (Errors and Omissions).** Two Million Dollars (\$2,000,000) aggregate for errors and omissions as appropriate to profession of engineer designing energy efficiency measures, coverage to continue through completion of construction plus two (2) years thereafter.

**44.1.5. Builder's Risk Insurance.** In the amount of Five Hundred Thousand Dollars (\$500,000), Contractor shall procure and maintain, during the life of this Agreement, Builder's Risk (Course of Construction), or similar first party property coverage to insure against all risks of accidental physical loss and shall include without limitation the perils of vandalism and/or malicious mischief (both without any limitation regarding vacancy or occupancy), sprinkler leakage, civil authority, theft, sonic disturbance, earthquake, flood, collapse, wind, fire, war, terrorism, lightning, smoke, and rioting. Coverage shall include debris removal, demolition, increased costs due to enforcement of all applicable ordinances and/or laws in the repair and replacement of damaged and undamaged portions of the property, and reasonable costs for engineering services and expenses required as a result of any insured loss upon the Work and Project, including completed Work and Work in progress, to the full insurable value thereof.

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**44.1.6. Umbrella or Excess Liability.** Four Million Dollars (\$4,000,000) per occurrence to meet the policy limit requirements of the required policies if Contractor's underlying policy limits are less than required. There shall be no gap between the per occurrence amount of any underlying policy and the start of the coverage under the Umbrella Liability Insurance Policy. Any Umbrella Liability Insurance Policy shall protect Contractor, District, State, and Project Manager(s) in amounts, and that complies with all requirements for Commercial General Liability and Automobile Liability and Employers' Liability Insurance.

**44.1.7. Other Insurance Provisions:** The policies are to contain, or be endorsed to contain, the following provisions:

**44.1.7.1.** For the general liability and automobile liability policies:

**44.1.7.1.1.** The District, their representatives, consultants, trustees, officers, officials, employees, agents, and volunteers ("Additional Insureds") are to be covered as additional insureds with respect to liability arising out of activities performed by or on behalf of Contractor; instruments of Service and completed operations of the Contractor; premises owned, occupied or used by Contractor; or automobiles owned, leased, hired or borrowed by Contractor. The coverage shall contain no special limitations on the scope of protection afforded to the Additional Insureds.

**44.1.7.1.2.** For any claims related to the projects, Contractor's insurance coverage shall be primary insurance with respect to the Additional Insureds. Any insurance or self-insurance maintained by the Additional Insureds shall be in excess of the Contractor's insurance and shall not contribute with it.

**44.1.7.1.3.** Any failure to comply with reporting or other provisions of the policies including breaches of warranties shall not affect coverage provided to the Additional Insureds.

**44.1.7.2.** Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

**44.1.7.3.** Each insurance policy required by this clause shall be endorsed to state that coverage shall not be suspended, voided, canceled by either Party, reduced in coverage or in limits except after thirty (30) days prior written notice by certified mail, return receipt requested, has been given to the District.

**44.1.7.4.** Contractor shall furnish the District with Certificates of Insurance showing maintenance of the required insurance coverage and original endorsements affecting coverage. The endorsements are to be signed by a person authorized by that insurer to bind



coverage on its behalf. All endorsements are to be received and approved by the District before Work commences. Contractor must provide updates on the insurance coverage throughout the term of the Agreement to ensure that there is no break in coverage during the performance of the Work. Failure to provide evidence of current coverage shall be grounds for termination for breach of contract.

**44.1.8. Acceptability of Insurers.** Insurance is to be placed with insurers with a current A.M. Best's rating of no less than A:VII, unless otherwise acceptable to the District.

**45.Payment Bond and Performance Bond.** Contractor shall not commence the Work until it has provided to the District, in a form acceptable to the District, a Payment (Labor and Material) Bond and a Performance Bond, each in an amount equivalent to One Hundred Percent (100%) of the Total Contract Price issued by a surety admitted to issue bonds in the State of California and otherwise acceptable to the District.

**46.Permits and Licenses.** Contractor and all Contractor's employees or agents shall secure and maintain in force, at Contractor's sole cost and expense, such permits, licenses and registrations as are required by law in connection with the furnishing of materials, supplies, or services pursuant to this Agreement. Contractor is responsible for obtaining, on behalf of District and at Contractor's expense, permits and approvals (including CEC and DSA approval) required for the building, installation, and start-up of the Work hereunder which are required to complete the Project, and District shall provide reasonable assistance to Contractor regarding the same. District shall hire and pay for all inspectors, including DSA and other special inspectors, however, if Contractor requires overtime inspections, including but not limited to acceleration of the Work, Contractor shall reimburse District for overtime and/or additional fees and expenses for inspectors, including DSA and other special inspectors.

**47.Assignment.** The rights, burdens, duties, or obligations of Contractor pursuant to this Agreement shall not be assigned by the Contractor without the prior written consent of the District.

**48.Subcontractors.** Subcontractors, if any, engaged by the Contractor for any Service or Work under this Agreement shall be subject to the approval of the District. Contractor agrees to bind every subcontractor by the terms of the Agreement as far as such terms are applicable to subcontractor's work, including, without limitation, all indemnification, insurance, bond, and warranty requirements. If Contractor shall subcontract any part of this Agreement, Contractor shall be fully responsible to the District for acts and omissions of its subcontractor(s) and of persons either directly or indirectly employed by it. Nothing contained in this Agreement shall create any contractual relations between any subcontractor and the District.

**48.1. Prompt Payment of Subcontractors.** Contractor will promptly pay, when due, all amounts payable for labor and materials furnished in the performance of the Agreement and will endeavor to prevent any lien or other claim under any provision of Applicable Law from arising against any District property, against Contractor's rights to payments hereunder, or against District.

**49.Compliance with Laws.** Contractor shall observe and comply with all rules and regulations of the governing board of the District and all federal, state, and local laws, ordinances and regulations. Contractor shall give all notices required by any law,

ordinance, rule and regulation bearing on conduct of the Work as indicated or specified. If Contractor observes that any of the Work required by this Agreement is at variance with any such laws, ordinance, rules or regulations, Contractor shall notify the District, in writing, and any necessary changes to the scope of the Work shall be made and this Agreement shall be appropriately amended in writing, or this Agreement shall be terminated effective upon Contractor's receipt of a written termination notice from the District. If Contractor performs any work that is in violation of any laws, ordinances, rules or regulations, without first notifying the District of the violation, Contractor shall bear all costs arising therefrom.

**49.1.** Contractor hereby acknowledges that the District's Project Consultant(s), the Project Inspector(s), and the Division of the State Architect have authority to approve and/or stop Work if the Contractor's Work does not comply with the requirements of the Contract Documents, Title 24 of the California Code of Regulations, and all applicable laws. Contractor shall be liable for any delay caused by its non-compliant Work.

**49.2. Labor Code Requirements.** Contractor shall familiarize itself with and comply with all applicable provisions of the Labor Code, sections 1720 through 1861. Contractor and its subcontractors shall pay all workers on all work performed not less than the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work as determined by the Director of the Department of Industrial Relations ("DIR") for the type of work performed and the locality in which the Work is to be performed within the boundaries of the San Rafael City Schools, pursuant to sections 1770, et seq., of the California Labor Code. In performing the Work, Contractor and its subcontractors shall comply with all applicable provisions of Division 2, Part 7, Chapter 1, of the California Labor Code and Title 8 of the California Code of Regulations, including, without limitation, the requirement that the contractor and all of its subcontractors shall maintain timely, complete, and accurate electronic certified payroll records as set forth herein. Contractor and its subcontractors shall complete and submit the Prevailing Wage and Related Labor Requirements Certification attached hereto, and Contractor shall provide a copy of the Certification(s) to District prior to commencement of the Work. Willful failure to comply may result in penalties, including loss of the right to bid on or receive public works contracts.

**49.2.1. Certified Payroll Records.** Contractor and its subcontractor(s) shall keep accurate certified payroll records ("CPRs") of workers and shall electronically submit certified payroll records directly to the Labor Commissioner using DIR's eCPR System by uploading the CPRs by electronic XML file or entering each record manually using the DIR's iForm (or current form) online on a weekly basis and within ten (10) days of any request by the District or the Labor Commissioner. (See <http://www.dir.ca.gov/Public-Works/Certified-Payroll-Reporting.html>).

**49.2.2. Labor Compliance:** Contractor shall perform the Work of the Project while complying with all the applicable regulations, including section 16000, et seq., of Title 8 of the California Code of Regulations and is subject to labor compliance monitoring and enforcement by the Department of Industrial Relations.

**50.Audit.** Contractor shall establish and maintain books, records, and systems of account, in accordance with generally accepted accounting principles, reflecting all business operations of Contractor transacted under this Agreement. Contractor shall retain these

books, records, and systems of account during the Term of this Agreement and for three (3) years thereafter. Contractor shall permit the District, its agent, other representatives, or an independent auditor to audit, examine, and make excerpts, copies, and transcripts from all books and records, and to make audit(s) of all billing statements, invoices, records, and other data related to the Services covered by this Agreement. Audit(s) may be performed at any time, provided that the District shall give reasonable prior notice to Contractor and shall conduct audit(s) during Contractor's normal business hours, unless Contractor otherwise consents.

**51.Anti-Discrimination.** It is the policy of the District that in connection with all work performed under contracts there be no discrimination against any employee engaged in the work because of race, color, ancestry, national origin, religious creed, physical disability, medical condition, marital status, sexual orientation, gender, or age and therefore the Contractor agrees to comply with applicable Federal and California laws including, but not limited to the California Fair Employment and Housing Act (beginning with Government Code section 12900) and Labor Code section 1735. In addition, the Contractor agrees to require like compliance by all its subcontractors.

**52.Environmental Attributes and Energy Credits.** District shall own all right, title, and interest associated with or resulting from the development, construction, installation and ownership of any facilities installed on the Project. This ownership includes without limitation, all rights, credits (including tax credits), rebates, reporting rights, benefits, reductions, offsets and allowances and entitlements of any kind, howsoever entitled or named (including carbon credits and allowances), whether arising under federal, state or local law, international treaty, trade association membership or the like arising from the energy efficiency measures and Project.

**53.Contract Tax Responsibility.** Contractor shall be solely responsible for any and all tax law compliance, including, without limitation, compliance with the requirements related to any use of the Investment Tax Credit. District shall not make, or cause to be provided any legal guidance or opinions related to taxation matters.

**54.Limitation of District Liability.** Other than as provided in this Agreement, District's financial obligations under this Agreement shall be limited to the payment of the compensation provided in this Agreement. Notwithstanding any other provision of this Agreement, in no event, shall District be liable, regardless of whether any claim is based on contract or tort, for any special, consequential, indirect or incidental damages, including, but not limited to, lost profits or revenue, arising out of or in connection with this Agreement for the services performed in connection with this Agreement.

**55.Confidentiality.** Contractor and all Contractor's agents, personnel, employee(s), and/or subcontractor(s) shall maintain the confidentiality of all information received in the course of performing the Services to the extent allowed by law. This requirement to maintain confidentiality shall extend beyond the termination of this Agreement.

**56.Claims & Disputes.** In the event of any demand by Contractor for (A) a time extension, including, without limitation, for relief from damages or penalties for delay assessed by the District under the Agreement, (B) payment by the District of money or damages arising from work done by, or on behalf of, the Contractor pursuant to the Agreement and payment of which is not otherwise expressly provided for or to which Contractor is not otherwise entitled to, or (C) an amount of payment disputed by the District, the parties shall attempt to resolve the dispute by those procedures set forth in Public Contract Code section 9204 and/or Article 1.5 (commencing with section 20104) of Chapter 1, Part, 3, Division 2, of the Public Contract Code, if applicable, the provisions of which are each

attached hereto and incorporated herein by this reference. If a claim, or any portion thereof, remains in dispute upon satisfaction of all applicable dispute resolution requirements, the Contractor shall comply with all claims presentation requirements as provided in Chapter 1 (commencing with section 900) and Chapter 2 (commencing with section 910) of Part 3 of Division 3.6 of Title 1 of Government Code as a condition precedent to the Contractor's right to bring a civil action against the District. For purposes of those provisions, the running of the time within which a claim must be presented to the District shall be tolled from the time the Contractor submits its written claim until the time the claim is denied, including any time utilized by any applicable meet and confer process. Pending resolution of the dispute, Contractor and its subcontractors shall continue to perform the Work under the Agreement and shall not cause a delay of the Work during any dispute, claim, negotiation, mediation, or arbitration proceeding, except by written agreement of the District.

**57. Attorney Fees and Costs.** Should litigation be necessary to enforce any terms or provisions of this Agreement, then each Party shall bear its own litigation and collection expenses, witness fees, court costs, and attorney's fees.

**58. Notice.** Any notice required or permitted to be given under this Agreement shall be deemed to have been given, served, and received if given in writing and either personally delivered or deposited in the United States mail, registered or certified mail, postage prepaid, return receipt required, or sent by overnight delivery service, addressed as follows:

To District:  
San Rafael City Schools  
310 Nova Albion Way  
San Rafael, California 94903

To Contractor:  
Solar Technologies  
14 Beta Court  
San Ramon, CA 94583

ATTN: SUPERINTENDENT

ATTN: PRESIDENT

Any notice personally given or sent by email shall be effective upon receipt. Any notice sent by overnight delivery service shall be effective the business day next following delivery thereof to the overnight delivery service. Any notice given by mail shall be effective three (3) days after deposit in the United States mail.

**59. Governing Law.** This Agreement shall be governed by, and the rights, duties and obligations of the Parties shall be determined and enforced in accordance with, the laws of the State of California. The Parties further agree that any action or proceeding brought to enforce the terms and conditions of this Agreement shall be maintained in the county in which the District's administrative offices are located.

**60. Severability.** If any term, condition or provision of this Agreement is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions will nevertheless continue in full force and effect, and shall not be affected, impaired or invalidated in any way.

**61. Waiver.** The waiver by either Party of any breach of any term, covenant, or condition herein contained shall not be deemed to be a waiver of such term, covenant, condition, or any subsequent breach of the same or any other term, covenant, or condition herein contained.

**62.Captions and Interpretations.** Paragraph headings in this Agreement are used solely for convenience and shall be wholly disregarded in the construction of this Agreement. No provision of this Agreement shall be interpreted for or against a Party because that Party of its legal representative drafted such provision, and this Agreement shall be construed as if jointly prepared by the Parties.

**63.Use of Pronouns.** All personal pronouns used in this Agreement, whether used in the masculine, feminine, or neuter gender, will include all other genders; the singular will include the plural and the plural will include the singular.

**64.Incorporation of Recitals and Exhibits.** The Recitals and each exhibit attached hereto are hereby incorporated herein by reference.

**65.Cooperation.** The Parties hereby agree to execute all such other documents and to take all such other action as may be reasonably necessary to effect the purposes of this Agreement.

**66.Binding Contract.** This Agreement shall be binding upon the Parties and upon their successors and assigns, and shall inure to the benefit of said Parties and their successors and assigns.

**67.Authority to Bind Parties.** Neither Party in the performance of any and all duties under this Agreement, except as otherwise provided in this Agreement, has any authority to bind the other to any agreements or undertakings.

**68.No Rights in Third Parties.** This Agreement does not create any rights in, or inure to the benefit of, any third party except as expressly provided herein.

**69.Signature Authority.** Each Party has the full power and authority to enter into and perform this Agreement, and the person signing this Agreement on behalf of each Party has been properly authorized and empowered to enter into this Agreement.

**70.Counterparts.** This Agreement and all amendments to it may be executed in counterparts, each of which shall be deemed an original. A facsimile or electronic signature shall be deemed to be the equivalent of the actual original signature. All counterparts so executed shall constitute one document binding all the Parties.

**71.Provisions Required By Law Deemed Inserted.** Each and every provision of law and clause required by law to be inserted in this Agreement shall be deemed to be inserted herein and this Agreement shall be read and enforced as though it were included therein.

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**72. Entire Contract.** This Agreement sets forth the entire contract between the parties hereto and fully supersedes any and all prior agreements, understanding, written or oral, between the parties hereto pertaining to the subject matter thereof. This Agreement may be modified only in writing upon mutual consent.

IN WITNESS WHEREOF, the Parties have executed this Agreement on the dates indicated below.

**San Rafael City Schools**

Date: \_\_\_\_\_, 2019  
By: \_\_\_\_\_  
Print Name: \_\_\_\_\_  
Print Title: \_\_\_\_\_

**STE Electric dba Solar Technologies**

Date: \_\_\_\_\_, 2019  
By: \_\_\_\_\_  
Print Name: \_\_\_\_\_  
Print Title: \_\_\_\_\_

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**Information Regarding Contractor:**

Proper Name: STE Electric dba Solar Technologies  
License No.: 932914  
Registration No.: 1000035324  
Address: 14 Beta  
San Ramon, CA 94583  
Telephone: 831.359.4348  
E-Mail: jeff@solartechnologies.com

Type of Business Entity:  
☐ Individual  
☐ Sole Proprietorship  
☐ Partnership  
☐ Limited Partnership  
☒ Corporation, State: California  
☐ Limited Liability Company  
☐ Other: \_\_\_\_\_

90-0451969:  
Employer Identification and/or Social  
Security Number

**NOTE: Section 6041 of the Internal Revenue Code (26 U.S.C. 6041) and Section 1.6041-1 of Title 26 of the Code of Federal Regulations (26 C.F.R. 1.6041-1) requires the recipients of \$600.00 or more to furnish their taxpayer information to the payer. In order to comply with these requirements, the District requires the Contractor to furnish the information requested in this section.**

## **Public Contract Code section 9204**

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

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

(c) For purposes of this section:

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

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

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

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

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

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

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

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

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

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

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

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

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

(vii) The High-Speed Rail Authority.

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

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

(d) (1) (A) Upon receipt of a claim pursuant to this section, the public entity to which the claim applies shall conduct a reasonable review of the claim and, within a period not to exceed 45 days, shall provide the claimant a written statement identifying what portion of the claim is disputed and what portion is undisputed. Upon receipt of a claim, a public entity and a contractor may, by mutual agreement, extend the time period provided in this subdivision.

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

(C) If the public entity needs approval from its governing body to provide the claimant a written statement identifying the disputed portion and the undisputed portion of the claim, and the governing body does not meet within the 45 days or within the mutually agreed to extension of time following receipt of a claim sent by registered mail or certified mail, return receipt requested, the public entity shall have up to three days following the next duly publicly noticed meeting of the governing body after the 45-day period, or extension, expires to provide the claimant a written statement identifying the disputed portion and the undisputed portion.

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

(2) (A) If the claimant disputes the public entity's written response, or if the public entity fails to respond to a claim issued pursuant to this section within the time prescribed, the claimant may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the public entity shall schedule a meet and confer conference within 30 days for settlement of the dispute.

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

(C) For purposes of this section, mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this section.

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

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

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

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

(5) If a subcontractor or a lower tier subcontractor lacks legal standing to assert a claim against a public entity because privity of contract does not exist, the contractor may present to the public entity a claim on behalf of a subcontractor or lower tier subcontractor. A subcontractor may request in writing, either on his or her own behalf or on behalf of a lower tier subcontractor, that the contractor present a claim for work which was performed by the subcontractor or by a lower tier subcontractor on behalf of the subcontractor. The subcontractor requesting that the claim be presented to the public entity shall furnish reasonable documentation to support the claim. Within 45 days of receipt of this written request, the contractor shall notify the subcontractor in writing as to whether the contractor presented the claim to the public entity and, if the original contractor did not present the claim, provide the subcontractor with a statement of the reasons for not having done so.

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

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

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

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

(i) This section shall remain in effect only until January 1, 2020, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2020, deletes or extends that date.



## **Public Contract Code sections 20104 – 20104.6**

### **§ 20104.**

(a) (1) This article applies to all public works claims of three hundred seventy-five thousand dollars (\$375,000) or less which arise between a contractor and a local agency.

(2) This article shall not apply to any claims resulting from a contract between a contractor and a public agency when the public agency has elected to resolve any disputes pursuant to Article 7.1 (commencing with Section 10240) of Chapter 1 of Part 2.

(b) (1) "Public work" means "public works contract" as defined in Section 1101 but does not include any work or improvement contracted for by the state or the Regents of the University of California.

(2) "Claim" means a separate demand by the contractor for (A) a time extension, (B) payment of money or damages arising from work done by, or on behalf of, the contractor pursuant to the contract for a public work and payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled to, or (C) an amount the payment of which is disputed by the local agency.

(c) The provisions of this article or a summary thereof shall be set forth in the plans or specifications for any work which may give rise to a claim under this article.

(d) This article applies only to contracts entered into on or after January 1, 1991.

### **§ 20104.2.**

For any claim subject to this article, the following requirements apply:

(a) The claim shall be in writing and include the documents necessary to substantiate the claim. Claims must be filed on or before the date of final payment. Nothing in this subdivision is intended to extend the time limit or supersede notice requirements otherwise provided by contract for the filing of claims.

(b) (1) For claims of less than fifty thousand dollars (\$50,000), the local agency shall respond in writing to any written claim within 45 days of receipt of the claim, or may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the local agency may have against the claimant.

(2) If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the local agency and the claimant.

(3) The local agency's written response to the claim, as further documented, shall be submitted to the claimant within 15 days after receipt of the further documentation or within a period of time no greater than that taken by the claimant in producing the additional information, whichever is greater.

(c) (1) For claims of over fifty thousand dollars (\$50,000) and less than or equal to three hundred seventy-five thousand dollars (\$375,000), the local agency shall respond in writing to all written claims within 60 days of receipt of the claim, or may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the local agency may have against the claimant.

(2) If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the local agency and the claimant.

(3) The local agency's written response to the claim, as further documented, shall be submitted to the claimant within 30 days after receipt of the further documentation, or within a period of time no greater than that taken by the claimant in producing the additional information or requested documentation, whichever is greater.

(d) If the claimant disputes the local agency's written response, or the local agency fails to respond within the time prescribed, the claimant may so notify the local agency, in writing, either within 15 days of receipt of the local agency's response or within 15 days of the local agency's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a demand, the local agency shall schedule a meet and confer conference within 30 days for settlement of the dispute.

(e) Following the meet and confer conference, if the claim or any portion remains in dispute, the claimant may file a claim as provided in Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code. For purposes of those provisions, the running of the period of time within which a claim must be filed shall be tolled from the time the claimant submits his or her written claim pursuant to subdivision (a) until the time that claim is denied as a result of the meet and confer process, including any period of time utilized by the meet and confer process.

(f) This article does not apply to tort claims and nothing in this article is intended nor shall be construed to change the time periods for filing tort claims or actions specified by Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code.

**§ 20104.4.**

The following procedures are established for all civil actions filed to resolve claims subject to this article:

(a) Within 60 days, but no earlier than 30 days, following the filing or responsive pleadings, the court shall submit the matter to nonbinding mediation unless waived by mutual stipulation of both parties. The mediation process shall provide for the selection within 15 days by both parties of a disinterested third person as mediator, shall be commenced within 30 days of the submittal, and shall be concluded within 15 days from the commencement of the mediation unless a time requirement is extended upon a good cause showing to the court or by stipulation of both parties. If the parties fail to select a mediator within the 15-day period, any party may petition the court to appoint the mediator.

(b) (1) If the matter remains in dispute, the case shall be submitted to judicial arbitration pursuant to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, notwithstanding Section 1141.11 of that code. The Civil Discovery Act (Title 4 (commencing with Section 2016.010) of Part 4 of the Code of Civil Procedure) shall apply to any proceeding brought under this subdivision consistent with the rules pertaining to judicial arbitration.

(2) Notwithstanding any other provision of law, upon stipulation of the parties, arbitrators appointed for purposes of this article shall be experienced in construction law, and, upon stipulation of the parties, mediators and arbitrators shall be paid necessary and reasonable hourly rates of pay not to exceed their customary rate, and such fees and expenses shall be paid equally by the parties, except in the case of arbitration where the arbitrator, for good cause, determines a different division. In no event shall these fees or expenses be paid by state or county funds.

(3) In addition to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, any party who after receiving an arbitration award requests a trial de novo but does not obtain a more favorable judgment shall, in addition to payment of costs and fees under that chapter, pay the attorney's fees of the other party arising out of the trial de novo.

(c) The court may, upon request by any party, order any witnesses to participate in the mediation or arbitration process.

**§ 20104.6.**

(a) No local agency shall fail to pay money as to any portion of a claim which is undisputed except as otherwise provided in the contract.

(b) In any suit filed under Section 20104.4, the local agency shall pay interest at the legal rate on any arbitration award or judgment. The interest shall begin to accrue on the date the suit is filed in a court of law.

[REMAINDER OF PAGE INTENTIONALLY BLANK]

**PREVAILING WAGE CERTIFICATION**

I hereby certify that I will conform to the State of California Public Works Contract requirements regarding prevailing wages, benefits, on-site audits with 48-hours' notice, payroll records, and apprentice and trainee employment requirements, for all Work on the Project.

Date:	_____
Name of Contractor:	<u>STE Electric dba Solar Technologies</u>
Signature:	_____
Print Name:	_____
Title:	_____

### **WORKERS' COMPENSATION CERTIFICATION**

Labor Code section 3700 in relevant part provides:

Every employer except the State shall secure the payment of compensation in one or more of the following ways:

1. By being insured against liability to pay compensation by one or more insurers duly authorized to write compensation insurance in this state.
2. By securing from the Director of Industrial Relations a certificate of consent to self-insure, which may be given upon furnishing proof satisfactory to the Director of Industrial Relations of ability to self-insure and to pay any compensation that may become due to his employees.

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

Date: \_\_\_\_\_  
Name of Contractor: STE Electric dba Solar Technologies  
Signature: \_\_\_\_\_  
Print Name: \_\_\_\_\_  
Title: \_\_\_\_\_

(In accordance with Article 5 - commencing at section 1860 of the Labor Code, Division 2, Part 7, Chapter 1, the above certificate must be signed and filed with the District to performing any Work under this Agreement.)

## **DRUG-FREE WORKPLACE CERTIFICATION**

PROJECT/CONTRACT NO.: \_\_\_\_\_ between the San Rafael City Schools ("District") and STE Electric dba Solar Technologies ("Contractor" or "Bidder") ("Contract" or "Project").

This Drug-Free Workplace Certification form is required from the successful Bidder pursuant to Government Code section 8350 et seq., the Drug-Free Workplace Act of 1990. The Drug-Free Workplace Act of 1990 requires that every person or organization awarded a contract or grant for the procurement of any property or service from any state agency must certify that it will provide a drug-free workplace by doing certain specified acts. In addition, the Act provides that each contract or grant awarded by a state agency may be subject to suspension of payments or termination of the contract or grant, and the contractor or grantee may be subject to debarment from future contracting, if the contracting agency determines that specified acts have occurred.

The District is not a "state agency" as defined in the applicable section(s) of the Government Code, but the District is a local agency and public school district under California law and requires all contractors on District projects to comply with the provisions and requirements of the Drug-Free Workplace Act of 1990.

Contractor shall certify that it will provide a drug-free workplace by doing all of the following:

Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance is prohibited in the person's or organization's workplace and specifying actions which will be taken against employees for violations of the prohibition.

Establishing a drug-free awareness program to inform employees about all of the following:

The dangers of drug abuse in the workplace.

The person's or organization's policy of maintaining a drug-free workplace.

The availability of drug counseling, rehabilitation, and employee-assistance programs.

The penalties that may be imposed upon employees for drug abuse violations.

Requiring that each employee engaged in the performance of the contract or grant be given a copy of the statement required above, and that, as a condition of employment on the contract or grant, the employee agrees to abide by the terms of the statement.

I, the undersigned, agree to fulfill the terms and requirements of Government Code section 8355 listed above and will publish a statement notifying employees concerning (a) the prohibition of controlled substance at the workplace, (b) establishing a drug-free awareness program, and (c) requiring that each employee engaged in the performance of the Contract be given a copy of the statement required by section 8355(a), and requiring that the employee agree to abide by the terms of that statement.

I also understand that if the District determines that I have either (a) made a false certification herein, or (b) violated this certification by failing to carry out the requirements of section 8355, that the Contract awarded herein is subject to termination, suspension of payments, or both. I further understand that, should I violate the terms of the Drug-Free Workplace Act of 1990, I may be subject to debarment in accordance with the requirements of the aforementioned Act.

I acknowledge that I am aware of the provisions of and hereby certify that I will adhere to the requirements of the Drug-Free Workplace Act of 1990.

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

Proper Name of Contractor: STE Electric dba Solar Technologies

Signature: \_\_\_\_\_

Print Name: \_\_\_\_\_

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

END OF DOCUMENT

## **TOBACCO-FREE ENVIRONMENT CERTIFICATION**

PROJECT/CONTRACT NO.: \_\_\_\_\_ between the San Rafael City Schools ("District") and STE Electric dba Solar Technologies ("Contractor" or "Bidder") ("Contract" or "Project").

This Tobacco-Free Environment Certification form is required from the successful Bidder.

Pursuant to, without limitation, 20 U.S.C section 6083, Labor Code section 6400 et seq., Health & Safety Code section 104350 et seq., and District Board policies, all District sites, including the Project site, are tobacco-free environments. Smoking and the use of tobacco products by all persons is prohibited on or in District property. District property includes school buildings, school grounds, school-owned vehicles and vehicles owned by others while on District property.

I acknowledge that I am aware of the District's policy regarding tobacco-free environments at District sites, including the Project site and hereby certify that I will adhere to the requirements of that policy and not permit any of my firm's employees, agents, subcontractors, or my firm's subcontractors' employees or agents, to use tobacco and/or smoke on the Project site.

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

Proper Name of Contractor: STE Electric dba Solar Technologies

Signature: \_\_\_\_\_

Print Name: \_\_\_\_\_

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

END OF DOCUMENT

**FINGERPRINTING/CRIMINAL BACKGROUND INVESTIGATION CERTIFICATION**

PROJECT/CONTRACT NO.: \_\_\_\_\_ between the San Rafael City Schools ("District") and STE Electric dba Solar Technologies ("Contractor") ("Contract" or "Project").

The undersigned does hereby certify to the governing board of the District as follows:

That I am a representative of the Contractor currently under contract with the District; that I am familiar with the facts herein certified; and that I am authorized and qualified to execute this certificate on behalf of Contractor.

Contractor certifies that it has taken at least one of the following actions with respect to the construction Project that is the subject of the Contract (check all that apply):

- ☐ The Contractor is a sole proprietor and intends to comply with the fingerprinting requirements of Education Code section 45125.1(k) with respect to all Contractor's employees who may have contact with District pupils in the course of providing services pursuant to the Contract, and hereby agrees to the District's preparation and submission of fingerprints such that the California Department of Justice may determine that none of those employees has been convicted of a felony, as that term is defined in Education Code section 45122.1. No work shall commence until such determination by DOJ has been made.

As an authorized District official, I am familiar with the facts herein certified, and am authorized to execute this certificate on behalf of the District and undertake to prepare and submit Contractor's fingerprints as if he or she was an employee of the District.

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

District Representative's Name and Title: \_\_\_\_\_

District Representative's Signature: \_\_\_\_\_

- ☐ The Contractor, who is not a sole proprietor, has complied with the fingerprinting requirements of Education Code section 45125.1 with respect to all Contractor's employees and all of its Subcontractors' employees who may have contact with District pupils in the course of providing services pursuant to the Contract, and the California Department of Justice has determined that none of those employees has been convicted of a felony, as that term is defined in Education Code section 45122.1. A complete and accurate list of Contractor's employees and of all of its subcontractors' employees who may come in contact with District pupils during the course and scope of the Contract is attached hereto; and/or
- ☐ Pursuant to Education Code section 45125.2, Contractor has installed or will install, prior to commencement of Work, a physical barrier at the Work Site, that will limit contact between Contractor's employees and District pupils at all times; and/or
- ☐ Pursuant to Education Code section 45125.2, Contractor certifies that all employees will be under the continual supervision of, and monitored by, an employee of the Contractor who the California Department of Justice has ascertained, or as described below, will ascertain, has not been convicted of a violent or serious felony. The name and title of the employee who will be supervising Contractor's and its subcontractors' employees is:

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



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

**NOTE:** If the Contractor is a sole proprietor, and elects the above option, Contractor must have the above-named employee's fingerprints prepared and submitted by the District, in accordance with Education Code section 45125.1(k). No work shall commence until such determination by DOJ has been made.

As an authorized District official, I am familiar with the facts herein certified, and am authorized to execute this certificate on behalf of the District and undertake to prepare and submit Contractor's fingerprints as if he or she was an employee of the District.

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

District Representative's Name and Title: \_\_\_\_\_

District Representative's Signature: \_\_\_\_\_

- ☐ *The Work on the Contract is either (i) at an unoccupied school site and no employee and/or subcontractor or supplier of any tier of the Contract shall come in contact with the District pupils or (ii) Contractor's employees or any subcontractor or supplier of any tier of the Contract will have only limited contact, if any, with District pupils and the District will take appropriate steps to protect the safety of any pupils that may come in contact with Consultant's employees, subcontractors or suppliers so that the fingerprinting and criminal background investigation requirements of Education Code section 45125.1 shall not apply to Contractor under the Contract.*

*As an authorized District official, I am familiar with the facts herein certified, and am authorized to execute this certificate on behalf of the District.*

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

District Representative's Name and Title: \_\_\_\_\_

District Representative's Signature: \_\_\_\_\_

Contractor's responsibility for background clearance extends to all of its employees, Subcontractors, and employees of Subcontractors coming into contact with District pupils regardless of whether they are designated as employees or acting as independent contractors of the Contractor.

Date: \_\_\_\_\_  
Proper Name of Contractor: STE Electric dba Solar Technologies  
Signature: \_\_\_\_\_  
Print Name: \_\_\_\_\_  
Title: \_\_\_\_\_

## **HAZARDOUS MATERIALS CERTIFICATION**

PROJECT/CONTRACT NO.: \_\_\_\_\_ between San Rafael City Schools ("District") and STE Electric dba Solar Technologies ("Contractor" or "Bidder") ("Contract" or "Project").

1. If photovoltaic modules using hazardous materials are to be provided by Contractor, then the environmental impact of the hazardous material usage must be discussed, including any special maintenance requirements and proper disposal/recycling of the modules at the end of their useful life. Modules containing hazardous materials must comply with the EPA Landfill Disposal Requirements. Any additional costs and/or District responsibilities related to photovoltaic modules containing hazardous materials must be clearly identified. Notwithstanding anything herein to the contrary, District shall be exclusively responsible for, and Contractor shall have no responsibility for, any environmental liabilities relating to the Site, except for such pollution, toxic emissions, and other hazardous materials as are transported onto the site by Contractor during construction of the System.
2. Contractor further certifies that it has instructed its employees with respect to the standards, hazards, risks, and liabilities regarding asbestos, or asbestos-containing materials, polychlorinated biphenyl (PCB), or any material listed by the federal or state Environmental Protection Agency or federal or state health agencies as a hazardous material, or any other material defined as being hazardous under federal or state laws, rules, or regulations.
3. Asbestos and/or asbestos-containing material shall be defined as all items containing but not limited to chrysotile, crocidolite, amosite, anthophyllite, tremolite, and actinolite. Any or all material containing greater than one-tenth of one percent (0.1%) asbestos shall be defined as asbestos-containing material.

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

Proper Name of Contractor: STE Electric dba Solar Technologies

Signature: \_\_\_\_\_

Print Name: \_\_\_\_\_

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

END OF DOCUMENT

## **LEAD-BASED MATERIALS CERTIFICATION**

PROJECT/CONTRACT NO.: \_\_\_\_\_ between the San Rafael City Schools ("District") and STE Electric dba Solar Technologies ("Contractor" or "Bidder") ("Contract" or "Project").

This certification provides notice to the Contractor that:

Contractor's work may disturb lead-containing building materials.

Contractor shall notify the District if any work may result in the disturbance of lead-containing building materials.

Contractor shall comply with the Renovation, Repair and Painting Rule, if lead-based paint is disturbed in a six-square-foot or greater area indoors or a 20-square-foot or greater area outdoors.

### **1. Lead as a Health Hazard**

Lead poisoning is recognized as a serious environmental health hazard facing children today. Even at low levels of exposure, much lower than previously believed, lead can impair the development of a child's central nervous system, causing learning disabilities, and leading to serious behavioral problems. Lead enters the environment as tiny lead particles and lead dust disburses when paint chips, chalks, peels, wears away over time, or is otherwise disturbed. Ingestion of lead dust is the most common pathway of childhood poisoning; lead dust gets on a child's hands and toys and then into a child's mouth through common hand-to-mouth activity. Exposures may result from construction or remodeling activities that disturb lead paint, from ordinary wear and tear of windows and doors, or from friction on other surfaces.

Ordinary construction and renovation or repainting activities carried out without lead-safe work practices can disturb lead-based paint and create significant hazards. Improper removal practices, such as dry scraping, sanding, or water blasting painted surfaces, are likely to generate high volumes of lead dust.

Because the Contractor and its employees will be providing services for the District, and because the Contractor's work may disturb lead-containing building materials, CONTRACTOR IS HEREBY NOTIFIED of the potential presence of lead-containing materials located within certain buildings utilized by the District. All school buildings built prior to 1978 are presumed to contain some lead-based paint until sampling proves otherwise.

### **2. Overview of California Law**

Education Code section 32240 et seq. is known as the Lead-Safe Schools Protection Act. Under this act, the Department of Health Services is to conduct a sample survey of schools in the State of California for the purpose of developing risk factors to predict lead contamination in public schools. (Ed. Code, § 32241.)

Any school that undertakes any action to abate existing risk factors for lead is required to utilize trained and state-certified contractors, inspectors, and workers.

(Ed. Code, § 32243, subd. (b).) Moreover, lead-based paint, lead plumbing, and solders, or other potential sources of lead contamination, shall not be utilized in the construction of any new school facility or the modernization or renovation of any existing school facility. (Ed. Code, § 32244.)

Both the Federal Occupational Safety and Health Administration ("Fed/OSHA") and the California Division of Occupational Safety and Health ("Cal/OSHA") have implemented safety orders applicable to all construction work where a contractor's employee may be occupationally exposed to lead.

The OSHA Regulations apply to all construction work where a contractor's employee may be occupationally exposed to lead. The OSHA Regulations contain specific and detailed requirements imposed on contractors subject to those regulations. The OSHA Regulations define construction work as work for construction, alteration, and/or repair, including painting and decorating. Regulated work includes, but is not limited to, the following:

Demolition or salvage of structures where lead or materials containing lead are present;

Removal or encapsulation of materials containing lead;

New construction, alteration, repair, or renovation of structures, substrates, or portions thereof, that contain lead, or materials containing lead;

Installation of products containing lead;

Lead contamination/emergency cleanup;

Transportation, disposal, storage, or containment of lead or materials containing lead on the site or location at which construction activities are performed; and

Maintenance operations associated with the construction activities described in the subsection.

Because it is assumed by the District that all painted surfaces (interior as well as exterior) within the District contain some level of lead, it is imperative that the Contractor, its workers and subcontractors fully and adequately comply with all applicable laws, rules and regulations governing lead-based materials (including title 8, California Code of Regulations, section 1532.1).

**Contractor shall notify the District if any Work may result in the disturbance of lead-containing building materials. Any and all Work that may result in the disturbance of lead-containing building materials shall be coordinated through the District. A signed copy of this Certification shall be on file prior to beginning Work on the Project, along with all current insurance certificates.**

**3. Renovation, Repair and Painting Rule, Section 402(c)(3) of the Toxic Substances Control Act**

The EPA requires lead safe work practices to reduce exposure to lead hazards created by renovation, repair and painting activities that disturb lead-based paint.

Pursuant to the Renovation, Repair and Painting Rule (RRP), renovations in homes, childcare facilities, and schools built prior to 1978 must be conducted by certified renovations firms, using renovators with training by a EPA-accredited training provider, and fully and adequately complying with all applicable laws, rules and regulations governing lead-based materials, including those rules and regulations appearing within title 40 of the Code of Federal Regulations as part 745 (40 CFR 745).

The RRP requirements apply to all contractors who disturb lead-based paint in a six-square-foot or greater area indoors or a 20-square-foot or greater area outdoors. If a DPH-certified inspector or risk assessor determines that a home constructed before 1978 is lead-free, the federal certification is not required for anyone working on that particular building.

#### **4. Contractor's Liability**

If the Contractor fails to comply with any applicable laws, rules, or regulations, and that failure results in a site or worker contamination, the Contractor will be held solely responsible for all costs involved in any required corrective actions, and shall defend, indemnify, and hold harmless the District, pursuant to the indemnification provisions of the Contract, for all damages and other claims arising therefrom.

If lead disturbance is anticipated in the Work, only persons with appropriate accreditation, registrations, licenses, and training shall conduct this Work.

It shall be the responsibility of the Contractor to properly dispose of any and all waste products, including, but not limited to, paint chips, any collected residue, or any other visual material that may occur from the prepping of any painted surface. It will be the responsibility of the Contractor to provide the proper disposal of any hazardous waste by a certified hazardous waste hauler. This company shall be registered with the Department of Transportation (DOT) and shall be able to issue a current manifest number upon transporting any hazardous material from any school site within the District.

The Contractor shall provide the District with any sample results prior to beginning Work, during the Work, and after the completion of the Work. The District may request to examine, prior to the commencement of the Work, the lead training records of each employee of the Contractor.

THE CONTRACTOR HEREBY ACKNOWLEDGES, UNDER PENALTY OF PERJURY, THAT IT:

1. HAS RECEIVED NOTIFICATION OF POTENTIAL LEAD-BASED MATERIALS ON THE OWNER'S PROPERTY;
2. IS KNOWLEDGEABLE REGARDING AND WILL COMPLY WITH ALL APPLICABLE LAWS, RULES, AND REGULATIONS GOVERNING WORK WITH, AND DISPOSAL, OF LEAD.

THE UNDERSIGNED WARRANTS THAT HE/SHE HAS THE AUTHORITY TO SIGN ON BEHALF OF AND BIND THE CONTRACTOR. THE DISTRICT MAY REQUIRE PROOF OF SUCH AUTHORITY.

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

Proper Name of Contractor: STE Electric dba Solar Technologies

Signature: \_\_\_\_\_

Print Name: \_\_\_\_\_

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

END OF DOCUMENT

**IRAN CONTRACTING ACT CERTIFICATION**  
**(Public Contract Code Sections 2202-2208)**

PROJECT/CONTRACT NO.: \_\_\_\_\_ between the San Rafael City School District ("District") and STE Electric dba Solar Technologies ("Contractor" or "Bidder") ("Contract" or "Project").

Prior to bidding on or submitting a proposal for a contract for goods or services of \$1,000,000 or more, the bidder/proposer must submit this certification pursuant to Public Contract Code section 2204.

The bidder/proposer must complete **ONLY ONE** of the following two options. To complete OPTION 1, check the corresponding box **and** complete the certification below. To complete OPTION 2, check the corresponding box, complete the certification below, and attach documentation demonstrating the exemption approval.

- ☐ **OPTION 1.** Bidder/Proposer is not on the current list of persons engaged in investment activities in Iran created by the California Department of General Services ("DGS") pursuant to Public Contract Code section 2203(b), and we are not a financial institution extending twenty million dollars (\$20,000,000) or more in credit to another person, for 45 days or more, if that other person will use the credit to provide goods or services in the energy sector in Iran and is identified on the current list of persons engaged in investment activities in Iran created by DGS.
- ☐ **OPTION 2.** Bidder/Proposer has received a written exemption from the certification requirement pursuant to Public Contract Code sections 2203(c) and (d). *A copy of the written documentation demonstrating the exemption approval is included with our bid/proposal.*

**CERTIFICATION:**

I, the official named below, CERTIFY UNDER PENALTY OF PERJURY, that I am duly authorized to legally bind the bidder/proposer to the OPTION selected above. This certification is made under the laws of the State of California.

Vendor Name/Financial Institution (Printed)	Federal ID Number (or n/a)
By (Authorized Signature)	
Printed Name and Title of Person Signing	Date Executed

END OF DOCUMENT

**INSURANCE CERTIFICATES AND ENDORSEMENTS**

[TO BE INSERTED]



**PERFORMANCE BOND**  
**(100% of Total Contract Price)**

KNOW ALL PERSONS BY THESE PRESENTS:

WHEREAS, the governing board ("Board") of **San Rafael City Schools** ("District") and **STE Electric dba Solar Technologies** ("Principal") have entered into a contract for the furnishing of all materials and labor, services and transportation, necessary, convenient, and proper to perform the following project:

**Glenwood Elementary School and San Pedro Elementary School Solar Photovoltaic Project**

("Project"), which Agreement dated May 13, 2019, and all of the Contract Documents attached to or forming a part of the Agreement, are hereby referred to and made a part hereof ("Agreement"), and

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

NOW, THEREFORE, the Principal and \_\_\_\_\_ ("Surety") are held and firmly bound unto the Board of the District in the penal sum of **Seven Hundred Eighty-Eight Thousand, One Hundred and Twenty Dollars (\$788,120)**, lawful money of the United States, for the payment of which sum well and truly to be made we bind ourselves, our heirs, executors, administrators, successors, and assigns jointly and severally, firmly by these presents, to:

1. Perform all the work required to complete the Project; and
2. Pay to the District all damages the District incurs as a result of the Principal's failure to perform all the Work required to complete the Project.

Or, at the District's sole discretion and election, the Surety shall obtain a bid or bids for completing the Agreement in accordance with its terms and conditions, and upon determination by the District of the lowest responsible bidder, arrange for a contract between such bidder and the District and make available as Work progresses sufficient funds to pay the cost of completion less the "balance of the Total Contract Price," and to pay and perform all obligations of Principals under the Contract, including, without limitation, all obligations with respect to warranties, guarantees and the payment of liquidated damages. The term "balance of the Total Contract Price," as used in this paragraph, shall mean the total amount payable to Principal by the District under the Agreement and any modifications thereto, less the amount previously paid by the District to the Principal, less any withholdings by the District allowed under the Contract. Surety shall not utilize Principal in completing the Project nor shall Surety accept a Bid from Principal for completion of the Work if the District, when declaring the Principal in default, notifies Surety of the District's objection to Principal's further participation in the completion of the Work. Surety expressly agrees that the District may reject any contractor or subcontractor which may be proposed by Surety in fulfillment of its obligations in the event of default by the Principal.

The condition of the obligation is such that, if the above bounden Principal, his or its heirs, executors, administrators, successors, or assigns, shall in all things stand to and abide by,

and well and truly keep and perform the covenants, conditions, and agreements in the Agreement and any alteration thereof made as therein provided, on his or its part to be kept and performed at the time and in the intent and meaning, including all contractual guarantees and warranties of materials and workmanship, and shall indemnify and save harmless the District, its trustees, officers and agents, as therein stipulated, then this obligation shall become null and void, otherwise it shall be and remain in full force and virtue.

As a condition precedent to the satisfactory completion of the Agreement, the above obligation shall hold good for a period ending one year after the date of Final Completion during which time Surety's obligation shall continue if Principal shall fail to make full, complete, and satisfactory repair and replacements and totally protect the District from loss or damage resulting from or caused by defective materials or faulty workmanship. The above obligation is separate from and does not affect to the obligations under a performance guarantee, a maintenance services agreement, or any warranty obligations that are effective for any period longer than one year following the Final Completion date.

Nothing herein shall limit the District's rights or the Principal's or Surety's obligations under the Agreement, law or equity, including, but not limited to, the District's rights against Principal under California Code of Civil Procedure section 337.15.

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

IN WITNESS WHEREOF, two (2) identical counterparts of this instrument, each of which shall for all purposes be deemed an original thereof, have been duly executed by the Principal and Surety above named, on the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Principal

\_\_\_\_\_  
By

\_\_\_\_\_  
Surety

\_\_\_\_\_  
By

\_\_\_\_\_  
Name of California Agent of Surety

\_\_\_\_\_  
Address of California Agent of Surety

\_\_\_\_\_  
Telephone Number of California Agent of Surety

**Please attach a Notarial Acknowledgment for all Surety's signatures and a Power of Attorney and Certificate of Authority for Surety. The California Department of Insurance must authorize the Surety to be an admitted surety insurer.**

**PAYMENT BOND**

**Contractor's Labor & Material Bond  
(100% of Total Contract Price)**

KNOW ALL PERSONS BY THESE PRESENTS:

That WHEREAS, the governing board ("Board") of **San Rafael City Schools** ("District") and **STE Electric dba Solar Technologies** ("Principal") have entered into a contract for the furnishing of all materials and labor, services and transportation, necessary, convenient, and proper to perform the following project:

**Glenwood Elementary School and San Pedro Elementary School Solar Photovoltaic Project**

("Project") which Agreement dated May 13, 2019, and all of the Contract Documents attached to or forming a part of the Agreement, are hereby referred to and made a part hereof ("Agreement"), and

WHEREAS, pursuant to law and the Agreement, the Principal is required, before entering upon the performance of the work, to file a good and sufficient bond with the body by which the Agreement is awarded in an amount equal to one hundred percent (100%) of the Total Contract Price, to secure the claims to which reference is made in sections 9000 through 9510 and 9550 through 9566 of the California Civil Code, and division 2, part 7, of the Labor Code.

NOW, THEREFORE, the Principal and \_\_\_\_\_, ("Surety") are held and firmly bound unto all laborers, material men, and other persons referred to in said statutes in the sum of **Seven Hundred Eighty-Eight Thousand, One Hundred and Twenty Dollars (\$788,120)**, lawful money of the United States, being a sum not less than the total amount payable by the terms of Agreement, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, or assigns, jointly and severally, by these presents.

The condition of this obligation is that if the Principal or any of its subcontractors, or the heirs, executors, administrators, successors, or assigns of any, all, or either of them shall fail to pay for any labor, materials, provisions, provender, or other supplies, used in, upon, for or about the performance of the work contracted to be done, or for any work or labor thereon of any kind, or for amounts due under the Unemployment Insurance Act with respect to such work or labor, that the Surety will pay the same in an amount not exceeding the amount herein above set forth, and also in case suit is brought upon this bond, will pay a reasonable attorney's fee to be awarded and fixed by the Court, and to be taxed as costs and to be included in the judgment therein rendered.

It is hereby expressly stipulated and agreed that this bond shall inure to the benefit of any and all persons, companies, and corporations entitled to file claims under section 9100 of the California Civil Code, so as to give a right of action to them or their assigns in any suit brought upon this bond.

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

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

IN WITNESS WHEREOF, two (2) identical counterparts of this instrument, each of which shall for all purposes be deemed an original thereof, have been duly executed by the Principal and Surety above named, on the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Principal

\_\_\_\_\_  
By

\_\_\_\_\_  
Surety

\_\_\_\_\_  
By

\_\_\_\_\_  
Name of California Agent of Surety

\_\_\_\_\_  
Address of California Agent of Surety

\_\_\_\_\_  
Telephone Number of California Agent of Surety

**Please attach a Notarial Acknowledgment for all Surety's signatures and a Power of Attorney and Certificate of Authority for Surety. The California Department of Insurance must authorize the Surety to be an admitted surety insurer.**

**Exhibit "A"**  
**CEC Approved EEP**

[TO BE INSERTED]

## Exhibit "B"

### System Descriptions

San Rafael City Schools Solar Photovoltaic Project

Proposing Company Name:	Solar Technologies
-------------------------	--------------------

### System Specification

Shade Structure Manufacturer/Model/DSA PC #	Elevated Solar Performance
Monitoring System Manufacturer/Model	SolarEdge gateway/consumption monitoring CTs/DAS included/5 year cellular card

Array Specification								PV Module Specification					
Site Name	Array Code	Installation Type	Azimuth (°)	Tilt (°)	Min Clearance (from Ground/Roof) (ft)	Width (ft)	Length (ft)	Manufacturer	Model No	DC STC Rating (Watts)	PTC Rating (Watts)	Module Quantity	DC Array Size (kW)
Glenwood ES	A1	Array Over Parking	144°	7°	12	41.5	119.5	SunPower	SPR-P19-395-COM	395	355.5	216	85.320
													0.000
Site Total													85.320
San Pedro ES	A1	Parking	191°	7°	12	41.5	152.5	SunPower	395-COM	395	355.5	276	109.020
													0.000
Site Total													109.020
Project Total kW DC Rating													194.340

Inverter Specification											Production	
Site Name	Inverter Code	Manufacturer	Model No	Inverter Quantity	Inverter Rating (kW AC)	Inverter CEC Efficiency Rating	AC voltage (V)	AC Wire Type	CEC AC Rating (kW)	DC/AC Ratio	Year 1 Expected Production (kWh)	Expected Yield (kWh/kW DC)
Glenwood ES	INV1	SolarEdge	SE14.4KUS	5	14.4	97.0%	208	Copper	74.5	1.185	133,516	1,565
									0.0	0.000		
Site Total									74.484			
San Pedro ES	INV1	SolarEdge	SE43.2K	2	43.2	97.0%	208	Copper	95.2	1.262	170,812	1,567
									0.0	0.000		
Site Total									95.174			
Project Total CEC-AC									169.659	kW	304,328	kWh

## Executive Summary Glenwood Elementary School

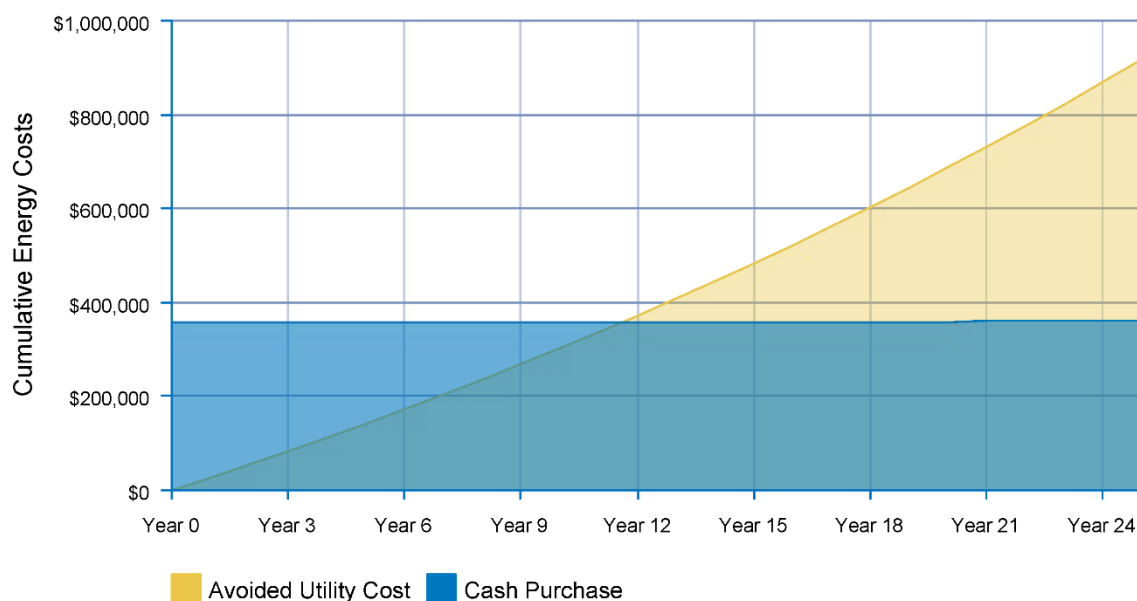
### SunPower Solar PV Project Details:

Peak Output Rating (kW-DC):	85.3 kW-DC
Peak Output Rating (kW-AC):	74.3 kW-AC
Total PV Generation in Year 1:	133,515 kWh
<b>Project Cost Per Kilowatt-DC:</b>	<b>4</b>

**Project Description:** Turnkey installation of Carport SunPower solar PV system including design, engineering, permitting, equipment procurement, construction, commissioning and utility interconnection.

Payment Options	Cash Purchase
Upfront Payment	\$357,491
Total Payments	\$357,491
Rebates and Incentives	-
Net Payments	\$357,491
25-Year Electric Bill Savings	\$917,507
Electric Bill Savings Year 1	\$26,990
25-Year IRR	7.96%
25-Year LCOE PV	\$0.114
25-Year NPV	\$127,962
Payback Period	11.6 Years

### Long-Term Electricity Cost Forecast: Solar vs. PG&E (Status Quo)



**Tim Glanville** 415-845-1254 | [tglanville@solartechnologies.com](mailto:tglanville@solartechnologies.com)  
 CA LIC 932914 (C10/C46) | Santa Cruz, CA | San Ramon, CA

# Glenwood ES Preliminary Layout and System Details

## General Information

Facility: Glenwood ES

Address: 25 W Castlewood Dr San Rafael, CA 94901

## Solar PV System Nameplate Rating

Power Rating (kW-DC): 85.3 kW-DC

Power Rating (kW-AC): 72.0 kW-AC

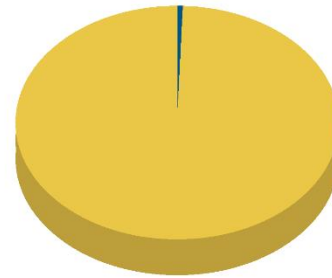
## Solar PV Equipment Description

Modules: (216) SunPower SPR-P19-395-COM

Inverters: (5) SolarEdge SE14.4KUS

## Energy Consumption Mix

Annual Energy Use: 134,294 kWh



Utility	779 kWh (0.58%)
Solar PV	133,515 kWh (99.42%)



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## Executive Summary San Pedro Elementary School

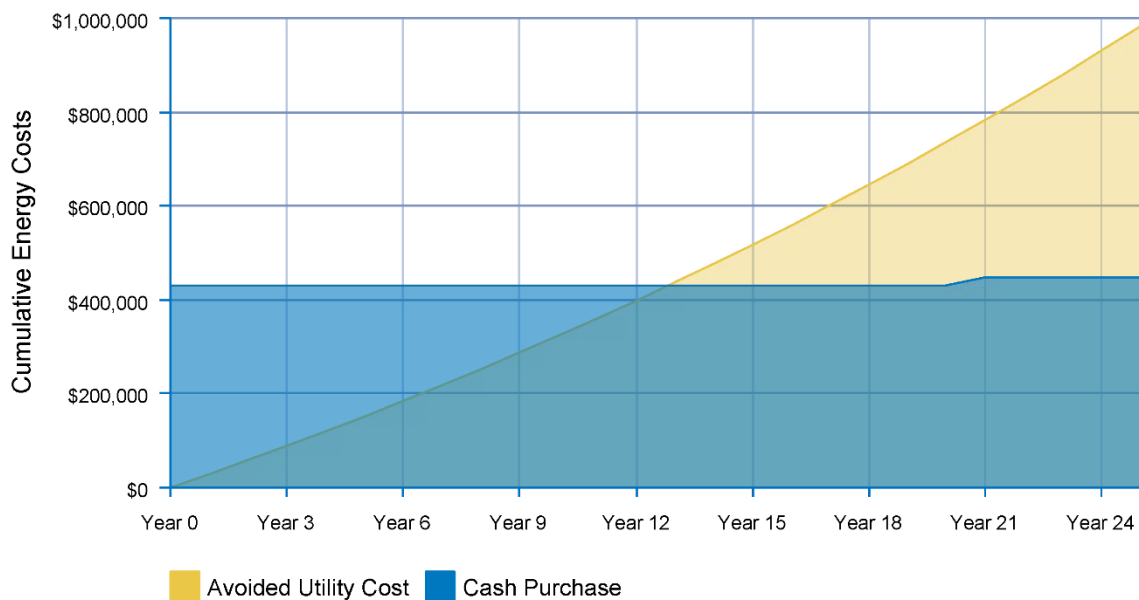
### SunPower Solar PV Project Details:

Peak Output Rating (kW-DC):	109.0 kW-DC
Peak Output Rating (kW-AC):	95.9 kW-AC
Total PV Generation in Year 1:	170,812 kWh
<b>Project Cost Per Kilowatt-DC:</b>	<b>4</b>

**Project Description:** Turnkey installation of Carport SunPower solar PV system including design, engineering, permitting, equipment procurement, construction, commissioning and utility interconnection.

Payment Options	Cash Purchase
Upfront Payment	\$430,629
Total Payments	\$430,629
Rebates and Incentives	-
Net Payments	\$430,629
25-Year Electric Bill Savings	\$982,791
Electric Bill Savings Year 1	\$28,911
25-Year IRR	6.69%
25-Year LCOE PV	\$0.107
25-Year NPV	\$84,574
Payback Period	12.8 Years

### Long-Term Electricity Cost Forecast: Solar vs. PG&E (Status Quo)



**Tim Glanville** 415-845-1254 | [tglanville@solartechnologies.com](mailto:tglanville@solartechnologies.com)  
CA LIC 932914 (C10/C46) | Santa Cruz, CA | San Ramon, CA

# San Pedro ES Preliminary Layout and System Details

### General Information

Facility: San Pedro ES  
Address: 498 Point San Pedro Rd San Rafael, CA 94901

### Solar PV System Nameplate Rating

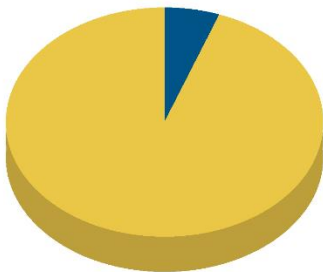
Power Rating (kW-DC): 109.0 kW-DC  
Power Rating (kW-AC): 86.4 kW-AC

### Solar PV Equipment Description

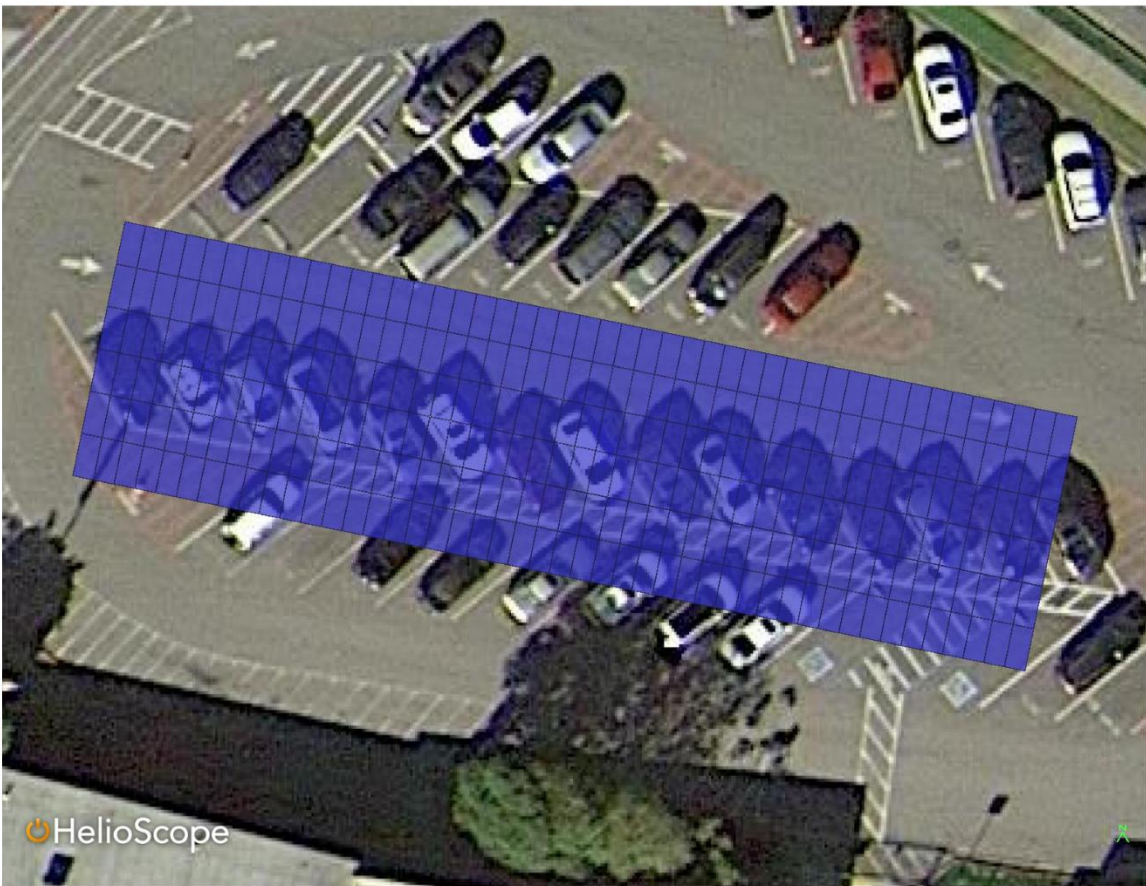
Modules: (276) SunPower SPR-P19-395-COM  
Inverters: (2) SolarEdge SE43.2K

### Energy Consumption Mix

Annual Energy Use: 180,975 kWh



Utility	10,163 kWh (5.62%)
Solar PV	170,812 kWh (94.38%)



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CA LIC 932914 (C10/C46) | Santa Cruz, CA | San Ramon, CA

[END OF EXHIBIT]

## **Exhibit "C"**

### **Scope of Work**

#### Project Scope

The Project scope shall include, but not be limited to, the following, as further described and supplemented within the Agreement, including but not limited to Exhibits "E" and "F":

#### **I. DESIGN PHASE**

1. Development and implementation of community outreach plan and community meetings for stakeholders and community members shall be included as part of the pre-design phase of the project.
2. Preliminary design of the PV systems to meet the targeted electrical production at each site or to the maximum system size limits allowed by the footprint available or to an agreed upon size with the District. Sizing shall include accurate and detailed modeling of system production for each specific site based on shading, available tariffs and other site constraints using industry standard modeling tools. Preliminary design shall include plans sufficient for presentation and discussion with the District.
3. Detailed design and complete construction drawings of the PV systems and all ancillary work sufficient for permitting and construction. Drawings must fully describe all aspects of the construction work including fencing, directional boring/trenching, excavations, racking and mounting systems, electrical systems, signage, foundations, lighting, ADA, etc. Contractor will provide Electrical, Structural and all other required Engineers of Record and Architect of Record to provide a complete, stamped bid package as required to permit and construct a complete photovoltaic Project for DSA submittal. The electrical construction drawings shall show and include all conduit below and above finished grade/finish. All plans and specifications must meet the approval of DSA, the District, the District's representative, Local Fire Authority and/or any other agency deemed as having jurisdiction over Project.
4. Contractor is responsible for the identification of light poles in conflict with the PV system design(s). Light poles proposed by Contractor to be removed shall be identified on the Contractor's proposed layouts and design drawings and removal is subject to District approval.
5. All permitting and permitting fees required to complete the project, including DSA, with the exception of CEQA. The District is the lead agency for CEQA permitting. Contractor must support the District in preparing any required CEQA documentation (including any exemption materials), adhere to applicable CEQA requirements, and implement any CEQA mitigation identified by the District.
6. Contractor is responsible for all site due diligence activities, which shall include: Title report and easement review, topographical survey, civil survey, electrical survey, geo-technical study, USA, and ground penetrating radar.

#### **II. CONSTRUCTION PHASE**

1. Installation of all equipment necessary for a complete, interconnected and operational solar PV system, including, but not limited to:
  - Solar PV modules
  - Inverters
  - All electrical switch gear modification necessary to interconnect the PV system

- All electrical connectors, cabling & components necessary for a complete solar system
  - All mounting systems, including canopy structures, ground or roof mount as applicable
  - All monitoring equipment necessary to remotely access and download real-time and historical PV energy production, with capability to provide reporting sufficient for WREGIS REC registration, and to remotely access and download real-time and historical site energy consumption data. Historical data on 15-minute interval shall be readily available for the full operating history of the PV system.
  - Any balance of system items for a complete, interconnected and operational solar PV system
  - Permanent fencing for all ground mounted equipment
  - All lighting, security or other ancillary equipment described in the Contract documents
  - Installation of accessible hardscape (concrete slabs) under canopies not currently hardscaped, where required by the AHJ for equal access to shade.
2. Spare Conduits at each site. Contractor shall install spare conduits with terminations two (2) x 1.5" conduits with appropriately rated pull string and properly capped, to terminate at canopies as indicated in Exhibit G, on column above foundation, minimum 6' above grade and terminate at wall-mounted junction box or Christy Box adjacent to Main Service.
  3. Educational Component for each site. Contractor shall provide an educational component that incorporates the PV project and systems into classroom curriculum and solar PV educational program assistance, as set forth in Exhibit "I".
  4. Utility interconnection applications, including tariff change requests, processing costs and coordination with the local utility(ies) necessary to achieve interconnect and permission to operate.
  5. Identification of all Americans with Disabilities Act (ADA) compliance issues that are directly associated with the PV project. The Contractor shall be responsible for ADA compliance measures within the canopy footprint(s), including but not limited to Work and/or costs associated with: DSA plan check and construction costs, parking lot restriping, covered parking space ratios, signage, and any other compliance issues that are located under the footprint of any PV array canopy, including canopies not located in parking lots. The District shall be responsible for all other ADA compliance improvements outside of canopy areas (i.e. path of travel access issues that fall outside of the canopy footprint).
  6. To the extent District approves the removal of light pole(s), light pole(s) shall be removed to maintain reusability by the District and transported to the District Maintenance Yard. Light pole foundation shall be chipped to a sufficient depth so as to allow for existing conduit to be contained in a concrete box that is flush with the surface and for resurfacing of areas surrounding any boxes to match existing surface. Chipping shall be a minimum of 6" below grade. Existing conduit that is not reused shall be capped and placed in a concrete box. Existing lighting controls may be reused, if available. Disturbed area(s) shall be repaired to match surrounding area. Light poles shall be provided in good condition to the District or disposed of at the District's option.
  7. Coordinate and schedule weekly project meetings from Notice to Proceed (NTP) through project closeout with all stakeholders. Contractor to maintain formal meeting minutes and a project schedule and distribute to all attendees no later than the next scheduled project

meeting. Frequency of meetings are allowed to change upon the stakeholder availability and approval from the District.

8. Coordination with and support of inspectors, the District and their consultants during design, construction, commissioning and close-out.
9. Any significant changes to District property (i.e. re-striping of parking areas, removal of trees, light standard removal, new lighting, parking islands, etc.) that are required as a result of the installation of the PV project, with the exception of ADA path of travel outside of canopy footprints as outlined above, are the sole responsibility of the Contractor.
10. Project Commissioning, including all associated tasks and documentation related to successfully commissioning the system. Commissioning shall include assisting any third party commissioning agents/inspectors with their process and providing documentation as requested.
11. Final PV system "as-built" Construction Documents clearly conformed with all changes during construction.
12. Provision of a comprehensive Operations & Maintenance Manuals for each installed system, per requirements listed in Exhibit "F," Submittals and Project Acceptance Requirements.
13. Conduct a training for District staff, with orientation to the Operations & Maintenance Manuals, systems and safety procedures.
14. Secure storage facility at job Site for all PV system equipment and supplies, including any required security.
15. Legal toilet and hand wash sink facilities at job Sites.
16. Daily cleanup to "broom clean" conditions.
17. Return disturbed areas to pre-construction conditions including repair of all pavement/concrete, street sweeping, restriping, landscape restoration, irrigation restoration, equipment track marks & scuffs on finished concrete surfaces and removal of USA markings.
18. Installation of District approved project information signage and removal at completion of project.
19. Project closeout, inclusive of obtaining DSA closed and certified status for all project associated DSA applications.
20. Provide temporary ADA parking stalls during construction, if construction activities make existing facility ADA parking stalls unusable. Quantity and location of temporary stalls shall be coordinated with District.
21. Provide temporary lighting in place of removed overhead lighting until under-canopy lighting is fully operational.
22. Contractor shall be responsible for prompt removal and appropriate disposal of all spoils related to construction activities, excluding contaminated soils.

### **III. OPERATIONAL PHASE**

1. Contractor shall maintain all warranties per Exhibit K.

2. Contractor shall offer a comprehensive Operations and Maintenance Contract and Performance Guarantee. The District at its sole discretion may elect to negotiate and enter into an Operations and Maintenance contract with the Contractor.

#### **IV. CONSTRUCTION MILESTONES**

***(To be negotiated with selected Firm)***

<b>Site</b>	<b>Completion of Disruptive Activities</b>	<b>Project Final Completion</b>
Glenwood ES	3/06/2020	4/30/2020
San Pedro ES	3/06/2020	4/30/2020

[END OF EXHIBIT]

## **Exhibit "D"**

### **Criteria and Codes**

#### **I. GENERAL CODES, GUIDELINES AND STANDARDS**

Contractor shall comply with all applicable California public works and Project requirements including, but not limited to:

1. Americans with Disabilities Act (ADA).
2. American National Standards Institute (ANSI).
3. American Society for Testing and Materials (ASTM)
4. California Building Code (CBC).
5. California Electrical Code (most recent).
6. California Environmental Quality Act (CEQA).
7. California Fire (CalFire) Solar Photovoltaic Installation Guidelines.
8. California Geological Survey (CGS).
9. California Labor Code
10. California Title 20 and 24.
11. Federal Communications Commission (FCC).
12. Department of State Architects (DSA).
13. Local and State Fire Code.
14. Institute of Electrical and Electronics Engineers (IEEE) 1547: Standard for Interconnecting Distributed Resources with Electric Power Systems.
15. International Electrotechnical Commission (IEC) Technical Committee 82 (TC82).
16. National Fire Protection Association (NFPA), National Electric Code (NEC), Including NFPA 70 and NEC Article 690
17. National Electrical Manufacturers Association (NEMA).
18. Occupational Safety and Health Administration (CAL-OSHA).
19. Local Utility requirements including Net Energy Metering Rules, Interconnection Requirements and Tariffs.
20. Storm Water Pollution Prevention Plan (SWPPP).
21. Underwriters Laboratories (UL) Standards, including 1703: Flat-plate Photovoltaic Modules and Panels and 1741-SA: Standard for Inverters, Converters, Controllers, and Interconnection System Equipment for Use with Distributed Energy Resources.
22. Uniform Solar Energy Code – ICC.
23. All applicable State and Local Codes and Ordinances.
24. District Specifications and Requirements.
25. DSA IR-16-8 (most recent) Guidelines.
26. DSA PL 07-02 (most recent) Guidelines.

#### **II. SOLAR PV CRITERIA**

1. System area and sizing as shown in Exhibit G is generally larger than necessary to allow for maximum design flexibility. Designs shall meet the production targets specified in Exhibit G, utilizing the preferred areas first. Should a site have insufficient area identified to meet production targets, the additional array areas may be recommended.
2. All homerun routes identified in Exhibit G are preliminary. The Contractor shall be responsible for identifying the appropriate conductor route in coordination with the District. Contractor shall adhere to the number of tie-ins at each site as required in the

RFP. Any change from a physical tie-in to a NEM-A arrangement must be approved in writing by the District.

3. Contractor is responsible for all interconnection applications and work required to achieve Permission to Operate (PTO) with the local utility.
4. The Contractor shall work with the District as-needed to provide visualizations of proposed systems and assessment of potential glare or reflectivity issues.
5. Warranties - The Contractor shall be required to provide the following minimum warranties consistent with Net Energy Metering requirements and the California Public Utility Code 387.5(d)(4), the Contractor shall provide a warranty of not less than 10 years to protect against defects and more than a 15% degradation of electrical generation output that may occur as a result of faulty installation. Standard warranty coverage should be at least twenty-five (25) years for any PV modules, at least ten (10) years for all inverters, or consistent with current Net Energy Metering Requirements for PV System warranty requirements, whichever is greater. Meters must have a 1-year warranty to ensure against defective workmanship, system or component breakdown, or degradation in electrical output of more than 15% from their originally rated electrical output during the warranty period. For meters that are integrated into the inverter, the meter warranty period must be 10 years.
6. If the PV system is designed to be physically interconnected via bus tap, all work shall be represented in engineered drawings and inspected and certified by a licensed UL inspector. Existing facility switch gear shall also be re-certified by UL.

### **III. EQUIPMENT AND INSTALLATION STANDARDS**

All system design, equipment and installation must further conform to the following codes, standards, and rating methodologies:

1. All design, equipment and workmanship must comply with the requirements of the local electrical utility. The Contractor must ensure all proposed equipment is acceptable to the local electrical utility and meets the interconnection and code requirements.
2. If any equipment using hazardous materials (i.e. Cadmium or other hazardous materials) are included in the Project, then the environmental impact of the hazardous material usage must be discussed, including any special maintenance requirements and proper disposal/recycling of the equipment at the end of its useful life. Equipment containing hazardous materials must comply with the EPA Landfill Disposal Requirements. Any additional costs related to equipment containing hazardous materials must be clearly identified.
3. CPUC approved Electric Rule 21 – Generating Facility Interconnections.
4. UL1741-SA (Inverters, Converters and Controllers for Independent Power Systems).
5. UL1703 (Standard for Flat Plate Photovoltaic Modules and Panels).
6. IEEE 929 (2000) – Recommended Practice for Utility Interface of Photovoltaic (PV) Systems.
7. IEEE 1262 (1995) – Recommended Practice for Qualifications of Photovoltaic (PV) Modules.
8. NEC Article 690.



9. All applicable Utility Guidelines and Standards for PV Systems, electrical utility systems and metering requirements, including net energy metering requirements.
10. Conform to the Utility's Distribution Interconnection Handbook
11. Wind uplift requirements per the American Society of Civil Engineers Standard for Minimum Design Loads for Buildings and Other Structures (ASCE 7), and must be able to withstand applicable design wind speeds for that location (at least 85 mph or 105 mph, as applicable (3-second gusts)).
12. Wind and seismic design requirements as cited in Exhibit "F".
13. All other applicable codes.

**a. Lighting Systems.** Lighting systems shall further conform to the following codes, standards, and rating methodologies:

1. Canopy lighting systems shall be designed to meet the Illuminating Engineering Society of North America (IESNA) requirements for parking lot areas, to meet or exceed minimum values and maximum uniformity ratios as listed in the IESNA criteria.
2. Lighting shall meet all Title 24 requirements for installations in California.
3. All lighting sources shall be LED type.
4. Contractor to design all light fixture temperatures (Kelvin value) to District standards or preference.
5. Lighting control system shall be connected to the existing lighting controls in each area. If tie-in with existing circuits is not feasible, Contractor shall establish new circuit and controls.
6. Lighting design on canopies shall ensure cut-off light control to limit spill light or glare to adjoining areas as-needed. Design and install custom shielding or other mitigation measures to avoid light pollution and glare to neighbors.
7. Existing pole mounted lighting in areas of new carport canopies shall be removed. Modify other existing lighting to coordinate with the new work and design, including reconnection of any existing downstream circuiting and controls to remain. Foundations of existing pole mount lighting are to be completely removed a minimum of 6-inches below grade, with grade restored to surrounding condition.
8. New design shall cover all areas of the parking lots where existing lighting has been impacted by the solar canopies or within thirty feet (30') of the of the solar canopy drip line to leave no dark spots and meet IESNA and requirements for all areas previously covered by light standards removed under this contract. Contractor shall install new pole mounted luminaires if canopy lighting does not provide sufficient lighting in all areas previously covered by removed or altered light standards. Existing fixtures may remain, if not in direct conflict with canopies or causing shading of new canopies.

[END OF EXHIBIT]

**Exhibit "E"**  
**Special Conditions**

**1. Project Site Requirements**

1.27 **Access.** Access to the school buildings and entry to buildings, classrooms, restrooms, mechanical rooms, electrical rooms, or other rooms, for construction purposes, must be coordinated with District and onsite District personnel before Work is to start. Unless agreed to otherwise in writing, only a school custodian will be allowed to unlock and lock doors in existing building(s). The custodian will be available only while school is in session. If a custodian is required to arrive before 7:00 a.m. or leave after 3:30 p.m. to accommodate Contractor's Work, the overtime wages for the custodian will be paid by the Contractor, unless at the discretion of the District, other arrangements are made in advance.

1.27.1. No new access roads are planned; however, should the need arise, District and Contractor shall agree upon reasonable accommodations and compensation. District to permit using on site water and power as available for construction at no charge to District, with the exception of fire hydrants. District to permit use of a temporary diesel generator onsite during construction activities, subject to local ordinances.

1.27.2. The Contractor is responsible for maintaining fire lane access and clearances at all easements at all times.

1.27.3. Contractor must fence off all active work areas from start of Work at that area until completion or until area is safe for entry, whichever is longer. Temporary fencing and access control layouts shall be submitted to the District and approved for each site prior to commencing construction. Temporary fencing shall also be installed to protect trees and vegetation adjacent to work areas from construction damage.

1.27.4. Construction zone access points shall be limited to EVA entrance locations. Vehicle entrance to work zone shall occur outside of school hours. Entrance to construction zone shall be limited to periods when class is in session or outside of school hours. Classroom schedule shall be confirmed with District prior to Contractor's mobilization.

1.27.5. Driving on the Premises shall be limited to periods when students and public are not present. If driving or deliveries must be made during the school hours, two (2) or more ground guides shall lead the vehicle across the area of travel. In no case shall driving take place across playgrounds or other pedestrian paths during recess, lunch, and/or class period changes. The speed limit on-the Premises shall be five (5) miles per hour (maximum) or less if conditions require. District shall designate a construction entry point to each site.

1.27.6. During the operational phase, all staff or Sub-Contractors must check in at the office of the respective school upon arrival at the site.

1.28. **Keys.** Upon request, the District may, at its own discretion, provide keys to the school site for the convenience of the Contractor. The Contractor agrees to pay all expenses to re-key the entire school site and all other affected District buildings if the

keys are lost or stolen, or if any unauthorized party obtains a copy of the key or access to the school.

1.29. **Maintaining Services.** The Contractor is advised that Work is to be performed in spaces regularly scheduled for instruction. Interruption and/or periods of shutdown of public access, electrical service, water service, lighting, or other utilities shall be only as arranged in advance with the District. Contractor shall provide temporary services to all facilities interrupted by Contractor's Work.

1.30. **Maintaining Utilities.** The Contractor shall maintain in operation during duration of Contract, drainage lines, storm drains, sewers, water, gas, electrical, steam, and other utility service lines within working area.

1.30.1. The Contractor is responsible for locating and protecting all underground utilities. Contractor shall utilize Ground Penetrating Radar ("GPR") for all areas with underground construction. Purchaser to assist by providing As-built information, as available. However, as-built information shall be for informational purposes only. The District in no way guarantees the accuracy of as-built drawings.

1.31. **Vegetation.** Contractor is responsible for restoring, and irrigating until vegetation is established, all vegetated areas disturbed by construction. Vegetation should be planted to match existing. Any irrigation disturbed during construction is to be repaired to original condition by the Contractor. Contractor shall coordinate all landscaping and irrigation plans with the District. The Contractor shall initiate a pre-construction survey with the District to review the condition of irrigation systems prior to start of construction. Any such survey must be done with a District representative.

1.32. **Confidentiality.** Contractor shall maintain the confidentiality of all information, documents, programs, procedures and all other items that Contractor encounters while performing the Work. This requirement shall be ongoing and shall survive the expiration or termination of this Agreement and specifically includes, without limitation, all student, parent, and employee disciplinary information and health information.

1.33. **Work during Instructional Time.** By submitting its bid, Contractor affirms that Work may be performed during ongoing instruction in existing facilities. If so, Contractor agrees to cooperate to the best of its ability to minimize any disruption to school operations and any use of school facilities by the public up to, and including, rescheduling specific work activities, at no additional cost to District.

1.34. **No Work during Student Testing.** Contractor shall, at no additional cost to the District and at the District's request, coordinate its Work to not disturb District students including, without limitation, not performing any Work when students at the Site are taking State or Federally-required tests.

## **2. Trees and Tree Trimming**

2.1. Contractor shall be responsible for specifying and conducting tree removal and/or trimming as needed to meet production guarantee of PV system arrays. All tree stumps shall be ground or removed to a minimum of 18 inches below grade. Disturbed area shall be repaired to match surrounding area. Areas with trees eligible for removal or trimming will be identified with District written approval and should be confirmed during

the site walk. Trees to be removed shall be identified on the Contractor's proposed layouts and design drawings. Contractor agrees the operations & maintenance agreement shall include any ongoing tree trimming as needed to ensure the systems meet the performance guarantees.

### **3. Badge Policy for Contractor and All Contractors**

Contractor and all Contractors (hereinafter "Contractor" or "Contractors") doing work for the District will provide their workers with identification badges. These badges will be worn by all members of the Contractor's staff who are working in a District facility.

#### **3.1** Badges must be filled out in full and contain the following information:

3.1.1. Name of Contractor

3.1.2. Name of Employee

3.1.3. Contractor's address and phone number

3.2. Badges are to be worn when the Contractor or his/her employees are on site and must be visible at all times. Contractors must inform their employees that they are required to allow District employees, the Architect, the Construction Manager, the Program Manager, or the Project Inspector to review the information on the badges upon request.

3.3. Continued failure to display identification badges as required by this policy may result in the individual being removed from the Project or assessment of fines against the Contractor.

### **4. Storm Water Prevention Plan**

4.1. Contractor shall comply with the Storm Water Pollution Prevention Plan ("SWPPP"), and shall ensure implementation of a SWPPP for the purpose of preventing the discharge of pollutants from the construction site as required by the local AHJs.

### **5. Dust Mitigation Measures**

5.1. Contractor is to meet applicable codes and specifications with regard to dust during construction and seek to minimize dust migration from the construction site.

### **6. Noise Minimization**

6.1. Contractor acknowledges that adjacent facilities may remain in operation during all or a portion of the Work, and it shall take all reasonable precautions to minimize noise as required by applicable laws and the Contract Documents. Notice of proposed noisy operations, including without limitation, operation of pneumatic demolition tools, concrete saws, and other equipment, shall be submitted to District a minimum of forty-eight (48) hours in advance of their performance. Contractor shall further prevent any of its employees or its Sub-Contractor employees from playing any recorded music

devices or radios or wearing any radio headphone devices for entertainment while working on the project.

## **7. Substitution for Specified Items**

**7.1** Whenever in the Specifications any materials, process, or article is indicated or specified by grade, patent, or proprietary name, or by name of manufacturer, that Specification shall be deemed to be followed by the words "or equal." Contractor may, unless otherwise stated, offer any material, process, or article that shall be substantially equal or better in every respect to that so indicated or specified.

7.1.1. If the material, process, or article offered by Contractor is not, in the opinion of the District, substantially equal or better in every respect to that specified, then Contractor shall furnish the material, process, or article specified in the Specifications without any additional compensation or change order.

7.1.2. This provision shall not be applicable with respect to any material, product, thing or service for which District made findings and gave notice in accordance with Public Contract Code section 3400(c); therefore, Contractor shall not be entitled to request a substitution with respect to those materials, products or services.

7.2. A request for a substitution shall be submitted within thirty-five (35) days of the date of Board approval of the Agreement, within which time, Contractor shall provide data substantiating a request for substitution of "an equal" item, including but not limited to the following:

7.2.1. All variations of the proposed substitute from the material specified including, but not limited to, principles of operation, materials, or construction finish, thickness or gauge of materials, dimensions, weight, and tolerances;

7.2.2. Available maintenance, repair or replacement services;

7.2.3. Increases or decreases in operating, maintenance, repair, replacement, and spare parts costs;

7.2.4. Whether or not acceptance of the substitute will require other changes in the Work (or in work performed by the District or others under Contract with the District); and

7.2.5. The time impact on any part of the Work resulting directly or indirectly from acceptance of the proposed substitute.

7.3. No substitutions shall be made until approved, in writing, by the District. The burden of proof as to equality of any material, process, or article shall rest with Contractor. The Contractor warrants that if substitutes are approved:

7.3.1. The proposed substitute is equal or superior in all respects to that specified, and that such proposed substitute is suitable and fit for the intended purpose and will perform adequately the function and achieve the results called for by the general design and the Contract Documents;

- 7.3.2. The Contractor provides the same warranties and guarantees for the substitute that would be provided for that specified;
- 7.3.3. The Contractor shall be fully responsible for the installation of the substitute and any changes in the Work required, either directly or indirectly, because of the acceptance of such substitute, with no increase in Contract Price or Contract Time. Incidental changes or extra component parts required to accommodate the substitute will be made by the Contractor without a change in the Contract Price or Contract Time;
- 7.3.4. The Contractor shall be responsible for any re-design costs occasioned by District's acceptance and/or approval of any substitute; and
- 7.3.5. The Contractor shall, in the event that a substitute is less costly than that specified, credit the District with one hundred percent (100%) of the net difference between the substitute and the originally specified material. In this event, the Contractor agrees to execute a deductive Change Order to reflect that credit.
- 7.4. In the event Contractor furnishes a material, process, or article more expensive than that specified, the difference in the cost of that material, process, or article so furnished shall be borne by Contractor.
- 7.5. In no event shall the District be liable for any increase in Contract Price or Contract Time due to any claimed delay in the evaluation of any proposed substitute or in the acceptance or rejection of any proposed substitute.
- 7.6. Contractor shall be responsible for any costs the District incurs for professional services, DSA fees, or delay to the Project Schedule, if applicable, while DSA reviews changes for the convenience of Contractor and/or to accommodate Contractor's means and methods. District may deduct those costs from any amounts owing to the Contractor for the review of the request for substitution, even if the request for substitution is not approved. District, at its sole discretion, shall deduct from the payments due to and/or invoice Contractor for all the professional services and/or DSA fees or delay to the Project Schedule, if applicable, while DSA reviews changes for the convenience of Contractor and/or to accommodate Contractor's means and methods arising herein.

**8. [RESERVED]**

[END OF EXHIBIT]

**Exhibit "F"**  
**Submittals & Project Acceptance**

**I. DESIGN PHASE**

- A. The District shall review and approve design documentation based on the requirements specified in this Agreement. The design drawings and associated documents shall represent 100% of the intended and agreed upon scope for the Project.
- B. Upon Contract Execution, Contractor will be given Notice to Proceed (NTP) for the design phase of the project. Upon Design NTP, Contractor may begin due diligence and site discovery in close coordination with District staff for site access and scheduling. Contractor shall submit executed NTP to the District prior to commencing due diligence and site discovery.
- C. The Contractor shall organize and conduct weekly meetings during the design process, including providing formal meeting minutes. Three phases of formal design submittal are required as listed below. For each phase of submittal, Contractor shall conduct design review meetings and maintain and distribute formal meeting minutes for each stage.
- D. The Contractor shall submit an electronic submittal package for each Design Stage including, but not limited to the items outlined in Table 1, below.
- E. The Contractor shall host formal design review meetings with the District and its representatives for each design stage submittal. The Contractor shall submit the design stage package no less than five (5) business days prior to the design review meeting. The District and its representative(s) will provide formal comments for each phase of design. The Contractor shall address all District comments in writing on the District's form and provide with the following design submittal. The District's review period will not begin until a complete design package and comment responses are received. District comments shall be incorporated into each successive stage of the design review. If the District has substantial comments on the 90% submittal, a formal review of the 100% Design may be performed with subsequent revisions and comment tracking by the Contractor.
- F. The District will formally approve, in writing, each phase of the design upon the District's determination that the design is progressing at or beyond the percentage completion expected at stage. The Contractor shall not enter a subsequent design phase without the approval of the District.

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**Table 1 – Design Submittal Packages**

Submittal Requirement	30% Design	50% Design	90% Final
1. Cover Sheet (TOC, project details, designers of record, PV summary table <sup>1</sup> , etc.)	X	X	X
2. PV System Sizes & Production Estimates (see Item G, below)	X		X
3. Site Plan (including array names, interconnection details, conduit routes)	X		X
4. Interconnection Equipment Assessment <sup>3</sup>	X		X
5. Interconnection Plan			X
6. Electrical Site Plan Drawings, incl. Balance of System	X		X
7. Electrical Single Line Diagrams with Utility Meter #s	X		X
8. DC String Wiring Plans (with corresponding inverter locations & IDs)			X
9. Demolition Plans (tree/lights first submittal, comprehensive for final submittal)			X
10. Structural Drawings			X
11. Equipment Pad and Mounting Details			X
12. Signage, Trenching, Installation, and Grounding Details			X
13. Monitoring System Details			X
14. Lighting Plan, Details and Photometric Plans			X
15. Complete Design Package Sufficient for DSA or AHJ Review			X
16. All specifications related to the Scope of Work (see Item I, below)		X	X
17. Geotechnical Reports and Associated Drawings		X	X
18. Equipment Manufacturer's Cut Sheets and Details		X	X
19. Interconnection Application & Any Utility Correspondence		X	X
20. Complete list of all Subcontractors, incl. specialty		X	X
21. Contractor's Commissioning Protocol (see Section III below)			X
22. Construction Schedule	Prelim		Detailed

**Notes:**

1. PV System Summary Table shall include the following with details for each array:  
Array No/Name, Dimensions, Azimuth, Tilt, Module Model/Count, Inverter Model/Count, Nameplate, No. of Strings, Canopy Column Count
  
- G. Contractor shall submit a System Size Spreadsheet showing all system sizes by site, year one production (kWh), and associated yields (kWh/kWp) per item 2 in Table 1. The spreadsheet shall be submitted at each phase of design as noted above and prior to construction. All final system designs shall be within 5% of contracted target production



and must receive written approval from customer before submittal to the AHJ. Along with the System Size Spreadsheet, the Contractor shall provide modeling software output reports, including shade analysis and 8760 production data using approved modeling software and assumptions prior to construction and post construction phase submittals.

- H. The Contractor shall re-submit the Interconnection Application with the utility and the utility shall have completed their Initial Review for each interconnection service prior to the 30% Design submittal. The Contractor will present the findings and/or Interconnection Reports at this meeting. Any issues with existing District or Utility equipment identified by the Utility that may prevent the system from interconnection or require Utility mitigation measures and/or upgrades that could result in additional costs must be identified at the time of the 30% Design submittal. If the Interconnection Application failed the Initial Review for either service then the Contractor will closely monitor the subsequent Utility review phases and present the final Utility Interconnection Report, as well as any and all finding, at the time of the 50% Design submittal for the District's review and evaluation. If the Utility determines that dedicated mitigation work is required to Interconnect either system and that those costs will be charged to the District then then District will have the opportunity to review and terminate the Agreement prior to the 90% Design submittal without penalty. The Contractor shall submit a complete specification packet as part of the 90% Submittal. Specification Divisions that shall be included are:

1. Electrical (General and Solar PV)
  2. Cutting and Patching
  3. Subsurface Investigation
  4. Concrete Forming, Reinforcing, and Finishing
  5. Structural Steel Framing
  6. Metal Fabrications
  7. Roof Patch and Repair
  8. Painting and Coating
  9. Signage
  10. Testing and Commissioning
  11. Exterior Lighting and Controls
  12. Earthwork
  13. Vegetation Clearing and Control
  14. Pavement Specialties and Striping
  15. Fencing and Gates
- I. Contractor shall submit complete electronic copies of all Final Approved Permit Set (Issued for Construction) drawings prior to Construction.
- J. Contractor shall prepare materials for, and participate in, community outreach meetings with the District as required by the scope of work.

## **II. CONSTRUCTION PHASE**

- A. District shall provide formal NTP for construction upon receipt of acceptable Permitted Plan Set with all necessary AHJ approvals and all required proof of bonding. District shall submit executed NTP to Contractor prior to Contractor commencing construction.
- B. Prior to beginning construction, Contractor shall:

1. Provide a comprehensive onsite Construction Management and Safety Plan for the construction of the Project in accordance with all applicable laws, policies and OSHA compliant safety practices. Plan should include, at a minimum, address of local emergency medical facilities, project directory, information on Sub-Contractors, coordination with District staff during specific construction tasks, and communication protocols.
  2. Provide an updated detailed Construction Schedule and a three week look-ahead.
  3. Obtain all required permits and approvals from the AHJ(s) and the Utility(ies) prior to starting Construction, in coordination with the District, and shall make copies available to the District of all permit applications and approvals.
- C. The Contractor shall provide Manufacturers' Installation Manuals for major project components, including, but not limited to: PV modules, inverters, racking or mounting structure, monitoring systems, other major electrical equipment, and lighting. When approved by the District, recommended installation standards shall become the basis for commissioning, inspecting and accepting or rejecting actual installation procedures used on the work.
- D. Prior to ordering equipment and materials, the Contractor shall verify all measurements at each project site and notify the District in writing on any discrepancies between the drawings and site measurements.
- E. Any proposed changes to design or scope of work shall be submitted in writing to the District for approval before any changes are made. Submittal for changes shall contain all necessary details of the proposed changes, detailed costs, and an updated system size and production spreadsheet.
- F. **CONSTRUCTION SUBMITTALS:** Shall be provided by the Contractor as follows:

**Table 2 – Construction Submittals**

Construction Submittal	Submittal Schedule
1. Construction Mgt & Safety Plan	No later than 15 days prior to site mobilization.
2. Construction Schedule	- Three week look-ahead schedule updated and submitted weekly prior to the weekly meeting. - Detailed schedule regularly maintained and provided every two weeks or as-requested.
3. Manufacturers' Installation Manuals	No later than 5 days after construction kickoff meeting.
4. Weekly Meeting minutes	No later than the day prior to the next scheduled project meeting.
5. Test Reports	As available
6. Factory Tests	As available
7. Field Tests	As available
8. Design Deviations/ Requests for Information	As-needed. All deviations shall be accurately and legibly detailed by the Contractor and approved by Designer of Record, then presented to the District/District Reps in the form of an RFI. All changes shall be recorded on as-built drawings at the time of the change.

Construction Submittal	Submittal Schedule
9. Proposed Change Orders	Prior to commencing any changed work. Shall be formally submitted and approved by the District/District Rep in writing, consistent with the form, requirements, and terms of the Agreement.

### III. **COMMISSIONING PHASE**

- A. Prior to commencement of commissioning tasks, the Contractor shall notify the District and District representatives and provide an Outline of all Commissioning and Testing and Safety Protocols in the form of a Method of Procedure (MOP) for review.
- B. Contractor shall provide electricians and support to District and District representative for verification of commissioning and workmanship, including providing reasonable notice prior to conducting commissioning activities so District representatives may observe.
- C. A detailed and comprehensive Commissioning Report; submitted 15 days after commissioning has been completed on a site-by-site basis.
- D. Commissioning shall proceed per the approved commissioning plan submitted during the Design Phase. At a minimum, system commissioning protocol shall include:
  1. Conductors
    - 1.1. AC & DC conductor inspection / megger testing
    - 1.2. Wire management check
    - 1.3. DC string Voc/Isc testing and recording
    - 1.4. Confirm all conduits & junction boxes are installed properly/watertight
  2. Inspection of DC fusing and disconnects
  3. Inspection of AC components: AC Disconnect, Main Switch Board, AC Combiner Panel Boards, Breakers, Fuses, Terminations, Phasing, OCPD operation, etc.
  4. Grounding & bonding system inspection & continuity testing
  5. Inverters
    - 5.1. Inverter inspections & tests per manufacturer instructions
    - 5.2. Inverter start-up & confirm proper inverter settings
    - 5.3. Inverter output tests - Confirm PV system AC output as expected based on design, insolation and inverter readings
  6. IV Curve Trace, Performance testing and recording
  7. Thermal Imaging
    - 7.1. Check all electrical components while systems are energized
    - 7.2. Spot check, Modules, Inverters, Disconnects, AC system etc.
  8. Torque spot check on mechanical and electrical terminations
  9. Inspection of corrosion control measures
  10. Confirm signage and placards meet plans
  11. Workmanship evaluation
  12. Inspection of DAS / CT metering and monitoring equipment
  13. Weather station component inspection and performance audit
  14. Confirm web-based monitoring interface operations

15. Lighting Controls

- 15.1. Confirm canopy lighting levels match photometric design
  - 15.2. Verify component installations
  - 15.3. Confirm lighting controls function as specified
- E. Commissioning of any other PV or EV associated systems.

**IV. CLOSEOUT PHASE / PROJECT ACCEPTANCE**

- 7. Contractor shall submit complete digital “as-built” Record Drawings for all sites for review and approval. Final as-built plans shall be provided in both AutoCAD (CAD) and portable document format (PDF) prior to Commercial Operation Date (COD). Contractor shall submit one set of final compiled Record Drawings for the District. The Record Drawings shall incorporate all changes from permit plan sets captured on all as-built sketches, details, and clarifications. Locations of work buried under or outside each building, including, without limitation, all utilities, plumbing and electrical lines and conduits. All deviations from the sizes, locations and other features of installations shown in Issue for Construction (IFC) plan sets and contract documents must be captured in detail in as-built Record Drawings.
- 8. The Contractor shall submit documentation of Punch List Completion for items under control of the Contractor within 30 days of the District issuing the Final Punch List. The document must be signed and show proof of completion of each item.
- 9. The Contractor shall submit executed Performance Guarantee (PeGu) Agreement amendment(s) within 30 days of PTO at all sites. All performance tables and commercial operation dates must be updated with the final as-built statistics.
- 10. Contractor shall provide DSA closed and certified documentation for the Project.
- 11. Any other Project documentation required by AHJs or the District.
- 12. The Contractor shall submit to the District a comprehensive Operations and Maintenance (O&M) manual within 30 days of the utility granting Permission to Operate (PTO) for that system. O&M manuals shall be prepared for the District for all financing types, including third-party finance of the project. O&M manuals shall be submitted on three (3) separate digital USB flash drives, compiled as a single, bookmarked portable document format (PDF) file. The document shall be a well-organized, comprehensive and custom document with details for each site. O&M document requirements are detailed in Solar PV Electrical Specification 26-60-00, within Exhibit “H” of the Agreement.

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## **V. Project Closeout Submittals**

Contractor shall deliver the following document submittals to District in order to obtain District approval for the listed Project milestones.

**Table 3 – Closeout Document Submittals**

<b>Interconnection Ready</b>	
1	AHJ Notice As-needed for Interconnection
2	Schedule for Project Closeout
3	Commissioning Protocol
4	Utility Interconnection Request Submitted
<b>Commercial Operation Date - COD (All prior items plus:)</b>	
5	Utility Permission-to-Operate (PTO) Notice
6	Contractor Commissioning Documentation
7	AHJ(s) Acceptance/Completion Documentation
8	As-Built Plan Sets (w/ Data Sheets for Major Equip.)
9	Record of all trenching/boring routes & depths and canopy column footing depths.
9	As-Built Performance Modeling & 8760 Data
10	Punchlist – Major/Safety Items Signed Off by District/Inspectors
11	O&M Manual Draft
12	Major Equipment Cut Sheets/Warranty Documentation
13	DAS Login Access and Credentials & Verification of Function
14	Subcontractor Notices of Completion
15	Contractor Formal Commercial Operation Notice
<b>Final Completion/Acceptance (All prior items plus:)</b>	
16	Punchlist – All Lists Signed Off
17	O&M Manual Final
18	Sage Cx/Inspection Completed
19	Operation and Safety Training (for Purchaser)
20	All Change Orders/Payments Finalized
21	Final Amended Executed Contracts (PPA & PeGu)
22	Inverter/Data Logger Serial Numbers, IDs, Locations Provided and Functional
23	DSA Closeout Documentation Complete and Submitted
24	Purchaser Notice of Acceptance

**VI. Submittal Dates**

<b>Submittal Item</b>	<b>Date</b>
30% Submittal	3 weeks from Effective Date
50% Design Submittal	5 weeks from Effective Date
90% Design Submittal	7 weeks from Effective Date
Final Approved Permit Set, Submitted to DSA	9 weeks from Effective Date
Construction Management Plan	October 18, 2019
Construction Schedule Submittal	October 18, 2019
Commissioning Reports	March 31, 2020
O&M Manual, All Sites	April 30, 2020
Punch List Completion Documents, All Sites	April 30, 2020
As Built – Record Drawings	April 30, 2020

[END OF EXHIBIT]

## Exhibit "G"

### Site Details



## Site Details: San Rafael City Schools

### Attachment A4 – Glenwood ES

Site            Glenwood Elementary School  
Address       25 W Castlewood Dr, San Rafael, CA 94901

#### Electrical Service

No/Name	SAID	Meter No	Volts	Amps	Phases	Hist. Ann. Usage	Current Tariff	PV Tariff
Main	3524134054	1008819570	120/208	800	3	134,000 kWh	A10S	A10S

#### Target Production

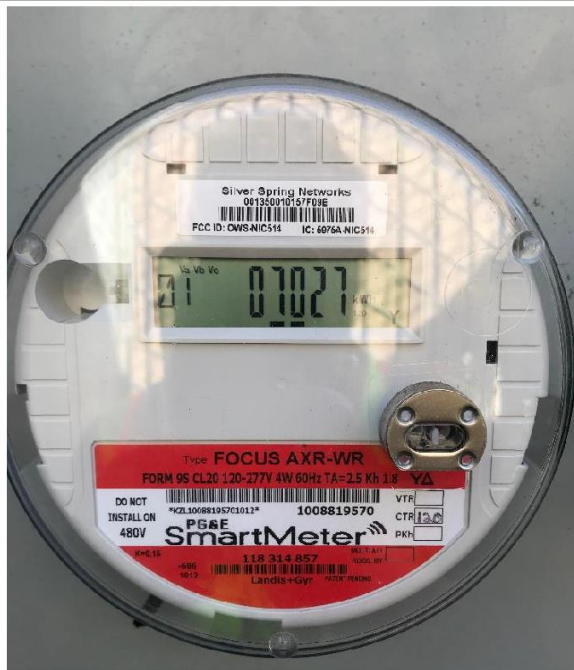
Year-1 Target Production    130,000 kWh

#### Site Details

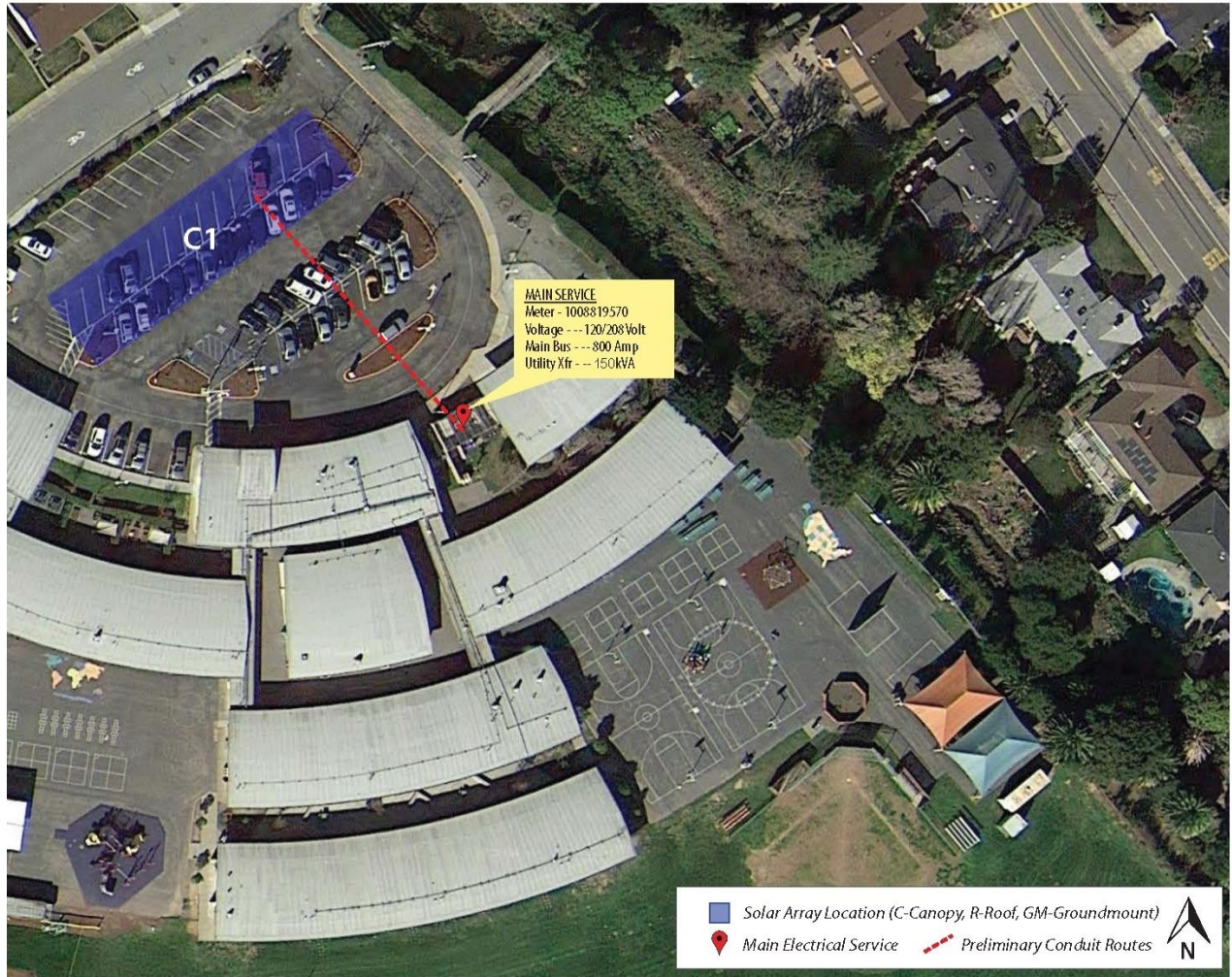
PV System Description	<ul style="list-style-type: none"> <li>- C1: DSA PC Solar PV carport canopy structure in existing parking lot, over the middle row of parking stalls.</li> <li>- String inverters to be mounted on canopy columns.- Canopies shall have a minimum clear height of 12 feet at the lowest point of any structure.</li> </ul>
Siting Preferences/ Constraints	<ul style="list-style-type: none"> <li>- Three (3) existing light poles and foundations to be removed by Contractor, per RFP requirements.</li> <li>- Multiple UG utilities in vicinity. Contractor responsible for GPR and locating all existing UG utilities prior to design.</li> <li>- EV charging infrastructure coordination needed (see notes below).</li> </ul>
Shading/Vegetation	<ul style="list-style-type: none"> <li>- Shading from flagpole to the south deemed insignificant. Contractor to verify.</li> <li>- Existing trees (3) in end planters to be transplanted/removed by Contractor.</li> </ul>
Main Service	<ul style="list-style-type: none"> <li>- Main service cabinet is in exterior enclosure adjacent to parking area. See photos next page.</li> </ul>
Homerun	<ul style="list-style-type: none"> <li>- Homerun is approximately 140 feet from center of array area across paved parking lot.</li> </ul>
EV Charging	<ul style="list-style-type: none"> <li>- District is in planning phase of installing EV charging stations under PG&amp;E's EV Charge Network Program. Charging stations are planned for stalls under array area. Contractor responsible for coordination with EV Charge Program.</li> </ul>
ADA	<ul style="list-style-type: none"> <li>- Contractor to ensure ADA coverage/compliance per RFP requirements.</li> <li>- EV Charge Program plans include creation of two new ADA stalls under array area.</li> </ul>
Lighting	<ul style="list-style-type: none"> <li>- Lighting required under all carport and shade canopies, per RFP specifications.</li> <li>- Contractor to ensure light levels throughout parking lot meet acceptable levels with under canopy lighting and remaining existing lights.</li> <li>- New lights to be tied into existing lighting circuit controls.</li> </ul>
<u>Other Notes</u> <ul style="list-style-type: none"> <li>- Interconnection applications were submitted for TOU Grandfathering before the 12/31/17 deadline.</li> <li>- Contractor is responsible for updating and managing the interconnection agreement process and will be responsible for maintaining TOU grandfathering status.</li> <li>- Interconnection Application Notification #114210127; Invoice Reference # 417738; Portal Application #22129.</li> </ul>	



Photographs, Main Service & Enclosure Area (March 2019)







# Glenwood ES

## San Rafael City Schools Solar PV Project RFP

Rev. 2019-3-22



## Site Details: San Rafael City Schools

### Attachment A4 – San Pedro ES

Site San Pedro Elementary School  
Address 498 San Pedro Rd, San Rafael CA 94901

#### Electrical Service

No/Name	SAID	Meter No	Volts	Amps	Phases	Hist. Ann. Usage	Current Tariff	PV Tariff
Main	4439259747	1009485006	120/208	1600	3	160,000	A10S	A10S

#### Target Production

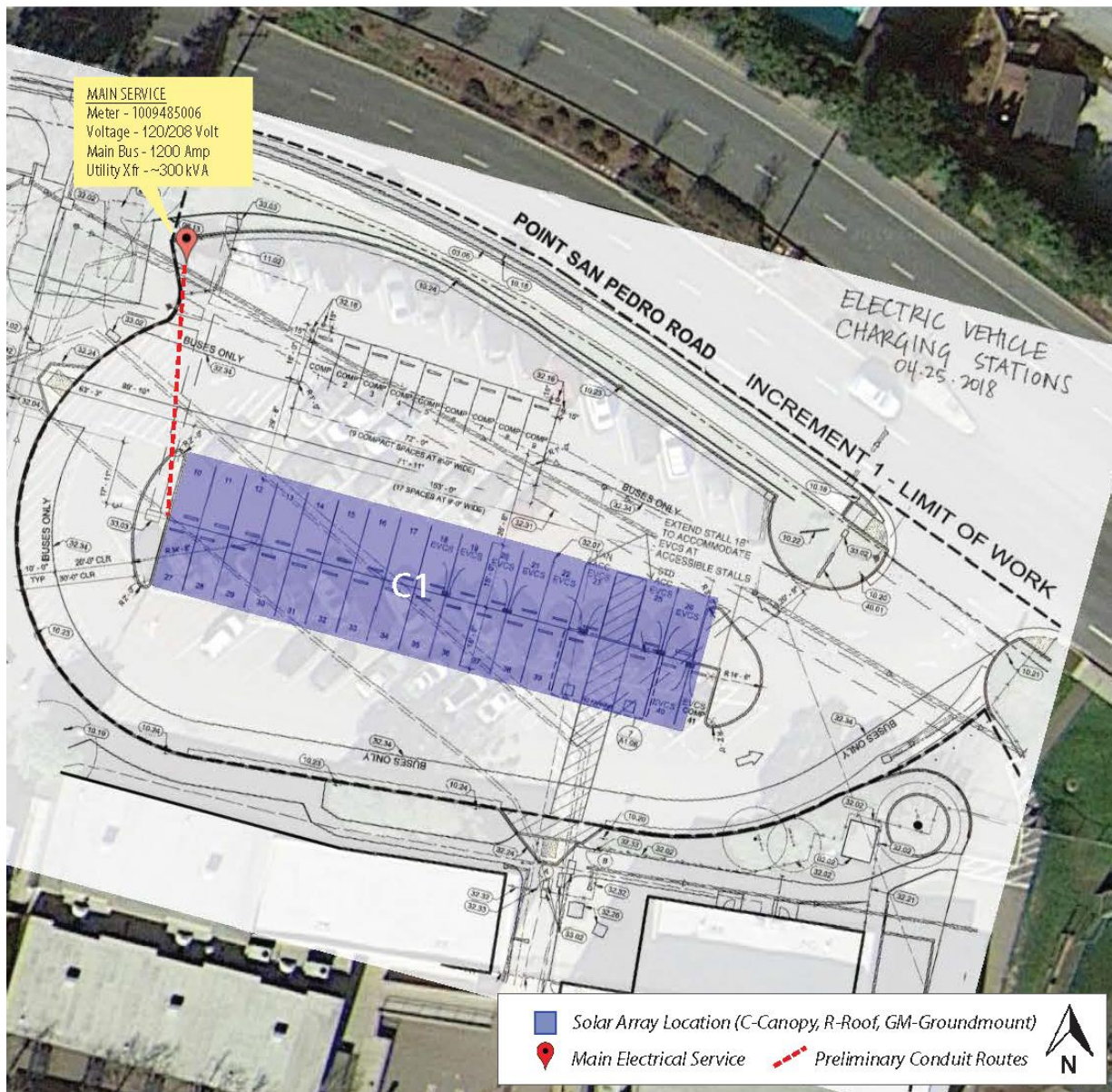
Target Production 168,000 kWh

#### Site Details

PV System Description	<ul style="list-style-type: none"><li>- C1: DSA PC Solar PV carport canopy structure in existing parking lot, over the middle row of parking stalls.</li><li>- String inverters to be mounted on canopy columns.</li><li>- Canopies shall have a minimum clear height of 12 feet at the lowest point of any structure.</li></ul>
Siting Preferences/ Constraints	<ul style="list-style-type: none"><li>- New parking lot reconfiguration happening Summer 2019. See details in Attachment D5.</li><li>- Multiple UG utilities in the area with central utility bank crossing parking lot.</li><li>- EV charging infrastructure coordination needed (see notes below).</li></ul>
Shading/Vegetation	<ul style="list-style-type: none"><li>- No shade or vegetation constraints.</li></ul>
Main Service	<ul style="list-style-type: none"><li>- Main service cabinet will be in exterior enclosure adjacent to parking area. See plans for parking lot reconfiguration and main service upgrades in Attachment D5.</li><li>- New MSB designed to have dedicated 400-amp PV breaker and 20-amp Com breaker.</li><li>- There is potential for conduits to be pre-installed from new MSB to solar array area vault during parking lot reconfiguration and service upgrade this summer.</li></ul>
Homerun	<ul style="list-style-type: none"><li>- Homerun is approximately 110 feet from center of array area across paved parking lot.</li></ul>
EV Charging	<ul style="list-style-type: none"><li>- District is in planning phase of installing EV charging stations under PG&amp;E's EV Charge Network Program. Charging stations are planned for stalls under array area. Contractor responsible for coordination with EV Charge Program.</li></ul>
ADA	<ul style="list-style-type: none"><li>- Contractor to ensure ADA coverage/compliance per RFP requirements.</li><li>- Current/new ADA stalls located under array area.</li></ul>
Lighting	<ul style="list-style-type: none"><li>- Lighting required under all carport and shade canopies, per RFP specifications.</li><li>- Contractor to ensure light levels throughout parking lot meet acceptable levels with under canopy lighting and remaining existing lights.</li><li>- New lights to be tied into existing site lighting circuit controls.</li></ul>
<u>Other Notes:</u> <ul style="list-style-type: none"><li>- Interconnection applications were submitted for TOU Grandfathering before the 12/31/17 deadline.</li><li>- Contractor is responsible for updating and managing the interconnection agreement process and will be responsible for maintaining TOU grandfathering status.</li><li>- Interconnection Application Notification #114210129; Invoice Reference #417740; Portal Application #22133.</li></ul>	

Note: No photos provided due to plans for parking lot and main electrical service upgrades.





## San Pedro ES

### San Rafael City Schools Solar PV Project RFP

Rev. 2019-3-22

[END OF EXHIBIT G]

**Exhibit "H"**  
**Specifications**

**IV. SECTION 26 00 00: GENERAL ELECTRICAL SPECIFICATION**

**PART 1 - GENERAL**

**1.01 RELATED DOCUMENTS**

- A. The Contract documents.
- B. Section 26 60 00: Photovoltaic System Specifications
- C. Section 05 90 02: PV Mounting Specifications

**1.02 GENERAL**

This specification defines the general electrical work required for complete and fully functioning photovoltaic systems at each site. The design and installation shall conform to all requirements as defined by the applicable codes, laws, rules, regulations and standards as specified in the Contract.

- B. The Contractor shall include all items and all work reasonably inferred by these specifications and the Agreement. If the Contractor is in doubt as to the intent of any portion of these specifications and the Agreement, or necessary information is omitted, the Contractor shall notify the District in writing for clarifications or corrections to be provided by addendum.
- C. All design documents, cut sheets, and technical specifications shall be submitted, reviewed and accepted by the District per the guidelines specified in Exhibit "F" to the Agreement.

**1.03 WORK INCLUDED**

- A. The work shall include the design of the electrical system, materials, equipment, fabrication, installation and tests in conformity with applicable codes and professionally recognized standards.
- B. The electrical design shall be fully developed, including but not limited to the following:
  - 1. Description and supportive calculations for all power and grounding systems.
  - 2. Location and layout of all system equipment.
  - 3. Site plans, elevations, schedules, equipment arrangement and detailed drawings
  - 4. All items of a given type shall be the products of the same manufacturer.
  - 5. Single line diagrams including local utility system tie-ins.
  - 6. Evaluation of existing switchgear and Utility transformers for interconnection compatibility.
  - 7. All other drawings, calculations, details, and schedules required for the system design.
- C. All required construction documents and compliance documentation.
- D. Temporary power and lighting as required for construction.
- E. All required incidental work directly related to the construction of the System, such as excavating, directional boring, backfilling, roof flashing, fire stopping, waterproofing, pavement repair, striping, and testing.
- F. Any other electrical work as might reasonably be implied as required to fulfill the contracted

scope, even though not specifically mentioned herein or shown on the drawings

- G. Design and construction coordination with all other disciplines and trades.
- H. All other utilities, labor, materials, apparatus, tools, equipment, transportation, and special or occasional services as required to fulfill the contracted scope.

#### 1.09 CONDITIONS AT SITE:

- A. Contractor is responsible for familiarizing themselves with all discernible site conditions. No extra payment will be allowed for work required because of these conditions, whether specifically mentioned or not.
- B. Lines of other services that are damaged as a result of this work shall promptly be repaired at no expense to the District and to the complete satisfaction of the District.

#### 1.10 QUALITY ASSURANCE

- A. General:
  - 1. Construction Documents shall be designed and signed by a validated, registered professional engineer in the State of California.
- B. Conformance:
  - 1. All equipment and accessories to be the product of a manufacturer regularly engaged in its manufacture.
  - 2. Supply all new equipment and accessories free from defects and listed by Underwriter's Laboratories, Inc., or bearing its label or label of a Nationally Recognized Testing Laboratory (NRTL).
  - 3. All items of a given type shall be the products of the same manufacturer.
  - 4. If after contract is awarded, minor changes and additions are required by aforementioned authorities, they shall be included at Contractor's expense.
- C. Coordination:
  - 1. Contractor shall become familiar with the conditions at each job site and plan the installation of the electrical work to conform with the existing conditions so as to provide the commercially reasonable assembly of the combined work of all trades within the Contractor's scope.
- D. Coordination Drawings for electrical installation:
  - 1. Prepare Coordination Drawings, to scale. Detail major elements, components and systems of electrical equipment and materials in relation to each other and to other systems, installations, and building components. Indicate locations and space requirements for installation, access and working clearances. Show where sequence and coordination of installations are important to the efficient flow of the Work. Indicate the following:
    - a. Provisions for scheduling, sequencing, moving and positioning large equipment in or on the site or buildings during construction.
    - b. Plans, elevations and details including the following:
      - 1) Clearances to meet safety requirements and for servicing and maintaining equipment, including space for equipment disassembly required for periodic maintenance.
      - 2) Equipment support details.
      - 3) Exterior wall, roof and foundation penetrations of cable and raceway; and their

- relation to other penetrations and installations.
- 4) Fire-rated wall and roof penetrations by electrical installations.
- 5) Sizes and locations of required concrete pads and bases.
- 6) Grounding system details.

#### 1.12 DELIVERY, STORAGE AND HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation and to protect the work and materials of all trades.
- B. Delivery and Storage: Deliver all materials to the job site in their original containers with all labels intact and legible at time of use. Store in strict accordance with approved manufacturers' recommendations. All deliveries are to be made to the Contractor's job trailer or approved storage location. Under no circumstances shall District be responsible for accepting deliveries.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the District and at no additional cost to the District.
- D. Contractor shall personally, or through an authorized representative, check all materials upon receipt at jobsite for conformance with approved shop drawings and/or plans and specifications.

#### 1.13 SCHEDULING/SEQUENCING

- A. Contractor shall coordinate all schedules and sequencing of electrical work with District.
- B. Place orders for all equipment in time to prevent any delay in construction schedule or completion of project. If any materials or equipment are not ordered in time, additional charges made by equipment manufacturers to complete their equipment in time to meet the construction schedule, together with any special handling charges, shall be borne by the Contractor.
  - 1. Contractor shall coordinate production and delivery schedule for all District-supplied equipment with the equipment suppliers to ensure that all District-supplied equipment is delivered to site in coordination with the construction schedule and in such a manner as to cause no delays in completion of the Contract as scheduled.

#### 1.14 WIND LOADING AND SEISMIC DESIGN

- A. Comply with all applicable codes and standards and provide wind load restraints for all equipment installed under this contract that requires restraint. The photovoltaic array wind loading restraint shall be designed as required by the Authorities Having Jurisdiction (AHJs).
- B. The photovoltaic system shall be designed for the appropriate seismic zone and to meet all seismic design requirements of the AHJs. Where applicable, the photovoltaic array shall be designed to accommodate lateral displacement in the event of an earthquake based on a nonlinear response-history seismic analysis for the appropriate seismic zone.

#### 1.15 PERMITS AND INSPECTIONS

- A. Contractor shall obtain all required permits and arrange for all required inspections, including utility company requirements, inspections, and sign-offs.
- B. Do not allow or cause any of the work to be covered or enclosed until it has been tested and/or inspected.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS**

- A. Materials of the same type or classification, used for the same purpose, shall be the product of the same manufacturer.

### **2.02 POSTED OPERATING INSTRUCTIONS**

- A. Furnish approved operating instructions for systems and equipment where indicated in the technical sections for use by operation and maintenance personnel. The operating instructions shall include wiring diagrams, control diagrams, and control sequence for each principal system and equipment. Print or engrave operating instructions and frame under glass or in approved laminated plastic. Post instructions as directed. Attach or post operating instructions adjacent to each principal system and equipment including startup, proper adjustment, operating, lubrication, shutdown, safety precautions, procedure in the event of equipment failure, and other items of instruction as recommended by the manufacturer of each system or equipment. Provide weather-resistant materials or weatherproof enclosures for operating instruction exposed to the weather. Operating instruction shall not fade when exposed to sunlight and shall be secured to prevent easy removal or peeling.

### **2.03 CATALOGED PRODUCTS / SERVICE AVAILABILITY**

- A. Materials and equipment shall be current products by manufacturers regularly engaged in the production of such products. Specified product models shall have been in satisfactory commercial or industrial use for a minimum of 2 years prior to design. The 2-year period shall include applications of equipment and materials under similar circumstances and of similar size. The 2-year period shall be satisfactorily completed by a product for sale on the commercial market through advertisements, manufacturers' catalogs, or brochures. Products having less than a 2-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6,000 hours, exclusive of the manufacturers' factory or laboratory tests, is furnished. The equipment items shall be supported by service organizations which are reasonable convenient to the equipment installation in order to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

### **2.04 ACCEPTABLE MANUFACTURERS**

- A. Materials shall be of make mentioned elsewhere in this specification. All materials shall be new and approved by the Underwriters' Laboratories or an NRTL.

### **2.05 BASIC ELECTRICAL EQUIPMENT AND MATERIALS**

- A. Inverters and PV Modules – See Specification 26 60 00.
- B. AC Panelboards:
  - 1. As manufactured by Cutler-Hammer, Square D, General Electric, Siemens, IEM, Schneider or to match existing equipment at each Site, wherever possible. Similar products may be submitted for considerations and formal approval. Equipment shall at a minimum be NEMA 3R outdoors or NEMA 1 for surface mount in unfinished interior locations and flush mounted in finished and occupied spaces. Provide housekeeping pads for all floor or slab mounted equipment.
  - 2. Enclosures: code gauge galvanized sheet steel with welded full flange end pieces, stretcher-leveled steel trim, back pan and door or painted steel or powder coated steel. All surface

mounted panels to have enclosures painted in gray enamel. All flush mounted panels to have cover painted to match adjacent surface.

3. Phase and ground bussing of copper with silver-plated or tin-plated or nickel plated contact surfaces.
  4. Trims on surface-mounted cabinets secured with nickel-plated screws with cup washers, bottom of all trims to have lugs for resting on cabinet flange.
  5. Panels shall be 20 inches minimum in width, provided with approved gutter space, barriers and adjustable supports. Doors mounted with concealed hinges provided with combination spring latch and lock. Doors and trims and surface mounted cabinets primed and finished with one coat baked on gray enamel.
  6. Each panel shall be equipped with a copper ground bus.
  7. All panels shall be fully bussed to accept future circuit breakers.
- C. Distribution Low Voltage Dry-Type Transformers (120/208V and 277/480V):
1. Ventilated type, NEMA 3R where used outdoors.
  2. Transformer shall be 3 phase, 60 Hertz. Primary winding shall be Delta connected and secondary winding shall be Wye connected. The temperature rise at rated voltage and full load shall not exceed 150 degrees C with a 220 degrees C U.L. Component Recognized Insulation System. The windings shall be Aluminum or Copper.
  3. The higher voltage winding shall have quantity (6) 2.5% taps - (2) FCAN and (4) FCBN. Set secondary voltage for 120/208V.
  4. Transformer terminals shall be front connected for ease of installation and maintenance.
  5. Where the transformers are installed outdoors provide weatherproof drip cover, rodent screen and a NEMA 3R rating of the enclosure.
  6. Transformers shall be suitable to carry the PV load characteristics and in the direction of power flow required for the PV system power production.
- D. Circuit Breakers:
1. Circuit breakers shall be molded case rated 250 or 480 volt, multiple or single pole with amperage ratings as required for each circuit. All breakers to be bolt on, manually operated with "de-ion" arc chutes. Plug-in breakers are not acceptable.
  2. Circuit breakers shall be rated to interrupt the available short circuit current at the point of application.
- E. Raceways and Conduit Bodies: Only the raceways specified below shall be utilized on these projects. Substitutions shall be pre-approved in writing:
1. Rigid Type - hot dip galvanized or sherardized steel, to be used at all exterior locations, below grade, or in concrete slab, and to 18" on either side of structural expansion joints in floor slabs, with completely watertight, threaded fittings throughout.
    - a. All rigid steel conduit couplings and elbows in soil or concrete or under membrane to be ½ lap wrapped with Scotch #50 tape and threaded ends coated with T&B #S.C.40 rust inhibitor prior to installation of couplings.
    - b. ½ lap wrap all rigid steel conduit stub-ups from slab or grade to 6" above finished grade level with Scotch #50 tape.
    - c. In lieu of rigid steel conduit for power and control raceways and branch circuit conduits in soil or concrete slabs, "Schedule 40" PVC with Schedule 80 PVC conduit elbows and stub-ups may be used with code size (minimum No. 12) ground wire. A "stub-up" is considered to terminate 6" above the finished surface.
      - 1) Schedule 80 PVC conduit shall be used in all concrete footings or foundations and to



- 18" of either side of footings or foundation walls.
- 2) Schedule 80 PVC conduit shall be used in all concrete masonry unit (CMU) walls or columns.
  2. Conduit installed using horizontal directional boring (HDB) shall include tracer tape or traceable conduit. Minimum depth of the conduit shall be per NEC 2011 Article 300.5. The Contractor is responsible for demonstrating that all conduits installed utilizing horizontal boring meets the minimum depth requirement and is solely responsible for any remediation costs and schedule impacts if the specification is not met. Contractor shall provide documentation of final depth and routes of all conduit installed in horizontal bores.
  3. Conduit buried underground shall be suitable for the application and compliant with all applicable codes. PVC shall be constructed of a virgin homopolymer PVC compound and be manufactured according to NEMA and UL specifications. All PVC conduit feeders shall contain an appropriate copper grounding conductor sized per NEC requirements and continuity shall be maintained throughout conduit runs and pull boxes. Minimum conduit size shall be ¾". A metallic tracing/caution tape shall be installed in the trench over all buried conduit. All underground conduits placed in trenches, buried under roadways, or swales shall be encased with red dyed concrete slurry cap.
  4. All conduit runs in concrete floor slabs (where allowed) shall be installed to comply with all applicable UBC and structural codes to maintain the structural integrity of the floor slab. Where conflicts occur, alternate routing shall be provided at no additional cost to the District.
  5. Electrical Metallic Tubing (EMT) shall only be exposed in electrical and mechanical rooms and in unfinished spaces and in concealed and furred spaces, made up with steel watertight or steel set screw type fittings and couplings. Set screws shall have hardened points. Cast fittings are unacceptable. EMT may be used in exterior installations where allowed by NEC, DSA, City code and any other applicable code. All exterior fittings shall be watertight. EMT may not be installed in areas subject to severe physical damage, including in any carport location with potential for vehicle strike or within 8' of grade.
  6. All exposed conduits on sides of buildings, or in other visible areas, shall be painted to match adjacent finishes, after complete installation.
  7. Fasten conduits securely to boxes with locknuts and bushings to provide good electrical continuity.
  8. To facilitate pulling of conductors, install junction boxes as required.
  9. If any empty conduits are provided as part of the projects, they shall be provided with a pull-wire.
  10. If conduits are to pass through structural expansion joints in floor slab, rigid galvanized conduit shall be used 18" on either side of joint, complete with Appleton expansion couplings and bonding jumpers, or equal. All above grade expansion joint crossings shall also utilize expansion joint couplings or flex conduit transitions as required for each particular installation. No solid conduits shall be allowed to cross expansion joints without proper provisions for building and seismic movement. Expansion joints only refer to contiguous structures, not the overhead space between adjacent, separate canopies. Under no circumstance shall conduits/conductors pass overhead between separate canopies.
  11. Provide thermal expansion fittings or provisions, per NEC 300.7(b), for all raceways subject to high temperatures in direct exposure to sunlight. Provide expansion provisions where more than 0.25" of expansion is calculated.<sup>10</sup>
  12. Provide a minimum cover of 36 inches for all conduits in ground outside of buildings, unless otherwise noted.

13. Provide and install exterior wall conduit seals and cable seals in the locations listed below. Coordinate installation and scheduling with other trades:
  - a. Conduit seals through exterior wall or slab (below grade): O.Z. Gedney series "FSK" in new cast in concrete locations, series "CSM" in cored locations.
  - b. Conduit seals through exterior wall or slab (above grade): O.Z. Gedney series "CSMI."
  - c. Cable seals at first interior conduit termination after entry through exterior wall or slab: O.Z. Gedney series "CSBI." Coordinate quantity of conductors at each location.
- F. Junction Boxes / Pull Boxes:
  1. One piece steel knockout type drawn j-boxes, unless otherwise noted, sized as required for conditions at each location.
  2. J-boxes for wet locations, cast aluminum FS or FD type with cast aluminum gasketed spring lid cover. Weatherproof "Bell" type boxes are not acceptable.
  3. Pull boxes to be NEMA 1 (indoor) or NEMA 3R (outdoor), sized per code, with grey enamel finish, steel construction, and screw-on covers.
  4. All connectors from conduit to junction or outlet boxes shall have insulated throats. Connectors shall be manufactured with insulated throats as integral part. Insertable insulated throats are unacceptable.
  5. Conduit Bodies: Malleable iron type, with lubricated spring steel clips over edge of conduit body, O-Z/Gedney type EW, or equal.
- G. Site Pull boxes: All site pull boxes shall be flush in-ground concrete, with engraved covers identifying service use (i.e. electrical, communications, etc.). Boxes shall be NEMA 250, Type 6, outside flanged, with recessed cover for flush mounting, by Christy or equal, with required depth to provide box and conduit depths shown or required.
  1. Provide concrete covers for all boxes in planted or paved areas (up to available concrete cover size).
  2. Provide galvanized steel covers for all larger boxes (when concrete is not available), or in traffic areas. No cast iron covers.
  3. Provide bolted covers and slab bottoms (with grouted perimeter) or vault type boxes for all electrical distribution and signal system pull boxes used for site distribution, to prevent rodent entry. No collar type boxes with dirt or gravel bottoms.
  4. Provide drain hole at bottom of all vault type boxes, with loose aggregate base below, for proper drainage.
  5. All covers to be completely flush with finished adjacent surfaces.
  6. Provide galvanized steel H20 rated covers and installation of box rated for H20 in all traffic areas.
- I. Wire and Cable:
  1. 600 or 1,000-volt class (as required for system design), insulation color coded, minimum No. 12 AWG for DC string circuits or AC circuits.
  2. All conductors shall be copper.
  3. Insulation type:
    - a. Standard locations: Conductors shall be Type PV or THWN or THWN-2 or RHH, RHW-2, USE-2 for wet and dry locations. All AC wire sizes used shall be based on a 75 degree insulation rating, unless specifically used with 90 degree rated devices. For wires/cables with 90 deg C insulation, the 90 deg C ampacity ratings shall be used for cable sizing before conditions of use de-rates are applied per NEC. All DC wire sizes shall be based on 90 degree insulation rating, when used with 90 degree rated PV equipment and

- components.
  - b. All conductors shall be stranded.
  - c. Install all wiring (low voltage and line voltage) in conduit, except PV string wiring at modules, which may be run outside of raceway per Exhibit A, Section 2.
  - d. Do not pull conductors into conduit until raceways and boxes have been thoroughly cleaned and swabbed as necessary to remove water and debris.
  - e. Approximately balance all AC circuits about the neutral conductors in AC collector panels.
  - f. All wire and cable shall bear the Underwriters' Label or equivalent NRTL label, brought to the job in unbroken packages.
  - g. The equipment grounding conductor shall be insulated or bare copper; where it is insulated, the insulation shall be colored green.
  - h. Install all circuits in one continuous section unless splices are approved by Purchaser. Exercise care in pulling to avoid damage or disarrangement of conductors, using approved grips. No cable shall be bent to smaller radius allowed by NEC code or manufacturer recommendations. Color code feeder cables at terminals. Provide identifying linen tags in each pull box
- J. Fire stopping: as manufactured by 3M Fire Protection Products or equal.
- 1. Fire-rated and smoke barrier construction: Maintain barrier and structural ceiling fire and smoke resistance ratings including resistance to cold smoke at all penetrations, connections with other surfaces or types of construction, at separations required to permit building movement and sound vibration absorption, and at other construction gaps.
  - 2. Systems or devices listed in the UL Fire Resistance Directory under categories XHCR and XHEZ may be used, providing that it conforms to the construction type, penetration type, annular space requirements and fire rating involved in each separate instance, and that the system be symmetrical for wall penetrations. Systems or devices must be asbestos free.

## **PART 3 - EXECUTION**

### **3.01 INSPECTION**

- A. Examine the areas and conditions under which the work of this Section will be installed. Correct conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

### **3.02 FIELD QUALITY CONTROL**

- A. All workmanship shall be first class and carried out in a manner satisfactory to and approved by the District.
- B. This Contractor shall personally, or through an authorized and competent representative, constantly supervise the work and so far as possible keep the same foreman and workmen on the job throughout.

### **3.03 INSTALLATION/APPLICATION/ERECTION**

- A. All cutting, repairing and structural reinforcing for the installation of this work shall be done by the General Contractor in conformance with the District's requirements.
- B. Excavate and trench or directional bore as necessary for the electrical installation, and when the work has been installed, inspected and approved, backfill all excavations with clean earth from

excavation, or imported sandy soil in maximum 8" (eight-inch) layers, moisten and machine tamp to 95% compaction, and restore the ground and/or paving or floor surfaces to their original condition.

- C. Floor Mounted Inverter Installation: Provide mounting channels for grouting into floor or slab. Channels shall be properly drilled to receive the equipment placed flush in floor, leveled and secured in place prior to pouring of floor, of length as required for switchboard. Bolt or weld switchboard to channels.
- D. Furnish and install all disconnect switches as required by code (AC and DC).

#### 3.04 EARTHQUAKE RESISTANT INSTALLATION & FASTENING:

- A. All electrical equipment and raceways shall be designed to withstand forces generated by earthquake motions. As a minimum, equipment and equipment frames shall be designed to withstand a force of 25% of the weight of the equipment and frame acting at its center of gravity. Anchorage of the equipment and/or frame to the structure shall be for a force of 50% gravity also acting at the center of gravity.
- B. For floor mounted inverters and switchboards / distribution panels, the above values shall be doubled. Design stresses in either case may be increased 1/3 over normal allowable stresses but never beyond yield.

#### 3.05 ADJUSTING AND CLEANING

- A. All electrical equipment, including existing equipment not "finish painted" under other sections, shall be touched up where finished surface is marred or damaged.
- B. All equipment shall be left in clean condition, with all shipping and otherwise unnecessary labels removed there from.

#### 3.06 IDENTIFICATION

- A. Inverters, combiner boxes, pull boxes, switchboards, panel boards, distribution circuit breakers, disconnect switches, and related electrical enclosures shall be properly identified by means of engraved laminated plastic descriptive nameplates mounted on apparatus using stainless steel screws or permanent epoxy adhesive where set screws are not feasible. Standard adhesives alone are not acceptable. Nameplates shall have white letters with black background. Cardholders in any form are not acceptable.
- B. Provide all required safety and identification placards as required by code.

#### 3.07 PAINTING OF EQUIPMENT

- A. Factory Applied: Electrical equipment shall have factory-applied painting systems which shall, as a minimum, meet the requirements of NEMA ICS 6 corrosion-resistance test, except equipment specified to meet requirements of ANSI C37.20 shall have a finish as specified in ANSI C37.20.
- B. Field Applied: Paint electrical equipment as required to match finish or meet safety criteria.

#### 3.08 TESTING

- A. General:
  - 1. All inspections and tests shall be in accordance with the International Electrical Testing Association - Acceptance Testing Specifications ATS-2009 (referred to herein as NETA ATS-

2009).

2. Final test and inspection may be conducted in presence of District: Tests shall be conducted at the expense of and by the Contractor at a mutually agreed time. Submit written test reports.
3. The electrical installation shall be inspected and tested to ensure safety to building occupants, operating personnel, conformity to code authorities, and final Construction Shop Drawings.
4. Final Inspection Certificates: Prior to final payment approval, deliver to the District, with a copy to the District, signed certificates of final inspection by the appropriate inspection authority.
  - a. Grounding System:
    - 1) All ground connections shall be checked and the entire system shall be checked for continuity. The resistance of the ground system at each site shall be measured using a 3 point fall-of-potential method. The maximum ground resistance shall be three ohms.
    - 2) Ground tests shall meet the requirements of the National Electric Code, Article 250.
    - 3) All PV system grounding shall meet the requirements of NEC Article 690.

**END OF SECTION**

## **V. SECTION 26 60 00: Photovoltaic System Specifications**

### **PART 1 – GENERAL**

#### **1.01 RELATED DOCUMENTS**

- A. The Contract documents.
- B. Section 26 00 00: General Electrical Specifications
- C. Section 05 90 02: PV Mounting Specifications

#### **1.02 GENERAL**

- A. The Project includes the design and construction of complete Photovoltaic Systems (PV), including all AC and DC components. The design and installation shall conform to all requirements as defined by the applicable codes, laws, rules, regulations and standards as specified in the Agreement.
- B. The Contractor shall include all items and all work reasonable required to complete the System in accordance with the Agreement. If the Contractor is in doubt as to the intent of any portion of these specifications, or necessary information is omitted, the Contractor shall notify the District in writing for clarifications or corrections to be provided by addendum.
- C. All design documents, cut sheets, and technical specifications shall be submitted, reviewed and accepted by the District per the guidelines specified in Exhibit “F” – Submittals and Project Acceptance.

#### **1.03 WORK INCLUDED**

- A. The work shall include the design, engineering, materials, labor, equipment, installation, testing, services, and incidentals necessary to install complete Photovoltaic (PV) Systems in conformity with applicable codes and professionally recognized standards.
- B. PV systems shall consist of arrays of framed photovoltaic modules, mounting hardware, terminal boxes, combiner boxes, quick-connect electrical connectors, DC wiring, DC disconnects, utility interactive inverters, AC disconnects, AC feeders, AC circuit breakers, AC panel boards / switchgear, and complete data acquisition and monitoring systems.
- C. The PV systems shall be utility grid connected. The Contractor shall be responsible for all required utility company coordination, applications, inspections, permits, and final approval for the complete interconnection of the PV systems with the utility company grid, including bi-directional utility meters at each location.
- D. The Contractor shall ensure adequate clearance and equipment space within the allotted areas and existing building and site conditions. All equipment and sizes / clearances shall be coordinated with the District prior to rough-in.
- E. The Contractor shall be provide for the disconnection, disposition and proper disposal of all existing equipment to be replaced.

#### **1.04 QUALITY ASSURANCE**

- A. All equipment shall be listed to Underwriters' Laboratories (UL) standards as applicable.
- B. Installer Qualifications – The installing contractor shall be familiar with the equipment to be installed and have the necessary training to install in the equipment.

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

- A. All materials shall be delivered new, undamaged and without defects.
- B. All equipment and panels shall be handled with care so as not to damage the delivered products. All equipment shall be installed in new and neat condition.
- C. Appropriate protective clothing shall be worn when handling the equipment.
- D. All materials stored on the roof shall be distributed so as not to overload the roof at any point. All materials stored on roof shall follow the guidelines of the roofing system manufacturer including protection boards, pallets and/or mats to prevent damage to the roof system and insulation assemblies. All roof top construction, construction related traffic and staging areas shall have protection boards in place to prevent damage to the roofing system and insulation assemblies.

### PART 2 – PRODUCTS

#### 2.01 ACCEPTABLE MANUFACTURERS

- A. Acceptable system manufacturers/vendors shall be as specified in this Agreement and Exhibits thereto. Manufacturers shall provide their latest line of equipment, meeting all current industry standards and all performance criteria set forth in this Agreement. The District seeks equipment from proven, industry leading manufacturers in solid financial standing, producing tier-one equipment.
- B. Contractor proprietary products shall have an ICC report or a testing report stamped and signed by a licensed California engineer.

#### 2.02 EQUIPMENT AND MATERIALS

- A. All PV Modules shall meet the following specifications:
  - 1. Module manufacturer that has produced no less than 250MW of modules in the prior year.
  - 2. Modules are from a field-tested product line that has been commercially available for no less than three years.
  - 3. Module manufacturer shall provide a 25-year warranty on the solar modules with at least 80 percent power output guaranteed at 25 years.
  - 4. Have a minimum 25-year design life, designed for normal, unattended operation.
  - 5. UL 1703 listed.
  - 6. UL listed for the specified voltage (typically 1000 V-DC).
  - 7. Meet IEC 61215 (crystalline silicon PV modules) or IEC 61646 (thin film PV modules) standards.
  - 8. Project costs shall include all known and future duties, tariffs, export tariffs, customs, demurrage, and shipping costs.
  - 9. Meet California SB1 Guidelines for Eligibility.
- B. No substitution for contracted equipment shall be made without the written consent of District. Such consent will not to be unreasonably conditioned, delayed, or withheld.

C. All Inverters shall meet the following requirements:

1. String-type inverters.
2. Integrated AC and DC disconnects
3. Include a 10-year warranty.
4. Manufacturer produced no less than 250 MWp of inverters in the prior fiscal year.
5. Field-tested product line that is commercially available for no less than 2 fiscal years.
6. UL 1741 listed and Comply with IEEE 1547, including testing to IEEE 1547.1 and IEEE C62.45. Regulatory standards compliance shall also include IEEE C62.41.2 and CSA107.1-01.1.
7. Incorporate disconnect switch for main DC power disconnect in compliance with applicable codes and utility requirements.
8. Sized as required to support the PV module production load within the rating of the equipment, together with all other components.
9. CEC approved, Rule 21 compliant and shall be utility line interactive type.
10. Capable of producing reactive power to operate between a power factor of 0.9 lagging to 0.9 leading (as adjusted on the inverter equipment).
11. Meet the following requirements:
  - a) Nominal AC Voltage (Three-phase, + 10%): 208, 240, or 480 VAC (as required per site)
  - b) Nominal AC Frequency (+ 0.5 Hz): 60 Hz
  - c) Line Power Factor (Above 20% rated power): >0.99
  - d) AC Current Distortion (At rated power): <5% THD
  - e) Maximum Open Circuit Voltage DC: 1,000 VDC
  - f) Maximum Ripple Current (% of rated current): <5%
  - g) Minimum Inverter Efficiency: >96%
  - h) Temperature Range Ambient: -4° F to 122° F (-20° C to 50° C)
  - i) Enclosure Environmental Rating (minimum): NEMA 3R
  - j) Relative Humidity (non-condensing): 0-95%
  - k) Sound level: <85 dBa
  - l) Protective Functions: Standard wakeup voltage, wakeup time delay, shutdown power, shutdown time delay, AC over / under voltage and time delays, AC over / under frequency and time delays, ground over current, over-temperature, AC and DC over current, DC over voltage
  - m) User Display: Standard-LCD with on/off capability and physical screen cover or other means of protection from UV exposure.
  - n) DC Disconnect: 1,000 VDC load break rated
  - o) Isolation Transformer (if applicable): High efficiency type, supplied by the manufacturer of the Inverter Systems, mounted within same enclosure or directly adjacent, with factory designated wiring provisions.
  - p) Zone 4 Seismic Rating (free standing) or wall mounted
  - q) Internal combiner panel option to allow connections of sub-arrays at the Inverter without the use of additional equipment.



- D. Upon connection of the new PV systems, provide a placard on the respective Main Switchboard to identify the two sources of power feeding the equipment.
- E. Combiner boxes (where used) shall be NEMA 3R rated (minimum) and shall include fuses for string inputs and a bus bar to combine the strings into sub-arrays, for input into the Inverter system. Minimum combiner box output bus ampacity shall be 156% of the rated short circuit current available to be carried on the bus (the sum from all strings to the bus).]
- F. All AC interconnecting feeders shall be sized to NEC Table 310.16 (75 degree column) based on associated disconnect amperage. Conduit fill to 40% max. Include temperature derating as required for the ambient temperatures and roof conditions per NEC. Provide equipment grounding conductor in each conduit.
- G. All roof and exterior mounted raceways shall be designed and installed to accommodate expansion and contraction due to heating affects, including adequate cable length and listed expansion couplings. All expansion couplings or installations shall include grounding bonding jumpers as required by code.
- H. All AC circuits to be 3-wire or 4-wire + ground. All grounding per NEC 690, Part V.
- I. All DC circuits and feeders sized to NEC table 310.16 (90 degree column) based on associated disconnect amperage. Minimum ampacity shall be 156% of the rated short circuit current available to be carried on the specific conductor. Conduit fill to 40% max. Include temperature derating as required for the ambient temperatures and roof conditions per NEC. Provide equipment grounding conductor in each conduit.
- J. All DC circuits to be 2-wire + ground.
- K. All AC and DC wiring in conduit to be RHW-2, PVWIRE, THWN-2, or XHHW-2 (90 degree) wet rated for use with 90 degree listed terminals on PV equipment.
- L. All exposed DC wiring to be USE-2, PVWIRE, or SE (90 degree) wet rated and sunlight resistant or PV Wire.
- M. Above ground exposed conduit shall be rigid galvanized steel with threaded fittings except where DSA and other applicable codes specifically allow for the use of EMT conduit. All conduit shall meet NEC Code, DSA Guidelines and any applicable standards. Exterior installations shall have watertight fittings. All conduit shall be rated for exposed installation and a minimum design life equivalent to the solar panels. Paint all visible exposed raceways and boxes to match adjacent surface finish after installation. Colors to be selected and approved by the Owner, such approval not to be unreasonably conditioned, delayed, or withheld.
- N. All conduits and stub-ups under array canopies shall be encased within concrete caissons or piers or, protected from parking traffic with appropriately sized bollards if protection is required by electrical engineer.
- O. All interior conduit to be EMT with steel set-screw fittings (no cast fittings).

## 2.03 WIRE MANAGEMENT

- A. All inter-array wiring methods must meet or exceed current industry standards for wire management, strain relief and fastening.
- B. All inter-array wire management shall use stainless steel or galvanized steel cable clips, Heyco or similar. UV rated cable ties shall be used minimally and only in locations where the use of cable clips

are impossible.

- C. Where exposed, wires, cables and conductors shall be managed in a neat and orderly manner. Where exposed to environmental conditions e.g. sunlight, rain, wind etc. and visible from below, wires shall be fastened in a uniform and discrete fashion.
- D. All conductors and conduits between separate arrays shall be routed underground. Wiring shall be routed down columns, encased in piers/caissons, routed underground between arrays or carports, and up the nearest column on the adjacent array. Under no circumstance will circuits, conduits, or chaseways be mounted overhead between separate structures, including seismic gaps).
- E. Strain relief and drip loops shall be utilized at all entrances to and from conduit bodies, junction boxes, weather heads, switchgear, inverters and panelboards etc. Conductors shall be strapped with strain relief as not to stress panel leads, home runs or mechanically crimped connections within the array.

#### 2.04 MISC. SYSTEM REQUIREMENTS

- A. All exterior equipment to be sunlight and UV resistant as well as rated for elevated temperatures at which they are expected to operate (on roofs in hot sunlight).
- B. No dissimilar metals are allowed to contact each other (use plastic or rubber washers) with the exception of anodized aluminum module frames in contact with galvanized carport purlins. Best practices shall be used to avoid corrosion.
- C. No aluminum in contact with concrete or masonry materials.
- D. Bolted connections shall be non-corrosive and include locking devices designed to prevent twisting over the design life of the PV system.
- E. Environmental impact of system equipment containing hazardous materials shall be disclosed, as well as maintenance and disposal instructions for equipment at the end of its useful life.

#### 2.05 SYSTEM ELECTRICAL

- A. The modules shall be interconnected using cable assemblies. The pigtails shall be quick-connect electrical wiring connections rated for the application (90 degree rated).
- B. Raceway system shall be installed in a manner that prevents water from draining into electrical equipment.
- C. Full specifications of the inverter shall be supplied as part of the system submittal.
- D. All major components of the systems and the installation procedures shall meet National Electrical Code requirements, including Article 690.
- E. The PV system shall be designed to automatically drop offline when normal utility power is lost to avoid unintentional islanding effects as required by the local utility.
- F. All electrical system equipment shall be properly rated to withstand and interrupt (in the case of over current protection devices) the available fault current at the point of use.
- G. The system shall be capable of producing reactive power to operate between a power factor of 0.9 lagging to 0.9 leading (as adjusted on the inverter equipment).
- H. All required overcurrent protection and electrical bussing sizes per NEC 690.

- I. Means of system grounding to be approved by professional Electrical Engineer of record and GFCI protection shall be in accordance with latest NEC requirements.

## 2.06 MONITORING

- A. A Data Acquisition and Monitoring System (DAS) shall be provided for all points of interconnect. The system shall include, but not be limited to, the measurement, calculation, display, and reporting of the following items:
  - 1. PV production in 15-min reporting intervals.
  - 2. Energy consumption in 15-min reporting intervals.
  - 3. Weather data in 15-min reporting intervals
  - 4. System electrical functions (instantaneous and accumulated power output (kW and kWh), AC and DC system voltage and amperage, and peak value tracking with associated time stamps).
  - 5. Pounds of CO<sub>2</sub> emissions avoided from the generation of PV energy at the site (compared to local utility fuel mix electric carbon content).
  - 6. DAS shall be capable of outputting data in the Western Renewable Energy Generation Information System (WREGIS) format sufficient for registering Renewable Energy Credits (RECs) from each system.
  - 7. Lifetime logging and access to data reported by DAS.
  - 8. DAS shall allow customer or customer's third-party designee to programmatically download data through Application Program Interface ("API") at no cost to customer or customer's third-party designee. This data shall, at a minimum, include PV production data, energy consumption data, inverter production data, inverter AC power data, inverter current data, inverter voltage data, weather station and/or satellite data, and alarm status readings. All data shall be available over multiple timescales, ranging from 15-min intervals to annual intervals and shall include both real-time and historic data.
- B. Cellular data shall be used for communications with the DAS and metering systems. In the absence of cellular service availability, the District may, at its own discretion, provide internet connections on a site by site basis.
- C. Separate consumption meters shall be provided for each utility account. Consumption meters shall include a web-enabled interface and 15-min reporting intervals to be synced with PV meter production intervals. Consumption meter standard assumption is 480V POI, assumption for anything above 480V POI without a storage component will be monitored at additional cost.
- D. Contractor shall load software (as applicable) on District provided computers and train District in operation and maintenance of software or cloud based systems and related monitoring functions.
- E. A weather station shall be provided at one site in the District's portfolio of Systems, located geographically to best provide coverage for the portfolio of sites being considered. The station shall provide at a minimum: solar irradiation (coplanar and horizontal), ambient temperature, wind speed and any other data relevant to weather correction of solar PV system performance.

## PART 3 - EXECUTION

### 3.01 REQUIRED PLACARDS

- A. All placards shall be machine generated phenolic type with red background and white lettering, affixed to equipment with stainless steel screws or with permanent adhesive where set screws are not feasible. Minimum lettering size to be 1/4" unless otherwise noted or required for legibility.
- B. Provide a placard clearly visible at each main service panel to identify both sources of power, with

the following wording in 1/4" high lettering per NEC 690.64(B)(4): "Warning - This Service Is Fed By Two Sources Of Power – The Utility Service Main Disconnect And The PV System Main Disconnect – Both Services Must Be Disconnected To Remove Power From The Switchboard".

- C. Provide a placard on each PV system input circuit breaker (where used) at the main panel with the following wording in 1/4" high lettering per NEC 690.64(B)(7): "Warning – Inverter Output Connection – Do Not Relocate This Overcurrent Device".
- D. Provide a placard on all disconnects with the following wording in 1/4" high lettering per NEC 690.17: "Warning - Electric Shock Hazard - Do Not Touch Terminals - Terminals On Both The Line and Load Sides May Be Energized In The Open Position".
- E. Provide a placard on the Main PV System Disconnect (adjacent to each main service panel) with the following information in 1/4" high lettering per NEC 690.53: "Photovoltaic Power Source Disconnect - Operating Current: X Amps; Operating voltage: XX VAC; Maximum System Voltage: XX VAC; Short-Circuit Current: XXX Amps", where X is the operating current, XX is the system voltage, and XXX is the maximum short circuit current contribution of the generating facility at the point of interconnection with the utility system.
- F. Provide a placard at each Main Switchboard with the following information in 1/4" High lettering per NEC 690.54: "Caution - Possible Backfeed From Photovoltaic Power System – X VAC, XX Amps", where X is the system voltage and XX is the maximum AC amperes of the installed system.
- G. Provide a placard on each PV System Inverter with the following information in 1/4" high lettering: "Photovoltaic Power Source Inverter Rating - Operating Current: XX Amps; Operating voltage: XXX VDC; Maximum System Voltage: 1,000 VDC; Short-Circuit Current: XXXX Amps", where XX is the maximum DC amperes of the installed system, XXX is the operating voltage DC, and XXXX is the short circuit current that the Inverter can provide (from all strings in parallel).
- H. Provide utility-required System Directory placard and utility safety switch Identification placard as required by local utility company, to identify all system components.
- I. Provide a placard for all Combiner Boxes to read: "DC Combiner Box [XXX]– [System Voltage] VDC Maximum".

### 3.02 UTILITY INTERCONNECTION

- A. The Contractor shall complete the submissions for the utility interconnection agreement with the District's approval. The Contractor shall submit the required authorization form with the utility to act on behalf of the District. In the event that the District has already submitted interconnection applications, the Contractor shall take all responsibility for the interconnect process upon contract execution.
- B. The PV system at each Site shall not be interconnected with the Utility's distribution facilities until written authorization from the Utility Company has been obtained. Unauthorized interconnections may result in injury to persons and damage to equipment or property for which the installing contractor may be liable.

### 3.03 INSTALLATION STANDARDS

- A. System Installation shall conform to the equipment manufacturers Installation Manual(s) and requirements or guidelines.
- B. All Local, State, and NEC codes shall be observed, including all industry standards related to the

installation, operation, and maintenance of photovoltaic power systems.

### 3.04 TESTING

- A. Photovoltaic modules shall be tested in the factory for design performance and results shall be included in the Operation and Maintenance manuals.
- B. Inverters shall be factory tested for performance and the results shall be included in the Operation and Maintenance manuals.
- C. System testing of the installed photovoltaic array shall be performed on all system strings and recorded in commissioning documentation and the Operation and Maintenance manuals.
- D. Commissioning of PV Systems shall include (at a minimum):
  - 16. Conductors
    - 16.1. AC & DC conductor inspection / megger testing
    - 16.2. Wire management check
    - 16.3. DC string Voc/sc testing and recording
    - 16.4. Confirm all conduits & junction boxes are installed properly/watertight
  - 17. Inspection of DC fusing and disconnects
  - 18. Inspection of AC components: AC Disconnect, Main Switch Board, AC Combiner Panel Boards, Breakers, Fuses, Terminations, Phasing, OCPD operation, etc.
  - 19. Grounding & bonding system inspection & continuity testing
  - 20. Inverters
    - 20.1. Inverter inspections & tests per manufacturer instructions
    - 20.2. Inverter start-up & confirm proper inverter settings
    - 20.3. Inverter output tests - Confirm PV system AC output as expected based on design, insolation and inverter readings
  - 21. IV Curve Trace, Performance testing and recording
  - 22. Thermal Imaging
    - 22.1. Check all electrical components while systems are energized
    - 22.2. Spot check, Modules, Inverters, Disconnects, AC system etc.
  - 23. Torque spot check on mechanical and electrical terminations
  - 24. Inspection of corrosion control measures
  - 25. Confirm signage and placards meet plans
  - 26. Workmanship evaluation
  - 27. Inspection of DAS / CT metering and monitoring equipment
  - 28. Weather station component inspection and performance audit
  - 29. Confirm web-based monitoring interface operations
  - 30. Lighting Controls
    - 30.1. Confirm canopy lighting levels match photometric design
    - 30.2. Verify component installations
    - 30.3. Confirm lighting controls function as specified
  - 31. Commissioning of any other major electrical infrastructure installed on the project per manufacturer requirements
  - 32. Medium voltage equipment tested to NETA requirements
- E. Testing to be performed per CPUC Electric Rule 21 testing procedures and requirements. All testing to be done on “no-cloud” days to avoid system fluctuation by passing clouds. Installer to provide all testing and certification / commissioning.
- F. System start-up procedure shall be as outlined by the Manufacturer’s Installation Manual and the

Inverter Manual.

### 3.05 DOCUMENTATION

- A. All commissioning and testing reports shall be provided to the District within 15-days of completion of testing.
- B. The Contractor shall submit to the District a comprehensive Operations and Maintenance (O&M) Manual for each system. O&M Manuals shall be compiled as a single, bookmarked portable document format (PDF) file. The document shall be a well-organized, comprehensive and custom document created with details for each site. The document shall include at a minimum the following:
  - 1. System description and overview
  - 2. Simplified site plan that shows array naming convention, inverter locations, and disconnects
  - 3. Safety Details, including shut down procedures
  - 4. Contact information for the system installer and maintenance personnel
  - 5. Monitoring system login and operation details
  - 6. Standard procedures for both District and O&M personnel
  - 7. Maintenance information, including schedules and responsibilities for ongoing maintenance
  - 8. Troubleshooting and repair, including responses to typical issues and responsible parties
  - 9. Summary of Performance Guarantee on a site-by-site basis, inclusive of COD for each site, reporting dates and true-up dates.
  - 10. Example performance report.
  - 11. Summary table with the following details for each site: Site, System Size, Permission-to-Operate (PTO), Commercial Operation Date (COD), Final Completion Date, DSA Closeout Date
  - 12. Any other information that may be required for the District to easily and safely interact with, confirm performance, troubleshoot, maintain and/or service the materials and equipment installed under this Contract.
  - 13. O&M Attachments shall include:
    - a) Formal Permission-to-Operate (PTO) notice, and any other pertinent Utility documentation
    - b) As built Record Drawings in both AutoCAD and PDF (single compiled file for each site), provided as separate files from the fully compiled O&M Manual PDF. The updated as-built drawings shall also include the following details:
      - DC string maps with corresponding inverter nomenclature (ID), locations, serial numbers, azimuth, and tilt.
      - Data logger make, model and serial number
      - Include all horizontal/directional boring logs and column footing depths
    - c) Finalized Performance Guarantee (PeGu) with as-built details
    - d) As-built predicted performance data, including expected production over time. Expected hourly production and insolation data shall also be provided in spreadsheet format to represent one full year (8760 hours)."
    - e) Complete material list of all items furnished and installed, including but not limited to the following: PV Modules, inverters, wiring, combiner boxes, panelboards, switch gear, optimizers, disconnects, boxes, metering and DAS equipment, etc. PV System operation details
    - f) All warranties, cut sheets and manuals for major equipment

g) System testing and commissioning documentation

**END OF SECTION**

## **VI. SECTION 05 90 02: STRUCTURAL PHOTOVOLTAIC SHADE CANOPY SPECIFICATION**

### **PART 1 – GENERAL**

#### **1.01 RELATED DOCUMENTS**

- A. The Agreement and all Exhibits thereto.
- B. Section 26 00 00: General Electrical Specifications
- C. Section 26 60 00: Photovoltaic System Specifications

#### **1.02 GENERAL**

- A. This project may include the design and construction of Structural Photovoltaic Shade Canopies (PV Canopies). The design and installation shall conform to all requirements as defined by the applicable codes, laws, rules, and standards as specified in the Agreement.
- B. The Contractor shall include all items and all work reasonable inferred by these specifications and the Agreement for compliance with all applicable structural codes. If the Contractor is in doubt as to the intent of any portion of these specifications and the Agreement, or necessary information is omitted, the Contractor shall notify the District in writing for clarifications or corrections to be provided by addendum.
- C. All design documents, cut sheets, and technical specifications shall be submitted, reviewed and accepted by the District per the guidelines specified in the Agreement.
- D. General Specifications as described in Section 26 00 00: General Electrical Specifications, are referred to herein and shall apply to this specification. Section 26 00 00 shall be deemed to supersede this specification in the case of conflicts.

#### **1.03 WORK INCLUDED**

- A. The work shall include the design and construction of the structural systems, in conformity with applicable codes and professionally recognized standards.
- B. The structural design shall be fully developed, including descriptions and calculations for all structural components. The site, plans, elevations, schedules and detail drawings must be sufficiently developed to reflect the overall design per the Agreement and as described in Section 26 00 00, Photovoltaic System Specifications.
- C. Contractor shall provide all materials, labor, equipment, services, and incidentals necessary to install the structures at each Site as shown on the design drawings and as specified hereinafter.
- D. Contractor shall provide temporary power and lighting as required for construction. Additionally, contractor must provide sufficient temporary facility lighting in place of removed existing lighting during construction phase until under canopy lighting is fully operational.
- E. Contractor responsible for location of all underground utilities and infrastructure with the use of Ground Penetrating Radar (GPR) or equivalent technology.
- F. Contractor shall be responsible for prompt removal and disposal of spoils from all related construction activities.



#### 1.04 COATINGS AND CORROSION CONTROL

- A. Each canopy system and associated components must be designed and selected to withstand the environmental conditions of the site (e.g., temperatures, winds, rain, flooding, etc.) to which they will be exposed. The design life shall be a minimum of 25-years.
- B. All structural members and racking installed outdoors shall be hot dipped galvanized steel.
  - 1. All galvanized materials cut during construction shall be field coated with a long lasting rust inhibiting coating, color matched and intended for coating hot-dipped galvanized metal in outdoor settings.
  - 2. All galvanized materials shall be in compliance with ASTM 123/A-02 Standard Specification for Zinc (Hot-Dipped Galvanized) Coatings on Iron and Steel Products.
  - 3. All purlin framing members shall be G90 galvanized steel. If structure is in close proximity to coastal conditions (within 1 mile), G120 galvanized steel or higher shall be installed per Engineer of Record's specification.
- C. Particular attention shall be given to the prevention of corrosion at the connections between dissimilar metals.

#### 1.05 GEOTECHNICAL STUDY AND ANALYSIS

- A. A geotechnical analysis shall be provided by Contractor and performed by a qualified geotechnical engineering contractor. The results of the analysis shall be used when designing the foundations for the structures on the Site.
- B. At a minimum, the following should be included in the analysis:
  - 1. Review publicly available geotechnical information. This may include soils and geologic maps and literature, photographs, hydroelectric reports, groundwater reports, and water well data.
  - 2. Coordination and mobilization of the geotechnical services team for subsurface exploration of the Site. This should include working with the local utilities to mark any existing underground utilities (such as cables, gas lines, piping, etc.).
  - 3. Study the Site to determine the presence of faults, ground fissures, and other potential geologic hazards that could affect the structural design and construction of the Facility.
  - 4. Drilling or digging of exploratory borings and pits. The amount and depth shall be determined by the Contractor.
  - 5. Performance of cone penetration tests. The amount and depth shall be determined by the Contractor.
  - 6. Laboratory testing of collected soil samples from the borings and test pits. An evaluation of the in-place moisture content and dry density, gradation, plasticity, consolidation characteristics, collapse potential, expansivity, shear strength, resistivity, chloride content, sodium sulfate content, and solubility potential (total salts) should be conducted.
  - 7. Analyze the corrosivity of the soil upon determination of a professional engineer. Include a recommendation for the type of cement to be used in concrete foundations. Also include recommendations for corrosion protection for underground steel, including rigid metal conduit (such as the need for polyvinyl chloride [PVC] coating).

- C. A detailed report shall be provided outlining the tasks performed and the results of the testing. Included in the report should be any recommendations for the foundation designs, structural support designs, corrosion protection, pile drive frequency, minimum pile size, and any geologic conditions that may prevent the development of the project. For ground mount systems, an opinion on the viability of driven piles as the PV racking supports should be provided.

## **PART 2 – PRODUCTS**

### **2.01 SOLAR CANOPY STRUCTURES**

- A. Canopies shall have a minimum clear height of 12 foot at the lowest point of any structure. Clear heights shall be verified by the Contractor with the District and increased as needed.
- B. All structural system components shall be designed and constructed to withstand the environmental conditions of the site to which they will be exposed. The mounting systems shall be designed and installed to resist dead load, live load, corrosion UV degradation, wind loads, and seismic loads appropriate to the geographic area over the expected life of the PV system, a minimum 25-years.
- C. The PV Canopies shall consist of interconnected columns, beams, purlins, and blocking with solar modules installed in either portrait or landscape orientation connected to the purlins by approved means of through bolting. Columns shall be located between parking stall spaces with beams cantilevered to either side of the column for both dual entry (aisle) and single entry (perimeter) parking structures.
- D. All materials shall conform to the requirements, tolerances, etc. of the latest editions of the AISC Manual of Steel Construction, AISI Specifications for the Design of Cold Formed Steel Members, ASTM Standard Specifications for General Requirements for rolled steel plates, shapes, sheets and bars for structural use.
- E. All canopy bolts, nuts and washers, unless otherwise noted, shall be hot dip galvanized or stainless steel.
- F. Purlins shall be structurally connected **to** the beams unless otherwise noted. Top of purlins shall be flush with the top of the upper beam to provide a flat plane for uniform mounting of solar panel and integrated racking system.
- G. Purlins shall be bolted to clips or brackets on beams with hot dip galvanized Grade 5 bolts, unless otherwise specified by the Structural Engineer of Record. Number of purlins and purlin spacing shall be determined by solar module and integrated rack layout. Mounting holes for the racking system and solar module installation shall be pre-located and pre-drilled prior to finishing and coating operations.
- H. Canopies placed in parking lots shall be clearly labeled with max clearance for vehicles at the low points. Labels shall be rated for long-term UV exposure with lifetime to match warranties specified for PV panels in Section 26 60 00. Minimum labeling of one every 50 feet of carport on the long axis and one at every exterior corner of each array within a parking lot. Label should be easily visible from a vehicle.
- I. Structural caissons/foundations for canopies in parking lots shall extend a minimum height of 30 inches above grade.
- J. Electrical conduits extending from the canopy to grade are to be encased in the foundations, not mounted on the outside of finished piers. All electrical connections between separate structures shall be underground. Overhead “jumpers” between structures shall not be permitted.
- K. For canopies located in parking lots, a minimum of two three-inch (3”) spare conduits shall be installed

from the main electrical service to one array that covers ADA parking stalls. Conduits shall originate at the main service cabinet and follow the PV AC homerun conduits to the point designated on the Site Detail Sheets. In the absence of a designated termination point at the canopies, conduit shall terminate at the first column of a designated carport or centered between the closest ADA and standard parking stalls closest to the AC panel board. The spare conduit shall terminate in a Christy box (hand hole). Spare conduit shall include a minimum of two sufficiently rated pull strings or wires inside conduit for future wire pull. All spare conduits to be properly capped to prohibit water, debris and vermin from entering. Additional spare conduits may be required as specified in the Site Detail sheets.

- L. All framing material shall be drained or have provisions to prevent water pooling on or within the framing member (weep holes).
- M. All canopies to be co-planer and in alignment horizontally and vertically with adjacent arrays. Top of column heights shall be shown in design drawings.
- N. All anchor bolts shall be double nutted or 'staked' (threading irreversibly altered) to protect from structural compromise and vandalism.
- O. All structural connections at the flanged base of columns shall be outfitted with metal pole skirts coated to match columns. Pole skirts shall have rounded corners.
- P. All canopies shall be designed to meet ADA requirements per the relevant AHJs. Contractor shall be responsible for all ADA improvements within the footprint of the canopy. Path of travel outside the footprint shall be the responsibility of the District.
- Q. Canopies shall have a minimum tilt of five degrees (5°) and maximum tilt of ten degrees (10°).

## 2.02 LIGHTING SYSTEMS

- A. Canopy lighting systems shall be designed to meet the Illuminating Engineering Society of North America (IESNA) requirements for parking lot areas, to meet or exceed minimum values and maximum uniformity ratios as listed in the IESNA criteria.
- B. Lighting shall meet all Title 24 requirements for installations in California.
- C. All lighting sources shall be LED type.
- D. Lighting control system shall be connected to the existing lighting controls in each area. If tie-in with existing circuits is not feasible, Contractor shall establish new circuit and controls.
- E. Lighting design on canopies shall insure cut-off light control to limit spill light or glare to adjoining areas as-needed. Design and install custom shielding or other mitigation measures to avoid light pollution and glare to neighbors.
- F. Existing pole mounted lighting in areas of new carport canopies shall be removed. Modify other existing lighting to coordinate with the new work and design, including reconnection of any existing downstream circuiting and controls to remain. Foundations of existing pole mount lighting are to be completely removed a minimum of 6-inches below grade, with grade restored to surrounding condition.
- G. New design shall cover all areas of the parking lots (in the area of the work) to leave no dark spots and meet IESNA and requirements for all areas previously covered by light standards removed under this contract. Contractor shall install new pole mounted luminaires if canopy lighting does not provide sufficient lighting in all areas previously covered by removed or altered light standards. Existing fixtures may remain, if not in direct conflict with canopies or causing shading of new canopies.

## **PART 3 - EXECUTION**

### **3.01 SITE PREPARATION AND INSPECTION**

- A. Contractor shall direct, oversee and inspect all site work related to structural installation. Site preparation shall be in accordance with final drawings and specifications provided by manufacturer.

### **3.02 INSTALLATION**

- A. Erect/Stand structural steel with proper equipment and qualified installers.
- B. Actively cooperate with other trades and provide incidental welding, connections, etc. for securement of work of others to structural steel framing.
- C. Erect/Stand temporary flooring, planking, and scaffolding necessary in connection with erection of structural steel or support of erection machinery. Use of temporary floors shall be as required by municipal or state laws and governing safety regulations. Hoist metal deck onto structural frame.
- D. After erection, clean connections and abrasions to shop coat and spot paint with same primer used in shop.
- E. Installation of the structural system and all components shall be in strict accordance with manufacturer's recommendations.
- F. Post installation, Contractor shall provide the materials and labor to grout the base of the column to produce a finished joint.

### **3.03 ERECTION TOLERANCES**

- A. Erection tolerances for structural steel work shall be in accordance with latest AISC "Code of Standard Practice for Steel Buildings and Bridges".

### **3.04 BOLTING**

- A. High strength steel bolts shall be used where indicated. Fabrication and erection shall be in strict accordance with the latest edition of "Specifications for Assembly of Structural Joints Using High-Strength Steel Bolts", as approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation. Load indicator washer shall be used. Use beveled washers on sloping surfaces.

### **3.05 WELDING**

- A. Welding and welded joints shall be in accordance with AWS standards. Work shall be performed by operators who have been qualified by test in accordance with AWS D1.1, "Structural Welding Code – Steel", to perform type of work required for this project.
- B. All methods, sequence, qualifications and procedures, including preheating, postheating, etc. shall be detailed in writing and submitted to Architect for review by the testing laboratory. Provisions shall be made in detailing of lengths of members for dimensional changes as a result of shrinkage stresses so as to provide specified finished dimensions.
- C. Remove all runoff tabs, and bottom backing bars. Top backup bars to be removed or have continuous fillet weld to column.

### **3.06 ANCHOR BOLTS**

- A. Provide at site, for others to install, all anchor bolts, bearing plates, and templates to be embedded in concrete.
- B. Provide necessary steel or wood templates and diagrams for setting and securing of such anchor bolts in concrete forms.

- C. Be jointly responsible with others for proper locating and installing, and make good any deficiencies and errors.
- D. Setting of anchor bolts in hardened concrete necessitates drilled holes solidly grouted in place with epoxy grout. Submit materials and methods for review and approval.

**END OF SECTION**

## **VII. SECTION 32 84 00: IRRIGATION Specification**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including Exhibits thereto, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:
  - 1. Piping.
  - 2. Encasement for piping.
  - 3. Manual valves.
  - 4. Pressure-reducing valves.
  - 5. Automatic control valves.
  - 6. Automatic drain valves.
  - 7. Transition fittings.
  - 8. Dielectric fittings.
  - 9. Miscellaneous piping specialties.
  - 10. Sprinklers.
  - 11. Quick couplers.
  - 12. Drip irrigation specialties.
  - 13. Controllers.
  - 14. Boxes for automatic control valves.

#### **1.3 RELATED REQUIREMENT:**

- A. Section "Landscape Specifications" for coordinating installation of irrigation systems with plantings.

#### **1.4 DEFINITIONS**

- A. Lateral Piping: Downstream from control valves to sprinklers, specialties, and drain valves. Piping is under pressure during flow.
- B. Mainline Piping: Downstream from point of connection to water distribution piping to, and including, control valves. Piping is under water-distribution-system pressure.
- C. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.

#### **1.5 PERFORMANCE REQUIREMENTS**

- A. Irrigation zone control shall be automatic operation with controller and automatic control valves, unless indicated otherwise on Drawings.

- B. Location of Sprinklers and Specialties: Design location is diagrammatic and approximate. Make minor adjustments necessary to avoid plantings and obstructions such as signs and light standards. Maintain 100 percent irrigation coverage of areas indicated.
- C. Minimum Working Pressures: The following are minimum pressure requirements for piping, valves, and specialties unless otherwise indicated:
  - 1. Irrigation Main Piping: 100 psi
  - 2. Lateral Piping: 70 psi

#### 1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Wiring Diagrams: For power, signal, and control wiring.

#### 1.7 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Irrigation systems, drawn to scale, on which components are shown and coordinated with each other, using input from Installers of the items involved. Also, include adjustments necessary to avoid plantings and obstructions such as signs and light standards.
- B. Zoning Chart: Show each irrigation zone and its control valve.
- C. Controller Timing Schedule: Indicate timing settings for each automatic controller zone.

#### 1.8 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For sprinklers, controllers and automatic control valves to include in operation and maintenance manuals.
- B. Record Documents: Submit Record Drawings and Specifications at least 15 days prior to requesting inspection for District's designation of Interconnection Ready status. After review, the District will either return the Record Documents to the Contractor requesting further information or will notify Contractor that the Record Documents are acceptable. After the District has accepted the Record Documents, an inspection may be scheduled.
  - 1. Record Documents for this purpose shall be black line prints marked in red ink. Record Drawings shall indicate the following:
    - a. Zoning changes.
    - b. Dimensions from two permanent points of reference (i.e. building corners, fixed hardscape corners, road intersections, permanent existing utilities, etc.), to the location of the following items as applicable:
      - 1) Water meters.
      - 2) Pump stations.
      - 3) Connection to existing water lines.
      - 4) Routing of pressure supply lines at every 100 feet along routing.

- 5) Backflow prevention devices.
- 6) Pressure regulators.
- 7) Flow sensors.
- 8) Master valves.
- 9) Isolation gate valves.
- 10) Isolation ball valves.
- 11) Quick coupling valves.
- 12) Electric remote control valves.
- 13) Field satellite units/controllers.
- 14) Grounding rods.
- 15) Control wire routing.
- 16) Communication cable routing.
- 17) Communication cable and control wire splices.
- 18) Other equipment installed as a part of the Contract Documents, as directed by District.

2. Submit final corrected set of Record Documents prior to requesting inspection for Final Completion. Submit these drawings as electronic submittals. Maintenance Period will not commence until after submittal of final Record Documents.

C. Controller Charts:

1. Provide scaled drawings for each controller unit installed. The controller drawings shall be a scaled drawing of the area covered by that controller unit and shall be at the maximum scale that will fit inside the controller door without folding the drawing. The chart shall consist of a site plan, entire or partial, showing building(s), walks, roadways, and walls. Drawings shall show valves and sprinkler heads serviced by that particular controller, identifying each station by separate color. Valve numbers shall match the schedule and the drawings. Provide draft for District review prior to submittal. Drawing shall be laminated plastic, and secured to the inside door of the controller enclosure.
2. Submit additional copies of color coded controller drawings as follows: two 11-inch x 17-inch laminated copies; one 8-inch x 11-inch laminated copy; and one 11-inch x 17-inch non-laminated copy.
3. Submit controller charts prior to requesting an inspection for District designation of Interconnection Ready status.

D. Equipment Certifications:

1. Submit the following prior to requesting an inspection for District designation of Interconnection Ready status:
  - a. All manufacturers' rebate certificates (bonus dollars).
  - b. All manufacturers' warranty information stating length of warranty and how to exercise warranty on all valves, irrigation controllers, sprinklers, and other components.
  - c. Central Irrigation Control System equipment installation certification letter from the factory-authorized service representative.
  - d. Contractor is responsible to submit backflow certification test(s) as required by local water purveyor to both the water purveyor and the District.

## 1.9 WARRANTY

- A. Special Warranty: Contractor agrees to repair or replace irrigation system components and appurtenances that are defective, faulty, or fail in materials, workmanship, or operation within specified warranty period.



1. Defects and failures include, but are not limited to, the following:
  - a. Leaks and breaks on valves, piping, fittings, or other components.
  - b. Electrical disconnects and short-circuits.
  - c. Faulty performance of remote control valves, quick coupler valves, and manual valves.
  - d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  - e. Settlement of trenches, valve boxes, and other components.
  - 1) Repair shall include replacement and repair of soil, finish grades, mulch (organic and inorganic), turfgrass, plant materials, hardscape elements, paving surfaces, etc.
2. Warranty Period: One year from the date of completion of the Maintenance Period.

#### 1.10 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Five (5) rotor sprinklers with nozzles of each type used, for every 100 rotor sprinklers installed on the project. Five (5) rotor sprinklers with nozzles, minimum.
  2. Two (2) quick coupler keys with swivel hose bib attachment, as described within these specifications, for every 20 quick coupler valves installed, minimum of one (1).
  3. Two (2) sets of the required equipment specific specialty tools for removing, disassembling and adjusting each type of rotor or spray sprinkler, isolation valve, and electric control valve used on the project. This shall include, but not limited to; nozzle adjustment/removal tool, small screwdriver for spray nozzle adjustment, arc adjustment key/screwdriver, insertion collar for pop-up rotor head repairs, locking cover key for quick coupler valves, channel lock pliers, universal screwdriver, and nut driver for valve box bolts.
  4. Two (2) keys for opening and locking each automatic controller.
  5. One (1) remote control transmitter and receiver, Hunter Roam Kit.
  6. One (1) painted steel operation key for cross handle isolation valves.
  7. One (1) painted steel tee-handled operation key for 2inch square nut isolation gate valves. Length of stem to operate deepest buried valve. Socket matching valve operating nut for Project.
  8. Five (5) spare keys matching equipment enclosure locks used.

#### 1.11 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified irrigation system Contractor whose work has resulted in successful installation and operation of planting irrigation systems.
  1. Experience: Five years' experience in landscape irrigation system installation.
  2. Contractor's Field Supervision: Maintain an experienced full-time supervisor on Project site when work is in progress.
  3. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Copper Piping Components: Installation of copper piping, backflow prevention devices, and related work shall be accomplished by a Plumbing Contractor, licensed to perform that work.

1.12 DELIVERY, STORAGE, AND HANDLING

- A. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.
- B. Protect valves, fittings, and appurtenances from moisture, dirt, grease, and other possible contaminants.

1.13 PROJECT CONDITIONS

- A. Interruption of Existing Water Service: Do not interrupt any District services without prior advance notification and approval of the District.
  - 1. Notify Grounds Supervisor no fewer than seven days in advance of proposed interruption of water service.
  - 2. Do not proceed with interruption of water service without Ground Supervisor's written permission.
  - 3. Obtain Ground Supervisor's written approval of exact length of time for each shut-off or work session.

Section 2 - Irrigation Components:

PART 2 PRODUCTS

1.14 PIPES, TUBES, AND FITTINGS

- A. General:
  - 1. Pipe sizes shall be nominal inside diameter unless otherwise noted.
  - 2. Pipe shall be identified with indelible markings including manufacturer's name, nominal pipe size, schedule or class, pressure rating, NSF (National Sanitation Foundation) seal of approval, and date of extrusion.
- B. Pressure Supply Line:
  - 1. Fittings, 3 Inch Size Pipe and Greater:
    - a. Fittings: Ductile iron, slanted, deep bell, gasketed style made in accordance with ASTM A-536, Grade 65-45-12 & AWWA C153. Fittings shall have four lugs to accommodate joint restraints and other fittings. Bell section shall allow 5-degree freedom of pipe deflection within the bell end. All gaskets shall be manufactured of high grade EPDM rubber and shall be rib-enforced "U-Cup" design to seal and assist in restraining pipe at all pressures. Epoxy coating on interior & exterior surfaces of fittings shall be fusion bonded epoxy, 10-12 mil thickness. The epoxy coated fittings shall pass 90-day immersion tests per CSA Z245.20-98.
    - b. No male adapters permitted.
  - 2. Joint Restraints, 4 Inch Size Pipe and Greater:
    - a. Joint Restraints: Ductile iron with epoxy coating and made in accordance with ASTM A-536, Grade 65-45-12 & AWWA C153. All restraints shall have blunt cast serrations. Machine-threaded restraints shall not be allowed. Epoxy coating shall be fusion bonded epoxy, 10-12

mil thickness. The epoxy coated restraints shall pass 90-day immersion tests per CSA Z245.20-98.

- b. Pipe to Fitting Connections: Joint restraint set shall consist of two half-clamps and hardware that attaches PVC pipe to ductile iron fittings. Valves shall be treated as a dead end and shall be mechanically restrained for serviceability.
  - c. Pipe to pipe connections: Joint restraint set shall consist of four half clamps, two tie-bars and hardware that restrains bell-spigot PVC pipe connection.
  - d. Joint restraints as manufactured by Leemco, Inc.
- 3. Threaded Nipples: ASTM D2464, Schedule 80 with molded threads. Threaded connections to be toe nipples or nipples cut to size.
  - 4. Joint Cement and Primer: Type as recommended by manufacturer of pipe and fittings.

C. Non-pressure Lateral Lines:

- 1. PVC Schedule 40, conforming to ASTM D1785-83.
- 2. Fittings: Standard weight, Schedule 40, injection molded PVC, complying with ASTM D1784 and D2466, cell classification 12454-B.
- 3. Threads: Injection molded type (where required).
- 4. Tees and Ells: Side gated.
- 5. Threaded Nipples: ASTM D2464, Schedule 80 with molded threads.
- 6. No ½" PVC permitted.
- 7. No male adapters permitted.

D. Sleeves and Conduit:

- 1. Sleeves for pressure supply line up to 3-inch size pipe and non-pressure supply lines shall be twice the nominal size of the pipe unless indicated otherwise on Drawings.
- 2. Sleeves for pressure supply lines 4-inch size and larger shall be 2-1/2 times the nominal size of the pipe to accommodate any joints and joint restraints inside the sleeve unless indicated otherwise on Drawings.
- 3. Sleeve Material (Provide size specified unless indicated otherwise on Drawings):
  - a. PVC SCH 40 for pressure supply mainline.
  - b. PVC SCH 40 for non-pressure lines.
  - c. One 2 inch PVC SCH 40 sleeve for up to 30 direct burial control wires.
  - d. One 3 inch PVC SCH 40 sleeve for between 31 and 50 direct burial control wires.
  - e. One 3 inch PVC SCH 40 sleeve for each 1-1/4-inch master valve and flow sensing cable conduit.
  - f. One 3 inch PVC SCH 40 sleeve for each 1-1/2-inch communication cable conduit.
- 4. Conduit Material (Provide size specified unless indicated otherwise on Drawings):
  - a. One ¾ inch PVC SCH 40 conduit for up to 5 wires.
  - b. One 1 inch PVC SCH 40 conduit for up to 8 wires.
  - c. One 1¼ inch PVC SCH 40 conduit for up to 15 wires.
  - d. One 1½ inch PVC SCH 40 conduit for up to 20 wires.
  - e. One 2 inch PVC SCH 40 conduit for up to 30 wires.
  - f. One 2½ inch PVC SCH 40 conduit for up to 35 wires.
  - g. One 1¼ inch PVC SCH 40 wire conduit for Master Valve and Flow Sensing cable.
  - h. One 1-1/2-inch PVC SCH 40 wire conduit for 2-wire path communication cable.

E. Copper Pipe and Fittings:

1. Pressure supply line or non-pressure lateral line in structure: Type K Copper hard tempered, in accordance with ASTM B4284.
2. Fittings: Wrought copper, solder joint type.
3. Joints: Solder shall be made up of 45 percent silver, 15 percent copper, 16 percent zinc and 24 percent cadmium and solids at 1125 deg F and liquids at 1145 deg F.

F. Brass Pipe and Fittings:

1. Pressure Supply Line (from point of connection through backflow prevention device): Brass pipe, regular weight, 85 percent red brass, ANSI Schedule 40 screwed pipe.
2. Fittings: Medium brass, screwed at 125-pound class.

1.15 BACKFLOW PREVENTION DEVICE

1. Backflow devices 2" or less shall be one of the following:
  - a. Wilkins 975XL
  - b. Wilkins 975XLSE
  - c. Febco 825Y
  - d. Febco 825YA
2. Backflow devices larger than 2" to be determined by Grounds Supervisor and/or Landscape Architect.

B. Backflow Prevention Device Enclosure: Provide vandal-resistant enclosure to fit entire backflow prevention assembly with all components, and allow sufficient clearances all around with no contact and operational obstructions.

1. Hardware: All locking and mounting hardware shall be 100 percent stainless steel.
2. Model: Heavy Duty Stainless Steel enclosures made by VIT Products.

1.16 WYE STRAINERS

- A. Wye Strainers 2 inches and Smaller: Brass or bronze body, 300 lb. Class with internal 20-mesh stainless steel screen with tapered self-aligned seats.
- B. Wye Strainers 2-1/2-inches and Larger: Cast iron body, 125 lb. Class with 50-mesh monel metal screen.
- C. Metal screen shall be accessible for maintenance without removing the device from line.

1.17 FLOW SENSORS

- A. Hunter Flow Sync with properly-sized FCT Tee as specified by manufacturer and Grounds Supervisor. Sensor and Tee sizing to be made by Hunter Industries technician or Grounds Supervisor.

1.18 ISOLATION VALVES

- A. Isolation Gate Valve - Mainline Pipe 3/4-inch through 2-inch in Size.
  1. Model shall be either:
    - a. A.Y. McDonald #76101
    - b. Jones Valve J-1900 curb stops
- B. Isolation Gate Valve - Mainline Pipe 2-1/2 inches and Larger.

1. Model: Clow F6102 Flanged Resilient Wedge Valve.
  - C. Manifold Isolation Valves
    1. All manifold isolation valves shall be either:
      - a. A.Y. McDonald #76101
      - b. Jones Valve J-1900 curb stops, line-sized.
- 1.19 AUTOMATIC CONTROL VALVES
- A. Valve identification tags shall be pre-printed, double-sided standard yellow tags made of polyurethane with reinforced attachment hole. Lettering shall be hot-stamped with alpha-numeric numbering matching controller station, minimum of 1 inch height.
- 1.20 QUICK COUPLER VALVES
- A. Quick Coupler Assembly:
    1. Quick Couple Valve Model to be one of the following:
      - a. Rainbird ¾-inch 33DLRC with key 33DK
      - b. Rainbird 1-inch 44LRC with key 44K
- 1.21 TRANSITION FITTINGS
- A. General Requirements: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.
  - B. Transition Couplings:
    1. Description: Romac, metal sleeve-type coupling for underground pressure piping.
  - C. Plastic-to-Metal Transition Fittings:
    1. Description: PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-socket or threaded end.
- 1.22 DIELECTRIC FITTINGS
- A. General Requirements: Assembly of copper alloy and ferrous materials or ferrous material body with separating nonconductive insulating material suitable for system fluid, pressure, and temperature.
  - B. Dielectric Unions:
    1. Description: Factory-fabricated union, NPS 2 and smaller.
      - a. Pressure Rating: 150 psig minimum at 180 deg F.
      - b. End Connections: Solder-joint copper alloy and threaded ferrous; threaded ferrous.
  - C. Dielectric Flanges:

1. Description: Factory-fabricated, bolted, companion-flange assembly, NPS 2-1/2 to NPS 4 and larger.
  - a. Pressure Rating: 150 psig minimum.
  - b. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

D. Dielectric-Flange Kits:

1. Description: Nonconducting materials for field assembly of companion flanges, NPS 2-1/2 and larger.
  - a. Pressure Rating: 150 psig minimum.
  - b. Gasket: Neoprene or phenolic.
  - c. Bolt Sleeves: Phenolic or polyethylene.
  - d. Washers: Phenolic with steel backing washers.

E. Dielectric Couplings:

1. Description: Galvanized-steel coupling.
  - a. Pressure Rating: 300 psig at 225 deg F.
  - b. End Connections: Female threaded.
  - c. Lining: Inert and noncorrosive, thermoplastic lining.

F. Dielectric Nipples:

1. Description: Electroplated steel nipple complying with ASTM F 1545.
  - a. Pressure Rating: 300 psig at 225 deg F.
  - b. End Connections: Male threaded or grooved.
  - c. Lining: Inert and noncorrosive, propylene.

1.23 MISCELLANEOUS PIPING SPECIALTIES

- A. Pressure Gages: ASME B40.1. Include 4-1/2-inch- diameter dial, dial range of two times system operating pressure, and bottom outlet.

1.24 SPRINKLERS

- A. All heads to have anti-drain valves built-in.
- B. Heads utilized for large turf areas shall be Hunter I-20 through I-40 depending on the area being applied.
- C. Heads utilized for shrubs and trees shall be either Rainbird 1806 SAM or Rainbird 1812 SAM. To be used with Hunter PCN-50 bubblers at plant locations.
- D. No overhead spray systems allowed except for large turf fields.
- E. No drip of laser tubing allowed.

- F. Swing joint assemblies for 3/4 inch and greater sprinkler inlets shall be pre-assembled, double O-ring, Schedule 80 PVC.

1.25 CONTROL EQUIPMENT ENCLOSURE:

- 1. Controller enclosures shall be one of the following:
  - a. VIT stainless steel model #SB-24SSW for wall mount applications
  - b. VIT stainless steel model #SB-24SS for pedestal mount applications
- B. Radio Remote Control Equipment:
  - 1. Hunter Roam Kit
- C. Irrigation Controllers:
  - 1. Hunter ACC-1200
  - 2. All controllers to be equipped with the following"
    - a. Hunter ACC-COM-LAN network module
    - b. Hunter Wireless Solar Sync device
    - c. Hunter ROAM XL Remote control
- D. Stand-Alone Controllers:
  - 1. These are not District standard and must be approved prior to specification.
  - 2. Hunter ACC 1200 (Standard metal cabinet)
  - 3. Irritrol Sentar II 6, 12, 18, 24, and 36 station controller

1.26 RAIN GAUGE EQUIPMENT

- A. A rain sensor to connect to District's remote Irrigation Central Control System. The tipping rain collector shall be manufactured by Texas Electronics Inc., Dallas, TX, Model No. TR-4. Conduit for roof mounting shall comply with Division 26 sections.

1.27 REMOTE CONTROL VALVES

- A. All Remote Control Valves to be brass unless otherwise specified by grounds supervisor.
- B. Superior Brass 950 is the standard Remote Control Valve for the District. All other Remote Control Valves must be approved through the Grounds Department prior to installation. Remote Control Valve to be one of the following:
  - 1. Superior Brass 950 Series ¾-inch to 3-inch
  - 2. Rainbird 100-EFB-CP 1-inch Brass Valve
  - 3. Rainbird 150-EFB-CP 1-½ -inch Brass Valve
  - 4. Rainbird 200-EFB-CP 2-inch Brass Valve

1.28 CONTROLLER COMMUNICATION

- A. Ethernet connection from ACC-COM-LAN to local area network for central control
  - 1. Cat 5 or cat 6 female ethernet junction terminal at controller per district standards, contact district IT department

## 1.29 CONTROLLER WIRING

### A. Conventional

1. All direct-bury pilot and common control wiring shall be UF14 single-conductor wire unless otherwise specified by Grounds Supervisor and/or Landscape Architect. Any wire run exceeding 500-feet shall be increased to 12-gauge UF wire for the entire length.
2. Colors shall be the following unless otherwise specified by Landscape Architect:
  - a. White for common wires
  - b. Black for pilot wires
  - c. Red for spares
3. No 14-gauge wiring permitted into the controller or enclosure. 14-gauge wiring shall transition outside of controller room or enclosure to multi-conductor 18-gauge sprinkler wire.
4. No direct-buried splices are permitted.
5. No junction boxes are permitted unless the length of wiring run is found to exceed 500-feet by the Grounds Supervisor and/or Landscape Architect.
6. Wiring shall be in their own dedicated sleeve and not installed inside any other sleeve.

### B. Decoder System

1. The decoder output module shall have 6 two-wire output paths to the field. The decoders may be wired in sequence over any combination of the two-wire paths, including all 99 on a single two-wire path. Each path may extend up to 10,000 ft./3km to the end of the wire run over 14 AWG (1.5mm dia.) wire, or 15,000 ft./4.5km over 12 AWG (2mm dia.) wire.
2. The wire paths shall be twisted pair, solid-core, color-coded red/blue pairs, enclosed in a PE sleeve available in 6 different colors for in-ground identification.
3. The two-wire paths shall be Hunter Industries Model ID1xxx for 14 AWG (1.5mm) conductors, or Model ID2xxx for 12 AWG (2mm) conductors for extended range (over 10,000 ft./3km, up to 15,000 ft./4.5km), where "xxx" indicates the external sleeve color-code.
4. The two-wire paths may be spliced, or "teed", permitting extensions of the path in multiple directions. In general, the distance from the controller to the end of any one end of a "tee" or wire run shall not exceed the maximum for the gauge of wire, even if the total of all wire exceeds that number. For example, a path comprised of IDWIRE1 (rated for 10,000ft./3km) could extend 5000 ft./1.5km to a "tee" splice, and each arm of the tee could extend an additional 5000 ft./1.5km. The total wire connected would equal 15,000 ft./4.5km, but the distance from the controller, to the end of each run, would be 10,000ft./3km or less, meeting the specification. All wire splices must be made in a valve box with DBR-6 or equal direct-burial waterproof connectors.
5. The decoder output module shall be compatible only with Hunter Industries ICD Series decoders, and shall not be connected to any other model or brand of decoder. The decoder output module shall have a port for programming station addresses directly into each field decoder, and shall not require the use of serial numbers. Each decoder shall have one or more (in the case of multiple output decoders) station addresses programmed at the controller location with the ACC control panel, and the station number(s) shall be noted on the side of the decoder prior to installing in the valve box.

## 1.30 WIRE SPLICE KIT

### A. No direct-burial splicing permitted without prior authorization by Grounds Supervisor.

1. For any approved direct bury splicing use only:  
Splice using 3M 3570G-N.

### B. Wire splices inside valve and junction boxes shall be either:

1. Spears DS-100 Dri-Splice with DS-300 sealant only.
2. DBRY-6 for Hunter products.



1.31 WARNING TAPE

- A. Tape shall be detectable blue color marking tape with the words "Caution – Irrigation Line Buried Below" in 1 inch size minimum letters. The warning message shall be encased within the tape to prevent ink rub-off and be impervious to acid, alkali, and other destructive elements typically found in soil. Minimum thickness 4.5 mil, with 0.0035 mil solid aluminum foil core. Widths shall be at least three-fourths of the diameter of the pipe being protected, 3-inch size minimum.

1.32 BOOSTER PUMP SYSTEM

- A. A variable-frequency drive (VFD) simplex water pressure booster system. The system shall be a completely prefabricated system with pump, piping, electrical, and structural elements. Booster pump system shall include a stainless-steel enclosure. The entire booster pump assembly shall be UL Listed and Approved.
- B. All system piping shall be type "L" copper. All fittings shall be copper or brass, with unions or flanges to allow for system disassembly or major component removal. System shall incorporate an integral full pipe size bypass line with isolation valve to allow for pump removal and repair without disrupting water supply to system.
- C. Isolation valves shall be all brass quarter turn ball valves with hard chrome ball on lines 2-inches and less. Isolation valves shall be lug style butterfly valves with Buna-N elastomeric seats, ductile iron nickel coated disc, and stainless steel stem with handle and 10 position galvanized memory plate on lines 2-1/2 inch and greater.
- D. Gauges shall be 2-1/2 inch diameter face, glycerin-filled with stainless steel casing and brass internals.
- E. Flow activated paddle style magnetically coupled flow switch, sensitive to flows as low as 1 fps, mounted on piping and interconnected to time delay relay to shut down pump on no-flow conditions, time delay relay adjustable from 0 to 5 minutes.
- F. Pump system shall be mounted on a structural aluminum skid with mounting flanges on front and back to allow for mounting of skid to concrete pad. Skid equipped with pipe support on suction and discharge piping. All nuts and bolts and washers to be heavy zinc coated steel on skid and piping. Skid shall include mounting hardware for integral aluminum enclosure.
- G. The system enclosure shall be vandal and weather resistant, marine grade aluminum alloy 5052-H32 construction with rectangular punch-outs for viewing and heat dissipation. The enclosure shall be low profile hinged top design with padlock provision. The cover shall be secured to the concrete pad with stainless steel hardware.
- H. Pump Assembly shall include variable-frequency drive (VFD) system to convert incoming 1-phase power to 3-phase power for the motor. VFD system to receive feedback signal from system mounted stainless steel pressure transducer, and in conjunction with internal software driven PID control loop maintain customer adjustable constant system discharge pressure by varying the speed of the pump in response to varying system load.

1.33 THRUST BLOCKS

- A. Concrete thrust and anchor blocks shall consist of Portland cement concrete, Class C, at 2,500 psi with 4 inches slump.

1.34 SAND BEDDING

- A. Sand bedding material shall be clean, washed, construction grade type.
- B. Sand bedding material shall be free of rocks, clay, organic matter, or other objectionable material.
- C. Sand bedding material shall not contain angular material, as described in ASTM D2488.

### Section 3 - Irrigation Installation Specifications:

#### PART 3 EXECUTION

1.35 EXAMINATION

- A. Examine field conditions with installer present prior to beginning the work of this Section. Grading operations shall be completed and approved prior to beginning work.
- B. Verify all sleeve locations prior to beginning work of this Section. Flag all existing sleeves and conduits installed by other trades.
- C. Verify location of existing underground utilities, valves, manholes, catch basins, and other appurtenances that will affect the layout of the sprinkler system. Verify location of existing trees, new specimen trees, and other obstructions that will affect the layout of the sprinkler system. Verify location of stub outs and points of connection to the water supply system. Verify location of all new and existing architectural elements.
- D. Report any conflicts and discrepancies to the Construction Manager immediately. Do not begin work until conflicts and other unsatisfactory conditions have been corrected.

1.36 PREPARATION

- A. Locations of piping and equipment indicated on Drawings is diagrammatic and approximate and shall be adjusted as necessary and as directed to meet existing conditions and obtain complete water coverage.
- B. Preserve and protect all existing trees, plants, monuments, structures, hardscape and architectural elements to remain from damage due to work in this section. If damage does occur to inanimate objects and structures, repair or replace such damage to the satisfaction of the District. Contractor, at Contractor's expense, shall replace damaged or injured living plant material.
- C. Sprinkler lines shall have a minimum clearance of 12 inches from each other and from other utility lines. Do not install parallel lines directly over one another.
- D. Construct irrigation system to the sizes and grades at the locations indicated. Mark with powdered agricultural gypsum or marking paint routing of pressure supply line and stake the location of each spray head, rotor, flush valve assembly, electric control valve and other related equipment for the first three zones. Project Inspector shall review staking with Contractor and direct any necessary changes prior to proceeding to other zones. This review does not in any way alleviate Contractor from the responsibilities associated with proper uniformity and distribution of head placement after staking.

- E. Install sleeves to accommodate pipes and wires under paving, hardscape areas, sidewalks, and paths prior to asphalt and concrete operations. Compact backfill around sleeves to 95 percent Modified Proctor Density within 2 percent of optimum moisture content in accordance with ASTM D1557. Where not yet utilized, close sleeve ends with cloth duct tape.
- F. Install landscape headers, sidewalks, roadways, curbs, walls, concrete bands, mowing strips, and other permanent hardscape elements before installation of sprinkler system.
- G. Plant specimen trees 24-inch box and larger before installation of the irrigation system.

#### 1.37 EXCAVATION AND BACKFILLING OF TRENCHES FOR IRRIGATION

- A. Follow layout indicated on Drawings as closely as possible in excavating trenches. Trenches shall be straight in alignment and support pipe continuously on bottom of trench. Remove rocks and debris greater than 1 inch in diameter. Over excavate as required for bedding material.
- B. Specified depths of pressure supply lines, laterals and pitch of pipes as stated in this Section are minimums. Settlement of trenches lower than grades indicated on Drawings is cause for removal of finish grade treatment, refilling trenches, re-compacting and repairing of finish grade treatment.
- C. Trenching or other work required in this section under the limb spread of existing trees shall be done by hand or by other methods to prevent damage or harm to limbs, branches, and roots.
- D. Trenching in areas where root diameter of existing trees exceeds 1 inch shall be done by hand. Exposed roots of this size shall be heavily wrapped with moistened burlap to avoid scarring or excessive drying. Where a trenching machine is operated in proximity to roots that are less than 1 inch, the wall of the trench shall be hand trimmed, making clean cuts through roots.
- E. Trenches adjacent to or under existing trees shall be closed within 24 hours. When this is not possible, the side of trench closest to the tree or trees affected shall be covered with moistened burlap.
- F. Protect, maintain, and coordinate work with other contracts, trades, and utilities. Exercise extreme care in excavating and working in areas where utilities exist. Repair damaged caused by Contractor operations at no cost to the District.
- G. Use caution where trenches and piping cross existing roadways, sidewalks, hardscape, paths, or curbs. Repair damaged caused by Contractor operations at no cost to the District.
- H. Depth of Trench in Landscape Areas (unless indicated otherwise on Drawings):
  - 1. Pressure Supply Line: 18 inch from top of pipe to finish grade.
  - 2. Non-Pressure Line (for all rotor sprinkler heads and 12-inch pop-up heads): 18 inch from top of pipe to finish grade.
  - 3. Non-Pressure Line (for all non-rotor sprinkler heads and 6-inch pop-up heads): 12 inch from top of pipe to finish grade.
  - 4. Control Wiring: Directly at side and bottom of mainline piping trench.
  - 5. Communication Cable: Opposite side of control wiring inside conduit, never direct-buried.
  - 6. Pressure Supply Line Locator Tape: 6 inch above top of pipe, at a maximum depth of 12 inch below finish grade.
- I. Width of Trench (unless indicated otherwise on Drawings):

1. Pipe greater than 3 inch: 14-inch minimum.
2. Pipe less than 3 inch: 7-inch minimum.

J. Distance Between Trenches:

1. Irrigation trench to irrigation trench: 6-inch minimum.
2. Irrigation trench to other trade trenches: 12-inch minimum.

K. Sleeves: Provide specified sized sleeves for piping located under asphalt paving or concrete.

L. Boring: Boring is only permitted where pipe must pass under an obstruction that cannot be avoided or removed. Backfill shall match surrounding soil density and grain. Boring under existing paving, sidewalks, or hardscape shall be permitted at Contractor's risk. Contractor shall repair all damage to such items caused by Contractor operations at its own expense.

M. Backfilling: Backfilling of trenches shall not be done until all required testing for the irrigation system has been completed:

1. Material: Excavated material is generally considered to be adequate for backfilling operations. Before beginning the backfilling operation, insure that backfill material is free from debris and rocks greater than 1 inch in diameter, and is not mixed with topsoil. Legally dispose of these materials after being separated from backfill.
2. Bed pressure supply line with construction grade sand 6 inch above and 6 inch below pipe. Remaining backfill shall be as described above.
3. Bed all electrical control wire and communication cable wire, trenched separate from pressure supply line, with construction grade sand 6 inch above and 6 inch below wires.
4. Bed all sleeves with sand bedding with construction grade sand 6 inches above and 6 inches below pipe sleeves.
5. Set in place, cap and pressure test piping in the presence of the Project Inspector prior to backfilling.
6. Compact backfill to a 90 percent maximum density in accordance with ASTM D1557 with a mechanical tamper. Do not leave trenches open for a period greater than 48 hours. Open trenches shall be protected in accordance with current OSHA regulations. Slightly mound filled trenches for settlement after backfilling is compacted.
7. Smooth trenches to match surrounding finish grade prior to requesting inspection.

1.38 POINT(S) OF CONNECTION

- A. Point(s) of connection shall be approximately as indicated on Drawings. Connect new underground piping and valves, and provide all flanges, adapters, or other necessary fittings.

1.39 SOLVENT WELDED POLYVINYL CHLORIDE (PVC) PIPE INSTALLATION

- A. Polyvinyl chloride pipe shall be cut with an approved PVC pipe cutter designed only for that purpose.
- B. All plastic-to-plastic solvent weld joints shall use solvent recommended by the pipe manufacturer. Do not install solvent weld pipe when temperature is below 40 deg F.
- C. Wipe pipe ends and fittings clean before welding solvent is applied. Welded joints shall be given a minimum of 15 minutes to set before moving or handling.

- D. Snake pipe from side-to-side on trench bottom to allow for expansion and contraction.
- E. All changes of direction over 15 degrees shall be made with appropriate fittings.
- F. When pipe laying is not completed by the end of the workday, close pipe ends with tight plug or cap.
- G. Install pressure supply line locating tape along the entire length of pressure supply line.
- H. Coordinate pressure supply line with sand bedding operations.
- I. No water shall be permitted in the pipe until inspections have been completed and a period of at least 24 hours has elapsed for solvent weld setting and curing.
- J. Center load pipe with small amount of backfill to prevent arching and slipping under pressure. Leave joints exposed for inspection during testing.
- K. All PVC fittings and piping shall be solvent welded with Weld-On P-69 primer and P-711 glue.
- L. Lateral lines and Main lines are primer-required.
- M. Manufacturer's label instructions must be followed when performing all solvent welding.

#### 1.40 COPPER PIPE INSTALLATION

- A. Copper piping shall be cut by a power hacksaw, a circular cutting machine using an abrasive wheel, or by means of a hand hacksaw. No piping shall be cut with a metallic wheel cutter of any description. All pipes shall be reamed and rough edges or burrs removed so that a smooth and unobstructed flow is obtained.
- B. Eccentric reducing fittings shall be used where change in pipe size occurs. Bushings shall not be used unless specifically authorized by the Project Inspector.
- C. Apply emery cloth to pipe ends and wipe with clean cloth prior to solder welding pipe end to fitting. Apply an even layer of flux along area to be soldered. Apply solder uniformly around joint and let cool. After cooling lightly apply emery cloth along soldered area until smooth.
- D. All exposed piping under structural slabs shall be stenciled with "Irrigation Main" or "Irrigation Lateral" as required, at ten foot intervals in black permanent ink lettering, 3/4 inch minimum high.

#### 1.41 BRASS PIPE INSTALLATION

- A. Brass piping shall be cut by a power hacksaw, a circular cutting machine using an abrasive wheel, or by means of a hand hacksaw. All pipes shall be reamed and rough edges or burrs removed so that a smooth and unobstructed flow is obtained.
- B. Eccentric reducing fittings shall be used where change in pipe size occurs. Bushings shall not be used unless specifically authorized by the Project Inspector.
- C. Carefully and smoothly place joint compound on the male thread only. All screwed joints shall be tightened with tongs or wrenches. Caulking of any kind is not permitted.

- D. All exposed piping under structural slabs shall be stenciled with "Irrigation Main" or "Irrigation Lateral" as required, at ten foot intervals in black permanent ink lettering, 3/4 inch size minimum.

#### 1.42 CONCRETE THRUST BLOCKS INSTALLATION (UP TO 3 INCH SIZE PIPE)

- A. Install concrete thrust blocks behind each fitting according to the following:
  - 1. Provide thrust blocks on all 3 inch and below bell end solvent weld pipe and fittings, and ends where line changes 30 degrees and greater.
  - 2. Provide thrust blocks of concrete having a compression strength of 2,500 psi or greater.
  - 3. Form thrust blocks against solid unexcavated earth that has been undamaged by mechanical equipment.
  - 4. The space between pipe and trench wall shall be filled to the height of the outside diameter of the pipe. Size thrust block in accordance with ASAE Standards.
  - 5. If unable to form approved thrust block against solid unexcavated earth, mechanical joint restraints shall be used.

#### 1.43 JOINT RESTRAINT INSTALLATION (4 INCH SIZE PIPE AND GREATER)

- A. All changes of direction 30 degrees and greater and locations of pipe reductions shall be mechanically restrained with joint restraints. Additional adjacent joints shall also be restrained per manufacturer's recommendations.
- B. Install joint restraints as per manufacturer's recommendations.
- C. Concrete thrust blocks shall not be used on 4-inch size pipe and greater.

#### 1.44 BACKFLOW PREVENTION DEVICE AND ENCLOSURE INSTALLATION

- A. Install backflow prevention device and associated equipment as close as possible to the water meter or point-of-connection. Verify exact location in the field with the Project Inspector prior to layout and installation.
- B. Coordinate installation with local water purveyor and comply to their specifications.
- C. Install backflow prevention device and enclosure per manufacturer's recommendations. Install keyed lock.

#### 1.45 FLOW SENSOR INSTALLATION

- A. Install Hunter Flow-Sync flow sensors as indicated in Drawings and per manufacturer's recommendations. Install with a minimum of 2 feet or 10 times the pipe diameter, whichever is greater, straight pipe without fittings prior to the sensor. Install with a minimum of 1 foot or 5 times the pipe diameter, whichever is greater, straight pipe without fittings after the sensor. Install with a cover of 6-inch minimum and 12-inch maximum over top of the flow sensor. Fit each valve with a rectangular valve box, set over 3/4 inch gravel.
- B. Flow sensor wire may be extended to a maximum distance of 2,000 feet from the location of the assembly to which it is connected. Wire shall be installed in a 1-1/4-inch gray PVC Schedule 40 pipe.

- C. Connection of flow sensor wires shall only be within the valve box of the flow sensor. Wire connections on the cable shall be made with wire splice kit, installed per manufacturer's specifications. No splices shall be allowed without prior written approval of the Grounds Supervisor.
- D. Install flow sensor cable and normally open master valve cable in same conduit and apart from all other wires. Connection of these cables to the controller terminals shall be by equipment supplier during their certification of equipment installation.

#### 1.46 MASTER VALVE INSTALLATION

- A. Install master valve per Drawings and manufacturer's instructions. Install after the backflow assembly and prior to the flow sensor. Install with a cover of 4-inch minimum and 8-inch maximum over top of flow control stem. Fit each valve with a rectangular valve box, set over 3/4 inch gravel with filter fabric.
- B. Install master valve cable in same conduit with flow sensor cable and apart from all other wires. Connection of these cables to the controller terminals shall be by equipment supplier during their certification of equipment installation.
- C. Connection of master valve wires shall only be within the valve box of the master valve. Wire connections on the cable shall be made with wire splice kit, installed per manufacturer's specifications.

#### 1.47 ISOLATION VALVE INSTALLATION

- A. Install isolation valves in separate round valve boxes as indicated on Drawings.
- B. Fit each valve with a round valve box and ensure clearances will allow full and complete operation of valve and valve handle within box.
- C. Mainline Isolation Valves
  1. Mainline isolation valves 2-1/2 -inch or larger shall be installed with van stone flanges for glued piping systems, and with mechanical joints on all other pipeline types.
  2. Mainline isolation valves 2-inch or smaller shall be installed with schedule 80 toe nipples. No male adapters allowed.
  3. Mainline isolation valves shall be nut-operated type.
  4. Mainline isolation valves shall be installed with section of schedule 40 or C1200 PVC pipe sleeve over bonnet to allow operation of valve from the surface.
  5. Area between pipe sleeve and valve box shall be filled with ¾-inch gravel to 4-inch below to top of sleeve.

#### 1.48 VALVE BOXES

- A. Valve boxes shall be installed onto bricks and leveled to grade
- B. Bottom 6-inches shall be graveled with ¾-inch gravel
- C. Valve lids shall be branded with District-approved nomenclature
- D. Top of box must be no more than 1-inch above final grade

- E. No filter fabric or other geotextile to be used under any valve, splice, isolation, quick coupler, or junction boxes.

#### 1.49 QUICK COUPLING VALVE INSTALLATION

- A. Install quick coupling valves with brass riser set in a 1 cubic foot concrete footing. Set plumb and true in center of box with QCV top 3 inch below box lid. Ensure that proper quick coupling key operation is provided with each installation.
- B. Install in separate round valve box as indicated on the Drawings.
- C. Fit each valve with a round valve box and ensure clearances will allow full and complete operation of valve and valve handle within box.

#### 1.50 ELECTRIC REMOTE CONTROL VALVE INSTALLATION

- A. Install each electric control valve in a separate valve box so that cross handle is 3- to 5-inch minimum below valve box cover. Install with union type connection. Fit each valve with a rectangular valve box, set over 3/4 inch gravel.
- B. Group electric remote control valves together with no more than 4 per manifold. Allow a maximum of 12 inch between each valve boxes. Install valve boxes in the same direction and parallel with one another and perpendicular to paving, hardscape, sidewalks and paths. Install each manifold group with a mainline-sized Jones valve.
- C. Connection of electric remote control valve wires shall only be made within the valve box of the electric remote control valve. Wire connections on electric remote control valve 24-volt wire shall be made with DS-100 and DS-300 Sealant or DBRY-6 only.
- D. After final wiring and approval of controller station sequencing, secure valve identification tag to valve solenoid wires.
- E. Control wiring shall have 18-inches extra length and coiled in box.
- F. All threaded fittings to be installed with schedule 80 toe nipples only. No male adapters permitted.
- G. No direct-bury wiring connections permitted.

#### 1.51 CONTROLLERS

- A. Irrigation controllers shall be installed into interior electrical or utility rooms as determined by Grounds Supervisor and/or Landscape Architect.
- B. Irrigation controllers that must be installed onto exterior walls or at remote locations shall be installed within a stainless-steel enclosure approved by the grounds supervisor.
- C. Irrigation controllers shall be installed with Hunter Solar-Sync wireless device.



- D. Controllers shall be installed with all required Ethernet adapters, network interface devices, device-specific wiring and related equipment to ensure network communication with district central server.

#### 1.52 VALVE BOX INSTALLATION

- A. Install valve boxes with each type of irrigation equipment so that top of valve box is no more than 1-inch above finish grade. Valve box extensions are not acceptable except for mainline isolation gate valves.
- B. Brand the valve box lid of associated equipment with District-approved nomenclature as instructed by Grounds Supervisor.
- C. Letter and number size of brands shall be no less than 1 inch and no greater than 1½ inch in height and shall be 1/8-inch maximum in depth. Submit sample branding to the Project Inspector prior to commencement of work. Coordinate with Project Inspector for any non-listed equipment box identification required.
- D. Inspection shall not be allowed until all branding is complete and approved by Project Inspector.
- E. Plastic valve box covers shall be secured with a stainless-steel locking bolt mechanism.

#### 1.53 SPRINKLER INSTALLATION

- A. Flush all piping with full water pressure and install sprinklers after hydrostatic test is completed. All piping and heads shall be flushed prior to nozzling.
- B. All heads shall be equipped with a built-in low-head drainage device and installed with a pre-made Sch. 80 Double-O-Ring assembly.
- C. Heads shall be set and compacted to eliminate settling and movement.
- D. All heads shall be nozzled uniformly with other heads on the same valve zone.
- E. Locate part circle sprinklers to maintain a minimum distance of 2 inch to a maximum of 4 inch between paving, hardscape, sidewalks, and paths and a minimum distance of 12 inch from walls.
- F. Spray heads and rotors shall not exceed the maximum head and row spacing indicated on Drawings or staked in the field unless approved by the Project Inspector. In no case shall spray heads or rotors be installed at a distance between heads that exceeds the manufacturer's recommended distance.
- G. Angled nipples on swing joints below spray heads and rotors or any sprinkler type, where applies, shall not exceed 45 deg nor be less than 10 deg.
- H. After installation adjust nozzle sizes, arcs, and radius of throw to allow head to head uniform distribution. No overspray will be allowed on paving, hardscape, sidewalks, running tracks, buildings, structures, neighboring properties, and paths. Adjust all spray heads and rotors to correct height as indicated below:
  - 1. Heads shall be installed in shrub beds and slopes ¼-inch above finish grade.
  - 2. Heads shall be installed in turf applications at finish grade and must never create a potential tripping hazard.
- I. Adjust adjacent new plant material placement or trim existing plants so that they do not interfere with uniform distribution of each spray head or rotor.

- J. Project Inspector may request nozzle changes and/or adjustments without additional cost to the District.

#### 1.54 AUTOMATIC CONTROLLER UNIT INSTALLATION

A. Conventional Controller

1. Verify electrical power at location of automatic controller unit prior to its installation. Control unit shall have a dedicated separate circuit on the panel. Electrical panel and circuit number serving the irrigation control equipment shall be labeled inside the controller enclosure.
2. Hardwire controller to the on/off switch and existing power source. Controller shall never be plugged into a socket.
3. Controller shall be tested with complete electrical connections.
4. Connect electric remote control valve assembly wiring to controller unit in the same numerical sequence as indicated on the Drawings, or as directed by the Grounds Supervisor in the field. All Irrigation controllers shall be installed with a permanently mounted remote-control device.
5. Connect flow sensing and master valve wiring to controller into proper terminals for their designed purpose.
6. Install a separate ground wire for each controller unit as indicated on the Drawings and per manufacturer's requirements. Each Controller and decoder shall be grounded as required by the California Electrical Code and the manufacturer's written instructions. Provide 8-foot long grounding rod. No solder connections will be allowed. Resistance to ground shall be no greater than 5 ohms.
7. Below ground conduit shall be PVC SCH 40 electrical conduit with appropriate sweeps and fittings. Conduit sweeps shall extend a minimum of 3 inch above concrete controller base.
8. Each automatic controller unit shall be completely operable and sequence tested prior to scheduling an inspection.
9. Irrigation controllers shall be installed with Hunter Solar-Sync wireless device.
10. Controllers shall be installed with all required Ethernet adapters, network interface devices, device-specific wiring, and related equipment to ensure network communication with district central server.

B. Hunter ACC Two-Wire Controller

1. The decoder output module shall in no way reduce the range of features or programming capabilities of the standard ACC controller. The decoder output capability shall be compatible with any of the enclosure configurations (steel wall, metal pedestal, plastic pedestal) available for the ACC controller.
2. The decoder output module shall have an intrinsic capability of up to 99 stations, and shall occupy 3 modular expansion slots inside the ACC controller cabinet
3. The decoder output module shall have 6 two-wire output paths to the field. The decoders may be wired in sequence over any combination of the two-wire paths, including all 99 on a single two-wire path. Each path may extend up to 10,000 ft./3km to the end of the wire run over 14 AWG (1.5mm dia.) wire, or 15,000 ft./4.5km over 12 AWG (2mm dia.) wire.
4. The wire paths shall be twisted pair, solid-core, color-coded red/blue pairs, enclosed in a PE sleeve available in 6 different colors for in-ground identification.
5. The two-wire paths shall be Hunter Industries Model ID1xxx for 14 AWG (1.5mm) conductors, or Model ID2xxx for 12 AWG (2mm) conductors for extended range (over 10,000 ft./3km, up to 15,000 ft./4.5km), where "xxx" indicates the external sleeve color-code.
6. The two-wire paths may be spliced, or "teed", permitting extensions of the path in multiple directions. In general, the distance from the controller to the end of any one end of a "tee" or wire run shall not exceed the maximum for the gauge of wire, even if the total of all wire exceeds that number. For example, a path comprised of IDWIRE1 (rated for 10,000ft./3km) could extend 5000 ft./1.5km to a "tee" splice, and each arm of the tee could extend an additional 5000 ft./1.5km. The total wire connected would equal 15,000 ft./4.5km, but the distance from the controller, to the end of each run, would be 10,000ft./3km or less, meeting the specification. All wire splices must be made in a valve box with DBR-6 or equal direct-burial waterproof connectors.

7. The decoder output module shall be compatible only with Hunter Industries ICD Series decoders, and shall not be connected to any other model or brand of decoder. The decoder output module shall have a port for programming station addresses directly into each field decoder, and shall not require the use of serial numbers. Each decoder shall have one or more (in the case of multiple output decoders) station addresses programmed at the controller location with the ACC control panel, and the station number(s) shall be noted on the side of the decoder prior to installing in the valve box.

#### 1.55 BOOSTER PUMP INSTALLATION

- A. Install booster pumps on cast-in-place concrete equipment base(s).
- B. Support connected water piping so weight of piping is not supported by booster pump.

#### 1.56 ELECTRIC WIRE INSTALLATION

- A. Low Voltage Wiring:
  1. Bury control wiring in same trench as pressure supply line as specified.
  2. Bundle all 24 volt wires at 10 foot intervals with electrical tape.
  3. Provide expansion loops at every pressure supply line angle fitting, inside each electric remote control valve box, and at 250 feet length intervals along routing. Form expansion loop by wrapping wire a minimum of 10 times around a 3/4 inch pipe and withdrawing pipe.
  4. Limit splicing of electrical wiring. Provide each splice made at intervals or in electric remote control valve assembly valve boxes with approved direct burial waterproof connectors.
  5. Wire splices occurring at intervals outside electric control valve box shall be installed in a separate valve box.
  6. Provide one electrical control wire for every electric remote control valve. Piggy-backing like zones on the same electrical control wire or into the same station terminal is unacceptable.
  7. Install two spare #14-1 electrical control wires (with common wire) from the automatic controller unit pedestal to the last electric control valve on each leg of pressure supply line. Locate the spare wires in their own valve box as specified. Provide one additional spare electrical control wire at every electric remote control valve manifold (valve grouping). In addition to these spare wires, provide additional wires as indicated on Drawings and locate them in the same valve box as the spare wires. Length of spare wires at each end enclosure shall be sufficient for connection into possible fixture equipment or connection point.
- B. Power Source Wiring: Install 120-volt power source to automatic controller unit as required by California Electric Code.
- C. Two-Wire Decoder Wiring:
  1. Earth grounding shall be connected via a factory supplied copper ground lug inside the controller, for connection to earth ground hardware via 6 AWG(4mm dia.) copper wire (see ASIC Earth Grounding Guideline 100-2002 for details of earth grounding irrigation control systems available online at [www.asic.org](http://www.asic.org)). Ground wire shall be extended underground, at right angles to any communications wiring, to approved direct burial earth grounding hardware at least 6 ft./2m from the controller location. Earth Ground shall be have an impedance of 10 Ohms or less, or shall meet the standards of the Earth Grounding Guideline cited above.
  2. The controllers shall be equipped with an integrated, pre-wired SmartPort input to permit connection of wireless remote controls and other devices as specified by the manufacturer. Wireless remote

control shall permit individual start of individual stations and Programs, and shall also enable remote shut down of all irrigation at the controller.

3. The controller shall be adaptable to compatible computerized central control systems through an optional communications module, with a selection of common communications media including hardwired cable, UHF radio, dial-up modem, and cellular telephone. When configured for operation within a central system, the controller shall feature full two-way communications with the central computer. The compatible control system shall be Hunter Industries Model IMMS 2.0 Irrigation Management and Monitoring System.
4. The controller shall be installed in accordance with the manufacturer's published instructions. The controller shall carry a conditional five year exchange warranty. The automatic controller(s) shall be the ACC series controller as manufactured for Hunter Industries Incorporated, San Marcos, California.
5. The controller shall be UL and c-UL listed. The controller shall be CE and C-tick approved and shall have WEEE recyclability markings as required.
6. The wall mount controller shall be model ACC-1200.
7. The optional steel pedestal shall be model ACC-PED and the controller cabinet shall be installed on the pedestal according to the manufacturer's instructions.
8. The plastic pedestal configuration shall be model ACC-1200PP.
9. Station expansion modules (6 stations each) shall be Hunter Model ACM-600.
10. Compatible Flow Meter shall be Hunter Industries Model HFS, with appropriately sized FCT fitting for the pipe.
11. The wireless remote control shall be Hunter Industries Model ICR.

#### 1.57 COMMUNICATION AND CONTROL EQUIPMENT CABLE INSTALLATION

- A. Install communication cable in conduit and according to manufacturer's specifications. Control equipment cable (flow sensor and master valve) shall be in the same conduit. All cable shall be pulled by hand and shall be a continuous wire run. A minimum of 2 feet of slack shall be left at each field controller and within pull boxes.
- B. Irrigation interconnect cable and flow sensor cable shall be installed within continuous run with no splices. Communication cables conductors shall be installed with NO UNDERGROUND splices. All splices that are required to be made must be approved by the Grounds Supervisor prior to installation and shall be placed in a suitable type valve box. Splices in communication cable are only allowed at the following locations:
  1. At each decoder location.
  2. At the end of each entire length of communication cable line.
- C. Central control system communication cable installation and splicing or radio communication shall be tested and certified in writing by the appropriate manufacturer's representative. The system shall also be tested online with the central computer system prior to requesting walk-through.

#### 1.58 CONTROL EQUIPMENT FIELD TESTING

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust electrical components, assemblies, and equipment installations, including connections, as follows:
  1. Test each circuit for continuity.
  2. Test each circuit for leaks to ground with an ohmmeter after each interconnect circuit has been installed and connections have been made. No circuit checking lower than 1 megohm will be acceptable.

3. Test the grounding system with a meter. System resistance shall not measure more than 5 ohms.
4. Perform operational test and demonstrate that each part of the system functions as specified. Do not start operational test without written approval to do so from the Construction Manager.
  - a. The operational test for each new or modified electrical system shall consist of not less than five days of continuous, satisfactory operation. If unsatisfactory performance of the system develops, the condition shall be corrected and the test shall be repeated until the five days of continuous satisfactory operation are obtained.
  - b. Shutdown caused by factors beyond the Contractor's control shall not constitute discontinuity of the operational test.
5. Any material revealed by these tests to be faulty shall be replaced or corrected, and the same test shall be repeated until no fault is evident.
6. Record results of circuitry tests and submit to Construction Manager.

#### 1.59 MEG-OHM TESTING

- A. To ensure all low-voltage wiring is free from ground faults, contractor is required to have all wiring meg-ohm tested before any backfilling, and final acceptance by the District.
  1. Contractor to obtain meg-ohm testing for all UF wiring.
  2. Once meg-ohm test is 100% passing, the Grounds Supervisor shall be notified at least two days in advance for a district representative to inspect and accept final meg-ohm test.
  3. The minimum insulation resistance to ground shall be fifty (50) meg-ohms. Any wiring not meeting this requirement shall be replaced at the contractor's expense.

#### 1.60 CONTROL EQUIPMENT SUPPLIER SUPPORT

- A. Engage control equipment supplier to provide the following field support services:
  1. Conduct on-site system familiarization meeting for Contractor and District personnel to ensure that all personnel understand the system installation technique.
  2. Provide on-site technical assistance during installation period when requested by Contractor or Construction Manager.
  3. Test grounding system to verify that equipment is properly grounded.
  4. Perform continuity and resistance test on communication wire to ensure that proper voltage will be delivered to the equipment on line.
  5. Hook-up communication and sensor wire to the proper terminals inside the enclosures to ensure that good connections are made.
  6. Certify that equipment conforms to and is installed in accordance with plans, specifications and manufacturers recommendations.
  7. Address satellites and decoders.
  8. Test system components for proper operation.
  9. Verify system flow range and calibrate pulse transmitter.

#### 1.61 REPAIRS

- A. All PVC repairs shall be made utilizing Romac couplings in conjunction with solvent weld fittings only.
- B. Slip-fix, compression couplings or other similar type repair fittings are not permitted.

- C. Other transitional and mechanical joints permitted with prior approval of the Grounds Supervisor.
- D. Repairs shall be inspected by the Grounds Supervisor or their delegated district personnel prior to backfilling.
- E. Lines shall be flushed prior to charging for use.
- F. Lines shall be sanitized where required by local health codes.
- G. When re-routing of lines is necessitated the proposed re-route shall be approved by the Grounds Supervisor prior to re-routing.

#### 1.62 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections. All tests and inspections are required to be performed in the presence of the Project Inspector, who may delegate authority to the District Landscape Inspector. Provide three days' notice to the Project Inspector prior to performing tests and requiring inspections.
  - 1. Hydrostatic Pressure Testing the Pressure Supply Line: After backfilling, flushing, and prior to the installation of each electric remote control valve, isolation ball valve, quick coupling valve, and manual drain valve, pressure test the irrigation system utilizing the following procedure:
    - a. Pressurize the irrigation system to 40 psi greater than the designated static pressure or 150 psi whichever is greater for a period of no less than 4 hours. The pressure gauge used for the pressure test shall not exceed readings greater than 300psi. Pressure pump and other equipment necessary for the test shall be furnished by Contractor.
    - b. Test is acceptable if no leakage occurs within the system for the duration of the testing period.
    - c. If leaks occur, repair said leaks and begin pressure test again. Repeat this operation until no leaks occur in the irrigation system.
    - d. Before requesting a walk through, the entire irrigation system shall remain under pressure for a period of no less than 48 hours.
  - 2. Inspections: Inspection will be performed by the Project Inspector at the following times:
    - a. Upon installation and testing of main lines and lateral lines; when pipes are laid and are to be submitted to pressure tests. Do not cover lines until they have been inspected and approved.
    - b. Upon installation and testing of valves, quick couplers, backflow preventer device, automatic controllers, control valves, and wires.
    - c. When the cooling system is completed, perform a coverage test, in the presence of the Project Inspector, to determine if the coverage is complete and adequate. Furnish materials and perform construction required to correct inadequacies in the coverage.
    - d. Final inspection and performance test shall be at the same time as the final inspection of the landscape construction.
  - 3. Flushing: Center-load all piping prior to flushing. After all new irrigation piping and risers are in place and connected and all necessary diversion work has been completed and prior to the installation of sprinkler heads and quick coupling valves, thoroughly flush piping system under full head of pressure. After the furthestmost riser from the point of connection begins to flush, continue flushing for duration of five minutes. After the system is thoroughly flushed, cap all risers.
  - 4. Walk-Through:

- a. Before requesting a walk-through, the following requirements must be entirely satisfied:
  - 1) The entire irrigation system shall be completely installed, flushed and satisfactorily pressure tested.
  - 2) All valve boxes shall be branded.
  - 3) All automatic controllers or field satellite units are fully operable, control equipment has been certified and operation tested for interface with the District's Irrigation Central Control System (through District's Irrigation Control System Specialist).
- b. Once the above requirements have been met a walk-through shall be requested. The following procedures shall be used during the walk-through:
  - 1) Contractor shall have two personnel available with radio communication for the entire length of the walk-through.
  - 2) All valve box lids shall be removed from valve boxes and placed faced up adjacent to the valve box prior to beginning the walk through.
  - 3) The scheduling of each walk-through type will be divided over several days as needed to provide adequate time to complete the review of all zones. The walk through will be divided into two sections and proceed as follows:
    - a) Visual Walk Through: This will consist of walking through the entire irrigation system and examining all components of the system without turning on zones. A punch list will be developed identifying deficiencies in the construction and workmanship of the system when compared to the requirements of the Contract Documents.
    - b) Operational Walk-Through: This will consist of walking through the entire irrigation system observing each zone in a fully operable condition. Valves must be activated from the automatic controller unit. Manual bleeding of individual electric remote control valves is not acceptable. A punch list will be developed identifying deficiencies in the operation of each zone in the system evaluating, but not limited to: head spacing, row spacing, nozzle sizing, correct radius of throw, correct stationing, and flushing operation of zones when compared to the requirements of the Contract Documents.
    - c) Once the Walk-Through has been completed, a copy of the punch list will be forwarded to the Contractor who shall repair, replace, and adjust all items on the punch list prior to requesting a final walk-through.

5. Final Walk-Through

- a. Before requesting a final walk-through, the following requirements must be entirely satisfied:
  - 1) Each item on the punch list shall have been thoroughly addressed and resolved by Contractor.
  - 2) Controller charts for each automatic controller unit shall have been completed, installed, and submitted to the District.
- b. Once the above requirements have been met, a final walk-through shall be request-ed. The following procedures will be used during the walk-through:
  - 1) Contractor shall have two personnel available with radio communication for the entire length of the walk-through.

- 2) Only those valve box lids shall be removed from valve boxes as indicated on the punch list. The valve box lids shall be placed face up adjacent to the valve box prior to beginning the final walk-through.
  - 3) The final walk-through shall be divided into two sections and proceed as follows:
    - a) Visual Walk-Through: This will consist of walking through the punch list items created at the time of the walk-through, examining all components of the system without turning on zones. Any remaining deficiencies in the construction and workmanship of the irrigation system when compared to the punch list and Contract Documents will be noted.
    - b) Operational Walk-Through: This will consist of walking through the punch list items and observing each zone in a fully operable condition. Valves shall be activated from the automatic controller unit. Manual bleeding of individual electric remote control valves will not be acceptable. Any remaining deficiencies in the operation of each zone in the system including but not limited to head spacing, row spacing, nozzle sizing, correct radius of throw, correct stationing, and flushing operation of zones, when compared to the punch list and Contract Documents, will be noted.
6. Any additional walk-throughs required due to Contractor's inability to address all issues on the punch lists described above shall be provided at Contractor's expense, including costs of District's consultants.
- B. Booster Pump Start-Up: Provide the services of a factory representative or trained service professional on the job site to check installation and perform the startup and instruct the operating personnel. Submit a startup report containing voltage and amperage readings, suction and discharge pressure readings, estimated flow conditions, and general operating characteristics.
- 1.63 DEMONSTRATION
- A. Train District's maintenance personnel to adjust, operate, and maintain equipment, sprinklers, specialties, and accessories.

#### Section 4 – Notes

- 1.64 GENERAL IRRIGATION NOTES
- A. The sprinkler system is based on the minimum operating pressure and the maximum flow demand shown on the irrigation drawings at each point of connection. The irrigation contractor shall verify water pressure prior to construction. Report to the owner's authorized representative any difference between the water pressure shown on the drawings and the actual pressure reading at the irrigation point of connection. In the event pressure differences are not reported prior to start of construction, the irrigation contractor shall assume full responsibility for any revisions necessary.
- B. The final location of the automatic controller shall be approved by the owner's authorized representative prior to installation. 120-volt electrical power at the automatic controller location shall be provided by others. It shall be the responsibility of the irrigation contractor to make final hook-up from the electrical outlet to the controller in accordance with local electrical code.



- C. This design is diagrammatic. All piping, valves, etc. Shown within paved areas, under building/wall foundations, and outside of the project boundary are for plan clarification only. Install piping and valves in planting areas where possible, and locate control and quick coupling valves 6" to 12" away from hardscape or turf area for easy access.
- D. The irrigation contractor shall flush and adjust all sprinkler heads for optimum performance and to prevent overspray onto walks, roadways, and/or buildings. This shall include selecting the best degree of arc to fit the existing site conditions and throttling the flow control at each valve to obtain optimum operating pressure for each system.
- E. Do not willfully install the sprinkler system as shown on the drawings when it is obvious in the field that obstructions, grade differences, or differences in site dimensions exist that might not have been foreseen and considered in the engineering. The owner's authorized representative should be informed of such obstructions and differences, but in the event that this notification is not performed, the irrigation contractor shall assume full responsibility for any revisions necessary.
- F. Install all pipe materials and equipment as shown in construction details. Use teflon tape or teflon pipe dope on all pvc male pipe threads of all sprinkler swing joint and valve assemblies.
- G. It is the responsibility of the irrigation contractor to familiarize himself with all grade differences, location of walls, structures and utilities. The irrigation contractor shall exercise extreme care, and be responsible for any damage in excavating and working near utilities. He shall coordinate his work with the general contractor and other sub-contractors for the location of utilities and the installation of pipe sleeves through walls, under roadways, and near structures. H. Drainage of water through sprinkler head will not be allowed.
- H. All pipe adjacent to sidewalks, curbs, and or at top and toe of slopes to be pvc buried as per the details and specifications.

#### 1.65 VALVE INSTALLATION NOTE

- A. Valves are shown in hardscape areas for graphic clarity only.

#### 1.66 ADDITIONAL NOTES

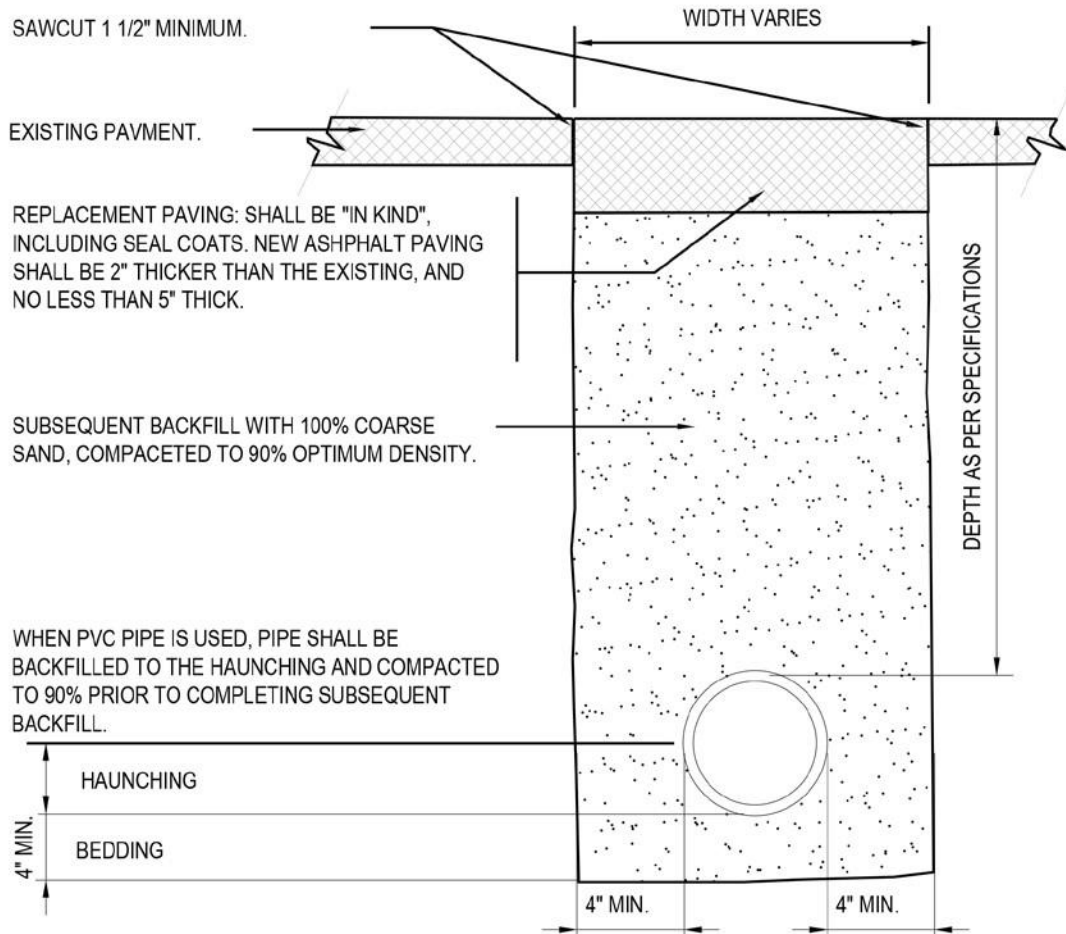
- A. All landscape and irrigation shall comply with the city of vista's land development code, landscape regulations; the land development manual, landscape standards; and all other city and regional standards.
- B. All landscape areas not containing trees shall have a minimum finished dimension of 3 feet (width) measured from the inside face of pavement.
- C. Each tree shall be planted in an air and water permeable planting area of at least 40 square feet with a minimum finished dimension (width) of 5 feet measured from the inside face of pavement. The planting area shall be unencumbered by utilities.
- D. All irrigation design and installation shall conform with the landscape standards. It is the responsibility of the designer to be familiar with and implement the landscape standards.
- E. Any changes to the site and/or landscape plans shall be submitted to the Landscape Architect and Grounds Supervisor for review and approval prior to proceeding.

- F. Any discrepancy or conflicts in dimensions, landscape area or material shall be brought to the attention of the Landscape Architect and Grounds Supervisor prior to installation.
- G. Trees required by this division shall be self-supporting, woody plants with at least one well defined trunk.
- H. The irrigation system shall be installed with a rain shut-off device.
- I. Graded, disturbed, or eroded areas to be treated with non-irrigated hydroseed mix shall receive an interim binder/tackifier as needed between April 2nd and August 31st for dust/erosion control with subsequent application of the hydroseed mix during the rainy season between October 1st. and April 1st. Supplemental manual irrigation will be implemented if deemed necessary by the project biologist and/or the Grounds Supervisor and may include hand watering or utilization of a water truck. If used, supplemental watering frequencies would mimic natural rainfall cycles.

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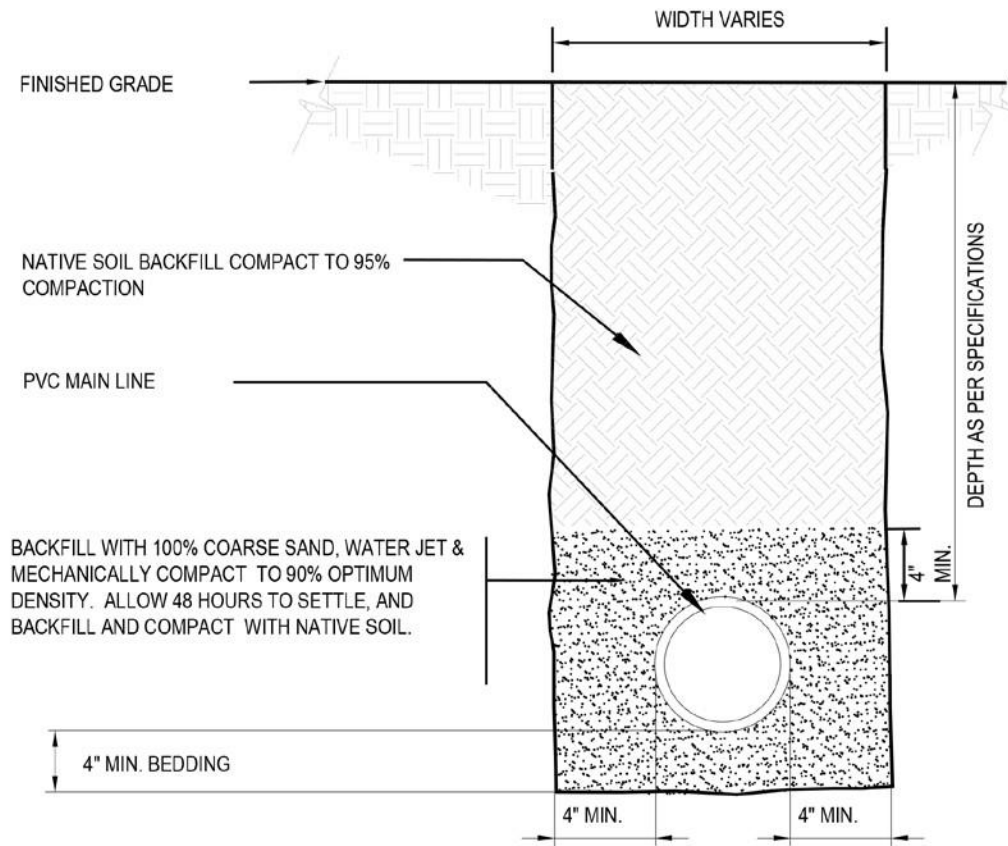


B. Irrigation Trenching at Asphalt Paving



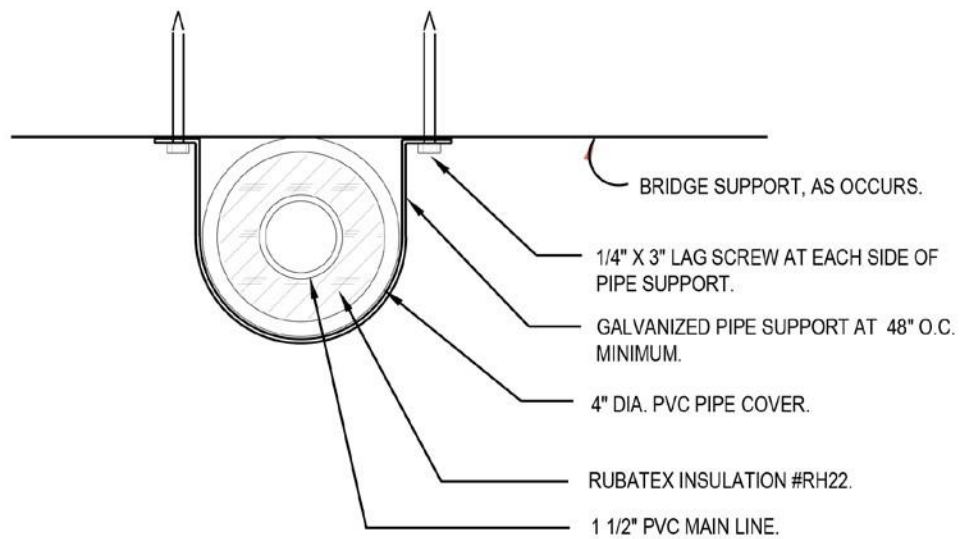
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C. Mainline with Sand Bedding



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D. Insulated Exposed Pipe Support

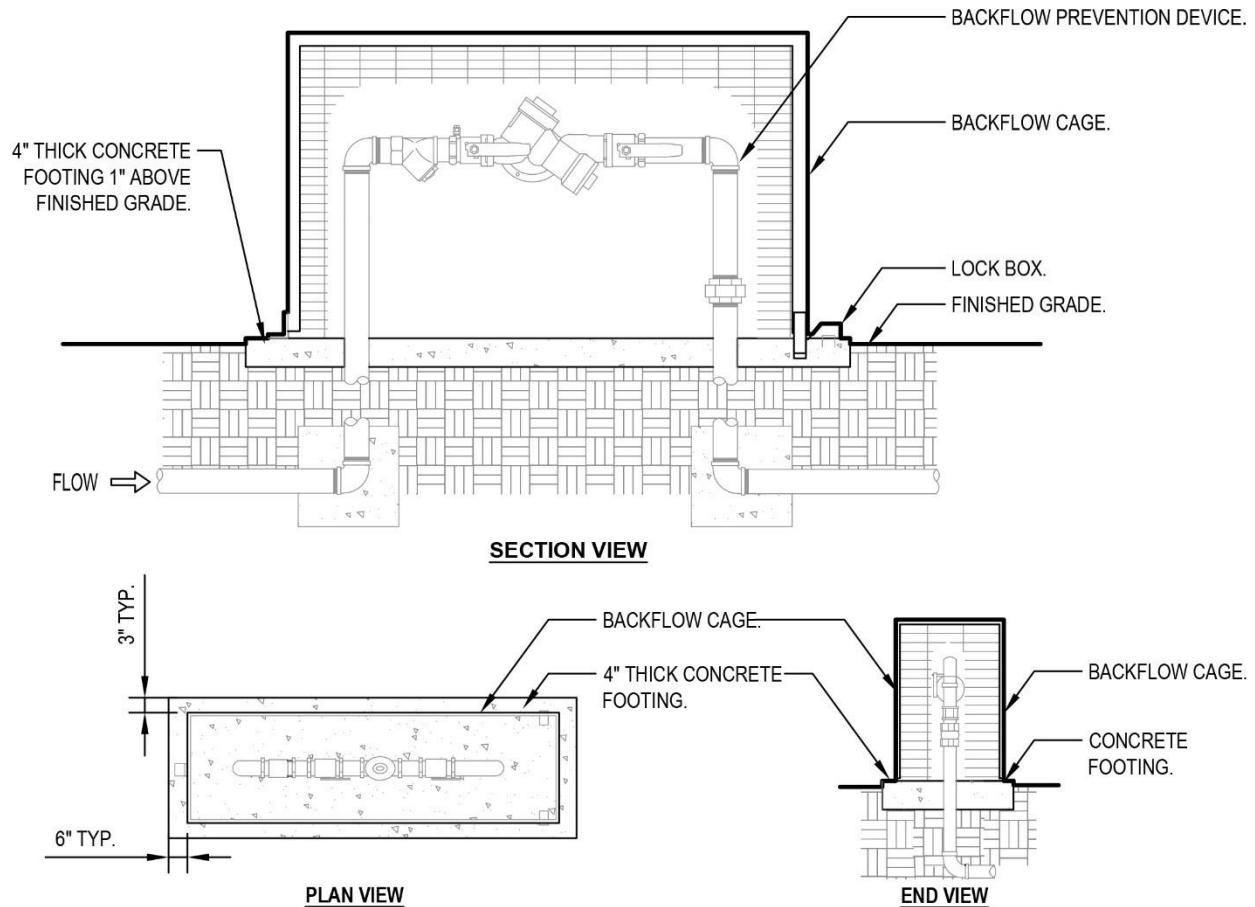


NOTE: AT ELBOWS, SPLIT THE PVC ELL COVER, ASSEMBLE THE UNIT, AND USE PIPE STRAPS TO INSTALL PVC ELL COVER AROUND MAIN LINE ELL.

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## 1.68 BACKFLOW PREVENTION DEVICES

### A. Backflow Prevention Device with Cage



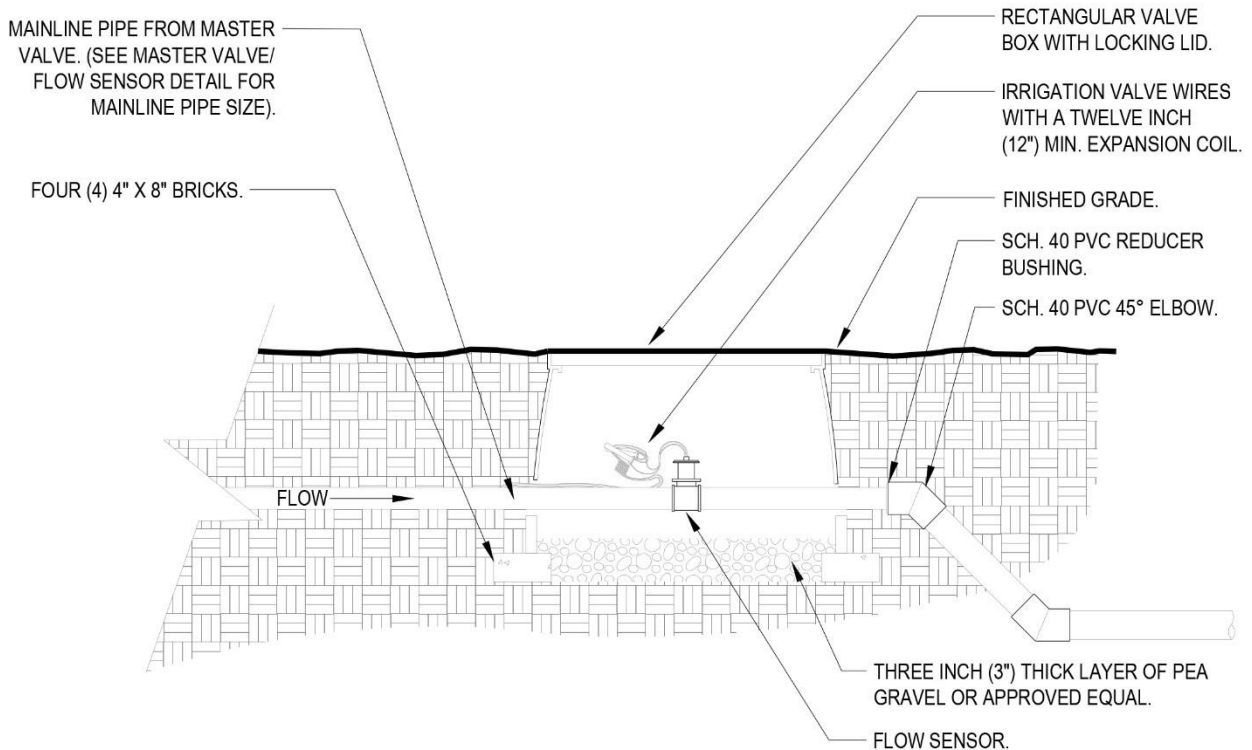
#### NOTES:

- 1- INSTALL BACKFLOW CAGE PER MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
- 2- REFER TO DISTRICT STANDARDS FOR BACKFLOW INSTALLATION.
- 2- LOCK BOX SHALL BE LOCATED ABOVE CONCRETE FOOTING
- 3- CONTRACTOR SHALL PROVIDE A LOCK AS APPROVED BY THE GROUNDS SUPERVISOR.

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## 1.69 FLOW SENSORS

### A. Flow Sensor



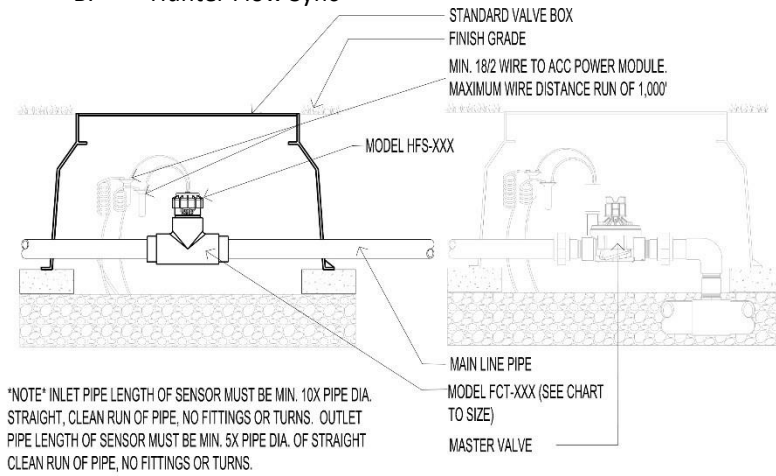
#### NOTES:

- 1- FLOW SENSOR MAKE AND MODEL NUMBER SHALL BE PER CONTROLLER MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
- 2- FLOW SENSOR WIRE SHALL BE PER THE CONTROLLER MANUFACTURER'S SPECIFICATIONS.
- 3- INSTALL FLOW SENSOR PER MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
- 4- ALL WIRE RUNS SHALL BE CONTINUOUS WITHOUT ANY SPLICES. WIRE CONNECTIONS SHALL BE MADE USING DBR/Y-6 CONNECTORS OR APPROVED EQUAL.
- 5- VALVE BOX SHALL BE WRAPPED WITH A MIN. OF THREE (3) MIL THICK PLASTIC AND SECURE IT TO THE VALVE BOX USING DUCT TAPE OR ELECTRICAL TAPE.
- 6- SEE MASTER VALVE/FLOW SENSOR DETAIL FOR LINEAR DIMENSIONS.

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## B. Hunter Flow Sync



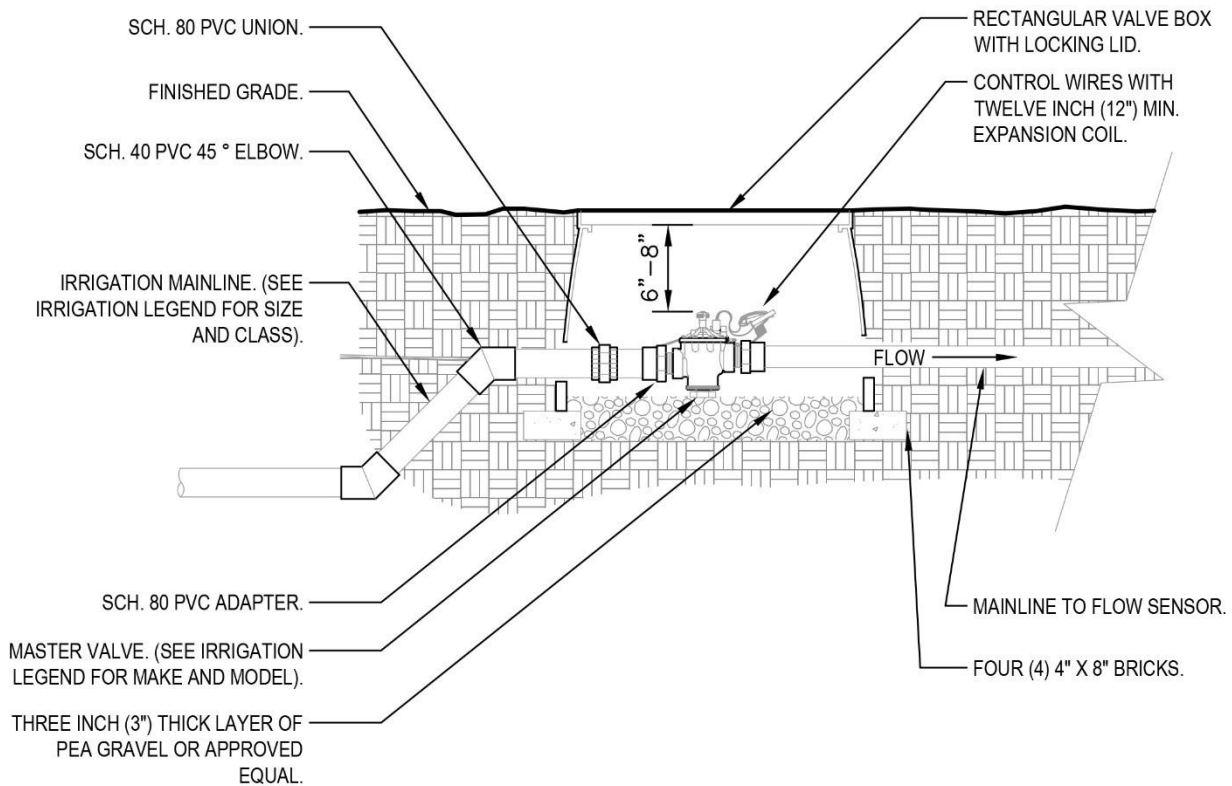
FCT FITTING SELECTION

FCT100	1 INCH	SCH. 80
FCT150	1.5 INCH	SCH. 80
FCT158	1.5 INCH	SCH. 80
FCT200	2 INCH	SCH. 80
FCT208	2 INCH	SCH. 80
FCT300	3 INCH	SCH. 80
FCT308	3 INCH	SCH. 80
FCT400	4 INCH	SCH. 80

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## 1.70 MASTER VALVES

### A. Master Valves



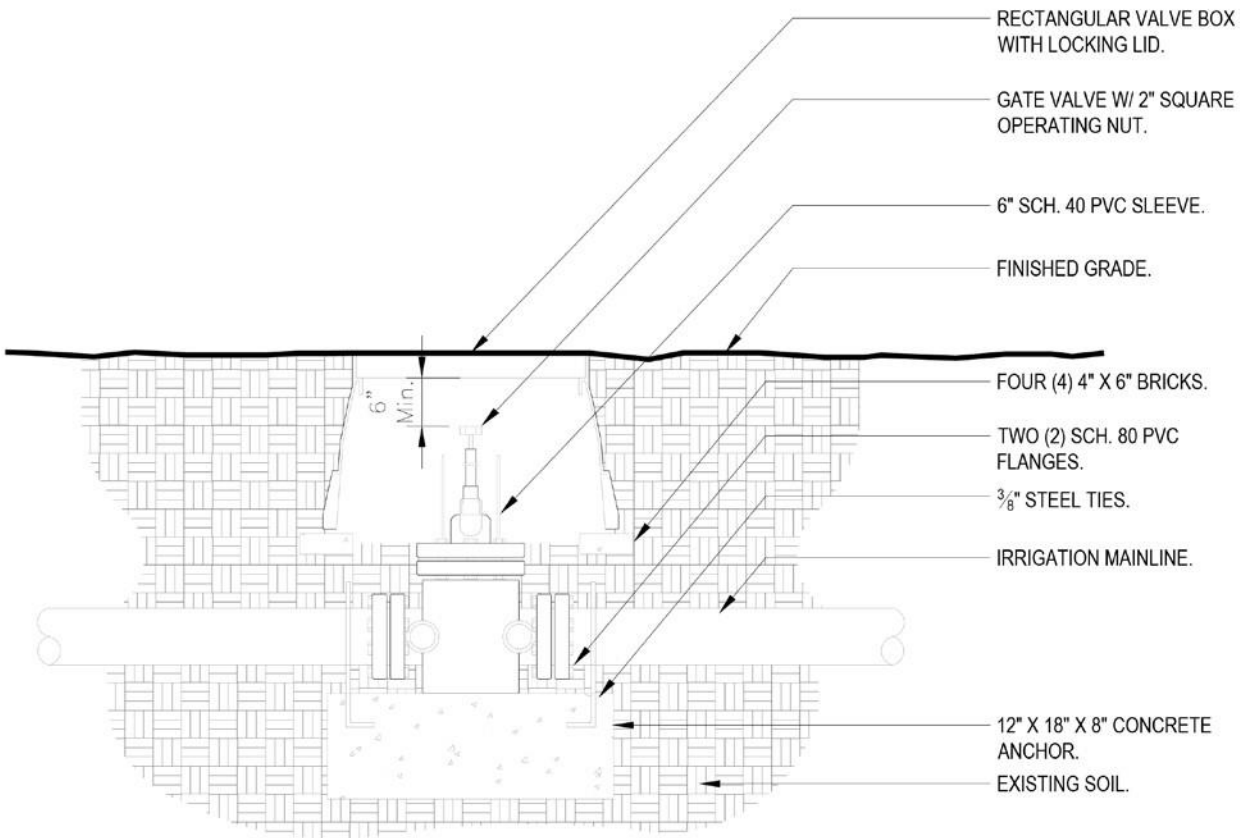
#### NOTES:

- 1- MASTER VALVE SHALL BE MAKE AND MODEL NUMBER AS PRESCRIBED PER THE CONTROLLER MANUFACTURER'S SPECIFICATIONS.
- 2- INSTALL MASTER VALVE PER MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
- 3- MASTER VALVE WIRE SHALL BE 14 AWG OR LARGER. COLOR: BLACK.
- 4- ALL WIRE RUNS SHALL BE CONTINUOUS WITHOUT ANY SPLICES. WIRE CONNECTIONS SHALL BE MADE USING DBR-Y/6 CONNECTORS OR APPROVED EQUAL.
- 5- WRAP VALVE BOX WITH MIN. 3 MIL. THICK PLASTIC AND SECURE IT TO THE VALVE BOX USING DUCT TAPE OR ELECTRICAL TAPE.
- 6- SEE MASTER VALVE/ FLOW SENSOR DETAIL FOR LINEAR DIMENSIONS.
- 7- VALVE BOXES SHALL BE LOCATED IN PLANTING AREAS.
- 8- MASTER VALVE SHALL ONLY BE USED IN CONJUNCTION WITH FLOW SENSOR.

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1.71 ISOLATION VALVES

A. Isolation Valve with Flanged Ends

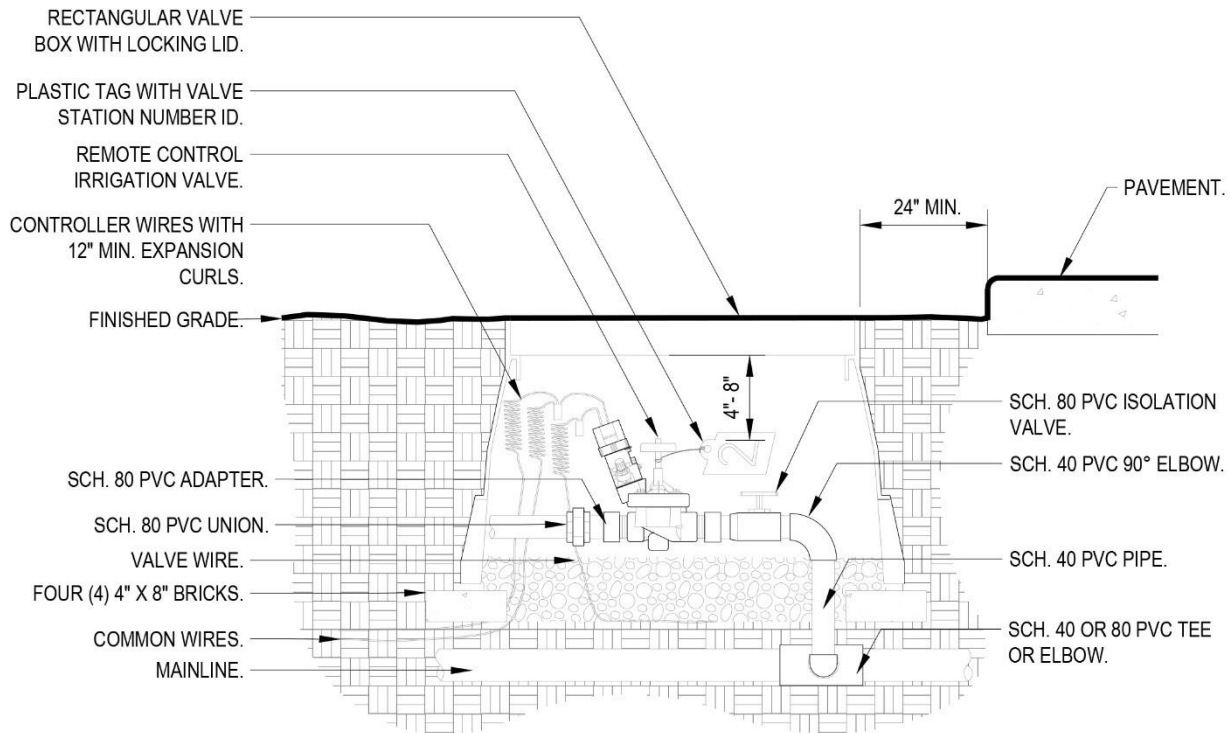


- NOTES:
- 1- INSTALL GATE VALVE PER MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
  - 2- VALVE BOX SHALL BE WRAPPED WITH MINIMUM 3 MIL THICK PLASTIC AND SECURE IT TO VALVE BOX USING DUCT TAPE OR ELECTRICAL TAPE.
  - 3- VALVE BOX SHALL BE LOCATED IN PLANTING AREA.

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## 1.72 AUTOMATIC CONTROL VALVES

### A. Remote Control Irrigation Valve



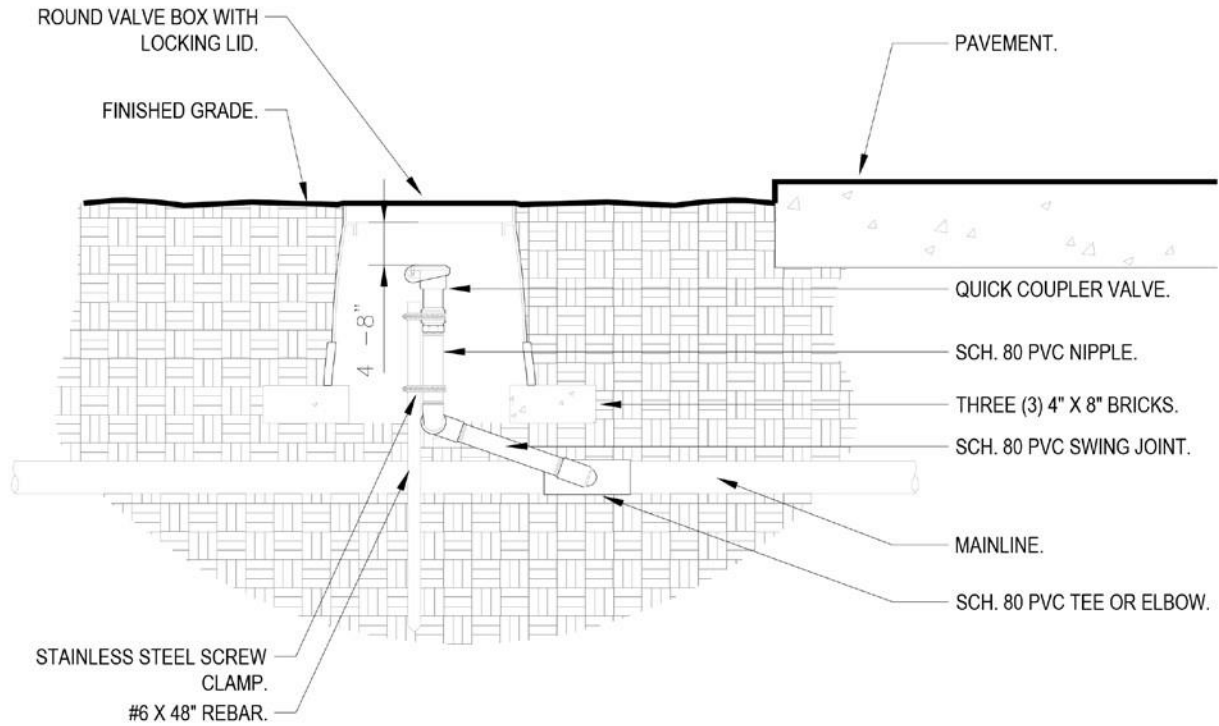
#### NOTE:

- 1- LOCATE VALVE BOX WITHIN 24" OF PAVEMENT EDGE IN PLANTING AREA WHERE EASILY ACCESSIBLE WHENEVER POSSIBLE.
- 2- COMMON WIRE AND CONTROLLER WIRE SHALL BE DIRECT BURIAL 14 AWG OR LARGER. COLOR: COMMON (WHITE), CONTROLLER WIRE FOR TURF (BLUE), AND CONTROLLER WIRE FOR SHRUBS (RED). (SEE SPECIFICATIONS FOR 2-WIRE CONTROLLERS).
- 3- ALL WIRE RUNS SHALL BE CONTINUOUS WITHOUT ANY SPLICES UNLESS APPROVED BY THE GROUNDS SUPERVISOR. SEE SPLICE BOX DETAIL. WIRE CONNECTIONS SHALL BE MADE USING DBR/Y-6 CONNECTORS OR APPROVED EQUAL.
- 4- VALVE BOX SHALL BE WRAPPED WITH MIN. 3 MIL THICK PLASTIC AND SECURE IT USING DUCT TAPE OR ELECTRICAL TAPE.
- 5- MAINLINES 4" OR LARGER SHALL USE SADDLES AT THE CONNECTIONS POINTS TO THE IRRIGATION VALVE. (SEE SPECIFICATIONS FOR IRRIGATIONS SADDLES).
- 6- ALL SCH. 80 PVC TO SCH. 40 PVC THREADED CONNECTIONS SHALL BE MADE USING TEFLON TAPE.
- 7- VALVE BOXES SHALL BE LOCATED IN PLANTING AREAS.

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## 1.73 QUICK COUPLER VALVES

### A. Quick Coupler Valve



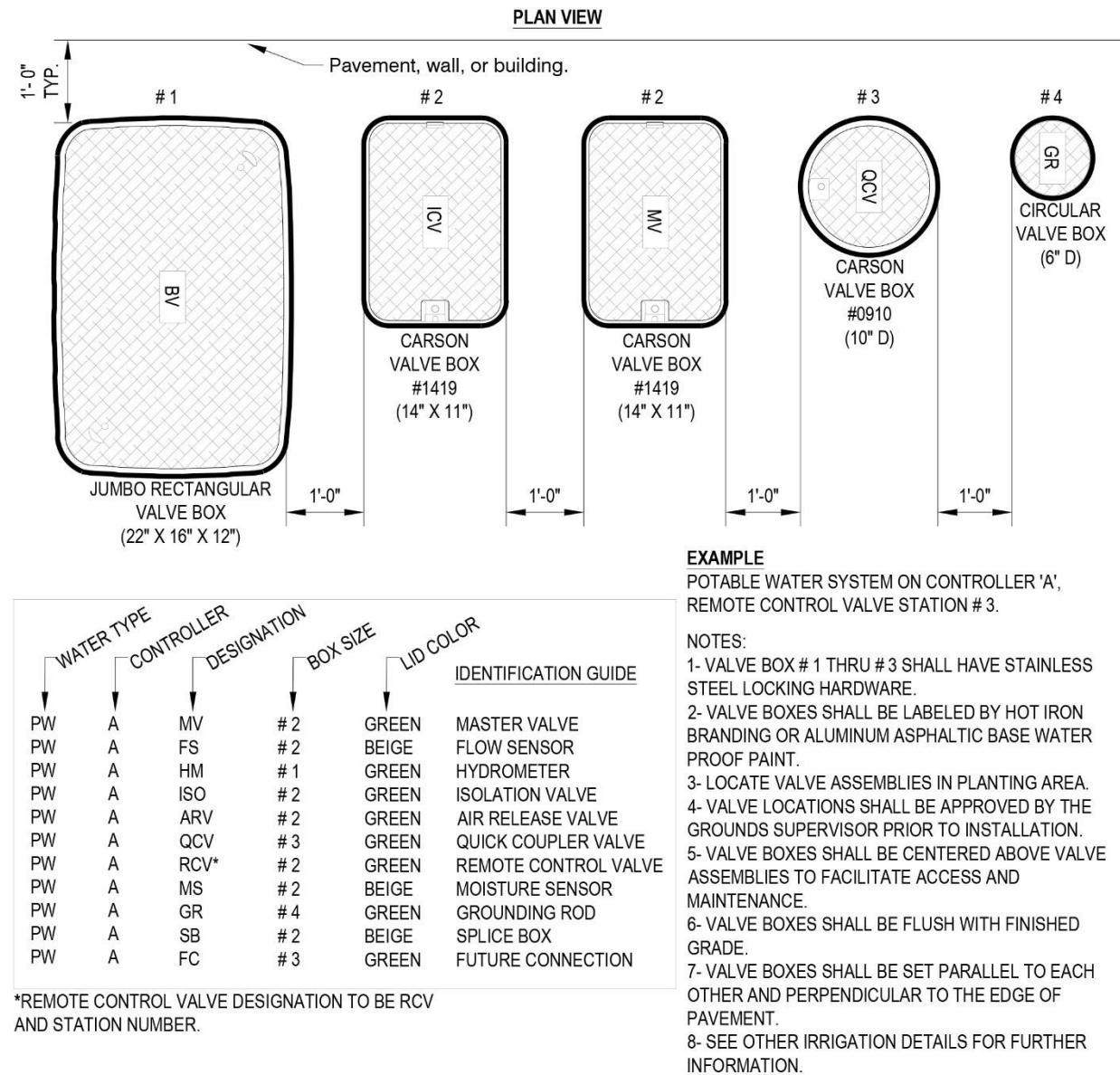
#### NOTES:

- 1- ALL THREADED CONNECTIONS SHALL BE INSTALLED USING TEFLON TAPE.
- 2- VALVE BOX SHALL BE WRAPPED WITH A MINIMUM 3 MIL THICK PLASTIC AND SECURED TO THE VALVE BOX USING DUCT TAPE OR ELECTRICAL TAPE.
- 3- ALL QUICK COUPLERS SHALL BE INSTALLED A MINIMUM OF 18" OFF OF THE MAINLINE.
- 4- VALVE BOXES SHALL BE LOCATED IN PLANTING AREAS.

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1.74 VALVE BOXES

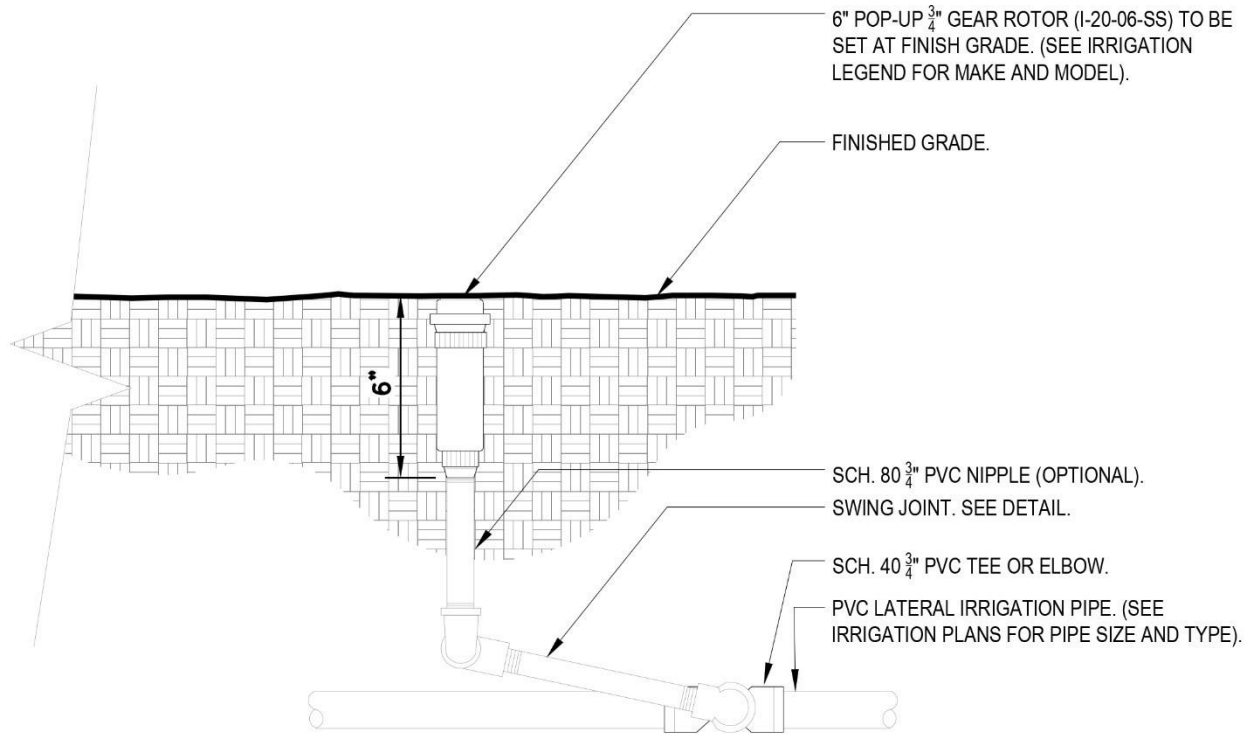
A. Valve Box Layout



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## 1.75 SPRINKLERS

### A. Gear Drive Rotor – $\frac{3}{4}$ "

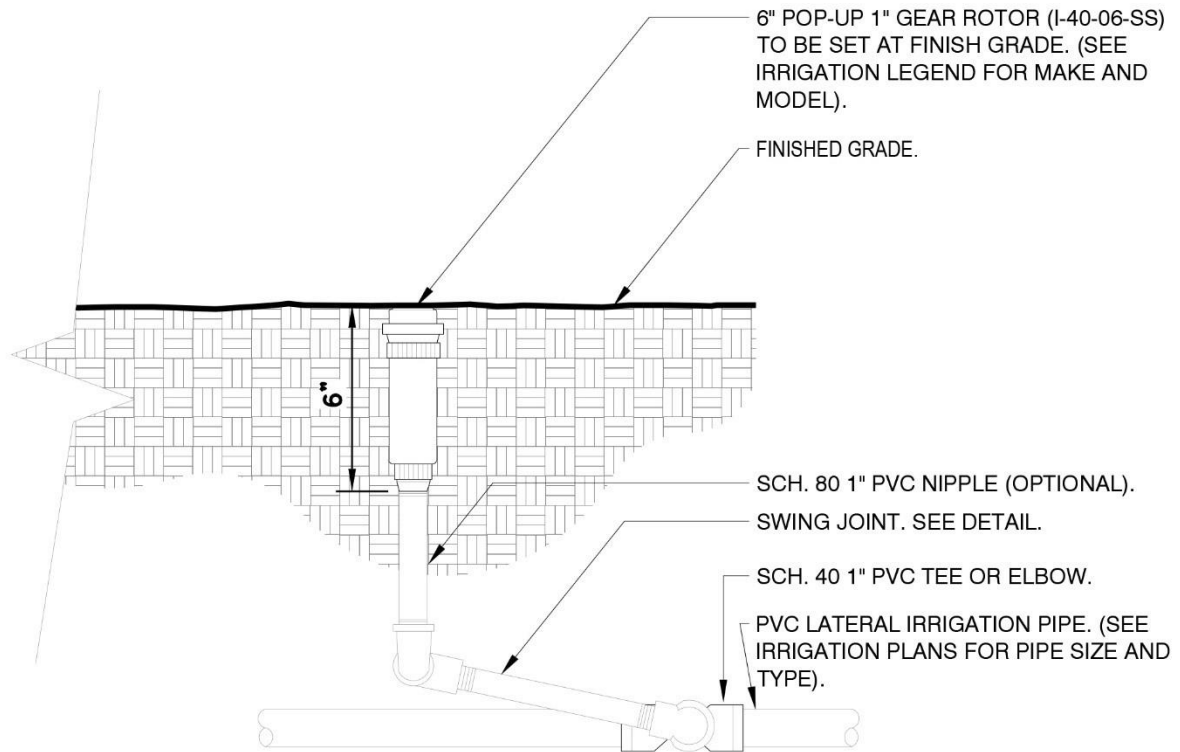


#### NOTES:

- 1- ALL THREADED CONNECTION POINTS BETWEEN SCH. 40 PVC AND SCH. 80 PVC FITTING SHALL BE INSTALLED USING TEFLON TAPE.
- 2- CONTRACTOR SHALL COMPACT SOIL AROUND ROTOR AND RISER PRIOR TO PLANTING, PLUGGING, SEEDING, OR LAYING OF SOD.

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B. Gear Drive Rotor – 1"



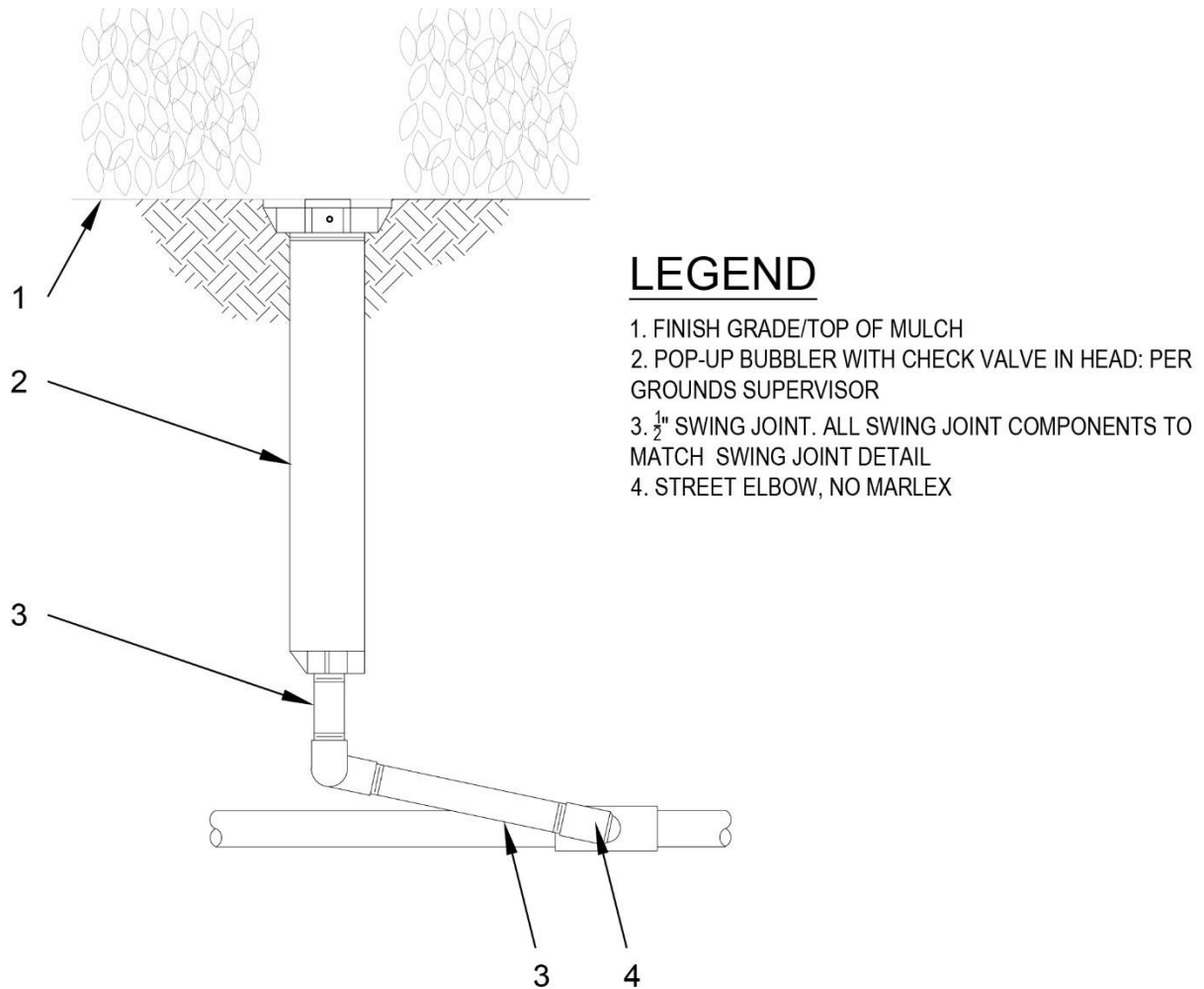
NOTES:

- 1- ALL THREADED CONNECTION POINTS BETWEEN SCH. 40 PVC AND SCH. 80 PVC FITTING SHALL BE INSTALLED USING TEFLON TAPE.
- 2- CONTRACTOR SHALL COMPACT SOIL AROUND ROTOR AND RISER PRIOR TO PLANTING, PLUGGING, SEEDING, OR LAYING OF SOD.

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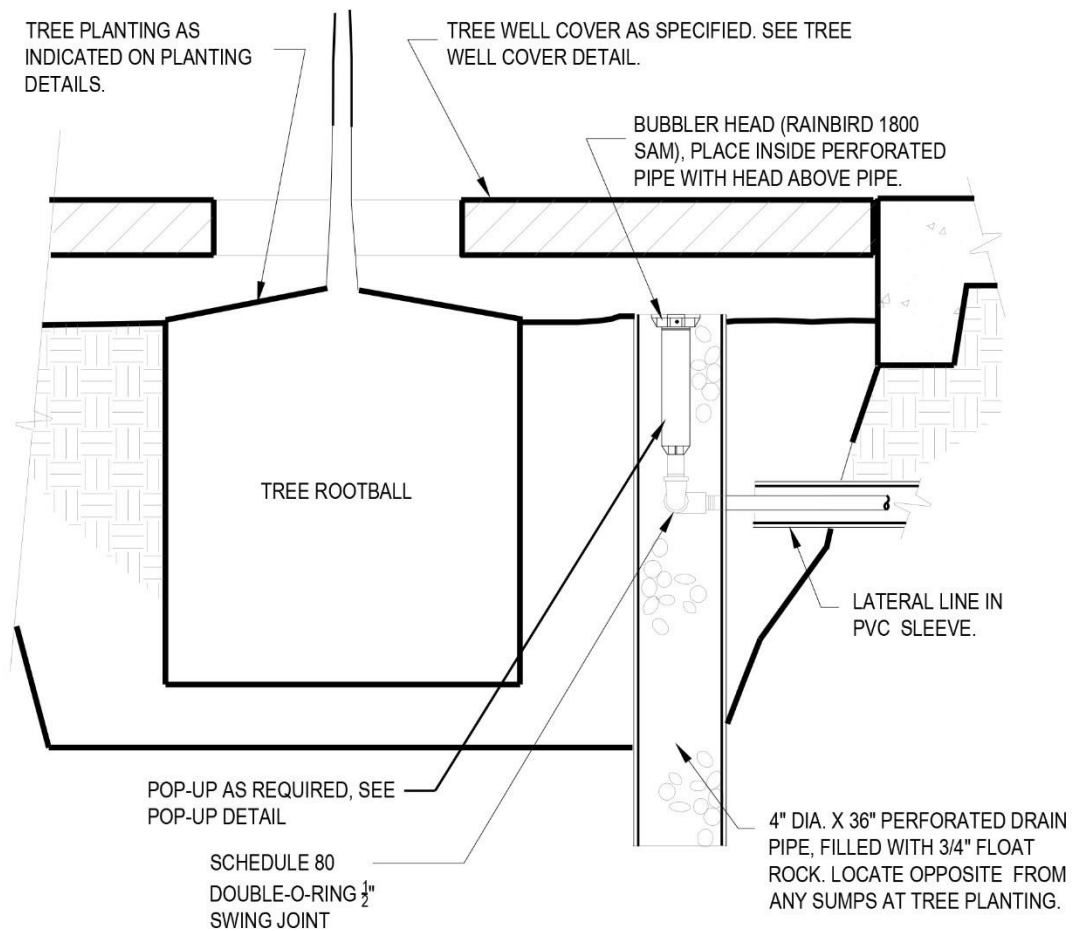


C. Pop-up Bubbler



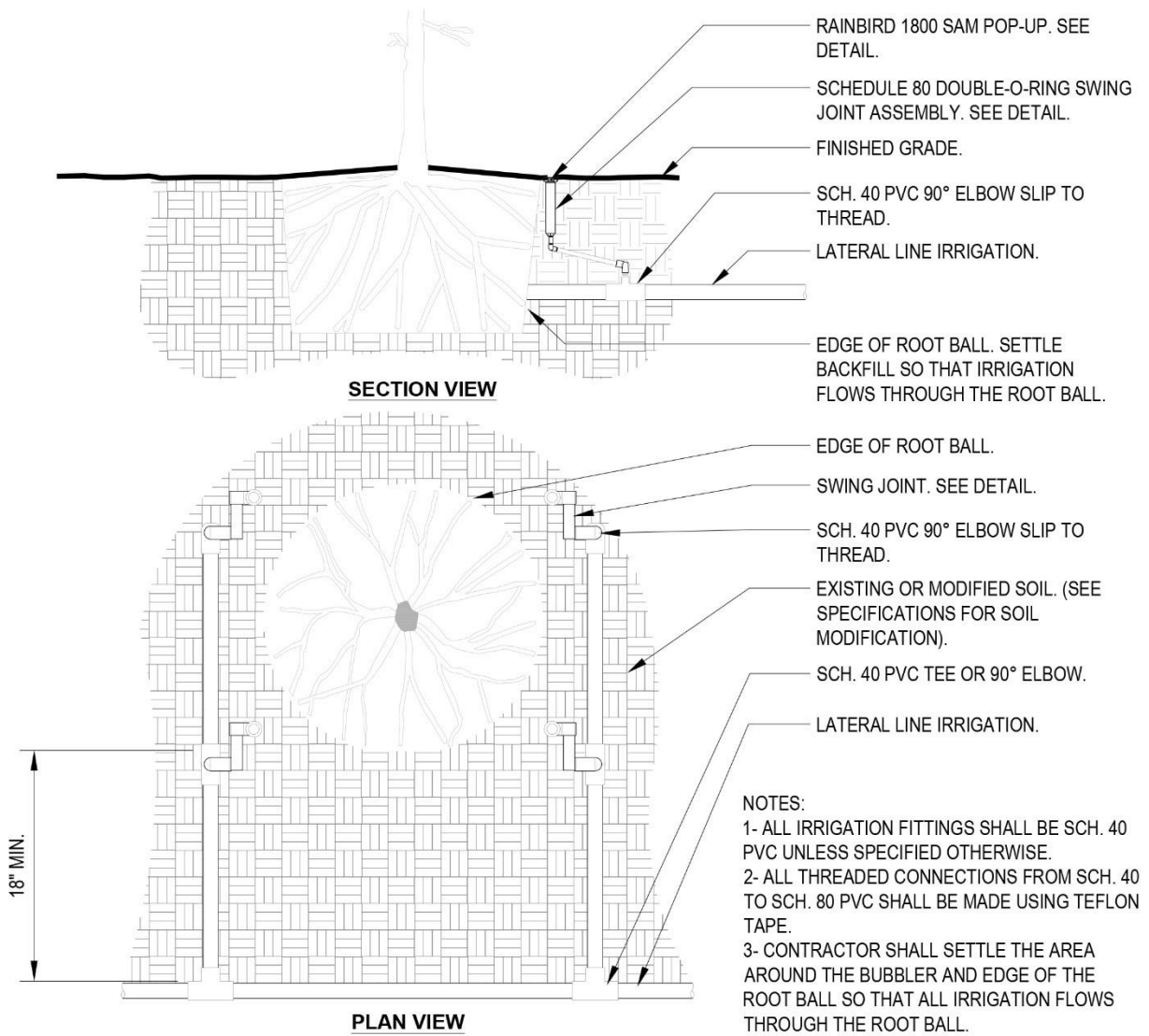
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D. Bubbler at Tree Well



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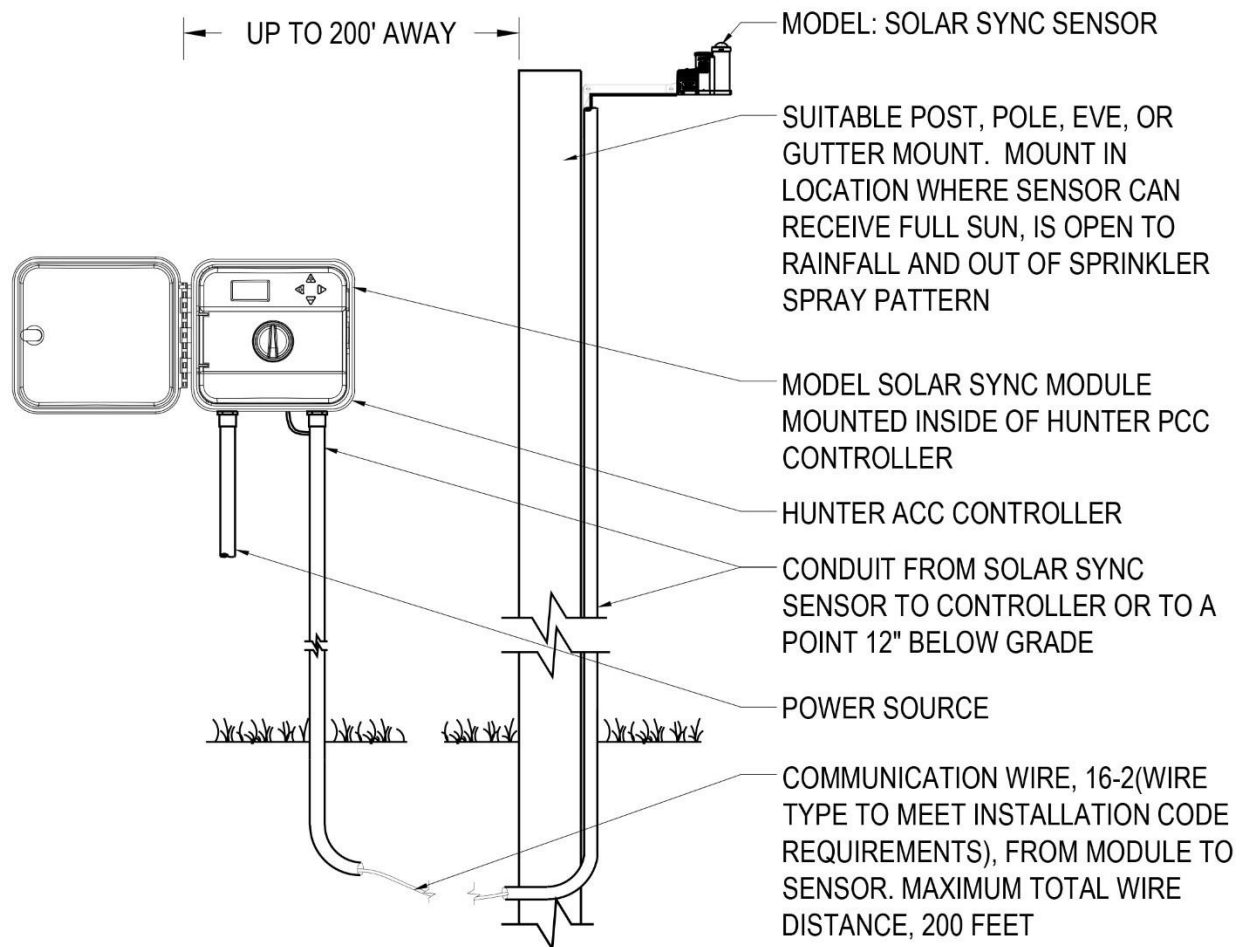
E. Irrigation Bubbler Layout



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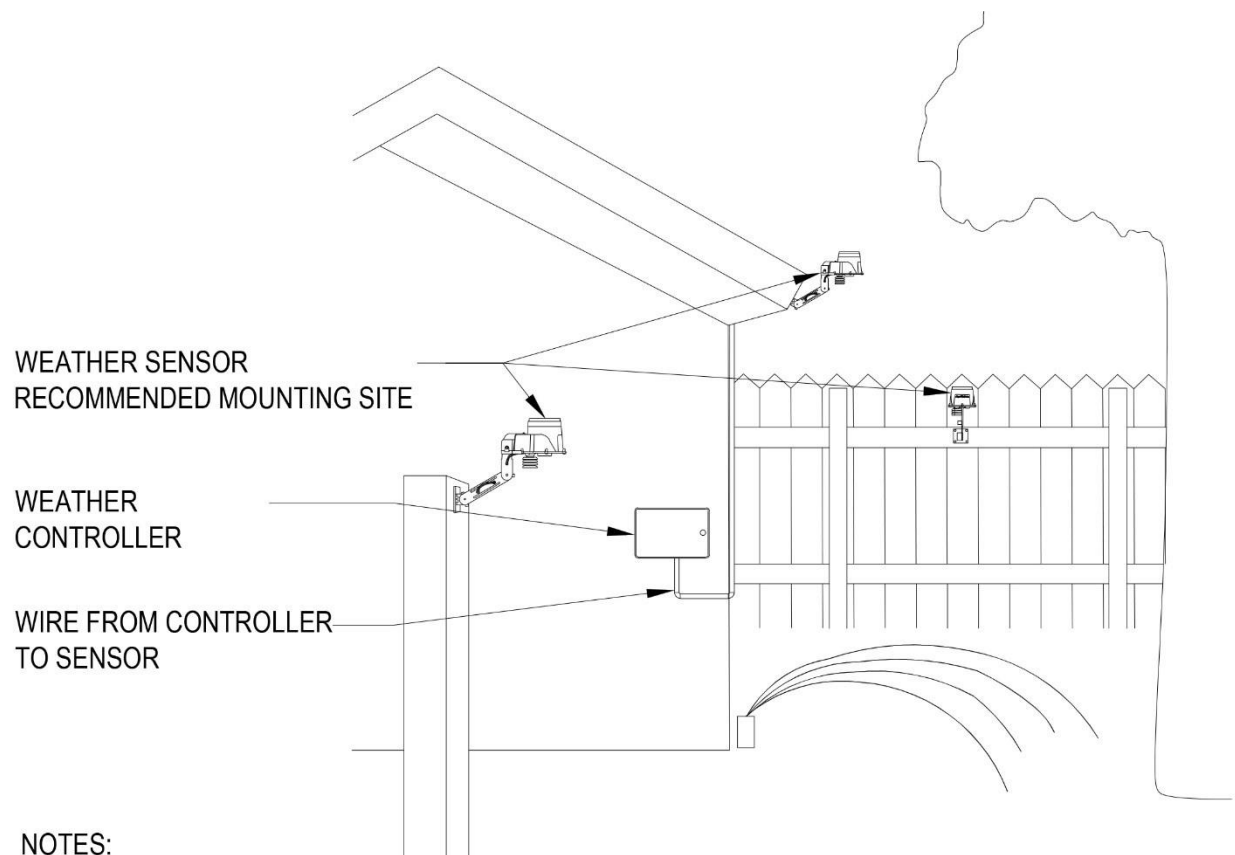
1.76 RAINGUAGE EQUIPMENT

A. Solar Sync



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B. Sensor Location



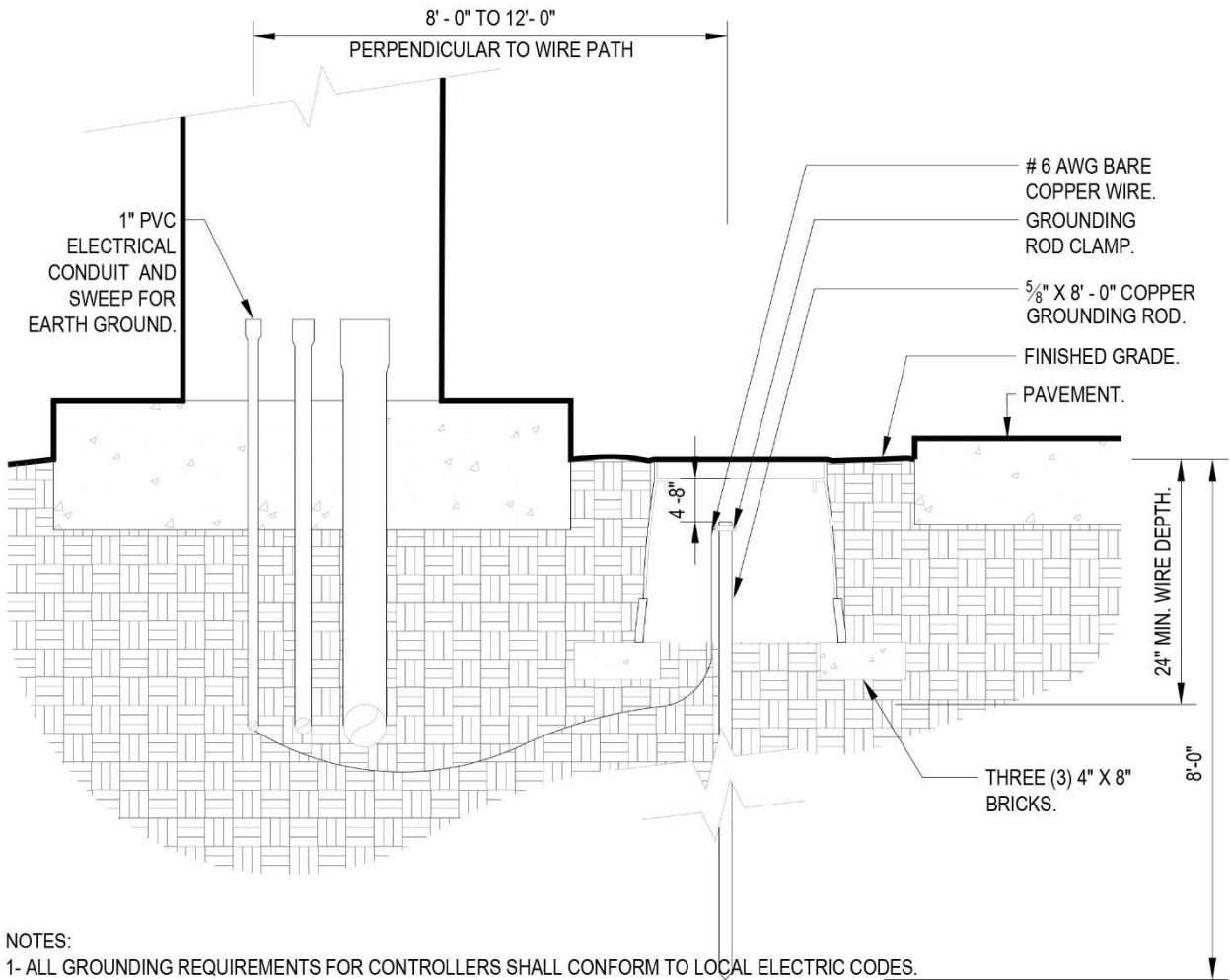
NOTES:

1. LENGTH OF WIRE FROM CONTROLLER TO SENSOR SHOULD BE NO GREATER THAN 200 FEET.
2. SENSOR MAY BE MOUNTED ON FENCE, FENCE POST OR ON EAVE OF HOUSE.
3. SENSOR SHOULD NOT BE MOUNTED UNDER TREES, IN AREAS AFFECTED BY SPRINKLER SYSTEM OR UNDER EAVE OF HOUSE.

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1.77      WIRING

A.      Grounding Rod



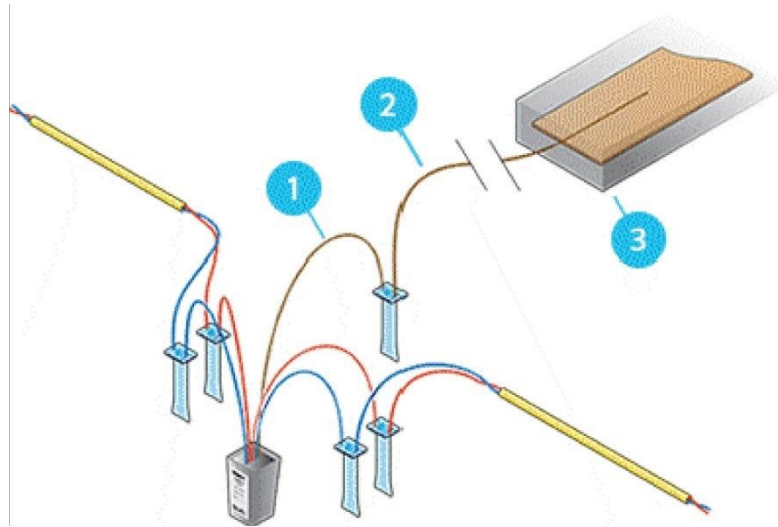
NOTES:

- 1- ALL GROUNDING REQUIREMENTS FOR CONTROLLERS SHALL CONFORM TO LOCAL ELECTRIC CODES.
- 2- GROUNDING ROD SHALL NOT BE LOCATED IN THE SAME TRENCH AS THE IRRIGATION MAINLINES OR LATERAL LINES.
- 3- VALVE BOX SHALL BE WRAPPED WITH A MINIMUM 3 MIL THICK PLASTIC AND SECURED TO THE VALVE BOX USING DUCT TAPE OR ELECTRICAL TAPE.
- 4- INSTALL GROUNDING ROD PER THE CONTROLLER MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.

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B. Two-Wire Connections

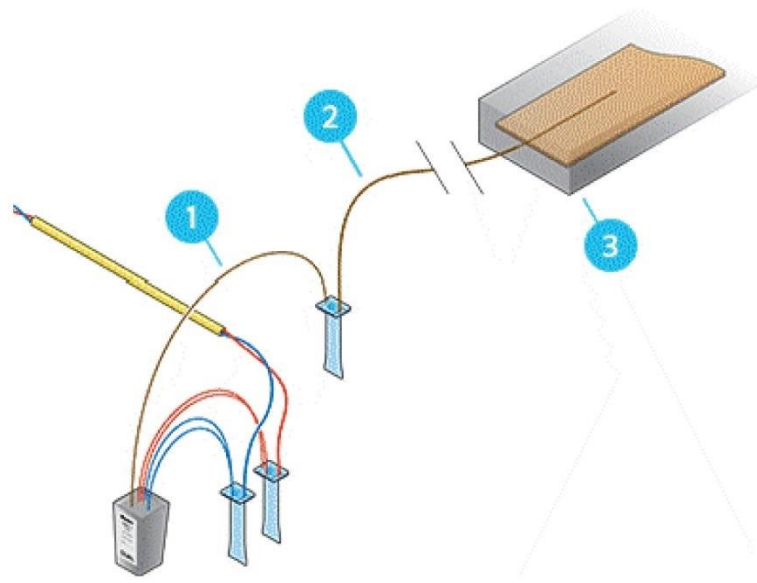
1. Grounding Detail, In-Line



1. DECODER GROUND WIRE
2. SOLID BARE COPPER SHIELDING WIRE
3. PLACE GROUND PLATE IN 6" (15 CM) WIDE TRENCH, PERPENDICULAR TO SHIELDING WIRE, 8 FEET (2.5 M) AWAY, 36" (1 M) BELOW GROUND LEVEL. SURROUND PLATE EVENLY WITH POWERSSET MATERIAL.

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## 2. Grounding Detail, End-Line

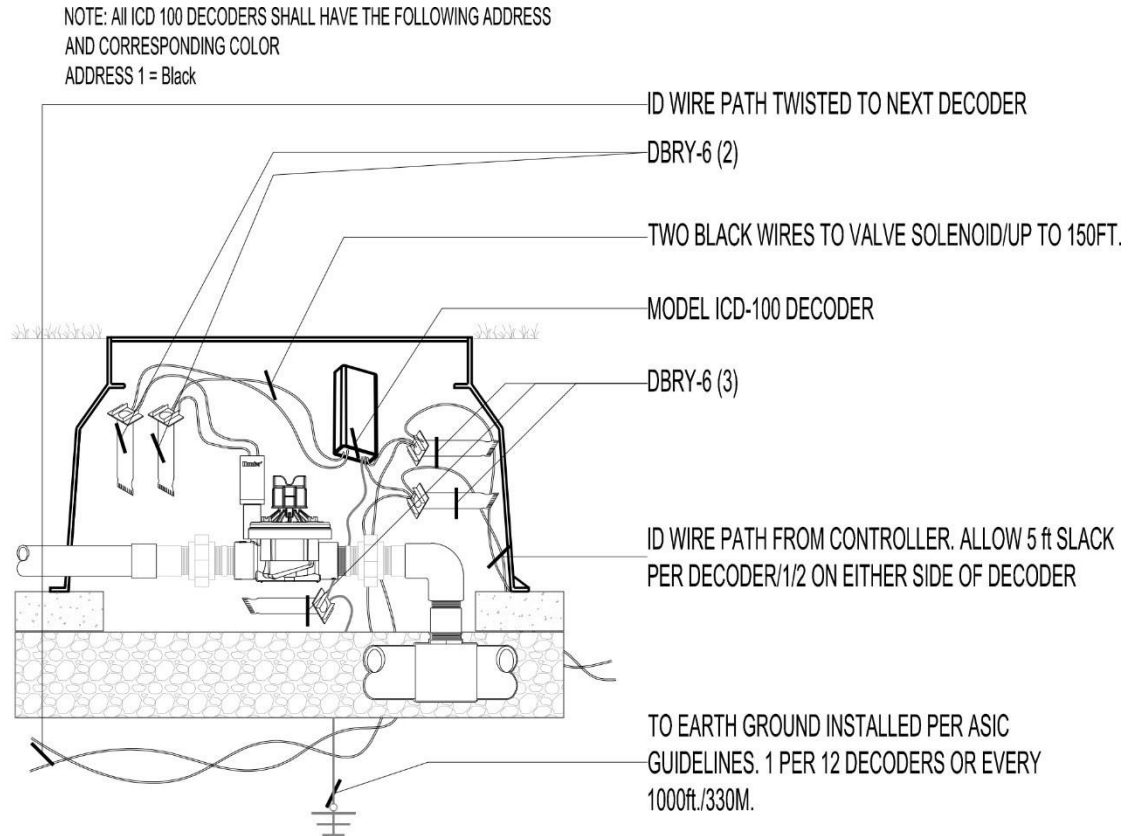


1. DECODER GROUND WIRE
2. SOLID BARE COPPER SHIELDING WIRE
3. PLACE GROUND PLATE IN 6" (15 CM) WIDE TRENCH, PERPENDICULAR TO SHIELDING WIRE, 8 FEET (2.5 M) AWAY, 36" (1 M) BELOW GROUND LEVEL. SURROUND PLATE EVENLY WITH POWERSET MATERIAL.

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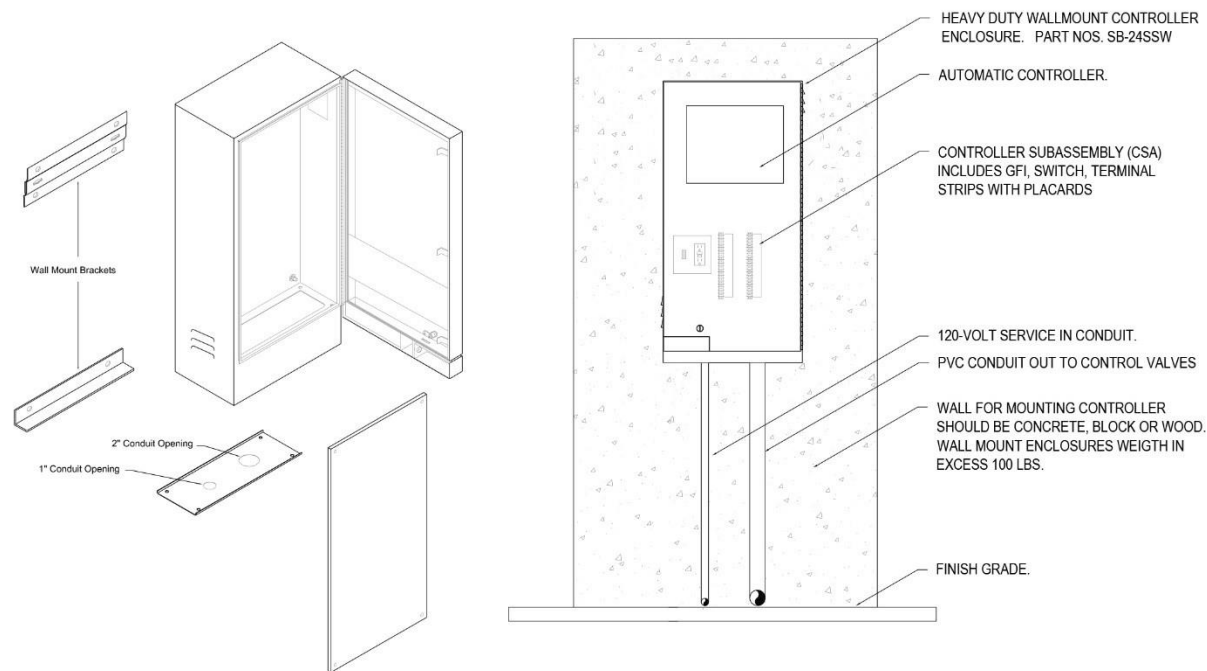
3. Decoder



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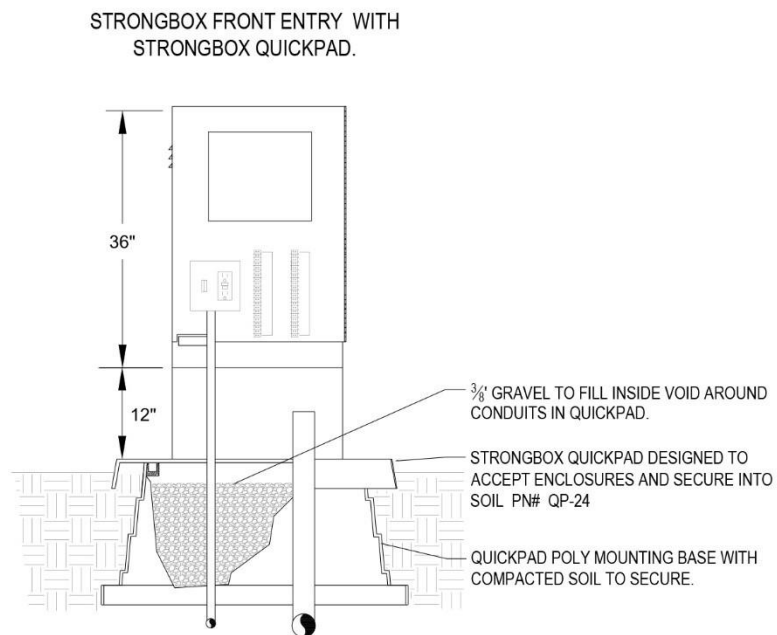
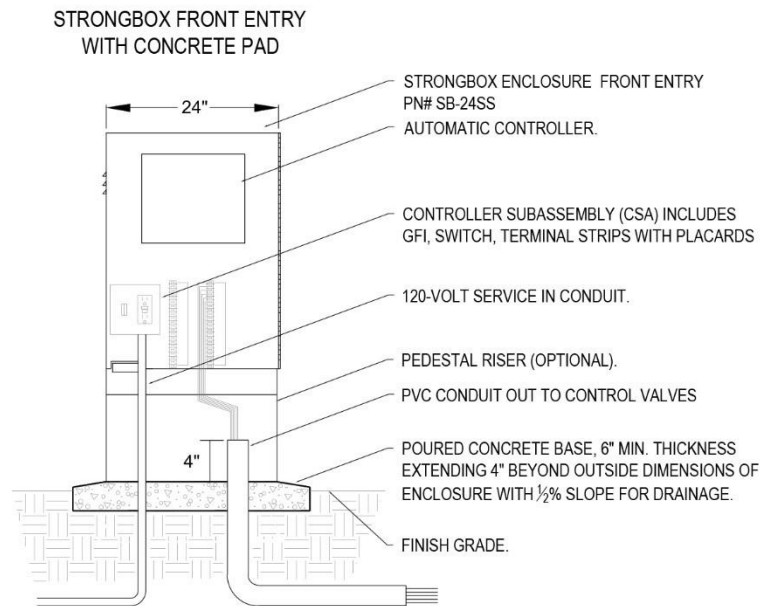
1.78 CONTROLLERS AND CONTROLLER ASSEMBLIES

A. VIT Strongbox Wall Mount



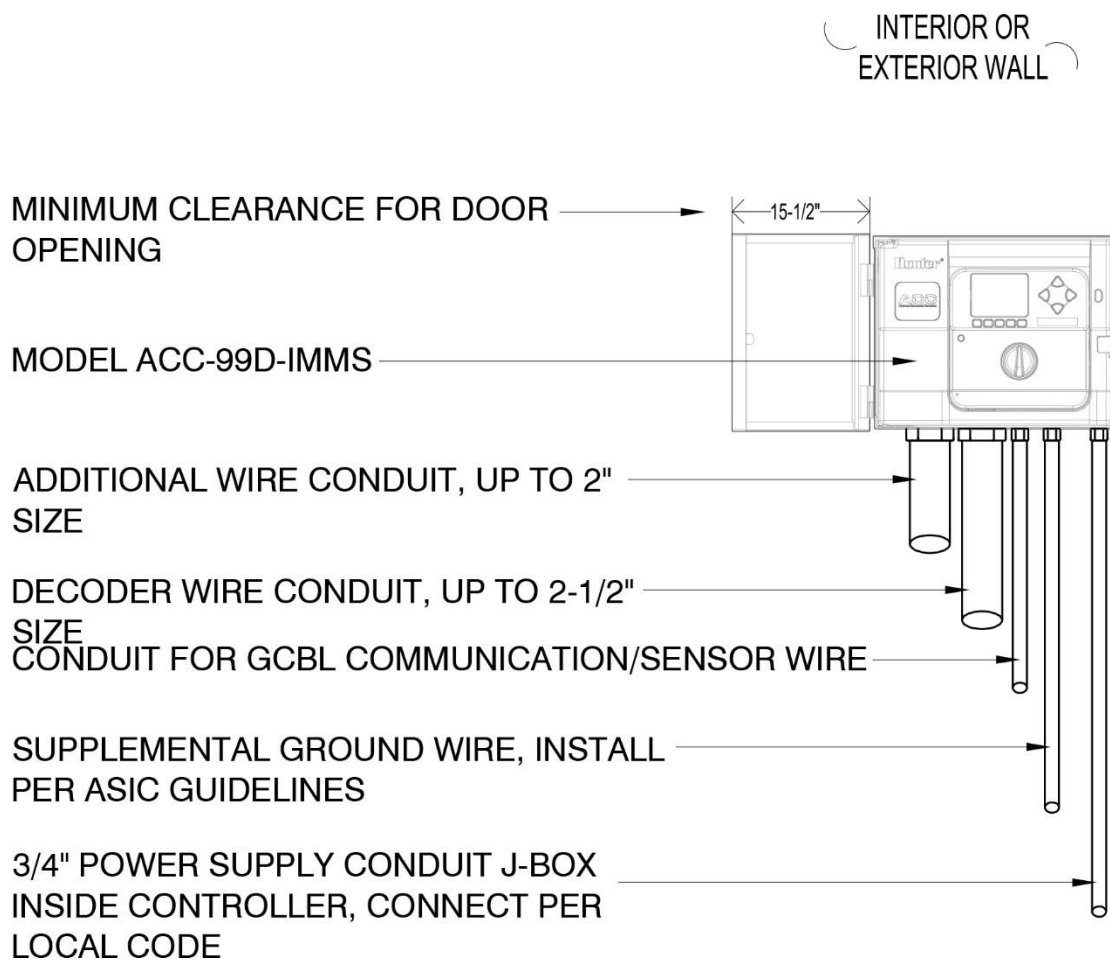
[REMAINDER OF PAGE INTENTIONALLY BLANK]

B. VIT Strongbox Front Entry



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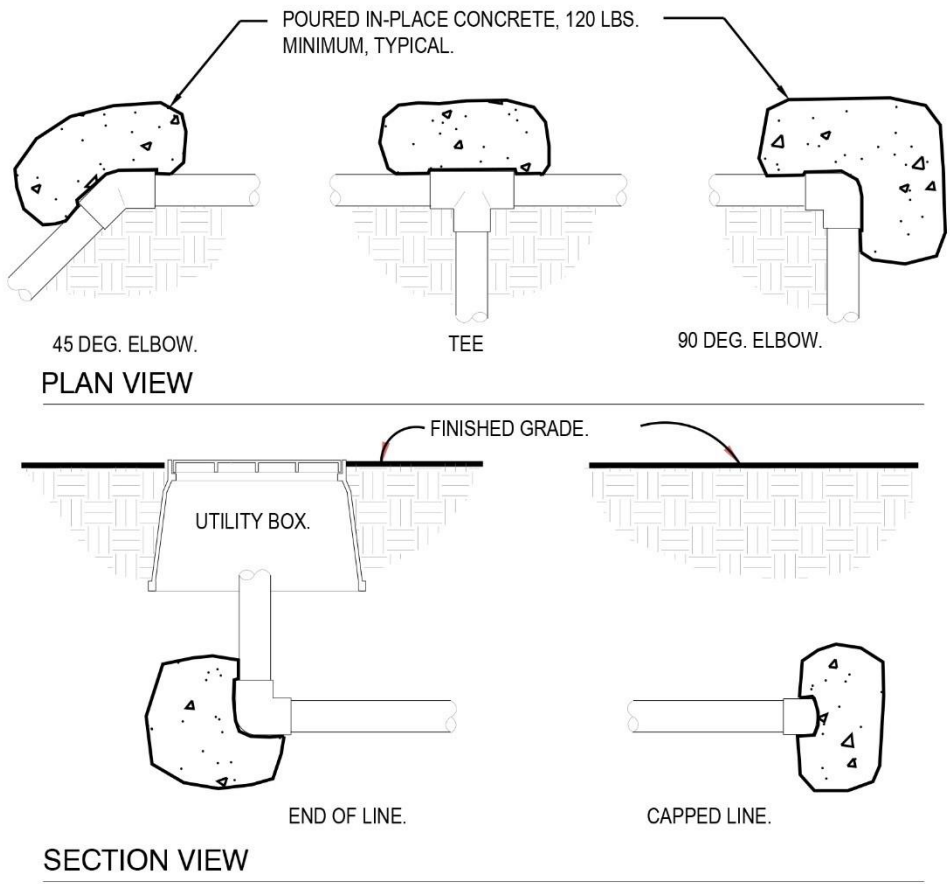
C. Wall Mount Controller



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1.79 THRUST BLOCKS

A. Thrust Blocking



END OF SECTION

## **VIII. WIND DESIGN CRITERIA SPECIFICATION**

### **GENERAL**

#### **A. SUMMARY**

**1. Section Includes: Wind design criteria for the following:**

a) Design of equipment, solar panels and supports, electrical equipment, light poles, flag poles, antenna poles, freestanding walls, solid signs, tanks, facilities, buildings and all other structures as indicated in ASCE 7. Wind design shall be considered for all cases listed unless equipment is 'housed' in a structure or when it can be demonstrated that Wind design does not govern. The minimum Wind loading for other elements that are not defined in ASCE 7 shall be sixteen pounds per square foot (16 lbs/ft<sup>2</sup>) multiplied by its area.

b) Design of anchorage for the Item 1. Listed above.

c) Other structures or items as specified or indicated on the Contract Drawings and as required by the 2016 California Building Code.

#### **B. REFERENCES**

**1. International Conference of Building Officials (ICBO):**

a) California Building Code (CBC).

b) American Society of Civil Engineers

a. 7-10 Minimum Design Loads for Buildings and Other Structures (ASCE 7-10)

#### **C. SYSTEM DESCRIPTION**

**1. Design Requirements: Design in accordance with the requirements of the 2016 California Building Code.**

a) Risk Category: III

b) Basic Wind Speed (3 second gust):

a. Ultimate design wind speed,  $V_{ULT} = 115$  mph

b. Nominal design wind speed,  $V_{ASD} = 90$  mph

c) Exposure Category: C

d) Topographic Factor,  $K_{tz}$  = shall be in accordance with ASCE 7-10 Standard.

e) Use anchor bolts, bolts, or welded studs for anchors for resisting wind forces. Anchor bolts used to resist wind forces shall have a standard hex bolt head. Do not use anchor bolts fabricated from rod stock with an L or J shape.

(1) Do not use concrete anchors, flush shells, chemical anchors, powder actuated fasteners, or other types of anchor unless indicated on the Drawings or accepted in writing by the ENGINEER.

(2) Wind forces must be resisted by direct bearing on the anchors used to resist wind forces. Do not use connections which use friction to resist wind forces.

6. Anchor design capacity is to be independent of reinforcing steel in the concrete providing ductility.

**D. SUBMITTALS**

1. Shop Drawings and Calculations: Complete shop drawings and wind calculations.

2. Calculations shall be signed and stamped by a civil or structural Professional Engineer licensed to practice in the state where the Project is located. All calculations shall be done in English units.

**IX. PRODUCTS**

Not Used.

**X. EXECUTION**

Not Used.

**END OF SECTION**

## **XI. SEISMIC DESIGN CRITERIA SPECIFICATION**

### **PART 1 GENERAL**

#### **1.01 SUMMARY**

- A. Section Includes: Seismic design criteria for the following:
  - 1. Seismic anchorage of mechanical equipment, electrical equipment and distributed systems (i.e. piping, conduit, ducting, other), shall be designed as called for below;
    - a. Where the mechanical or electrical equipment has a weight of four hundred pounds (400 lbs) or more.
    - b. Where the mechanical or electrical equipment has a weight of less than four hundred pounds (400 lbs) and a center of mass located four feet (4'-0") or more above the adjacent floor level.
    - c. Where mechanical or electrical equipment has a weight of twenty pounds (20 lbs) or less or, in the case of a distributed system that has a weight of five pounds per foot (5 lbs/ft) or less, seismic anchorage need not be considered. Where multiple distributed systems are supported off of the same system their combined weight must be used in determining if design is required for the support system.
  - 2. Typical Details may have been provided for supporting mechanical equipment, electrical equipment and distributed systems (i.e. piping, conduit, ducting, other) as well as for stairs ladders and other miscellaneous items in the construction documents. These Typical Details are to be used for a minimum standard for style, size, and materials and shall be used as a guide for the contractor in designing the specific item or system utilized on the project Design for these systems shall be provided in the submittal. The design shall include details and calculations stamped and signed by a Civil or Structural engineer registered in the State of California.
  - 3. Seismic design of tanks and anchorage of tanks.
  - 4. Other structures or items as specified or indicated on the Drawings.

#### **1.02 REFERENCES**

- A. International Code Council (ICC).
- B. California Building Code (CBC).
- C. American Society of Civil Engineers
  - 1. 7-10 Minimum Design Loads for Buildings and Other Structures (ASCE 7-10)
- D. American Concrete Institute
  - 1. 318-14 Building Code Requirements for Structural Concrete (ACE 318-14)
    - a. Chapter 17-Anchoring to Concrete

#### **1.03 SYSTEM DESCRIPTION**

- A. Design Requirements for Equipment provided by the Contractor:
  - 1. Design in accordance of the 2016 California Building Code.
    - a. Risk Category, III
    - b. Site Class, D



- c. Spectral Acceleration Parameter,  $S_s$ : 1.044
  - d. Spectral Acceleration Parameter,  $S_1$ : 0.367
  - e. Design Spectral Acceleration at short period,  $S_{DS}$ : 0.753g
  - f. Design Spectral Acceleration at 1-Second Period,  $S_{D1}$ : 0.407g
  - g. Component Amplification Factor,  $a_p$ : In accordance with ASCE 7-10, "Minimum Design Loadings for Buildings and Other Structures", Tables 13.5-1 and 13.6-1.
  - h. Component Response Modification Factor,  $R_p$ : In accordance with ASCE 7-10, Tables 13.5-1 and 13.6-1.
  - i. Overstrength Coefficients,  $\Omega_o$ : In accordance with ASCE 7-10, Tables 13.5-1 and 13.6-1
  - j. Component Importance Factor,  $I_p$ : In accordance with ASCE 7-10, Section 13.1.3 but not less than 1.25. For low and high pressure gas storage tanks  $I_p$  shall be 1.5.
  - k. Component Response Modification Factor,  $R$ : In accordance with ASCE 7-10, Tables 15.4-1 and 15.4-2
  - l. Overstrength Coefficients,  $\Omega_o$ : In accordance with ASCE 7-10, Tables 15.4-1 and 15.4-2
  - m. Deflection Amplification Factor,  $C_d$ : In accordance with ASCE 7-10, Tables 15.4-1 and 15.4-2
  - n. Importance Factor,  $I_e$ : In accordance with ASCE 7-10, Section 15.4.1.1 but no less than 1.25.
- 2. Do not use friction to resist sliding due to seismic forces.
  - 3. Do not use more than 60 percent of the weight of the mechanical and electrical equipment for designing anchors for resisting overturning due to seismic forces.
  - 4. Use anchor bolts, bolts, or welded studs for anchors for resisting seismic forces. Anchor bolts used to resist seismic forces shall have a standard hex bolt head. Do not use anchor bolts fabricated from rod stock with an L or J shape.
  - 5. Do not use concrete anchors, flush shells, chemical anchors, powder actuated fasteners, or other types of anchors unless indicated on the Drawings or accepted in writing by the ENGINEER.
  - 6. Anchor design capacity is to be independent of reinforcing steel in the concrete providing ductility.
  - 7. Seismic forces must be resisted by direct bearing on the fasteners used to resist seismic forces. Do not use connections which use friction to resist seismic forces.

#### **1.04 SUBMITTALS**

- A. Shop Drawings and Calculations: Complete shop drawings and seismic calculations.
- B. Calculations shall be signed and stamped by a civil or structural Professional. Engineer licensed to practice in the state where the Project is located. All calculations shall be done in English units.
- C.

#### **PART 2 PRODUCTS**

Not Used.

#### **PART 3 EXECUTION**

Not Used.

[END OF EXHIBIT]

**Exhibit "I"**  
**Educational Program Provided**

Contractor shall provide the SunPower Horizons Educational Program ("Educational Program") to District free of charge and as follows:

1. **Educational Program Duration.** The Educational Program shall last a minimum of one (1) year(s), which will commence upon the Filing of the Notice of Completion for the Project.
2. **Educational Program Contents.** The Educational Program shall be Common Core State Standard compliant and will include lesson plans, curriculum support, and professional development training for teachers of various grade levels tied to Common Core requirements.
  - 2.1. Additional detail regarding the Educational Program is found in the Attachment to this Exhibit.
3. **Contractor Guest Lecture.** Contractor shall provide one (1) in-school lecture per Project Site, a total of two (2) lectures. The Guest Lecture shall be an interactive lesson tied to the Educational Program curriculum. District shall review the proposed Guest Lecture and approve it in advance.
  - 3.1. **Scheduling.** The Guest Lecture shall be scheduled in coordination with the District, for date(s) agreeable to the District.

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Getting and keeping young students engaged in learning—particularly in learning science and mathematics – can make all the difference in their future. But it's a challenge. No one knows this better than teachers.

The SunPower Horizons™ program is a STEM education enrichment program designed to help teachers introduce the wonders of science and mathematics to their students. It lets students experience the creativity of engineering and gain exposure to new opportunities.

#### SunPower Horizons Program

- Brings STEM curriculum to life, connecting classwork to career work
- Provides unique, hands-on learning opportunities that promote creativity, motivate discovery and increase knowledge retention
- Builds critical thinking, problem-solving and collaboration skills
- Helps build a foundation for further studies and careers in engineering and technology

*"I see students who are not really engaged in the traditional classroom becoming highly engaged in the hands-on, Project Lead the Way classroom. Being active and having ownership of their learning really impacts students in a positive way."*

*Ashley Martin, Principal,  
Hoover Elementary School, Oakland, California*

Through classroom learning and real-world experiences, the SunPower Horizons program is actively preparing the next generation of leaders in sustainability. It helps young people envision a successful, meaningful future and shows them how that future is entirely within their grasp.

**SUNPOWER Horizons™**

*Experiential Learning. Expanding Opportunities™*

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# SunPower Horizons™ – K-8 Program Components

SunPower has not only developed the solar industry's most efficient, most reliable<sup>1</sup> solar panels, we've also developed a comprehensive, substantive education program that through hands-on learning introduces students to science, technology, engineering and math.

The SunPower Horizons program components are composed of several distinct elements appropriate for grades K-8. Schools and school districts may select any number or combination of these offerings.

## In the Classroom

The SunPower Horizons program takes traditional classroom learning to the next level. Using an activity-based approach, these SunPower Horizons offerings help students develop problem-solving skills and connect the dots between difficult math and science concepts and the real world.

- **Project Lead the Way (PLTW) STEM Curriculum:** PLTW Launch for K-5 engages kids' natural curiosity to develop a foundation of critical thinking, teamwork and interest in STEM. PLTW Gateway for 6-8 uses activity- and problem-based learning to inspire and challenge middle school students and help develop their communication, collaboration and creative skills.
- **Solar & Energy Efficiency Lesson Plans:** Professionally developed lesson plans introduce the concept of solar energy, explain why it's a great choice and show how it's being used today, both as an alternative to traditional energy sources and also as the only way to bring electricity to some remote areas of the world.
- **Guest Instructors & Mentors from SunPower:** Solar professionals from SunPower visit the classroom to engage students in an interactive lesson on solar science, solar technology applications or energy efficiency. For middle school students working on solar-related projects, SunPower employees are available as mentors to show how a STEM education can turn into a real and interesting career.

## In the Field

There's nothing like a field trip to get kids engaged. These SunPower Horizons events show students the direct links between what they're studying in the classroom and real-world solar industry projects.

- **Field Trips to Solar Sites & SunPower Offices:** SunPower arranges visits to various SunPower solar installations so students can see solar energy in action, as it provides electricity to homes, businesses and other schools in their area. SunPower also opens its offices, allowing students to experience a real work environment and see the many different careers available in the solar energy sector.

*"There's an engineer inside of each of these kids. But if we don't work with them and provide the kind of opportunities this program offers, all this potential could go untapped. I think it's absolutely essential that we provide this kind of hands-on learning to every single kid we can."*

*Steve Gunther-Murphy, Engineer (Retired) and STEM Classroom Volunteer, Hoover Elementary School, Oakland, California*

## About SunPower

SunPower designs, manufactures and delivers the most efficient, most reliable<sup>2</sup> solar panels and systems available today.

To learn more about our educational programs, visit [us.sunpower.com/horizons](http://us.sunpower.com/horizons) or email [horizons@sunpower.com](mailto:horizons@sunpower.com).

1 Highest efficiency 300 silicon solar panels. Photon Module Survey, Feb 2014.  
2 #1 Rank in "SunPower RHI Durability Initiative for Solar Modules: Part 2" Photovoltaic International, 2014. Campbell, J. et al. "SunPower Module Degradation Rate" SunPower white paper, 2013. See [www.sunpowercorp.com/facts](http://www.sunpowercorp.com/facts) for details.  
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# GRADES 9-12 STEM CURRICULUM AND ACTIVITIES

*Help students discover their true potential*

Engaging high school students in science and mathematics can be a challenge. Many have already decided, "I'm not good at math and science," even though gaining competence in these subjects could make a big difference in their future success. Many have no idea of their own potential and a limited vision of what their life beyond high school or college could hold.

The **SunPower Horizons™** program is a STEM education enrichment program designed to help teachers unlock their students' potential and open their minds to the many career opportunities available in STEM-related fields—particularly in the renewable energy sector.

## SunPower Horizons Program

- Brings STEM curriculum to life, connecting classwork to career work
- Provides unique, hands-on learning opportunities that promote creativity, motivate discovery and increase knowledge retention
- Builds critical thinking, problem-solving and collaboration skills
- Helps build a foundation for further studies and careers in engineering and technology

*"Getting the hands-on skills, learning the engineering process, may not impact every kid's career, but it will absolutely impact their life. I'm now finding that a lot more of my kids have a goal of going to a four-year school."*

*Jack Gillespie, Engineering Teacher,  
Pittsburg High School, Pittsburg, California*

Balancing classroom learning and real-world experiences, the SunPower Horizons program is actively preparing the next generation of leaders in engineering, renewable energy and sustainability. It helps teens envision a successful, meaningful future entirely within their grasp.

**SUNPOWER Horizons™**  
*Experiential Learning. Expanding Opportunities.™*

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# SunPower Horizons™ – 9-12 Program Components

SunPower has not only developed the solar industry's most efficient,<sup>1</sup> most reliable<sup>2</sup> solar panels, we've also developed a comprehensive, substantive education program that gives students first-hand exposure to work in science, technology, engineering and mathematics.

The SunPower Horizons program includes mix-and-match components suitable for students in grades 9-12. Schools and school districts may select any number or combination of these offerings.

## In the Classroom

SunPower Horizons takes traditional classroom learning to the next level. Through an activity-based approach, students connect difficult math and science concepts to real-life applications while developing problem-solving and other work-ready essential skills.

- **Project Lead the Way (PLTW) STEM Curriculum:** PLTW is a nonprofit organization that provides a transformative learning experience for K-12 students and teachers across the United States. Through PLTW's pathways in computer science, engineering and biomedical science, students develop in-demand knowledge and skills necessary to thrive in an evolving world.
- **Solar & Energy Efficiency Lesson Plans:** Professionally developed lesson plans introduce the concept of solar energy, explain why it's a great choice and show how it's being used today, both as an alternative to traditional energy sources and as the only way to bring electricity to some remote areas of the world.
- **Guest Instructors & Mentors:** Solar professionals from SunPower visit the classroom to give special presentations, open students' minds to STEM-related careers in renewable energy and offer mentoring to students working on solar-related projects.
- **SunPower® Panel Donation for Classroom Use:** SunPower will donate a high-efficiency solar panel for specific, well-defined classroom projects to give students the opportunity to develop a practical solar-powered project of their own design.

*"I'd always wanted to be a mechanical engineer and go to Stanford. The Academy really launched a lot of things for me. It gave me a lot of insight into the engineering field, and I think that the hands-on, work-based skills, the collaboration and networking experience, and the entrepreneurial spirit I gained really helped me get accepted into Stanford."*

*Mizarhy Aquino, Summer Solar Energy Academy Participant, Antioch, California*

## In the Field

The SunPower Horizons program shows students the direct links between what they're studying in the classroom and careers in renewable energy industries.

- **Summer Solar Energy Academy:** This intensive, weeklong, work-based learning experience places students on business teams to develop and present a real-world residential solar proposal. Students acquire and hone a range of work-ready technical and soft skills, while also getting a first-hand look at careers in marketing, project management, engineering and finance.
- **Internships:** High school students who have attended the Summer Solar Energy Academy are eligible to apply for a Teaching Assistant Internship for an Academy the following year.
- **Field Trips to Solar Sites & SunPower Offices:** SunPower arranges visits to various solar installations so students can see solar energy at work in their own communities. SunPower also opens its offices, allowing students to experience a real work environment and see the many different careers available in the solar energy sector.
- **Service Learning:** SunPower offers regional service learning opportunities connected to our partnerships. Examples include: We Share Solar: Students build portable Solar Suitcases that power critical lighting, communication and medical devices in remote areas around the world that lack reliable electricity. GRID Alternatives: Students train in solar installation and help bring the benefits of solar energy to underserved communities.



**About SunPower**

SunPower designs, manufactures and delivers the most efficient,<sup>1</sup> most reliable<sup>2</sup> solar panels and systems available today.

To learn more about our educational programs, visit [us.sunpower.com/horizons](http://us.sunpower.com/horizons) or email [horizons@sunpower.com](mailto:horizons@sunpower.com).

1 Highest of 60.4% 300 silicon solar panels. Photonic Module Survey, Feb 2014.  
2 as ranked by Fraunhofer IZD Quality Institute for Solar Modules, Part 1, Photovoltaic International, 2014. Comparison of Solar Panel Module Degradation Rates, SunPower White Paper, 2013. See [www.sunpowercorp.com/facts](http://www.sunpowercorp.com/facts) for details.

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[END OF ATTACHMENT; END OF EXHIBIT]

**Exhibit "J"**  
**Registered Subcontractors List**  
**(Labor Code Section 1771.1)**

PROJECT: Glenwood Elementary School and San Pedro Elementary School Solar Photovoltaic Project

Date Submitted (for Updates): \_\_\_\_\_

Contractor acknowledges and agrees that it must clearly set forth below the name and Department of Industrial Relations (DIR) registration number of each subcontractor **for all tiers** who will perform work or labor or render service to Contractor or its subcontractors in or about the construction of the Work **at least two (2) weeks before the subcontractor is scheduled to perform work**. This document is to be updated as all tiers of subcontractors are identified.

Contractor acknowledges and agrees that, if Contractor fails to list as to any subcontractor of any tier who performs any portion of Work, the Agreement is subject to cancellation and the Contractor will be subjected to penalty under applicable law.

If further space is required for the list of proposed subcontractors, attach additional copies of page 2 showing the required information, as indicated below.

**Subcontractor Name:** \_\_\_\_\_

DIR Registration #: \_\_\_\_\_

Portion of Work: \_\_\_\_\_

**Subcontractor Name:** \_\_\_\_\_

DIR Registration #: \_\_\_\_\_

Portion of Work: \_\_\_\_\_

**Subcontractor Name:** \_\_\_\_\_

DIR Registration #: \_\_\_\_\_

Portion of Work: \_\_\_\_\_

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**Subcontractor Name:** \_\_\_\_\_

DIR Registration #: \_\_\_\_\_

Portion of Work: \_\_\_\_\_

**Subcontractor Name:** \_\_\_\_\_

DIR Registration #: \_\_\_\_\_

Portion of Work: \_\_\_\_\_

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

Name of Contractor: STE Electric dba Solar Technologies

Signature: \_\_\_\_\_

Print Name: \_\_\_\_\_

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

[END OF DOCUMENT]



**Exhibit "K"**  
**Contractor Workmanship Warranty**

As set forth in the Agreement, Contractor shall warrant its workmanship on the Photovoltaic Solar System designed and constructed pursuant to this Agreement as follows:

STE Electric dba Solar Technologies ("Solar Technologies") will professionally install the solar panel system identified in Exhibit "B" to the Agreement ("System") per the terms of the Agreement. This Limited Warranty becomes effective when we complete the installation of the System at your Property.

**1. Limited Warranties.**

1.1. Limited Warranties. Unless otherwise stated, the following Limited Warranties will begin on the date Contractor completes the installation of the System at your Property and continues for a period of five (5) years following that date, which we shall refer to as the "Warranty Period". Solar Technologies warrants that:

1.1.1. Installation Warranty. Solar Technology conditionally warrants and guarantees that:

1.1.1.1. All installation work has been performed in a skillful and workmanlike manner, and in accordance with the standard of care set forth in this Agreement.

1.1.1.2. All materials and equipment furnished are new and of good quality.

1.1.1.3. All work performed under this Agreement and all materials and equipment furnished is free from defects and substantially and fully complies with the Contract Documents.

1.1.2. Use Warranty. Under normal use and service conditions, and during the Warranty Period, the System will be free from defects in materials and workmanship. This limited warranty shall not apply to any portion of the System which is damaged by the actions of persons other than Solar Technologies, its approved service providers, subcontractors, agents, representatives, or consultants, or by the forces of nature (e.g., wind, hail, falling trees or debris) other than sunlight and normal rainfall. This limited Use Warranty is subject to the provisions pertaining to OEM components set forth in sub-section 1.1.4, below.

1.1.3. Roof Leak Warranty. If we penetrate and flash your roof during the installation we warrant that your roof will not leak because of penetrations, made by, or caused solely by, us during the installation of the System. This limited warranty shall only pertain to areas that are within three (3) inches of the edge of any roof penetrations in your roof made by us during installation of the System. This limited warranty regarding leakage resulting from roof penetrations, will run for five (5) years following the date we begin installing the System at your Property. Any penetrations made by, or flashed by, a sub-contracted roofing contractor will be warranted by the roofer as defined within their warranty agreement.

1.1.4. Repair Warranty Only – OEM Limitations. During the applicable Warranty Period, Solar Technologies will repair any portion of your System that is defective as a result of our workmanship, at no cost or expense to you when you submit a valid claim. Solar Technologies shall use new, or reconditioned parts with District approval, and may also, at no additional cost to you and with the District's written authorization,

upgrade or add any part to the System to ensure that it is performing properly. This workmanship warranty shall extend to any and all repairs performed.

1.1.4.1. This workmanship warranty does not cover any defects or damage caused solely as a result of the equipment supplied. Any equipment supplied that is damaged or defective is covered by the original equipment manufacturer warranty.

1.2. Maintenance and Operation. The limited warranties set forth in this agreement will not apply in the event you have failed to take reasonable steps to protect and maintain the System. However, the existence of a Maintenance and Operations Agreement for the System entered into between Solar Technologies and the District shall be adequate to demonstrate the District's reasonable steps taken to protect and maintain the System.

2. **Making a Claim**. All claims under this Limited Warranty shall be presented to Solar Technologies and you shall notify Solar Technologies as soon as possible after you recognize a problem that could reasonably result in a potential warranty claim covered by this Limited Warranty. All notices shall be presented to Solar Technologies as set forth below.

To Solar Technologies:      STE Electric dba Solar Technologies  
14 Beta Court  
San Ramon, CA 94583  
Telephone: 1-888-SOLPOWER  
Email: [support@solartechnologies.com](mailto:support@solartechnologies.com)

3. **Exclusions and Disclaimers**. The limited warranties provided in this Limited Warranty do not apply to any repair, replacement or correction required due to the following:

- 3.1. Someone other than Solar Technologies or its approved service providers, subcontractors, agents, representatives, or consultants installed, removed, re-installed, altered or repaired the System;
- 3.2. Destruction or damage to the System or its ability to safely produce energy not caused by Solar Technologies or its approved service providers, subcontractors, agents, representatives, or consultants (e.g., damage caused by acts of God, neglect, alteration, modification, or unintended use and/or abuse not covered by this Limited Warranty, etc.);
- 3.3. Distortion, cracking or other failure or movement of the structures or surfaces over which the System is installed and which was not caused by Solar Technologies, its approved service providers, subcontractors, agents, representatives, or consultants;
- 3.4. Theft of the System;
- 3.5. Damage caused by structural changes, alteration, or additions to your structure, or by the installation of equipment to the structure after the System has been installed, none of which were performed by Solar Technologies, its approved service providers, subcontractors, agents, representatives, or consultants;
- 3.6. Your failure to perform your obligations under this Limited Warranty;
- 3.7. Your breach of this Limited Warranty;
- 3.8. Any Force Majeure Event as defined in Section 4 below;

3.9. A power or voltage surge caused by someone other than Solar Technologies or its subcontractors, agents, representatives, or consultants, including a grid supply voltage outside of the standard range specified by your utility;

3.10. Shading from foliage that is new or is not kept trimmed to its appearance on the date the System was installed, unless Solar Technologies, or its approved service providers, subcontractors, agents, representatives, or consultants, is responsible for foliage pursuant to the Agreement, a Maintenance and Operations Agreement, or other contract;

3.11. Any System Failure caused solely and entirely by something other than a System defect (e.g. such as damage to the System during roof repairs by others).

#### 4. **Force Majeure.**

If Solar Technologies is unable to perform all or some of its obligations under this Limited Warranty because of a Force Majeure Event, as defined within the Agreement, Solar Technologies may be excused from whatever performance is affected for the duration of the Force Majeure Event.

#### 5. **Limitations on Liability.**

5.1. **No Consequential Damages.** In the event Solar Technologies shall fail to perform any obligation arising under this Limited Warranty, YOU MAY ONLY RECOVER DIRECT DAMAGES AND IN NO EVENT SHALL SOLAR TECHNOLOGIES OR ITS AGENTS OR SUBCONTRACTORS BE LIABLE TO YOU OR YOUR ASSIGNS FOR SPECIAL, INDIRECT, PUNITIVE, EXEMPLARY, INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY NATURE. SOME STATES DO NOT ALLOW THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

5.1.1. This limitation shall apply only to Solar Technologies' failure to perform obligations set forth within this Exhibit "K" and in no way limits, abridges, or otherwise impacts the District's rights and remedies in connection with Solar Technologies' failure to perform obligations set forth elsewhere within the Agreement.

5.1.2. This limitation expressly does not apply to third party claims, and in no way limits, abridges, or otherwise impacts Solar Technologies' duties of defense and indemnity pursuant to the Agreement or the District's rights and remedies in connection therewith.

5.1.3. In no event shall this limit the District's rights or remedies pursuant to any other agreement with Solar Technologies including, but not limited, to any and all Maintenance and Operations Agreements or Performance Guarantees.

5.2. **Limit of Enforceability.** This Limited Warranty shall become effective upon the filing of the Notice of Completion for the Project. If the Agreement is cancelled or terminated prior to completion of the installation of the System, this Limited Warranty shall be of no further force or effect.

5.3. **Limit of Authority.** Solar Technologies' employees and agents have no authority to give or offer warranties or guarantees, whether express or implied beyond those expressly stated in this Limited Warranty and no such additional warranty or guarantee shall be binding on Solar Technologies.

6. **Assignment and Transfer of this Limited Warranty.**

Solar Technologies may assign its rights or obligations under this Limited Warranty to a third party only with the District's advance, written consent, provided that any assignment of Solar Technologies' obligations under this Limited Warranty shall be to a party qualified to provide services to the System.

7. **Effect and Non-Waiver**

The Limited Warranty set forth in this Exhibit is in addition to any and all other warranties set forth in the Agreement, and in addition to any and all implied warranties. In no event shall this Limited Warranty be interpreted as a waiver of any other express or implied warranty, or claim(s) arising therefrom, to which the District may have a right.