

.4 Taxes. Sales taxes on the costs of the materials described in Subparagraph 7.7.3.3, above.

.5 Equipment Rental. Rental charges for necessary machinery and equipment, exclusive of hand tools, whether rented from Contractor or others. No charge shall be allowed or credit required for items which have a replacement value of One Hundred Dollars (\$100) or less. The allowable rental rates shall include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, loading, transportation, repairs and maintenance of any kind, depreciation, storage, insurance and all incidentals. If equipment used for Extra Work is used intermittently and, when not in use, could be returned to its rental source at less expense to County than holding it at the Site, it shall be returned, unless Contractor elects to keep it at the Site at no expense to County. Under no circumstances shall the aggregate rentals chargeable for any item of equipment exceed the following percentages of the fair market value of the item at the time of its first use for the Work, which fair market value must be declared by Contractor and approved by County prior to the first use of such item in or for the Work: (1) if the item is owned by the Contractor or any company affiliated with Contractor, the aggregate rentals shall not exceed 75% of such fair market value; and (2) if the item is not owned by the Contractor or any company affiliated with Contractor, the aggregate rentals shall not exceed 100% of such fair market value. All equipment shall be acceptable to County, in good working condition, and suitable for the purpose for which it is to be used. Manufacturer's ratings and manufacturer's approved modifications shall be used to classify equipment, and it shall be powered by a unit of at least the minimum rating recommended by the manufacturer. The cost of major repairs or overhauls of rented equipment or machinery shall be deemed a cost of business of the lessor of such equipment or machinery and shall not be reimbursable as an Allowable Cost.

.6 Subcontractors. Payments made by Contractor to Subcontractors; provided, however, that: (1) such payments are not otherwise precluded from reimbursement by the terms of the Contract Documents; (2) such payments are for Work performed in accordance with the requirements of the Contract Documents; (3) such payments are for amounts properly due and owing by Contractor under the terms of the governing contract between Contractor and such Subcontractor; and (4) in the case of payments for extra work performed by a Subcontractor pursuant to a change order executed between Contractor and a Subcontractor the change order was executed under circumstances in which the Subcontractor was entitled under the terms of its contract with Contractor to receive the amount of additional compensation agreed to in the change order.

.7 Royalties, Permits. Costs of royalties and permits.

.8 Bonds. Costs of bonds required to be furnished by Contractor (not Subcontractors) under the terms of the Contract Documents; provided, however, that such additional costs chargeable for Extra Work or credited for Deleted Work shall not exceed two percent (2%) of the costs described in Subparagraphs 7.7.3.1 through 7.7.3.7, above.

7.7.4 Costs Not Allowed. Allowable Costs shall not include any of the costs associated with any of the following (whether incurred by Contractor or a Subcontractor):

- .1** superintendent(s);
- .2** assistant superintendent(s);
- .3** project engineer(s);
- .4** project manager(s);
- .5** scheduler(s);
- .6** estimator(s);
- .7** drafting or detailing (except as otherwise permitted by Paragraph 7.7.3.1, above)
- .8** vehicles not dedicated solely to the performance of the Work;
- .9** small tools with a replacement value not exceeding One Hundred Dollars (\$100);

- .10 office expenses, including staff, materials and supplies;
- .11 on-Site and off-Site trailer and storage rental and expenses;
- .12 Site fencing not added solely due to the performance of Extra Work;
- .13 utilities, including gas, electric, sewer, water, telephone, telefax and copier equipment;
- .14 computer and data-processing personnel, equipment and software;
- .15 federal, state or local business, income and franchise taxes;
- .16 insurance (including, without limitation, general liability, automobile and worker's compensation);
- .17 without limitation to Contractor's right to liquidated damages under Section 3.3 of the Construction Contract, Losses, of any kind, incurred by Contractor or a Subcontractor, of any Tier, that arise from or relate to Delay (including Excusable Delay, Compensable Delay or Unexcused Delay) or acceleration to overcome the effects of such Delay; and
- .18 costs and expenses of any kind or item not specifically and expressly included in Paragraph 7.7.3, above.

7.7.5 Allowable Markups. Allowable Markups consist of the percentages set forth provided for by this Paragraph 7.7.5. Allowable Markups are deemed to cover, without limitation, the following: (1) direct and indirect overhead (including, without limitation, consumables, small tools and cleanup) and profit of the Contractor; (2) direct and indirect overhead (including, without limitation, consumables, small tools and cleanup) and profit of the Subcontractors, of every Tier; and (3) all costs that are not reimbursable to Contractor under Paragraph 7.7.4, above. Subject to the exclusions and limitations set forth in Paragraph 7.7.7, below, or elsewhere in the Contract Documents, Allowable Markups include and are limited to the following:

.1 Self-Performed Work

(1) **Compensable Change.** With respect to all or that portion of a Compensable Change involving Self-Performed Work, the Allowable Markup to Contractor shall be not more than five percent (5%), which percentage shall for purposes of calculating the Contract Adjustment be multiplied times the Allowable Costs incurred by Contractor in the performance thereof, including, without limitation, Allowable Costs for materials or equipment purchased by Contractor from a first-Tier Subcontractor that is not an Installation Subcontractor.

(2) **Deleted Work.** With respect to all or that portion of Deleted Work involving Self-Performed Work, County shall be entitled to a credit equal to five percent (5%) of the amount of the credit for the savings to Contractor for the Self-Performed Work as calculated pursuant to Subparagraph 7.7.1.1 (4), (b), above.

.2 Installation Subcontractors (First-Tier)

(1) **Compensable Change.** With respect to all or that portion of a Compensable Change that is performed by a first-Tier Installation Subcontractor, the Allowable Markups to the first-Tier Installation Subcontractor and the Contractor shall be as follows:

(a) The Allowable Markup to the first-Tier Installation Subcontractor shall be not more than fifteen percent (15%), which percentage shall for purposes of calculating the Contract Adjustment be multiplied times the Allowable Costs incurred by such first-Tier Installation Subcontractor in the performance of such Compensable Change.

(b) The Allowable Markup to Contractor shall be five percent (5%), which percentage shall for purposes of calculating the Contract Adjustment be multiplied times the sum of (i) the Allowable

Costs incurred by such first-Tier Subcontractor in the performance of such Compensable Change and (ii) the amount which results when the Allowable Markups thereon that are permitted pursuant to preceding Clause (a) of this Subparagraph 7.7.5.2 (1) are multiplied times such Allowable Costs.

(2) **Deleted Work.** With respect to all or that portion of Deleted Work that was to have been performed by a first-Tier Installation Subcontractor, the Contract Price shall be reduced as provided in Subparagraph 7.7.1.1 (4), (b), above. In addition, a credit shall be due from Contractor of five percent (5%) of the amount of the total credit due pursuant to Subparagraph 7.7.1.1 (4), (b), above.

.3 Installation Subcontractors (Second-Tier)

(1) **Compensable Change.** With respect to all or that portion of a Compensable Change that is performed by a second-Tier Installation Subcontractor, the Allowable Markups to such second-Tier Installation Subcontractor, to the first-Tier Installation Subcontractor that is above and in the same vertical contractual line of Tiers with such second-Tier Installation Subcontractor and to the Contractor, shall be as follows:

(a) The Allowable Markup to the second-Tier Installation Subcontractor shall be not more than five percent (5%), which percentage shall for purposes of calculating the Contract Adjustment be multiplied times the Allowable Costs incurred by such second-Tier Installation Subcontractor in the performance of such Compensable Change.

(b) The Allowable Markup to the first-Tier Installation Subcontractor that is above and in the same vertical contractual line of Tiers with such second-Tier Installation Subcontractor shall be not more than fifteen percent (15%), which percentage shall for purposes of calculating the Contract Adjustment be multiplied times the sum of (i) the Allowable Costs incurred by such second-Tier Installation Subcontractor in the performance of such Compensable Change and (ii) the amount which results when the Allowable Markups thereon pursuant to preceding Clause (a) of this Subparagraph 7.7.5.3 (1) are multiplied times such Allowable Costs.

(c) The Allowable Markup to Contractor shall be five percent (5%), which percentage shall for purposes of calculating the Contract Adjustment be multiplied times the sum of (i) the Allowable Costs incurred by the second-Tier Installation Subcontractor in the performance of such Compensable Change and (ii) the amounts which result when the Allowable Markups thereon that are permitted pursuant to Clauses (a) and (b) of this Subparagraph 7.7.5.3 (1) are multiplied times such Allowable Costs.

(2) **Deleted Work.** With respect to all or that portion of Deleted Work that was to have been performed by a second-Tier Installation Subcontractor, the Contract Price shall be reduced as provided in Subparagraph 7.7.1.1 (4), (b), above. In addition, a credit shall be due from Contractor of five percent (5%) of the amount of the total credit due pursuant to Subparagraph 7.7.1.1 (4), (b), above.

.4 Other Subcontractors.

(1) **Compensable Changes:** With respect to any other Subcontractor, of any Tier, performing all or a portion of a Compensable Change who is not an Installation Subcontractor or who is an Installation Subcontractor below the second-Tier, the following shall apply:

(a) No markup shall be allowed to such other Subcontractor.

(b) The Subcontractor that is positioned in the Tier immediately above such other Subcontractor shall be entitled to an Allowable Markup of not more than five percent (5%) upon the Allowable Costs incurred by such other Subcontractor in the performance thereof.

(c) No other Allowable Markup by any Subcontractor of any Tier above such other Subcontractor shall be permitted.

(d) Contractor shall be entitled to an Allowable Markup of five percent (5%) of the sum of (i) the Allowable Costs of such other Subcontractor incurred in the performance of such Compensable

Change and (ii) the amount which results when the Allowable Markup permitted by Clause (b) of this Subparagraph 7.7.5.4 (1) is multiplied times such Allowable Costs.

(2) **Deleted Work.** With respect to all or that portion of Deleted Work that was to have been performed by such other Subcontractor who is not an Installation Subcontractor or who is an Installation Subcontractor below the second-Tier, the Contract Price shall be reduced as provided in Subparagraph 7.7.1.1 (4), (b), above. In addition, a credit shall be due from Contractor of five percent (5%) of the amount of the total credit due pursuant to Subparagraph 7.7.1.1 (4), (b), above.

7.7.6 Review of Markups. It is Contractor's responsibility to review information submitted by Subcontractors to ensure that all markups comply with the requirements of the Contract Documents. Payment by the County of markups that exceed Allowable Markups shall not be considered as a waiver by County of the right to require repayment by Contractor of any markup charged that is in excess of Allowable Markups and such excess amounts shall be promptly paid by Contractor to County.

7.7.7 Exclusions and Limitations. Allowable Markups are not permitted:

- .1 on agreed unit prices;
- .2 on materials, products or equipment furnished by County;
- .3 on liquidated damages payable to Contractor pursuant to Section 3.3 of the Construction Contract for Compensable Delay;
- .4 to a Subcontractor who contracts to perform a Compensable Change that is in fact wholly performed by another Subcontractor (for purposes of this Paragraph 7.7.7, "wholly performed" means that all of the Compensable Change, other than supervision or minor labor or materials, are furnished by such other Subcontractor); or
- .5 on any cost or compensation with respect to which the Contract Documents state that there shall be "no Allowable Markup", "no markup for overhead and profit" or words of similar meaning.

7.7.8 Net Calculations. If any one Change or collection of Changes in the same or related portions of the Work, or in multiple portions of Work covered by a single bulletin or instruction by County, involve both Compensable Change and Deleted Work, and if the added Allowable Costs resulting from the Compensable Change exceed the reduction calculated in accordance with Subparagraph 7.7.1.1 (4), (b), above, (excluding any Allowable Markup to the Contractor) then the calculation of Allowable Markups to Contractor shall be based on and limited to the resulting net increase in the Allowable Costs.

7.7.9 Unit Prices. Unless otherwise stated in the Contract Documents, unit prices stated in the Contract Documents or subsequently agreed upon by County and Contractor shall be deemed to include and encompass all costs of performance, overhead and profit, including, without limitation, all Allowable Costs and Allowable Markups. If the unit price stated in the Contract Documents is based on an estimated quantity established by County in the Construction Contract and the actual quantity of such unit-priced item varies by more than 25% above or below the estimated quantity, an equitable adjustment in the Contract Price shall be made upon demand of either County or Contractor. Such equitable adjustment shall be based solely upon any increase or decrease in Allowable Costs (without any Allowable Markups), due solely to the variation above 125% or below 75% of the estimated quantity.

7.7.10 Discounts. For purposes of determining Allowable Costs of a Compensable Change, all trade discounts, rebates, refunds, and returns from the sale of surplus materials and equipment shall accrue and be credited to County, and Contractor shall take all necessary steps to ensure that such discounts, rebates, refunds, and returns are secured.

7.7.11 Prompt Pricing. It is fundamental to the County's objective of controlling costs that performance of Compensable Changes on a time and materials basis of compensation and without a not-to-exceed price be curtailed. Contractor recognizes that prompt pricing by Contractor is critical to this objective. Accordingly, in addition to and without limitation on any of the County's other rights or remedies, including, without limitation, its right to enforce a

waiver under Subparagraph 7.6.2.4, above, it is agreed that if Contractor fails to timely submit a complete Change Order Request in accordance with Paragraph 7.6.2, above, with respect to any circumstance, event or occurrence constituting a Compensable Change then: (1) any Delay to the performance of the Work associated with the performance, delayed performance or nonperformance of such Compensable Change shall be conclusively deemed to be an Unexcused Delay; and (2) the County shall have the option, exercised in its sole discretion, to unilaterally fix and determine the amount of the Contract Adjustment to the Contract Price for such Compensable Change based on the "estimating guide" method set forth in Subparagraph 7.7.1.1 (3), above, which determination shall be conclusively final and binding upon Contractor.

7.7.12 Final Payment. No Claim by Contractor for a Contract Adjustment shall be allowed if asserted after Final Payment.

7.7.13 Full Resolution. Except as otherwise stated in Paragraph 7.7.14, below, the signing of a Change Order by Contractor and the County shall be conclusively deemed to be a full resolution, settlement and accord and satisfaction with respect to any and all Loss and Delay, whether known or unknown at the time of execution of the Change Order, related to the subject matter of the Change Order, including, without limitation, all rights to recovery of costs, expenses or damages for delay, disruption, hindrance, interference, extended or extraordinary (direct and indirect) overhead, multiplicity of changes, loss of productivity, labor, wage or material cost escalations, inefficiency, legal expenses, consultant costs, interest, lost profits or revenue, bond and insurance costs, changes in taxes and other similar and related Losses. The foregoing provisions of this Paragraph 7.7.13 shall, whether or not they are expressly stated or referenced on the face of a Change Order, be deemed to be part of the terms of the Change Order and shall be deemed to supersede and govern over any other provision contained in any proposal, estimate or other documents attached to or referenced in such Change Order that conflicts with the provisions of this Paragraph 7.7.13. **ANY RIGHT OR CLAIM BY CONTRACTOR FOR ANY ADDITIONAL COMPENSATION OR EXTENSION OF TIME RELATING DIRECTLY OR INDIRECTLY TO A COMPENSABLE CHANGE DESCRIBED IN A FULLY EXECUTED CHANGE ORDER SHALL BE CONCLUSIVELY DEEMED WAIVED BY CONTRACTOR, EVEN IF THE CIRCUMSTANCES GIVING RISE TO SUCH ADDITIONAL COMPENSATION OR EXTENSION OF TIME WERE NOT SUSPECTED BY OR KNOWN TO THE CONTRACTOR AT THE TIME OF EXECUTION OF THE CONSTRUCTION CHANGE DIRECTIVE AND IF SUSPECTED OR KNOWN WOULD HAVE BEEN CONSIDERED BY CONTRACTOR TO HAVE BEEN MATERIAL TO CONTRACTOR'S AGREEMENT TO THE CONTRACT ADJUSTMENT SET FORTH IN THE CHANGE ORDER.**

7.7.14 Reserved Rights. Change Orders shall be executed by Contractor without any express reservation of rights by Contractor to reserve for the future the assertion of any right of recovery from the County for Loss or Delay arising out of or relating to the subject matter of the Change Order. Execution of a Change Order, Unilateral Change Order or Construction Change Directive shall not be interpreted as a waiver, release or settlement of any rights or claims that the County may have for any of the following: (1) Defective Work; (2) liquidated damages or actual Losses for Delay; or (3) recoupment by County (by way of withholding of funds, set off or recovery from Contractor) of amounts paid by County for costs or markups on costs that the County discovers, following payment of such amounts to Contractor, do not constitute proper charges to County, or that constitute charges that are not properly substantiated, under the terms of the Contract Documents.

7.7.15 No "Total Cost" Calculations. Contractor represents and warrants that it has the ability to generate and maintain complete and accurate cost accounting records that, if required, will reflect the actual costs of the Work incurred or avoided for multiple Compensable Changes and, on an event-by-event basis, the effect of multiple and concurrently occurring or caused Compensable Delays on the progress of the Work. Accordingly, Contractor agrees that all Change Order Requests and Claims shall be itemized in a manner that, with reasonable mathematical certainty and without reliance upon probabilities or inferences, segregates on a discrete, event-by-event basis the direct, actual Allowable Costs associated with each individual Compensable Change or Compensable Delay. Unless otherwise agreed to by County in writing in the exercise of its sole discretion, Change Order Requests and Claims shall not be based, in whole or in part, upon any methodology (such as "total cost" or "modified total cost" methodologies) that purports to establish Contractor's entitlement to additional compensation inferentially based, solely or principally, on the difference between Contractor's total costs for the Work or a portion of the Work and its original Bid.

7.7.16 Multiple Changes. The County reserves the absolute right to make whatever Changes, including, without limitation, Compensable Changes or Deleted Work, that it determines, in its sole discretion, are necessary or

otherwise desirable. Under no circumstances shall the individual or cumulative number, value or scope of such Changes, or their individual and cumulative impact on the Work, become a basis for Contractor to assert any claim for breach of contract, abandonment, rescission, termination, cardinal change or reformation of the Construction Contract, nor shall such circumstances be the basis for Contractor, or any of the Subcontractors, of any Tier, to assert a right of recovery of any Loss if such right is not permitted by, or is in excess of that allowed under, the Contract Documents.

7.7.17 Continuous Performance. Subject to Contractor's rights under Section 15.4, below, no dispute or disagreement with respect to any Changes or Delay, including, without limitation, disputes over Contractor's right to or the terms of a Contract Adjustment, shall relieve or excuse Contractor from the obligation to proceed with and maintain continuous, expeditious and uninterrupted performance of the Work, including performance of any disputed Changes.

ARTICLE 8 CONTRACT TIME

8.1 COMMENCEMENT AND COMPLETION

8.1.1 Date of Commencement. The Date of Commencement shall not be postponed by the failure of Contractor or of persons or entities for whom Contractor is responsible to perform an obligation. Contractor shall not knowingly, except by agreement or instruction of the County in writing, commence operations on the Site or elsewhere prior to receipt of a Notice to Proceed. Contractor shall not commence any Work at the Site prior to its obtaining the insurance required by Article 11, below, and the Performance Bond and Payment Bond required by Article 12, below, and the Date of Commencement of the Work shall not be changed by the effective date of such insurance or bonds.

8.1.2 Substantial, Final Completion. Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion and Final Completion within the Contract Time, as adjusted for extensions of time duly permitted, authorized and noticed pursuant to Section 8.2, below.

8.1.3 Adjustments to Contract Time. Subject to the limitations set forth in this Article 8 and elsewhere in the Contract Documents, the Contract Time shall be extended for Compensable Delays and Excusable Delays and shall, where appropriate, be shortened for Deleted Work.

8.1.4 Early Completion. Nothing stated in these General Conditions or elsewhere in the Contract Documents shall be interpreted as creating any contractual right, express or implied, on the part of Contractor to finish the Work earlier than the Contract Time. Contractor has included in its Contract Price the costs of all Contractor's and its Subcontractors' direct and indirect overhead, including but not limited to all staff, temporary facilities, temporary utilities and home office overhead for the entire duration of the Contract Time. These costs have been included in the Contract Price notwithstanding Contractor's anticipation of possibly completing the Work in fewer Days than established by the Contract Time. Under no circumstances (including, without limitation, circumstances in which the County has approved in writing of Contractor completing early) shall the County be liable to Contractor for any Losses, of any kind, due to the inability of Contractor to complete the Work earlier than the Contract Time, regardless of the cause, including, without limitation, Delays due to acts or omissions (intentional or negligent) of the County, Inspectors of Record, County Consultants, Separate Contractors or others. If the Contractor anticipates completing early, it must obtain in advance County's approval in writing of such early completion. Approval by County of such early completion may be granted or withheld in the County's sole and absolute discretion.

8.2 DELAYS AND EXTENSIONS OF TIME

8.2.1 Adjustments to Contract Time

.1 Extensions. Provided that Contractor has complied with the provisions of this Section 8.2 (including, without limitation, the requirements pertaining to timely delivery of a Notice of Delay and Request for Extension), if, as a result of Excusable Delay or Compensable Delay to the actual, as-built critical path of activities leading to achievement of Substantial Completion, Contractor is unable to achieve Substantial Completion within the Contract Time for Substantial Completion, then the Contract Time for Substantial Completion and Final Completion

shall be extended, either by Change Order or Unilateral Change Order, for the length of the proven, resulting Delay to Contractor's ability to so complete the Work. The Contract Time shall not be adjusted for Unexcused Delays.

.2 Shortening. Contractor shall within ten (10) Days after receiving notice of Deleted Work prepare and deliver to County a Time Impact Analysis of the impact of the Deleted Work upon the critical path to determine if the Contract Time should be shortened thereby and if so the duration of the shortening. If the County and Contractor are unable to agree upon the duration of the shortening, then County shall make a Good Faith Determination of the reasonable amount of time that the Contract Time shall be shortened on account of such Deleted Work.

.3 Prescribed Calculations.

(1) Work Day Lost Calculations. Contractor may claim an Excusable Delay or a Compensable Delay for a full Day only if all Work on a critical path activity is stopped for more than six (6) hours of a normal eight (8) hour Work Day and for a half-Day only if all Work on a critical path activity is stopped for three (3) to six (6) hours of such a normal Work Day. No Excusable Delay or Compensable Delay may be claimed if all Work on a critical path activity is stopped for less than three (3) hours of such a normal work Day. Similarly, where Deleted Work results in the projected avoidance of the need to perform more than six (6), or between three (3) and six (6) hours of all Work on a critical path activity on such a normal work day, the Contract Time shall be contracted by a full Day or half Day, respectively.

(2) Dry Out Time Calculations. Contract Adjustments to the Contract Time that are based upon unusual precipitation that is an Act of God as defined in Paragraph 1.1.2, above, shall include, in addition to the number of Days of Excusable Delay to which Contractor is entitled due to a cessation of Work that occurs at the Site while the unusual precipitation is occurring, an additional extension for the Delay to the critical path of activities affecting Substantial Completion that is the result of Contractor being unable, after cessation of the unusual precipitation at the Site, to proceed with performance of Work due to wet or muddy conditions at the Site (hereinafter referred to as "dry out" time); provided, however, that the amount of dry out time for which Contractor is entitled to an extension of time in any given calendar month shall not exceed the number of Days that is the product derived by multiplying (a) the number of Days of Excusable Delay to which Contractor is entitled due to a cessation of Work that occurs at the Site while such unusual precipitation is occurring, by (b) a fraction, the (i) numerator of which is the number of Days of Excusable Delay due to measurable unusual precipitation occurring at the Site during such calendar month that constitutes an Act of God as defined in Paragraph 1.1.2, above, and (ii) the denominator of which is the total number of Days of measurable precipitation occurring at the Site during said calendar month (including both the number of Days comprising the normal, 10-year monthly average of measurable precipitation recorded by NOAA and the excess, or unusual precipitation that constitutes an Act of God as defined in Paragraph 1.1.2, above).

8.2.2 Notice of Delay.

.1 Submission. Contractor shall submit written Notice of Delay to County if any instruction, request, drawing, specification, action, condition, omission, default or other circumstance occurs that constitutes an Excusable Delay or Compensable Delay or other matter that may involve or require a Contract Adjustment extending the Contract Time. Such notice shall be provided prior to performance of the Work affected or involved and no later than seven (7) Days after the Discovery Date of such circumstance.

.2 Form. Notices of Delay shall be provided using forms furnished by County or, if requested by County, using forms furnished by Contractor that are approved by County. Failure by County to request or approve a particular form shall not relieve Contractor of its obligation to provide Notice of Delay in a written form that complies with the requirements of this Paragraph 8.2.2.

.3 Content. Each Notice of Delay in order to be considered complete shall include:

(1) a general statement of the circumstances giving rise to the Notice of Delay (including, without limitation, identification of any related Construction Change Directive);

(2) a Reasonable Order of Magnitude Estimate by Contractor of any related Contract Adjustments extending the Contract Time; and

(3) if such circumstances involve a right to a Contract Adjustment to the Contract Price for Compensable Change that has not been waived by Contractor, Contractor shall include, if not previously provided, a complete and timely Notice of Change.

.4 WAIVER BY CONTRACTOR.

FAILURE BY CONTRACTOR TO PROVIDE A COMPLETE AND TIMELY NOTICE OF DELAY UNDER CIRCUMSTANCES WHERE A NOTICE OF DELAY INVOLVING A DELAY IS REQUIRED BY THIS PARAGRAPH 8.2.2 SHALL, IN ACCORDANCE WITH THE PROVISIONS OF SECTION 4.6 OF THE GENERAL CONDITIONS, CONSTITUTE A WAIVER BY CONTRACTOR OF THE RIGHT TO A CONTRACT ADJUSTMENT ON ACCOUNT OF SUCH CIRCUMSTANCES AND A WAIVER OF ANY RIGHT TO FURTHER RECOURSE OR RECOVERY BY REASON OF OR RELATED TO SUCH DELAY.

.5 No County Notice. Failure by Contractor to submit a timely or proper Notice of Delay under circumstances in which a Notice of Delay is required shall in no way affect County's right to a Contract Adjustment shortening the Contract Time on account of such circumstances.

8.2.3 Request for Extension.

.1 Submission. With respect to any matter that may involve or require an adjustment extending the Contract Time, Contractor shall, within fourteen (14) Days after receipt by County of a Notice of Delay pursuant to Paragraph 8.2.2, above, submit to County a written Request for Extension.

.2 Form. Requests for Extension shall be provided using forms furnished by County or, if requested by County, using forms furnished by Contractor that are approved by County. Failure by County to request or approve a particular form shall not relieve Contractor of its obligation to provide Requests for Extension in a written form that complies with the requirements of this Paragraph 8.2.3.

.3 Content. Each Request for Extension in order to be considered complete shall include:

(1) a detailed description of the circumstances giving rise to the request for Contract Adjustment to the Contract Time and a Time Impact Analysis (a Request for Extension that seeks an extension for more than one Delay shall be supported by a separate Time Impact Analysis for each separate Delay); and

(2) if such circumstances involve a right to a Contract Adjustment of the Contract Price on account of Compensable Change that has not been waived by Contractor, Contractor shall include, if not previously provided, a complete and timely Change Order Request.

.4 WAIVER BY CONTRACTOR.

FAILURE BY CONTRACTOR TO PROVIDE A COMPLETE AND TIMELY REQUEST FOR EXTENSION UNDER CIRCUMSTANCES WHERE A REQUEST FOR EXTENSION INVOLVING A DELAY IS REQUIRED BY THIS PARAGRAPH 8.2.3 SHALL, IN ACCORDANCE WITH THE PROVISIONS OF SECTION 4.6 OF THE GENERAL CONDITIONS, CONSTITUTE A WAIVER BY CONTRACTOR OF THE RIGHT TO A CONTRACT ADJUSTMENT ON ACCOUNT OF SUCH CIRCUMSTANCES AND A WAIVER OF ANY RIGHT TO FURTHER RECOURSE OR RECOVERY BY REASON OF OR RELATED TO SUCH DELAY.

.5 Adjustments Shortening Time. Failure by Contractor to submit a timely or proper Request for Extension under circumstances in which a Request for Extension is required shall in no way affect County's right to a Contract Adjustment shortening the Contract Time on account of such circumstances.

8.2.4 Response by County. After receipt of a timely and complete Request for Extension, County shall investigate the facts concerning the cause and extent of such Delay and, depending on whether the Request for Extension is justified, will notify Contractor of its approval or disapproval of all or a portion of Contractor's request. Extensions of time approved by County shall apply only to that portion of the Work affected by the Delay, and shall not apply to other portions of Work not so affected.

8.2.5 Formal Notice of Essence. Contractor recognizes and acknowledges that timely submission of a formal Notice of Delay and a formal Request for Extension, whether or not the circumstances of a Delay may be known to County or available to County through other means, are not mere formalities but are of crucial importance to the ability of County to promptly identify, prioritize, evaluate and mitigate the potential effects of Delay. Any forms of informal notice, whether verbal or written (including, without limitation, statements at regular job meetings or entries in monthly reports, daily logs, job meeting minutes, updated Construction Schedules or look-ahead schedules), that do not strictly comply with the formal requirements of Paragraph 8.2.2, above, and Paragraph 8.2.3, above, shall accordingly be deemed insufficient to satisfy the notice requirements of this Article 8.

8.2.6 Compensation for Delay.

.1 Compensable Delay. Contract Adjustments to the Contract Price for a Compensable Delay that involve an extension of the Contract Time shall be based, without duplication to any other Contract Adjustments to the Contract Price, on the terms of Section 3.3 of the Construction Contract. Contractor agrees to accept such right of Contract Adjustment in lieu of any other right that may exist under Applicable Laws for recovery of Losses due to Compensable Delay, whether incurred by Contractor or its Subcontractors, of any Tier.

.2 Deleted Work. The Contract Time and Contract Price shall be reduced by Contract Adjustment for Deleted Work (including, without limitation, Deleted Work associated with a termination by County of a portion of the Construction Contract or a deletion of portion of Work for the convenience of the County or due to an Event of Contractor Default) that results in a shortening of the Contract Time.

(1) Contract Time. The Contract Adjustment shortening the Contract Time for Substantial Completion shall be the number of Days that Contractor at the time of contracting would have reasonably expected to expend in performance of the Deleted Work and that, based on the Contractor's original Construction Schedule prepared on or about the time of contracting, were reasonably expected by Contractor to be critical to Substantial Completion of the Work within the Contract Time for Substantial Completion.

(2) Contract Price. The Contract Adjustment reducing the Contract Price shall be the product of (1) the number of Days that the Contract Time for Substantial Completion is shortened pursuant to preceding Clause (1) of this Subparagraph 8.2.6.2 multiplied times (2) the amount of liquidated damages set forth in Paragraph 3.3.2 of the Construction Contract, without any additional credit to County for Allowable Markups.

8.2.7 Acceleration of the Work.

.1 Due to Unexcused Delay. If County makes a Good Faith Determination based on County's observations of progress in performance of the Work by Contractor that Contractor will not achieve Substantial Completion of the Work within the Contract Time as adjusted pursuant to Paragraph 8.2.1, above, then Contractor shall, following receipt of a written request by County to accelerate, immediately respond in writing setting forth a detailed plan for accelerating the Work. All measures necessary, including working overtime, additional shifts, Saturdays, Sundays and holidays, to accelerate performance to ensure that the Work is performed within the Contract Time shall be taken by Contractor and the cost thereof shall be paid for by Contractor at Contractor's Own Expense. County may also take all other necessary measures to ensure no further Delays affect achievement of Substantial Completion and Final Completion of the Work within the Contract Time and the Contractor shall reimburse County, or County may withhold from payment due to Contractor, for Losses incurred by County in taking such measures.

.2 Due to Excusable Delay. Contractor shall have the right, exercised in its sole discretion, to accelerate performance of the Work to overcome time lost due to Excusable Delay. Such acceleration, if performed other than at the written direction of County, shall be deemed a voluntary acceleration and the cost of such accelerated performance shall be paid for by Contractor at Contractor's Own Expense. If County directs in writing that the Work be accelerated to overcome an Excusable Delay that is not concurrent with an Unexcused Delay, then Contractor shall be entitled to a Contract Adjustment to the Contract Price for such acceleration on and subject to the same terms as provided for in Subparagraph 8.2.7.3, below, in the case of an acceleration to overcome a Compensable Delay.

.3 Due to Compensable Delay. County shall have the right, exercised in its sole and absolute discretion, in lieu of granting a Contract Adjustment to the Contract Time for Compensable Delay, to direct in writing

the acceleration of the Work by Contractor in order to recapture time lost due to such Compensable Delay. County and Contractor shall endeavor prior to commencement of such acceleration to mutually agree upon the amount of compensation to be paid therefor. County shall have the right, in the absence of such an agreement, to direct in writing that Contractor accelerate. Contractor shall comply with such directive. Contractor's right to a Contract Adjustment to the Contract Price on account of such acceleration shall be limited to (1) the premium time portion of any overtime paid for labor provided by Contractor or any Subcontractor, plus (2) additional supervision costs for additional shifts of supervision provided at the Site by Contractor only (not by Subcontractors), plus (3) Allowable Markup thereon as provided in Paragraph 7.7.5, above. Except as directed by County in the manner stated in this Subparagraph 8.2.7.3, no statements, conduct or actions by County will be construed as creating an obligation on the part of County to agree to a Contract Adjustment to the Contract Price on account of any cost of overtime or other costs associated with an acceleration of the Work to recapture time lost due to Compensable Delay.

8.2.8 Concurrent Delays. For purposes of the calculations provided for in this Paragraph 8.2.8, the words "concurrent delay", "concurrently delay" or "occur concurrently" mean the portion of two or more Delays affecting the critical path to Substantial Completion that are overlapping or co-existent. Contractor's right to a Contract Adjustment of the Contract Time (pursuant to Subparagraphs 8.2.8.1, 8.2.8.2 and 8.2.8.3, below) and Contract Price (pursuant to Subparagraphs 8.2.8.4, 8.2.8.5 and 8.2.8.6, below) shall, in the case of concurrent delays, be calculated in accordance with the following:

.1 If an Excusable Delay and a Compensable Delay occur concurrently, the maximum extension of the Contract Time shall be the number of Days from the commencement of the first Delay to the cessation of the Delay which ends last.

.2 If an Unexcused Delay occurs concurrently with either an Excusable Delay or a Compensable Delay, the maximum extension of the Contract Time shall be the number of Days, if any, by which such Excusable Delay or Compensable Delay exceeds the number of Days of such Unexcused Delay.

.3 If an Unexcused Delay occurs concurrently with both an Excusable Delay and a Compensable Delay, the maximum extension of the Contract Time shall be the number of Days, if any, by which such Excusable Delay and Compensable Delay, as determined pursuant to Subparagraph 8.2.8.1, above, exceeds the number of Days of such Unexcused Delay.

.4 If an Unexcused Delay occurs concurrently with a Compensable Delay, the maximum period of time for which Contractor shall be entitled to a Contract Adjustment to the Contract Price in accordance with Section 3.3 of the Construction Contract shall be the number of Days, if any, by which such Compensable Delay exceeds the number of Days of such Unexcused Delay.

.5 If a Compensable Delay occurs concurrently with an Excusable Delay, the maximum period of time for which Contractor shall be entitled to a Contract Adjustment to the Contract Price in accordance with Section 3.3 of the Construction Contract shall be the number of Days, if any, by which such Compensable Delay exceeds the number of Days of such Excusable Delay.

.6 If an Unexcused Delay occurs concurrently with both an Excusable Delay and a Compensable Delay, the maximum period of time for which Contractor shall be entitled to a Contract Adjustment to the Contract Price in accordance with Section 3.3 of the Construction Contract shall be the number of Days, if any, by which such Compensable Delay exceeds the number of Days of such Unexcused Delay.

8.2.9 Delay Claims. Claims by Contractor relating to disputed Contract Adjustments due to Delay shall be made in accordance with applicable provisions of Section 4.3, above.

8.2.10 Exercise of County Rights. Notwithstanding any other provision of the Contract Documents to the contrary, County's exercise in accordance with the Contract Documents of any of its rights or remedies permitted by Applicable Laws or the Contract Documents in response to a failure by Contractor or any Subcontractor to comply with the Contract Documents shall not, under any circumstances, entitle Contractor to a Contract Adjustment.

ARTICLE 9 PAYMENTS AND COMPLETION

9.1 PAYMENT BY COUNTY

9.1.1 **Time for Payment.** County shall make payment of undisputed sums due to the Contractor upon Applications for Payment requesting Progress Payment not later than thirty (30) Days after receipt of an Application for Payment requesting Progress Payment that has been properly and timely prepared and submitted by Contractor, and approved by County, in accordance with the requirements of the Contract Documents.

9.1.2 **Not Acceptance.** No approval, inspection or use of, or payment for, the Work by County or by any person or entity acting on County's behalf shall constitute acceptance of Work that is not in accordance with the Contract Documents or a waiver of any of County's rights under the Contract Documents.

9.1.3 **Interest.** If County fails to make payment of an undisputed sum due as a Progress Payment to the Contractor as required by this Article 9, County shall pay interest to the Contractor equivalent to the legal rate set forth in subdivision (a) of California Code of Civil Procedure §685.010. The number of Days available to the County to make payment without incurring such interest shall be reduced by the number of Days by which the County exceeds the seven (7) Day response time applicable to the County set forth in Section 9.5, below. The foregoing is the County's sole obligation with respect to payment of interest earned or accrued on an amount claimed due prior to the commencement by Contractor of legal proceedings for recovery of such amount.

9.1.4 **Disputed Payments.** Subject to Contractor's rights under Section 9.8, below, no good faith dispute or disagreement between County and Contractor with respect to the amount of any payment claimed due by Contractor shall relieve or excuse Contractor from the obligation to proceed with and maintain continuous, expeditious and uninterrupted performance of the Work.

9.2 APPLICATIONS FOR PAYMENTS

9.2.1 **Submission by Contractor.** Applications for Payment requesting Progress Payment shall be properly prepared and submitted by Contractor to County once a month on the twenty-fifth (25th) Day of the month. If the twenty-fifth (25th) Day of the month is a weekend or Holiday, the Application for Payment shall be submitted on the next working day.

9.2.2 **Period of Application.** The period covered by each such Application for Payment requesting Progress Payment shall be not more than thirty (30) Days ending on the twenty-fifth (25th) Day of the month in which such Application for Payment is submitted.

9.2.3 **Schedule of Values.** Each Application for Payment shall be accompanied by a Schedule of Values prepared and submitted in accordance with the requirements of the Contract Documents, including, without limitation, the provisions of Section 9.3, below.

9.2.4 **Changes in Work.** Applications for Payment may include requests for payment on account of Compensable Changes in the Work which have been properly authorized by Change Order or Unilateral Change Order.

9.2.5 **Progress Payments.** Applications for Payment requesting Progress Payments shall be based on amounts calculated in accordance with the provisions of Section 9.4, below.

9.2.6 **Percentage Completion.** Applications for Payment requesting Progress Payments shall indicate the Contractor's estimate of the percentage of completion of each line item listed in the Schedule of Values as of the end of the period covered by the Application for Payment.

9.2.7 **Projected Work.** Unless approved by County in writing in advance of an Application for Payment being submitted, which approval may be granted or denied in the sole and absolute discretion of County, Applications for Payment shall only include amounts for Work performed to the twenty-fifth (25th) Day of the month in which the

Application for Payment was submitted and shall not include request for payment of amounts for Work projected to be performed, stored or delivered beyond that date.

9.2.8 Disagreements. In the event of a disagreement between County and Contractor over the accuracy or reasonableness of the Contractor's statement of percentage of progress achieved that is contained in the Application for Payment, the County shall make a Good Faith Determination of the percentage, which percentage shall then be inserted by Contractor in the Application for Payment and the Application for Payment submitted, or resubmitted, incorporating such revision.

9.2.9 Substantial Completion. For the sole purpose of the percentage calculation set forth in Paragraph 9.2.6, above, and for no other purpose, the Work shall be deemed one hundred percent complete upon Substantial Completion and the amount released to Contractor shall, subject to County's right to withhold pursuant to Section 9.6, below, be a sum sufficient to increase the total of Progress Payments to Contractor to ninety-five percent (95%) of the Contract Price.

9.2.10 Certification by Contractor. Each Application for Payment that is submitted by Contractor shall be signed by Contractor with a certification by Contractor to County that: (1) the data comprising the Application for Payment is accurate and the Work has progressed to the point indicated; (2) to the best of Contractor's knowledge, information and belief, the Work is in accordance with the Contract Documents; (3) Contractor is entitled to payment in the amount certified; and (4) all sums previously applied for by Contractor on account of the Work performed by the Subcontractors and that have been paid by County have been paid to the Subcontractors performing such Work, without any retention, withholding or back charge by Contractor.

9.2.11 Stored Materials. County may, in the exercise of its sole and absolute discretion, approve or disapprove for inclusion in Contractor's Application for Payment the cost of materials to be incorporated, but not yet incorporated, in the Work and delivered and suitably stored either at the Site or at some other appropriate location acceptable to the County. As part of any request for such approval, Contractor shall furnish evidence satisfactory to County: (1) of the cost of such materials; (2) that such materials are under the exclusive control of Contractor, or if not, that title to the materials is in the County, free of any lien or encumbrance; and (3) with respect to materials stored off-Site, that the materials are safely and suitably stored in a bonded warehouse with appropriate insurance coverage satisfactory to County. No payment or approval by County pursuant to this Paragraph 9.2.11 shall (a) be construed as an inspection or acceptance of the materials; (b) relieve Contractor of its continuing and sole responsibility for the care and protection of, and sole responsibility for any Loss to, such materials, from any cause whatsoever; or (c) operate as a waiver of rights by County.

9.2.12 Title. Contractor warrants that title to all the Work covered by an Application for Payment will pass to County no later than the time of payment. Contractor further warrants that upon submittal of an Application for Payment all Work for which approval for payment has been previously issued by County shall, to the best of Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of Contractor, the Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials or equipment for the Work.

9.3 SCHEDULE OF VALUES

9.3.1 Initial Submission. Within twenty-one (21) Days after issuance by County of the Notice of Intent to Award, Contractor shall submit to County a Schedule of Values, prepared in a form and incorporating a level of detail satisfactory to County, that allocates the Contract Price to various portions of the Work, including, without limitation, each portion of the Work to be performed by a Subcontractor, self-performed Work, discrete categories of direct (i.e., on-Site) overhead costs (sometimes referred to as "general conditions costs"), Contractor home office and indirect overhead and profit and amounts reserved for contingencies.

9.3.2 Balanced Allocation. The Schedule of Values shall be balanced, reflecting in each line item Contractor's estimated or actual cost commitments for the category of Work included in the line item and a proportionate share of Contractor's overhead and profit. Techniques, such as "front-end loading", designed to create an imbalanced cash flow are strictly prohibited.

9.3.3 Line Estimates. Line item values stated in the Schedule of Values that are based on Contractor's estimates, rather than actual subcontract prices, shall be identified as such and replaced with actual subcontract prices when they become available as the subcontracting process progresses.

9.3.4 Updating. The Schedule of Values shall be updated by Contractor each month as necessary to reflect the Contractor's actual progress in subcontracting the Work. An updated Schedule of Values shall be attached to each Application for Payment.

9.3.5 Substantiation. Contractor shall provide such data as County may reasonably require to substantiate that the Schedule of Values has been prepared in conformance with the requirements of the Contract Documents. Failure to provide such substantiation shall result in the Schedule of Values being deemed incomplete and unapproved by County for use by Contractor in submitting its Applications for Payment.

9.3.6 Corrections. If corrections are required in order to make the Schedule of Values comply with the requirements of the Contract Documents, such corrections shall be made as a condition of the Contractor's Application for Payment being considered properly prepared, submitted and complete.

9.3.7 Changes to Work. Costs involved in the performance of Work covered by Change Orders, Unilateral Change Orders or Construction Change Directives shall be, at the option of County, either separately scheduled or incorporated as adjustments to the respective trade lines of Work to which they apply. Except as otherwise expressly required by Article 7, above, the Schedule of Values shall not be utilized by Contractor as a basis for calculating Contract Adjustments.

9.3.8 Applications for Payment. The Schedule of Values prepared by Contractor in accordance with the requirements of the Contract Documents shall be used as a basis for County's review and approval or disapproval of Applications for Payment.

9.4 PROGRESS PAYMENT CONDITIONS

9.4.1 Progress Payment Amount. Subject to the other provisions of the Contract Documents, the amount of each Progress Payment requested in an Application for Payment shall be computed as follows:

.1 take that portion of the Contract Price properly allocable to Work (other than materials, products or equipment furnished by County) permanently incorporated at the Site as part of the Work, based on the product derived by multiplying (1) the percentage completion of each such portion of the Work times (2) the portion of the total Contract Price allocated to that portion of the Work in the Schedule of Values, less a retention of five percent (5%) thereof;

.2 add that portion of the Contract Price that is allocable to materials and equipment (other than materials, products or equipment furnished by County) approved by County pursuant to Paragraph 9.2.11, above, and suitably stored at the Site or at a location off-Site, less a retention of five percent (5%) thereof;

.3 subtract the aggregate of previous payments made by the County; and

.4 subtract amounts, if any, that County has determined will be withheld pursuant to an exercise of the County's right to withhold pursuant to Section 9.6, below.

9.4.2 Other Conditions and Documentation. Contractor shall submit its Applications for Payment requesting Progress Payments to County using such forms as required by County. Without limitation to any other conditions to payment set forth elsewhere in the Contract Documents, the following shall be conditions precedent to a proper submission, and to County's approval, of each Application for Payment:

.1 submission of a Schedule of Values that complies with Section 9.3, above;

.2 submission of Contractor's certification required by Paragraph 9.2.10, above;

.3 submission of: (1) forms of conditional releases of stop payment notice and bond rights upon progress payment, complying with California Civil Code §8132, for all Work performed during the time period covered by the current Application for Payment, signed by Contractor and the Subcontractors, of every Tier; and (2) forms of unconditional releases of stop payment notice and bond rights upon progress payment, complying with California Civil Code §8134, for all Work performed during the time period covered by the previous Application for Payment, signed by Contractor and the Subcontractors, of every Tier;

.4 compliance by Contractor with its obligation for daily maintenance of Record Drawings and Specifications as required by Paragraph 3.10.1, above;

.5 compliance by Contractor with its obligation for submission of daily reports as required by Paragraph 3.10.2, above;

.6 compliance by Contractor with its obligations for submission of scheduling information and updating of the Construction Schedule as required by Section 3.9, above, and other provisions of the Contract Documents pertaining to preparation or updating of schedules and scheduling information;

.7 proper payment of prevailing wages as defined in California Labor Code §1720, et seq.;

.8 timely submission of adequate and complete certified payroll records for any time period that Work was performed and for which payment is being requested;

.9 submission of certifications by Contractor and the Subcontractors as required by Applicable Laws certifying that all employee benefit contributions due and owing have been paid in full;

.10 submission of sales tax information as required by Paragraph 3.6.3, above; and

.11 compliance by Contractor with all of its other obligations for submission of documentation or performance of conditions which, by the terms of the Contract Documents, constitute conditions to Contractor's right to receive payment for Work performed.

9.5 COUNTY APPROVAL/REJECTION OF APPLICATIONS FOR PAYMENT

9.5.1 **Review by County.** Subject to County's rights under Paragraph 9.5.4, below, County shall promptly review Applications for Payment submitted by Contractor and provide its approval or disapproval, in whole or part, within (1) seven (7) Days after receipt of an Application for Payment requesting Progress Payment, and (2) within fourteen (14) Days after receipt of an Application for Payment requesting Final Payment.

9.5.2 **Disapproval by County.** Disapproval by County disapproving of an Application for Payment shall be accompanied by an explanation of the reasons for such disapproval. Failure by County to specify in its disapproval a particular grounds for disapproval of an Application for Payment shall not waive the County's right to assert such grounds as a basis for any future disapproval, or nullification of its prior approval, of that or any other Application for Payment.

9.5.3 **Re-submittal by Contractor.** An Application for Payment that is disapproved by County shall be corrected and re-submitted by Contractor after receipt by Contractor of the notice of disapproval. A re-submitted Application for Payment shall be reviewed and responded to by County in the same manner as provided in Paragraphs 9.5.1 and 9.5.2, above. If re-submitted, the re-submitted Application for Payment shall be reviewed and responded to by County in the same manner as provided in Paragraph 9.5.1 and Paragraph 9.5.2, above. If not re-submitted, only the amount, if any, that is approved for payment shall be paid until such time as a proper Application for Payment that includes the disapproved amount has been submitted in another Application for Payment and, upon such re-submittal, approved for payment.

9.5.4 **Approval Nullification.** County reserves the right to nullify any prior approval of an Application for Payment that is later found to not be in compliance with the requirements of the Contract Documents, whether or not such noncompliance was previously actually observed or apparent on the face of the Application for Payment, and

based on such nullification County may take either of the following actions, as applicable: (1) if the Application for Payment has not yet been paid by County, disapprove of that portion of the Application for Payment that is not in compliance and withhold payment of that sum until the noncompliance is fully rectified; or (2) if the Application for Payment has been paid by County, nullify the County's prior approval and withhold payment of such disputed amounts in response to future Applications for Payment; provided, however, that in either case the amount of the County's nullification shall be limited to that portion of the amount requested in the Application for Payment that is in dispute and the amount of its withholding from the current or any future Application for Payment shall be limited to the amount nullified plus any additional withholding permitted under Section 9.6, below.

9.5.5 No Waiver by County. Neither approval by County or Architect of, failure by County to exercise its right of nullification with respect to, nor payment by County upon, an Application for Payment or any portion thereof shall be interpreted as or constitute a waiver or release of any of County's rights to require Contractor's full compliance with the Contract Documents.

9.5.6 No Representation. Neither approval by County or Architect of, failure by County to exercise its right of nullification with respect to, nor payment by County upon, an Application for Payment or any portion thereof shall be interpreted as a representation that County or Architect has: (1) made exhaustive or continuous on-Site inspections to check the quality or quantity of the Work, (2) reviewed Contractor's construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from the Subcontractors and other data requested by County or Architect to substantiate Contractor's right to payment, or (4) made examination to ascertain how or for what purpose Contractor has used money previously paid on account of the Contract Price.

9.6 WITHHOLDING OF PAYMENT

9.6.1 Grounds for Withholding. County may decline to approve an Application for Payment and withhold payment requested under any unpaid Application for Payment, in whole or in part, to such extent that County makes a Good Faith Determination that withholding is necessary, in the sole discretion of County, because of any of the following circumstances:

.1 Third-Party Claims. Third-party claims or stop payment notices filed or reasonable evidence (including, without limitation, failure by Contractor to submit conditional releases of stop payment notice and bond rights required by the Contract Documents) indicating the possible filing of such claims or stop payment notices.

.2 Defective Work. Defective Work not remedied.

.3 Nonpayment. Failure of Contractor to make proper payments to a Subcontractor for services, labor, materials or equipment or other Work.

.4 Inability to Complete. Reasonable doubt that the Work can be completed for the then unpaid balance of the Contract Price or within the Contract Time.

.5 Violation of Applicable Laws. Failure of Contractor or a Subcontractor to comply with Applicable Laws.

.6 Penalty. Any penalty asserted against County by virtue of Contractor's failure to comply with Applicable Laws.

.7 Lack of Progress. Failure by Contractor to maintain progress in accordance with the Construction Schedule.

.8 Setoff. Any reason specified elsewhere in the Contract Documents as grounds for a withholding, offset or setoff or that would legally entitle County to a setoff or recoupment.

.9 Consultant Services. Additional professional, consultant or inspection services required due to Contractor's failure to comply with the Contract Documents.

.10 Liquidated Damages. Liquidated damages payable to County pursuant to Section 3.2 of the Construction Contract or that there is a reasonable basis to believe will be payable to County based upon the Contractor's project date for Substantial Completion based on its update Construction Schedule or based upon other evidence available to County of the probable date that the Work will be Substantially Completed.

.11 Damage. Loss caused to County, a Separate Contractor or any other person or entity under contract to County, by Contractor or a Subcontractor.

.12 Cleanup. Cleanup performed by County and chargeable to Contractor pursuant to the terms of the Contract Documents.

.13 Employee Benefits. Failure of Contractor to pay contributions due and owing to employee benefits funds pursuant to any applicable collective bargaining agreement or trust agreement.

.14 Required Documents. Failure of Contractor to submit on a timely basis, proper and complete documentation required by the Contract Documents, including, without limitation, schedule updates, 'look ahead' schedules, pricing information, certifications and other required reports or documentation.

.15 Labor Compliance. Failure of Contractor or any Subcontractor to properly pay prevailing wages as defined in California Labor Code §§1720 et seq.

.16 Nullification. Nullification by County pursuant to Paragraph 9.5.4, above, of its prior approval of an Application for Payment.

.17 Releases. Failure by Contractor to submit any conditional release of stop payment notice and bond rights that is required pursuant to Subparagraph 9.4.2.3, above or Subparagraph 9.10.4.4, below.

.18 Other Breach. A breach by Contractor of any obligation or provision of the Contract Documents.

9.6.2 Application of Withholding. Sums properly withheld pursuant to Paragraph 9.6.1, above, may be used by County without a prior judicial determination of County's actual rights with respect to the grounds on which such withholding is based. Contractor agrees and hereby designates County as its agent for such purposes, and agrees that such payments shall be considered as payments made under the Construction Contract by County to Contractor. County shall submit to Contractor an accounting of such funds disbursed on behalf of Contractor. As an alternative to such payment, County may, in its sole and absolute discretion, elect to exercise its right to adjust the Contract Price as provided in Section 13.4, below.

9.6.3 Final Payment. In accordance with California Public Contract Code §7107, the amount to be withheld from Contractor's Final Payment pursuant to a withholding asserted pursuant to Paragraph 9.6.1, above, shall be limited to one hundred fifty percent (150%) of the disputed amount.

9.6.4 Release of Withholding. When the reasons for withholding of payment as set forth in Paragraph 9.6.1, above, are removed, approval by County will be promptly issued to Contractor for amounts previously withheld and payment of amounts withheld will be made by County within thirty (30) Days thereafter.

9.6.5 Additional Rights. The County's right of withholding set forth in this Section 9.6 is in addition to, and not a limitation upon, any other rights of withhold that County may have under the Contract Documents or Applicable Laws.

9.7 PAYMENTS BY CONTRACTOR

9.7.1 Payments to Subcontractors. Contractor shall not include in its Applications for Payment sums on account of any Subcontractor's portion of the Work that it does not intend to pay to such Subcontractor. Upon receipt of payment from County, Contractor shall pay the Subcontractors performing the Work, out of the amount paid to Contractor on account of such Subcontractors' portions of the Work, the amount to which said Subcontractors are

entitled in accordance with the terms of their contracts with Contractor and Applicable Laws, including, without limitation, California Public Contract Code §7107. Contractor shall remain responsible, notwithstanding a withholding by County pursuant to the terms of these General Conditions, to promptly satisfy from its own funds sums due to all the Subcontractors who have performed the Work that is included in Contractor's Application for Payment. Contractor shall, by appropriate agreement, require each Subcontractor to make payments to its sub-subcontractors and suppliers in similar manner. County shall have no obligation to pay or be responsible in any way for payment to the Subcontractors, of any Tier.

9.7.2 Payments in Trust. Any funds that Contractor receives in payment for services or Work performed by a Subcontractor shall constitute assets of a trust, which trust funds shall be used for the exclusive benefit of the Subcontractor for the purpose of discharging Contractor's financial obligations on account of labor, services, materials or equipment furnished to the Project by the Subcontractor, provided that such labor, services, materials or equipment were performed in accordance with the Contract Documents, were included in an Application for Payment to County, and were paid by the County to Contractor. Contractor shall be the trustee of the trust and shall be required to deal with the trust assets for the benefit of the Subcontractor. Contractor shall not be a beneficiary of the trust. Nothing herein shall be construed as an intent to require that Contractor maintain trust funds in separate bank accounts, specifically designate any third party as a beneficiary of the trust created herein, or otherwise give rise to any cause of action against the County by any third party beneficiary of the trust created herein.

9.7.3 Payment Information. County will, on request, furnish to any of the Subcontractors, if practicable, information for such Subcontractor's review regarding percentages of completion or amounts applied for by Contractor and action taken thereon by County on account of portions of the Work done by such Subcontractor.

9.7.4 Joint Payment. County shall have the right, if deemed necessary in its sole discretion, to issue joint checks made payable to Contractor and any of the Subcontractors, of any Tier. The joint check payees shall be solely responsible for the allocation and disbursement of funds included as part of any such joint payment. Endorsement on such check by a payee shall be conclusively presumed to constitute receipt of payment by such payee. In no event shall any joint check payment be construed to create: (1) any contract between County and any of the Subcontractors, of any Tier; (2) any obligation from County to any of the Subcontractors; or (3) any third-party rights against County or Architect.

9.7.5 Direct Negotiation of Stop Payment Notices. County shall have the right to directly discuss, negotiate, settle or pay, without notice to or participation by Contractor, any stop payment notice claims asserted by the Subcontractors, of any Tier, and to deduct such sums paid from sums due to Contractor.

9.7.6 Release of Stop Payment Notices. With the exception of that portion, and only that portion, of a stop payment notice or other claim that arises as a result of a failure by the County to make payment to Contractor under circumstances constituting a breach of the Construction Contract by County, if any stop payment notice or other claim, whether invalid or valid, is filed with, served upon or made or asserted against the County or the Site by any Subcontractor, of any Tier, or their agent or employee, for money claimed due, then Contractor shall within five (5) Days after written notice by the County procure, furnish and record appropriate releases or other instruments which under Applicable Laws will fully release, extinguish and remove such stop payment notice or claim, as well as any notices of pending action or other notices recorded against the Site in connection with the enforcement thereof. All costs of such actions by Contractor shall be paid for by Contractor at Contractor's Own Expense. Unless and until fully released as aforestated, the County shall have the right to retain from any payment then due, or thereafter to become due, to Contractor an amount equal to one hundred and fifty percent (150%) of the amount necessary to satisfy, discharge and defend against any such stop payment notice or claim and any action or proceeding thereon, including, without limitation, an amount for anticipated attorney's fees and costs. If the amount to be paid, or the amount retained, is insufficient to satisfy, discharge and defend against any such stop payment notice or claim and any action or proceeding thereon, then Contractor shall be liable for the difference and upon demand shall immediately deposit the same with the County. The provisions of this Paragraph 9.7.6 are in addition to such other rights as the County may have against Contractor under the Contract Documents or Applicable Laws.

9.7.7 No County Obligation. Neither County nor Architect shall have any obligation to pay or to see to the payment of money to any of the Subcontractors except as may otherwise be required by Applicable Laws.

9.8 FAILURE OF PAYMENT

If, through no fault of Contractor or failure by Contractor to comply with its obligations under the Contract Documents either: (1) approval or disapproval by County of an Application for Payment properly prepared and submitted by Contractor and requesting payment that is otherwise undisputed by County is not issued within the time period required therefor by the terms of this Article 9; or (2) the County does not (a) upon an Application for Payment properly prepared and submitted by Contractor pay to Contractor, within the time period required for payment by County, an undisputed amount approved by County as earned, which approval has not been, and is not thereafter, nullified by County, or (b) pay to Contractor an amount that has been awarded by arbitration or judgment of a court of competent jurisdiction, then Contractor may, following delivery to County of a written "10-day stop work order", stop the Work until, as applicable, an approval or disapproval by County, or payment by County, is received by Contractor. Promptly upon receipt of such approval or disapproval, or payment, as applicable, Contractor shall resume the Work. Any resulting Delay associated with the shut down and start up of the Work as a result of Contractor's proper exercise of its right to stop work under this Section 9.8 shall constitute a Compensable Delay.

9.9 SUBSTITUTION OF SECURITIES FOR RETENTION

9.9.1 Public Contract Code. Pursuant to the requirements of California Public Contract Code §22300, upon the Contractor's request, the County will make payment to the Contractor of any funds withheld from payments to ensure performance under the Contract Documents if the Contractor deposits with the County, or in escrow with a California or federally chartered bank in California acceptable to the County ("Escrow Agent"), securities eligible for the investment of State Funds under Government Code §16430, or bank or savings and loan certificates of deposit, interest-bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by the Contractor and the County, upon the following conditions:

.1 The Contractor shall be the beneficial owner of any securities substituted for monies withheld for the purpose of receiving any interest on such securities.

.2 All expenses relating to the substitution of securities under said §22300 and under this Section 9.9, including, but not limited to the County's overhead and administrative expenses and expenses of Escrow Agent, shall be the responsibility of the Contractor.

.3 Securities or certificates of deposit substituted for monies withheld shall be of a value of at least equivalent to the amounts of the retention to be paid to the Contractor pursuant to the Contract Documents.

.4 If the Contractor shall choose to deposit securities in lieu of monies withheld with an Escrow Agent, the Contractor, the County and Escrow Agent shall, as a prerequisite to such deposit, enter into an escrow agreement. Such escrow agreement shall be substantially in the form "Escrow Agreement for Security Deposits in Lieu of Retention" set forth in California Public Contract Code §22300(f).

.5 The Contractor shall obtain the written consent of Surety to such agreement.

.6 Securities, if any, shall be returned to the Contractor only upon satisfactory Final Completion of the Work.

9.9.2 Substitute Security. To minimize the expense caused by such substitution of securities, the Contractor shall, prior to or at the time the Contractor requests to substitute security, deposit sufficient security to cover the entire amount to be withheld. Should the current market value of such substituted security at any time fall below the amount for which it was substituted, or any other amount which the County withholds pursuant to the Contract Documents, the Contractor shall immediately and at the Contractor's Own Expense deposit additional security qualifying under said §22300 until the current market value of the total security deposited is no less than the amount subject to withholding under the Contract Documents. Securities shall be valued as often as conditions of the securities market warrant, but in no case less frequently than once per month.

9.9.3 Deposit of Retentions. Alternatively, subject to the conditions set forth in Paragraph 9.9.1, above, upon request of the Contractor, the County shall make payment of retentions directly to Escrow Agent at the expense of the Contractor, provided that the Contractor, the County and Escrow Agent shall, as a prerequisite to such

payment, enter into an escrow agreement in the same form as prescribed in Subparagraph 9.9.1.4, above. At the Contractor's Own Expense, the Contractor may direct the investment of the payments into securities and interest bearing accounts and the Contractor shall receive the interest earned on the investments. Escrow Agent shall hold such direct payments by the County under the same terms provided herein for securities deposited by the Contractor. Upon satisfactory Final Completion of the Work, the Contractor shall receive from Escrow Agent all securities, interest and payments received by Escrow Agent from the County, less escrow fees and charges of the Escrow Account, according to the terms of said §22300 and the Contract Documents.

9.10 FINAL PAYMENT

9.10.1 **Payment by County.** Subject to the County's right of withholding as set forth in Section 9.6, above, or elsewhere in the Contract Documents, Final Payment shall be made by County not more than sixty (60) Days after completion of the Work as defined in Clauses (1), (2), (3) or (4) of California Public Contract Code § 7107(c), whichever definition is earliest satisfied.

9.10.2 **Application for Final Payment.** Upon issuance by County of the Notice of Final Completion pursuant to Paragraph 9.13.5, below, Contractor shall submit to County its Application for Payment requesting Final Payment.

9.10.3 **Review by County.** County will review and approve or disapprove of the Application for Payment requesting Final Payment as provided in Section 9.5, above.

9.10.4 **Conditions to Final Payment.** Without limitation to any other conditions to payment set forth elsewhere in the Contract Documents, the following shall be conditions to a proper submission, and to County's approval, of Contractor's Application for Payment requesting Final Payment:

- .1 submission of Contractor certification as required by Paragraph 9.2.10, above;
- .2 submission of consent of Surety, if any, to Final Payment;
- .3 submission of a certificate evidencing that the insurance required by the Contract Documents is in force;
- .4 submission of conditional releases and waivers of stop payment notice and bond rights upon final payment in the form required by California Civil Code §8136 executed by Contractor and by all the Subcontractors, of every Tier;
- .5 submission of all Close-Out Documents (including, without limitation, complete, accurate Record Drawings and Specifications certified by Contractor as required by Paragraph 3.10.1, above);
- .6 timely submission of adequate and complete certified payroll records for any time period that Work was performed, which have not been submitted by Contractor in connection with its previous Applications for Payment;
- .7 proper payment of prevailing wages as defined in California Labor Code §§1720, et seq.;
- .8 submission of certifications by Contractor and each Subcontractor, as required by any applicable collective bargaining agreement or trust agreement or Applicable Laws, certifying that all employee benefit contributions due and owing have been paid in full; and
- .9 submission of any other documents or information required by the Contract Documents as a condition of Final Payment or Final Completion.

9.10.5 **Disputed Amounts.** Pursuant to California Public Contract Code § 7107, County may deduct and withhold from Final Payment an amount of up to one hundred fifty percent (150%) of any disputed amounts, including,

without limitation, amounts to protect County against any Loss caused or threatened as a result of Contractor's failing to fully satisfy the conditions of Final Completion and Final Payment.

9.10.6 No Waiver by County. The making of Final Payment by County shall not constitute a waiver by County of any rights or claims, including, without limitation, any right or claim for reimbursement of Allowable Costs or Allowable Markup paid to Contractor that is determined by County, either before or after Final Payment, to have been not due to Contractor.

9.10.7 WAIVER BY CONTRACTOR.

ACCEPTANCE OF FINAL PAYMENT BY CONTRACTOR OR A SUBCONTRACTOR SHALL CONSTITUTE A WAIVER OF ALL RIGHTS BY THAT PAYEE AGAINST COUNTY FOR RECOVERY OF ANY LOSS, EXCEPTING ONLY THOSE CLAIMS THAT HAVE BEEN SUBMITTED BY CONTRACTOR IN THE MANNER REQUIRED BY SECTION 4.3, ABOVE, PRIOR TO, OR AT THE TIME OF CONTRACTOR'S SUBMISSION TO COUNTY OF, ITS APPLICATION FOR PAYMENT REQUESTING FINAL PAYMENT.

9.11 SUBSTANTIAL COMPLETION

9.11.1 Contract Time. Contractor shall achieve Substantial Completion of the Work, or such portion of the Work as may be designated at any time by County for separate delivery, in accordance with the requirements of the Contract Time and other provisions of the Contract Documents.

9.11.2 Request for Inspection. Contractor shall notify the County when Contractor believes that the Work, or portion thereof designated by the County in the Contract Documents or otherwise for separate delivery, is Substantially Complete.

9.11.3 Substantial Completion Inspection. When Contractor gives notice to County that it has achieved Substantial Completion of the Work, or a County designated portion thereof, unless the County determines that the Work or County designated portion thereof is not sufficiently complete to warrant an inspection to determine Substantial Completion, County, Inspector of Record, Architect and such others as may be designated by County will inspect the Work, or such County designated portion thereof.

9.11.4 Substantial Completion Punch List. At the conclusion of such inspection, County shall prepare and give to Contractor (or, Owner may request that Contractor prepare and provide to County) a Substantial Completion Punch List of items, if any, to be completed or corrected for Substantial Completion. If Contractor disputes any of the items included, it shall so note its objection on the Substantial Completion Punch List. Contractor shall proceed within forty-eight (48) hours after preparation of the Substantial Completion Punch List to commence correction or completion of the items on the Substantial Completion Punch List, including, without limitation, any disputed items, and all such items of Work shall be completed promptly by Contractor before the Work will be considered as Substantially Complete. Failure by County, Architect, Inspector of Record or Contractor to include an item on the Substantial Completion Punch List does not alter the responsibility of Contractor to perform the Work in accordance with the Contract Documents. Items of Work necessary for Substantial Completion that, for any reason, have been omitted from the Substantial Completion Punch List shall be added to the Substantial Completion Punch List and Contractor shall, at the request of County, Architect or Inspector of Record made at any time prior to Final Payment commence correction or completion of such items within forty-eight (48) hours and all such items of Work shall be completed by Contractor promptly and before the Work will be considered as Substantially Complete.

9.11.5 Re-Inspection. Contractor shall notify County when the items of Work shown on the Substantial Completion Punch List are completed. County, Inspector of Record, Architect and such others as County deems necessary or appropriate will then make a further inspection to determine whether such Work is Substantially Complete. If such inspection, or any subsequent re-inspection required pursuant hereto, discloses any item, whether or not included on the Substantial Completion Punch List, which must be completed or corrected before Substantial Completion, Contractor shall, as a condition of Substantial Completion, complete or correct such item, which shall then be re-inspected to confirm that such Work is Substantially Complete. Contractor shall reimburse County, or County may at its option withhold from Contractor's payments, amounts incurred by County to the Inspector of Record, Architect, County Consultants or others whose services, for reasons within the control or responsibility of

Contractor or the Subcontractors, are necessary for more than two (2) such re-inspections to determine Substantial Completion.

9.11.6 Notice of Substantial Completion. When County determines that the Work, or such designated portion thereof, is Substantially Complete, County will prepare a Notice of Substantial Completion on the County's form, which shall state the date of Substantial Completion. If the Notice of Substantial Completion is for the entire Work, then the County will attach to it the Final Completion Punch List prepared in accordance with Paragraph 9.13.2, below. Regardless of the date the Notice of Substantial Completion is issued, Substantial Completion shall be deemed to have occurred on the date stated in the Notice of Substantial Completion.

9.12 PARTIAL OCCUPANCY OR USE

County reserves the right to beneficially occupy all or any portion of the Work at any time before Substantial Completion of the entire Work. Beneficial occupancy means that County has assumed physical occupancy and use of all or such portion of the Work. Commencement of improvements or other work by Separate Contractors in order to ready the Work for use or occupancy by County shall be unconditionally permitted in all cases prior to Substantial Completion and shall not constitute a taking of beneficial occupancy by County. Exercise by County in accordance with the provisions of this Section 9.12 of its right to take beneficial occupancy shall not constitute grounds for a Contract Adjustment. The County's right of beneficial occupancy of all or a portion of the Work prior to Substantial Completion shall be subject to the following conditions:

9.12.1 County and such others as County deems necessary will make an inspection of the portion of the Work to be beneficially occupied and prepare a list of items to be completed or corrected in the same manner as required by and subject to the same conditions as set forth in Section 9.11, above.

9.12.2 Beneficial occupancy by County shall not be construed as Acceptance of that portion of the Work which is to be occupied.

9.12.3 Except as otherwise provided in this Section 9.12, beneficial occupancy by County shall not constitute a waiver of rights of the County against Contractor. Notwithstanding anything stated in this Section 9.12 or elsewhere in the Contract Documents to the contrary, beneficial occupancy by County shall not constitute a waiver of rights of County relating to Defective Work in the area beneficially occupied or in any other portion of the Work.

9.12.4 Prior to the County's taking beneficial occupancy, Contractor shall submit to County an itemized list of each piece of equipment located in or serving the area to be occupied stating the date operation of such piece of equipment commenced, together with operating instructions, manuals and other information required by the Contract Documents. Contractor shall provide, in the areas beneficially occupied, on a continual basis, utility services, elevator service, and heating and cooling systems in operable condition commencing at the time of beneficial occupancy and until Final Completion of the entire Work. County shall be responsible, from and after taking occupancy, for utility consumption, regular operation and regular maintenance of such systems or equipment.

9.12.5 County shall pay all normal operating and maintenance costs resulting from its use of equipment in areas beneficially occupied.

9.12.6 County shall pay all utility costs that arise out of its beneficial occupancy.

9.12.7 Contractor shall not be responsible for providing security in areas beneficially occupied.

9.12.8 County shall use its best efforts to prevent its beneficial occupancy from interfering with the conduct of Contractor's remaining Work.

9.12.9 Contractor shall not be required to repair damage caused solely by County's beneficial occupancy.

9.12.10 Contractor shall continue to maintain all insurance required by the Contract Documents in full force and effect.

9.13 FINAL COMPLETION

9.13.1 Contract Time. Contractor shall expeditiously and diligently perform the Work after Substantial Completion, including, without limitation, all items of Work on the Final Completion Punch List that accompanies the Notice of Substantial Completion, so as to achieve Final Completion within the requirements of the Contract Time for Final Completion.

9.13.2 Final Completion Punch List. Contractor shall prepare and submit to County at the time that Contractor requests inspection for Substantial Completion of the entire Work pursuant to Paragraph 9.11.2, above, a draft proposed Final Completion Punch List of items of Work that will be required to be completed or corrected for Final Completion. Items identified in the course of any inspection for Substantial Completion that are required to Finally Complete the Work following Substantial Completion shall be added to the proposed Final Completion Punch List and the revised Final Completion Punch List attached to the Notice of Substantial Completion. If Contractor disputes any of the items included, it shall so note its objection on the Final Completion Punch List. When Contractor considers the Final Completion Punch List to be complete, it shall promptly sign and deliver the Final Completion Punch List to the County. Failure by County, Architect, Inspector of Record or Contractor to include an item on the Final Completion Punch List does not alter the responsibility of Contractor to perform the Work in accordance with the Contract Documents. Items of Work necessary for Final Completion that, for any reason, have been omitted from the Final Completion Punch List shall be added to the Final Completion Punch List upon request by the County made at any time prior to Final Payment and completion of such items shall be made promptly and before the Work will be considered Finally Complete.

9.13.3 Performance of Punch List. Contractor shall proceed promptly and in accordance with the Contract Time to correct and complete the items on the Final Completion Punch List, including, without limitation, any disputed items, and all such items of Work shall be completed by Contractor before the Work will be considered as Finally Complete.

9.13.4 Request for Final Inspection. Contractor shall notify County when Contractor believes that the Work is Finally Complete. County, Inspector of Record, Architect and such others as County deems necessary or appropriate will then make a further inspection to determine whether such Work is Finally Complete. If such inspection, or any subsequent re-inspection required pursuant hereto, discloses any item, whether or not included on the Final Completion Punch List, which must be completed or corrected before Final Completion, Contractor shall, as a condition of Final Completion, complete or correct such item, which shall then be re-inspected to confirm that such Work is Finally Completed. Contractor shall reimburse County, or County may at its option withhold from Contractor's payments, amounts incurred by County to the Inspector of Record, Architect, County Consultants or others whose services, for reasons within the control or responsibility of Contractor or the Subcontractors, are necessary for more than two (2) inspections to determine Final Completion.

9.13.5 Notice of Final Completion. When County determines that the Work is Finally Complete, County will prepare a Notice of Final Completion on the County's form, which shall state the date of Final Completion. Regardless of the date the Notice of Final Completion is issued, Final Completion shall be deemed to have occurred on the date stated in the Notice of Final Completion.

9.13.6 Acceptance by County. Acceptance may be exercised by County, in its sole and absolute discretion, either after Final Completion or, without waiving or releasing Contractor from any of its obligations under the Contract Documents, at any time after Substantial Completion and prior to Final Completion.

9.13.7 Notice of Completion. In addition to issuance of the Notice of Substantial Completion and Notice of Final Completion, County shall have the right, exercised in its sole and absolute discretion, to record a Notice of Completion pursuant to California Civil Code §9204.

9.13.8 No Waiver by County. No inspections conducted pursuant to this Article 9 nor any approvals or certificates issued by County, Architect or Inspector of Record shall be deemed to be a waiver or limitation on County's right to insist on Final Completion and full performance of all other conditions to Final Payment under the Contract Documents prior to issuance of Final Payment to Contractor.

ARTICLE 10 INSPECTIONS, SAFETY AND HAZARDOUS SUBSTANCES

10.1 INSPECTIONS

10.1.1 General. One or more Inspectors of Record, including special inspectors as required, may be employed by County and assigned to the Work. The fees of Inspectors of Record shall be directly paid for by County. IF INSPECTORS OR RECORD ARE ASSIGNED TO THE WORK, THEN NO WORK SHALL BE CARRIED ON EXCEPT UNDER THE INSPECTION, AND WITH THE KNOWLEDGE, OF THE APPROPRIATE INSPECTOR(S) OF RECORD, and Contractor shall be responsible, at Contractor's Own Expense, to remove and replace any Work performed without such inspection by the appropriate Inspector of Record.

10.1.2 Coordination. Contractor shall schedule, arrange, and coordinate its activities with the activities of the County, Inspectors of Record, Architect, County Consultants and others designated by County to inspect or observe the Work. When, in order to comply with the intent of the Contract Documents, inspection or observation must be made at the plant or mill of the manufacturer or fabricator of material or equipment, Contractor shall notify the County, as well as any other persons identified by County as assigned by it to inspect or observe the Work, a sufficient length of time in advance to allow for arrangements to be made for such inspection or observation.

10.1.3 Uncovering of Work. County or an Inspector of Record shall have the right to request that any portion of the Work be uncovered by Contractor for inspection. Except as otherwise provided in Paragraph 10.1.1, above, if such Work is found to be in accordance with the Contract Documents, then all of the additional costs incurred in uncovering, replacing and re-covering the Work shall constitute grounds for Contractor, upon proper notice and request pursuant to Article 7, above, to receive a Contract Adjustment for Compensable Change and if such uncovering, replacing and re-covering of the Work causes a Delay, such Delay shall constitute grounds for Contractor, upon proper and timely notice and request pursuant to Article 8, above, to receive a Contract Adjustment for Compensable Delay. If such Work is not in accordance with the Contract Documents, then such costs of uncovering, replacing and re-covering shall be paid for by Contractor at Contractor's Own Expense and any resulting Delay shall be consider an Unexcused Delay.

10.1.4 Off-Hours Inspections. Contractor shall request approval by County before arranging any inspections either: (1) before 7:00 am or after 3:00 pm on Monday through Friday, or (2) on any Saturday, Sunday, holiday or any other time when Work is not usually in progress. Such request shall be delivered to County at least two (2) working days in advance of the inspection being performed. Approval or disapproval of such request is in the sole and absolute discretion of County. Except where such off-hours inspections are due to a breach by County of an obligation under the Contract Documents, the additional cost (over and above that which would be required for inspections during regular business hours) to County of the inspection shall be paid for by Contractor at Contractor's Own Expense.

10.1.5 Access to the Work. Contractor shall make available for use by County, Inspectors of Record, Architect, County Consultants and others assigned to inspect or observe the Work, any equipment (wheelbarrow, shovel, ladder, man-lift, etc.) that is available or in use on Site, and is required to assist in such inspections or observations.

10.1.6 Right to Stop Work. County shall have the right, but not the obligation, to order Contractor to stop performance of Work. Inspectors of Record shall, only if and to the extent permitted by Applicable Laws or if they are given written authority to do so by County, have the authority, but not the obligation, to stop the Work whenever provisions of Contract Documents are not being complied with, or the conduct of the Work poses a probable risk of harm to persons or property.

10.1.7 No County Duty. No authority of the County, Inspectors of Record, Architect, County Consultants or others designated by County to inspect the Work that is conferred by the Contract Documents nor any decision made by any of them in good faith either to exercise or not exercise such authority, nor any recommendation by any of them, shall give rise to a duty or responsibility on the part of any of them to Contractor or to the Subcontractors, of any Tier.

10.1.8 Contractor Responsibility. Inspections or observations by the County, Inspectors of Record, County Consultants or others shall not in any way relieve Contractor from its sole responsibility for full compliance with all of the terms and conditions of the Contract Documents, nor be construed to lessen, to any degree, Contractor's responsibility for providing efficient and capable superintendence as required herein or for incorporating into the Work only those items of the Work that conform to the Contract Documents.

10.1.9 Reimbursement to County. Without limitation to any other provisions of the Contract Documents, Contractor shall reimburse the County at Contractor's Own Expense, or County shall have the right, at its option, to withhold from payments due to Contractor, costs of inspections, observations or testing and other Losses that are incurred for any of the following reasons: (1) Contractor has failed to execute the Work in accordance with the Contract Documents; (2) materials or equipment have been substituted by Contractor, without prior approval by the County and Architect; (3) Defective Work; or (4) to conduct load testing of certain portions of the structure that have not fully met the requirements of the Contract Documents.

10.2 SAFETY PRECAUTIONS AND PROGRAMS

10.2.1 General Safety Obligation. Contractor shall, notwithstanding the activities of others (such as, but not limited to, the County, Architect, Inspectors of Record, County Consultants or others designated by County to prepare safety recommendations or inspect or observe the Work), be solely responsible, on a twenty-four (24) hours a Day, seven (7) Days a week basis, for initiating, maintaining and supervising all safety precautions and programs on the Site in connection with the preparation, performance, observation or inspection of the Work, including all necessary precautions to protect and safeguard all persons and property from loss, injury, death or damage resulting, directly or indirectly, from the activities of Contractor or the Subcontractors, including, without limitation, all of the following:

- .1 persons in and around the Site, as well as their personal property and vehicles;
- .2 the Work, materials and equipment to be incorporated therein under care, custody or control of Contractor or the Subcontractors, of any Tier, whether in storage on or off the Site, including, without limitation, the provision of temperature control, covering and enclosures necessary to prevent Loss due to adverse weather conditions;
- .3 other property at the Site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, curbs, roadways, structures (including, without limitation, protection from settlement or loss of lateral support) and utilities not designated for removal, relocation or replacement in the course of construction; and
- .4 construction and operations by the County, Architect and Inspectors of Record.

10.2.2 Contractor's Safety Program. Prior to starting the Work, Contractor shall prepare and submit to County a Safety Program, which shall comply with the requirements of the Contract Documents and shall include, at a minimum, guidelines, requirements and procedures for the following: safety management policy; emergency response plan; illness and injury prevention procedures; safety meetings; accident investigation; basic accident causes; safety inspection checklist; fire prevention and control; report forms; and employee safety manual and procedures for achieving compliance with safety requirements of insurers. A copy of the Safety Program shall be maintained on Site at all times and provided to the County upon request. Contractor is solely responsible for monitoring activities at the Site for compliance with the Safety Program and for the enforcement thereof.

10.2.3 Safety Orders. Contractor shall comply with all Applicable Laws, including, without limitation, all safety laws, standards, orders, rules, regulations and building codes, to prevent accidents or injury to persons on, about or adjacent to the Site and to provide a safe and healthful place of employment. Contractor shall, at Contractor's Own Expense, correct any violations of Applicable Laws occurring or threatened by conditions on the Site.

10.2.4 Safety Representative. Contractor shall designate a responsible member of its organization on the Site, who meets the qualification and competency requirements of Applicable Laws and whose sole duty shall be giving safety instructions, prevention of accidents and overall job site safety (including, without limitation, posting of information and other notices regarding safety that are required under occupational safety and health laws and

compliance with reporting and other occupational safety requirements pertaining to the protection of the life, safety and health of the workers). The name of the person so designated shall be reported to the County by Contractor prior to the commencement of any Work on the Site.

10.2.5 Protection. Contractor shall take reasonable precautions to protect the Work and all building materials, equipment, temporary field offices, storage sheds, and other public and private real and personal property that might be affected, directly or indirectly, by Contractor's activities associated with performance of the Work, and shall make good, at Contractor's Own Expense, all Loss due to failure to provide such reasonable precautions.

10.2.6 Safeguards, Disabled Access. Contractor shall erect and maintain, as required by existing conditions and performance of the Work, all necessary safeguards for safety and protection, including, without limitation, safety devices, belts, nets, barriers, safety rails, canopies, danger signs, fire protection, no smoking prohibitions, warnings against hazards, safety regulations postings and notifications to owners and users of adjacent sites and utilities, and shall, as required by Applicable Laws, make provision for access for, and provide assistive devices to, persons with disabilities, including, without limitation, providing safe pathways of travel around areas where construction is being performed so that occupants, visitors, the public and others on the Site with disabilities are afforded reasonably direct and barrier-free access to areas of the Site and Existing Improvements.

10.2.7 Fire, Explosives, Hazardous Substances. Contractor shall take all necessary precautions to guard against and eliminate possible fire hazards. Explosives may be used or stored only when authorized in writing by the County. Explosives shall be handled, used and stored in accordance with Applicable Laws. When use or storage of explosives or other Hazardous Substances or methods of construction involving use of dangerous materials or equipment are necessary for execution of the Work, Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

10.2.8 First Aid. Contractor shall maintain emergency first aid treatment for all workers and other persons on the Project which complies with the Federal Occupational Safety and Health Act of 1970 (29 U.S.C.A. §§651 et seq.) and all other Applicable Laws.

10.2.9 Unsafe Conditions. Contractor shall immediately correct any condition that exists on the Site, or that County, in its reasonable judgment, determines to exist on the Site, that is unsafe or potentially unsafe to persons or property.

10.2.10 Responsibility for Loss. Contractor shall promptly remedy Loss to any property or person caused in whole or in part by the failure of Contractor, the Subcontractors, of any Tier, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable to fully comply with the requirements of this Article 10, except Loss attributable solely to the negligent acts or omissions of the County, Inspectors of Record, Architect, County Consultants or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, and not attributable, in whole or in part, to the negligence, willful misconduct or violation of Applicable Laws by Contractor or a Subcontractor, of any Tier, or the failure by Contractor to comply with the Contract Documents. The foregoing obligations of Contractor are in addition to and not a limitation upon Contractor's indemnity obligations under Section 3.18, above.

10.2.11 Loading, Storage. Contractor shall be responsible for coordinating the storage and staging of materials and equipment on-Site and off-Site and shall not load or store or permit any part of the Work or the Site to be loaded or stored so as to endanger the safety of persons or risk loss or damage to property.

10.2.12 Emergency.

.1 Contractor Responsibility. In an emergency involving safety or protection of persons or property, Contractor shall act immediately, either at County's direction or as otherwise necessary under the circumstances, to prevent any Loss. In such cases, Contractor shall immediately notify County, which notice may be oral, followed within twenty-four (24) hours after occurrence of the incident by written confirmation of the occurrence of such emergency and Contractor's action in response thereto.

.2 County Action. If, in the sole discretion of County, the condition is immediately threatening life or property, County may, with or without notice to Contractor, take whatever immediate action is necessary to

correct the life-threatening condition, and the costs thereof, including, without limitation, any fees or costs of Architect, Inspectors of Record, County Consultants or others to whom County may be liable, shall be borne by Contractor at the Contractor's Own Expense.

10.2.13 No County Responsibility. Nothing set forth in this Section 10.2 or elsewhere in the Contract Documents shall be interpreted as an assumption of any responsibility on the part of County or other persons or entities other than the Contractor and the Subcontractors, to report such conditions to Contractor nor as relieving Contractor of any of its responsibilities under the Contract Documents.

10.2.14 Separate Contractors. With respect to work of a Separate Contractor being performed within an area of the Site that is under the responsibility or control of the Contractor, Contractor shall: (1) provide copies of the Safety Program to the Separate Contractors and advise the Separate Contractors of the areas of the Site to which the Safety Program applies and where compliance with the Safety Program is expected; (2) protect the Separate Contractors' work and workers from Loss due to the actions or inactions of Contractor and the Subcontractors; and (3) notify the Separate Contractor and County of any observed violation by the Separate Contractor of the Safety Program or of any violations by the Separate Contractor of Applicable Laws governing safety on the Site. Nothing herein shall be interpreted as relieving the Separate Contractors from their obligations to comply with the Contractor's Safety Program, as excusing any failure by a Separate Contractor from performing its obligations under its contracts with County or Applicable Laws or as obligating Contractor to directly supervise or enforce the obligations of the Separate Contractors to comply with the requirements of the Safety Program or Applicable Laws relating to safety.

10.3 HAZARDOUS SUBSTANCES, MOLD

10.3.1 Hazardous Substances.

.1 On Site Conditions.

(1) Existing Conditions. In the event Contractor or its Subcontractors encounter materials existing or otherwise present at the Site that are reasonably believed to be Hazardous Substances that have not been rendered harmless, Contractor and Subcontractors shall, except in cases where the removal, encapsulation or abatement of such Hazardous Substances is indicated by the Contract Documents to be part of the Work to be performed by Contractor, immediately stop Work in the area affected and report the condition to County in writing. Contractor and Subcontractors shall continue Work in unaffected areas reasonably believed safe. County shall then promptly arrange for the sampling, testing and profiling of such suspected Hazardous Substances to confirm the nature, quantity or concentration thereof. In the event that such suspected Hazardous Substances are determined not to be Hazardous Substances or to be Hazardous Substances but not of sufficient nature, quantity or concentration to trigger handling and manifesting of the same as a hazardous waste upon disturbance and removal, then Contractor and its Subcontractors shall, without any Contract Adjustment, be obligated to resume the portion of the Work that was suspended and shall proceed to handle and dispose of such materials pursuant to the Contract Documents, taking all reasonable precautions that are applicable under the circumstances. If, alternatively, the suspected Hazardous Substances are determined to be Hazardous Substances of sufficient nature, quantity or concentration to trigger handling and manifesting of the same as hazardous waste upon disturbance and removal, the parties shall determine what, if any, action to take with respect to such Hazardous Substances, whether to resume Work with respect to such Hazardous Substances, taking all reasonable precautions that are applicable under the circumstances, and what, if any, Contract Adjustment is appropriate and mutually agreed in order to account for any increased cost of, or Delay in connection with, handling or disposal of Hazardous Substances not already contemplated and provided for in the Contract Documents.

(2) Contractor Release. Contractor and its Subcontractors shall not cause the discharge, release, emission, spill, storage, treatment or disposal of any Hazardous Substance on or adjacent to the Site, except as required and permitted by the Contract Documents and Applicable Laws in connection with Contractor's performance of an obligation to remove Hazardous Substances as part of the Work agreed to be performed under the Contract Documents or as otherwise required under the provisions of this Subparagraph 10.3.1.1. Should Contractor or its Subcontractors discharge, release, emit, spill, treat, store or dispose of any Hazardous Substance on the Site in violation of the foregoing obligation or otherwise in violation of Applicable Laws, Contractor shall at Contractor's Own Expense and without limitation to County's other rights or remedies for default immediately (a) inform County in writing of such event, (b) advise County with respect to any release reporting or

notification requirement that may apply as a result of such event, (c) assist County in complying with any such reporting or notification requirement as determined by County, and (d) perform any investigation, remediation, removal or other response that is necessary or desirable in order to abate or clean up the condition resulting from such event to the full satisfaction of County and any applicable Governmental Authority. Such Hazardous Substances shall be removed and properly disposed of as soon as they can be accepted at an appropriate disposal facility, and in no event later than sixty (60) Days after such waste is generated, unless a longer time is approved by County.

.2 Remediation by Contractor.

(1) **Application.** The provisions of this Paragraph 10.3.1.2 shall apply only if the Work to be performed by Contractor includes within its scope the removal, abatement, moving, handling, containment, disposal or transport of Hazardous Substances

(2) **Advance Submissions to County.** Before Contractor or any of its Subcontractors moves, removes, or transports Hazardous Substances to a facility for the receipt, treatment, storage or disposal of the Hazardous Substances ("Hazardous Substances Facility"), Contractor shall cause the person or entity who will be moving, removing or transporting the Hazardous Substances to provide to County the following: (a) verification of the Hazardous Substance Facility's or other transporter's licensed status to haul such materials; (b) verification of the Hazardous Substance Facility's licensed status, including a current permit to receive the specific materials to be transported there; (c) certification that the Hazardous Substance Facility is not under enforcement action by the U.S. Environmental Protection Agency ("EPA") or applicable State Governmental Authority or listed on any applicable EPA or applicable State Government Authority list of violating facilities; (d) verification of the Hazardous Substances Facility's EPA Identification Number (if applicable); and (e) original executed letter(s) of indemnity from the Hazardous Substances Facility bearing the Hazardous Substance Facility's letterhead. Contractor further warrants that the selected Hazardous Substance Facility is appropriately licensed and permitted to store, treat and dispose of Hazardous Substances waste in connection with the Work.

(3) **Contractor Responsibility.** Contractor warrants that it is aware of and understands the hazards which are presented to persons, property and the environment in performance of the transportation, storage and disposal of the Hazardous Substances described in the Contract Documents. Contractor and its Subcontractors and agents shall be responsible for the following: (a) processing the application for, and receiving on behalf of the County or appropriate entity, an EPA or state-equivalent generator identification number (if required); (b) preparing manifests and other shipping documents; (c) making all necessary arrangements (after consultation with County) for any off-Site transportation, treatment, storage and disposal of such Hazardous Substances in accordance with Applicable Laws; (d) ensuring the proper and lawful transportation and disposal of such Hazardous Substances, even if such services are performed by other entities under contract with Contractor or its Subcontractors; and (e) taking any necessary actions to ensure such proper transport and disposal in the event of any contingency, such as the rejection of the Hazardous Substances as nonconforming by any waste disposal facility. Contractor shall promptly provide to County copies of all manifests and other shipping documents confirming the receipt and proper disposal of all Hazardous Substances at the Hazardous Substances Facility, even if such services are performed by other entities under contract with Contractor or its Subcontractors.

(4) **Reporting Requirements.** Contractor shall comply with any Hazardous Substances release reporting requirements to Governmental Authorities directly applicable to Contractor. Notice of such reporting must be provided in advance to County or concurrently in the event of an emergency.

(5) **Samples.** Contractor and its Subcontractors shall retain all media samples for the longer of (a) the longest holding period specified in any federal, state or local laboratory analytical procedures or guidance for the analyses performed; or (b) three months for soil samples and thirty (30) Days for water samples. Further storage or transfer of samples will be made at County's expense upon County's written request of Contractor. Contractor shall require by contract that each and every Subcontractor and agent of Contractor or a Subcontractor who performs testing of samples in connection with the Work properly disposes of such samples in accordance with Applicable Laws after completion of testing and notice to County. Regarding any such samples which may remain on-Site, provided County has approved of such on-Site storage in advance, County agrees to pay all costs associated with the storage, transport, and disposal of such samples.

(6) **Verification.** Upon Final Completion of the Work, Contractor shall confirm to County in writing that: (a) all Hazardous Substances specified for removal in the Contract Documents have been removed; and (b) all Hazardous Substances wastes removed from the Site as part of the Work have been disposed of in accordance with this Subparagraph 10.3.1.2 and Applicable Laws in a Hazardous Substances Facility.

10.3.2 **Mold.** Contractor is responsible to immediately notify County in writing if any conditions in the construction materials incorporated or to be incorporated into the Work or present in Existing Improvements are encountered at the Site that Contractor or any Subcontractor knows or, in the exercise of due care of a Contractor and not that of a consultant with special or technical expertise in the subject of Mold, should know indicate the presence of Mold or if untreated are likely to result in the growth of Mold. Contractor shall thereafter take such precautions as are reasonably required to prevent the exposure of persons to such conditions until they have been evaluated. Except as otherwise authorized by the Contract Documents or as are usual and customary according to prevailing standards of the construction industry in the vicinity of the Project, Contractor shall not allow water or moisture to come into contact with materials in Existing Improvements or with materials located at the Site that are incorporated or to be incorporated into the Work and if such contact occurs, the areas affected shall be inspected by Contractor, using appropriate consultants experienced in testing and evaluating Mold, for the presence of Mold and evaluated for the potential of future growth of Mold. All portions thereof that are found to indicate the presence of Mold, or that are found to be in a condition that has the potential for becoming a source of Mold, shall be removed and replaced. Costs incurred by Contractor due to its failure to perform its obligation under this Paragraph 10.3.2 shall be borne by Contractor at Contractor's Own Expense.

10.3.3 **Release of County.** Contractor assumes the risk that its employees or the employees of its Subcontractors, and other persons that they cause or permit to be present on the Site, may be exposed to known or unknown Hazardous Substances or Mold. Under no circumstances shall County be liable for, and Contractor hereby fully and unconditionally releases County and the other Indemnitees from, and agrees to defend and indemnify County and the other Indemnitees on the terms set forth in Section 3.18, above, against, any and all known and unknown Losses resulting from or relating to the exposure of any employee of Contractor or its Subcontractors, or other person that they cause or permit to be present on the Site, to: (1) Hazardous Substances or Mold encountered in connection with or as a result of the performance of the Work, or (2) Hazardous Substances or Mold not necessarily encountered in connection with the performance of the Work, but to which any of them may nevertheless be exposed as a result of their being present on the Site.

10.3.4 **Communications with Governmental Authorities.** Contractor shall provide to County copies of all written communications with Governmental Authorities or others relating to Hazardous Substances or Mold (other than privileged communications); provided, however, that non-disclosure of privileged communications shall not limit Contractor's obligation to otherwise comply with the terms of the Contract Documents, including, without limitation, this Section 10.3.

10.3.5 **Subcontractors.** Contractor shall include provisions in all contracts it enters into with Subcontractors for the Work requiring them to assume toward Contractor and County the same obligations that Contractor assumes toward County under this Section 10.3. Contractor shall require the Subcontractors to ensure that such provisions are included in all contracts they enter into with all lower-Tier Subcontractors.

ARTICLE 11 INSURANCE

11.1 INSURANCE

11.1.1 **Contractor's Insurance Requirements.** Without limiting or diminishing any of the Contractor's obligations to defend, indemnify or hold the County harmless as set forth elsewhere in the Contract Documents, Contractor shall procure and maintain or cause to be maintained throughout the performance of the Work and for the duration of any guarantee or warranty provided under the Contract Documents, at Contractor's Own Expense, the following insurance coverages:

.1 **Workers' Compensation.** If the Contractor has "employees", as defined by the State of California, the Contractor shall provide a policy of statutory Workers' Compensation Insurance (Coverage A) as prescribed by the laws of the State of California. Such policy shall include Employers' Liability (Coverage B) including

Occupational Disease with limits not less than \$1,000,000 per person per accident. Such policy shall be endorsed to waive subrogation in favor of the County and, if applicable, to provide a Borrowed Servant/Alternate Employer Endorsement. Pursuant to §3700 of the California Labor Code, Contractor shall file with the County before commencing the Work the following signed certification:

"I am aware of the provisions of Section 3700 of the Labor Code, which requires 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 shall comply with such provisions before commencing the performance of the Work of this Construction Contract."

.2 Commercial General Liability. Contractor shall provide a policy of Commercial General Liability insurance coverage, including but not limited to, premises liability, contractual liability, products and completed operations liability, personal and advertising injury, and cross liability coverage, covering claims which may arise from or out of Contractor's performance of its obligations hereunder. Such policy shall name the County, its agencies, districts, special districts and departments, and their respective directors, officers, elected or appointed officials, agents, employees and representatives, including, without limitation, the members of the Board of Supervisors, and all other Indemnitees, as "additional insureds" and contain a waiver of subrogation in favor of the County and all other such additional insureds. Such policy's limit of liability shall not be less than \$1,000,000 per occurrence combined single limit. If such policy contains a general aggregate limit, it shall apply separately to the Construction Contract or be no less than two (2) times the occurrence limit.

.3 Vehicle Liability. If vehicles or mobile equipment are used in the performance of the Work or other obligations under the Contract Documents, then Contractor shall provide a policy of liability insurance coverage for all owned, non-owned or hired vehicles so used in an amount not less than \$1,000,000 per occurrence combined single limit. If such policy contains a general aggregate limit, it shall apply separately to the Construction Contract or be no less than two (2) times the occurrence limit. Such policy shall name the County, its agencies, districts, special districts and departments, and their respective directors, officers, elected or appointed officials, agents, employees and representatives, including, without limitation, the members of the Board of Supervisors, and all other Indemnitees, as "additional insureds" and contain a waiver of subrogation in favor of the County and all other such additional insureds.

.4 Property (Physical Damage). Contractor shall provide a policy of all-risk property insurance coverage for the full replacement value of all Contractor's equipment, improvements/alterations, temporary structures, and systems, including without limitation, items owned by others in the Contractor's care, custody or control, used on the Site or other County-owned property, or used in any way connected with the performance of the Work.

.5 Builder's All Risk (Course of Construction) Insurance. The Bid Form utilized by Contractor to prepare its Bid states whether the Contractor shall include Builder's All Risk (Course of Construction) Insurance for the Project. If the Bid Form states that such insurance shall be included by the Bidder in its Bid, then Contractor shall provide a policy of Builder's All Risk (Course of Construction) insurance coverage including (if the Work is located in an earthquake or flood zone or if required on financed or bond financing arrangements) coverage for earthquake and flood, covering the County, Contractor and every Subcontractor, of every Tier, for the entire Project, including property to be used in the construction of the Work while such property is at off-Site storage locations or while in transit or temporary off-Site storage. Such policy shall include, but not be limited to, coverage for fire, collapse, faulty workmanship, debris removal, expediting expense, fire department service charges, valuable papers and records, trees, grass, shrubbery and plants. If scaffolding, falsework and temporary buildings are insured separately by the Contractor or others, evidence of such separate coverage shall be provided to County prior to the start of the Work. Such policy shall be written on a completed value form. Such policy shall also provide coverage for temporary structures (on-Site offices, etc.), fixtures, machinery and equipment being installed as part of the Work. Contractor shall be responsible for any and all deductibles under such policy. Upon request by County, Contractor shall declare all terms, conditions, coverages and limits of such policy. NOTWITHSTANDING THE FOREGOING, COUNTY RETAINS THE RIGHT EXERCISED AT ANY TIME PRIOR TO AWARD TO ELECT TO USE ITS OWN BUILDER'S ALL RISK (COURSE OF CONSTRUCTION) INSURANCE and in the event County so elects to deduct the price for such insurance that is stated in Contractor's Bid, or if not so stated the amount included by Contractor for such insurance in the preparation of the Contractor's Bid, from the Contract Price by means of a Contract Adjustment

pursuant to Change Order or Unilateral Change Order. If the County so provides the All Risk (Course of Construction) insurance for the Project, then Contractor shall assume the cost of any and all applicable policy deductibles (currently, \$50,000 per occurrence) and shall insure its own machinery, equipment, tools, etc. from any loss of any nature whatsoever.

11.1.2 Other Mandatory Insurance Requirements. The Contractor shall comply with the following requirements, which shall be deemed applicable to all carriers and insurance policies provided pursuant to Paragraph 11.1.1, above:

.1 Insurer Rating. Any and all insurance carrier(s) providing insurance coverage under any and all policy(ies) of insurance provided by Contractor pursuant to Paragraph 11.1.1, above, shall be admitted to the State of California and have an A M BEST rating of not less than A: VIII (A:8) (unless such requirements are waived in writing by the County Risk Manager, and if the County's Risk Manager waives such requirement for a particular insurer such waiver is only valid for that specific insurer and only for one policy term);

.2 Self Insured Retentions. Contractor shall advise County in writing the dollar amount of any "self insured retention" maintained by the Contractor that exceeds \$500,000 per occurrence. Each such self insured retention must have the prior written consent of the County Risk Manager before the commencement of any Work or operations or activities relating to the Work. If Contractor is notified that a self insured retention is unacceptable to the County, then at the election of the County, exercised in the County's sole and absolute discretion, by means of the written approval of the County's Risk Manager, the insurance carriers affected shall either: (1) reduce or eliminate such self-insured retention as respects the Construction Contract; or (2) procure a bond, satisfactory to County and approved by County in writing, which guarantees payment of losses and related investigations, claims administration, and defense costs and expenses.

.3 Evidence of Insurance. Contractor shall cause Contractor's insurance carrier(s) to furnish to the County either: (1) properly executed original certificate(s) of insurance and certified original copy(ies) of endorsement(s) effecting the coverage(s) required by this Section 11.1, or (2) if requested to do so orally or in writing by the County Risk Manager, provide original, certified copy(ies) of policy(ies) including all endorsement(s) and all attachment(s) thereto, showing such insurance is in full force and effect. Such certificate(s) and all policies of insurance provided by Contractor pursuant to this Section 11.1 shall contain the covenant of the insurance carrier(s) that thirty (30) Days' written notice shall be given to the County prior to any material modification, cancellation, expiration or reduction in coverage of such insurance. Each certificate of insurance and endorsement shall be signed by an individual expressly authorized by the insurance carrier to do so on the carrier's behalf. Contractor shall, if requested, provide written proof of such authorization. ***Contractor shall not commence any Work or any activities or operations related to the performance of the Work unless and until Contractor has complied with all of the requirements of this Section 11.1.***

.4 Modification, Cancellation, Changes in Limits. A material modification, cancellation, expiration, or reduction in coverage, shall constitute an Event of Contractor Default for which County shall have right, without limitation to its other rights or remedies provided for in the Contract Documents or under Applicable Laws, to terminate this Construction Contract. Such Event of Contractor Default may only be deemed cured if the County receives, prior to the effective date of such material modification, cancellation, expiration or reduction in coverage, properly executed original certificate(s) of insurance and original, certified copy(ies) of policy(ies) and endorsement(s), including all attachment(s) thereto, evidencing that the coverage(s) required by this Section 11.1 is(are) and will continue, without any gap in coverage, in full force and effect in accordance with all of the requirements of this Section 11.1

.5 Primary Coverage. It is understood and agreed to by County and Contractor that the Contractor's insurance coverage(s) provided under this Section 11.1 shall be construed as primary insurance, and the County's insurance and/or deductibles and/or self-insured retentions or self-insured programs shall not be construed as contributory.

.6 Additional Coverages. County reserves the right to modify, adjust, add to and/or increase the types, amounts and terms of any insurance required under this Section 11.1 if the County Risk Manager determines, in the exercise of his/her sole and absolute discretion, that the type, amount or terms of the insurance required by this Section 11.1 has(have) become inadequate or that additional risk or exposure exists (such as, without

limitation, the use of aircraft, watercraft, cranes, etc.) due to: (1) a Change in the Work; (2) the period of time of Contractor's actual performance of the Work continuing for longer than five (5) years from the Date of Commencement, whether due to Contract Adjustment or for any for any other reason; or (3) other circumstances not reasonably foreseeable to County.

.7 Subcontractors. Contractor shall include provisions in its subcontracts requiring each Subcontractor to assume an obligation toward Contractor to furnish insurance that complies with all of the requirements of this Section 11.1 as apply to Contractor's insurance provided to Owner and requiring such Subcontractors to furthermore include provisions in their contracts with lower-Tier Subcontractors likewise requiring such lower Tier Subcontractors assume the same obligations for providing such insurance and for passing through all such obligations to all lower Tier Subcontractors.

.8 Self-Insurance. If approved by County, in the exercise of its sole and absolute discretion, the insurance requirements contained in this Section 11.1 may be met with a program(s) of self-insurance provided that such program has been submitted to County and approved in writing by County prior to commencement of the Work or of any activity or operation related to the performance of the Work.

.9 Notice of Claim. Contractor agrees to notify County of any claim by a third party or any incident or event that may give rise to a claim arising from the performance of the Work.

ARTICLE 12 BONDS

12.1 PERFORMANCE BOND AND PAYMENT BOND

12.1.1 Performance and Payment Bonds. Within ten (10) Days after the issuance of the Notice of Intent to Award and prior to commencing Work, Contractor shall deliver to County a good and sufficient labor and materials payment bond ("Payment Bond") and a good and sufficient performance bond ("Performance Bond"), each in the amount of one hundred percent (100%) of the Contract Price.

12.1.2 Changes. The penal amounts of the Performance Bond and Payment Bond shall be increased on account of Change Orders and Unilateral Change Orders increasing the Contract Price. If requested by County, Contractor shall deliver to County evidence of such increases.

12.1.3 Replacement. Should any bond required hereunder or any Surety on such bond become or be determined by County to be insufficient, it shall be replaced within ten (10) Days by a bond that fully complies with the requirements of this Section 12.1.

12.1.4 Duration. The Payment Bond shall remain in effect until Acceptance of the Work and all Claims of Contractor and the Subcontractors, of any Tier, have been fully and finally resolved. The Performance Bond shall remain in effect and assure faithful performance of all Contractor's obligations under the Contract Documents, including, without limitation, all warranty obligations.

12.1.5 Condition of Payment. No payments to Contractor for Work performed shall be made or due until there has been full compliance with the requirements of this Section 12.1.

12.1.6 Surety Rating. Any Surety company issuing the Payment Bond or Performance Bond shall be, at all times while such bond is in effect, an Admitted Surety. The Surety company issuing the Performance Bond shall additionally have at all such times a current A.M. Best rating of A VIII (A:8) or better.

12.1.7 Premiums. The premiums for the Performance Bond and Payment Bond are included in the Contract Price and shall be paid by Contractor at Contractor's Own Expense.

12.1.8 Obligee. The Performance Bond shall name County as obligee. All performance bonds, if any, purchased by Subcontractors shall name County as a dual obligee with Contractor.

12.1.9 No Exoneration. The Performance Bond and Payment Bond shall contain provisions to the effect that Changes, Change Orders, Unilateral Change Orders, Construction Change Directives, Modifications, Changes and Contract Adjustments shall in no way release or exonerate Contractor or its Surety from their obligations and that notice thereof is waived by the Surety.

12.1.10 Communications. County shall have the right to communicate with Surety with respect to matters that are related to performance of the Work. Contractor shall be provided with a copy of all such communications that are in writing. Such communications shall not create or be interpreted as creating any contractual obligation of County to Surety.

12.1.11 No Limitation. The requirements of this Section 12.1 pertaining to the Performance Bond and the Payment Bond shall be without limitation to any other obligations Contractor may have under Applicable Laws to provide bonding for the benefit of, and to assure payment to the Subcontractors performing the Work for, the Project.

12.1.12 Subcontractor Bonds. Each performance bond, if any, furnished by a first-Tier Subcontractor shall include a provision whereby the Surety consents to the contingent assignment of Contractor's rights under such bond to County as provided in Section 5.3, above.

12.1.13 Claims. By incorporation of the Construction Contract into the Performance Bond issued by Surety, Surety shall be deemed, subject to the other terms of the Performance Bond, to be bound by all of the obligations assumed by Contractor under the Contract Documents, including, without limitation, bound by any determination, resolution, award or judgment entered or made upon any Claim by or against Contractor.

ARTICLE 13 UNCOVERING AND CORRECTION OF THE WORK

13.1 UNCOVERING OF THE WORK

If a portion of the Work is covered contrary to the request or direction of County, Inspector of Record or Architect, or contrary to the requirements of the Contract Documents, it must, if required by the any of them, be uncovered for observation and be re-covered by Contractor at Contractor's Own Expense.

13.2 CORRECTION OF THE WORK

Contractor shall promptly correct Defective Work, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. All such Defective Work shall be either: (1) replaced and all the Work disturbed thereby made good by Contractor at Contractor's Own Expense; or (2) County may exercise its option pursuant to Section 13.4, below, to accept such Work and adjust the Contract Price.

13.3 GUARANTEE TO REPAIR PERIOD

13.3.1 Guarantee To Repair Period. Besides guarantees and warranties required elsewhere in the Contract Documents, Contractor guarantees the Work as provided hereinbelow. The period of this guarantee, termed the "Guarantee To Repair Period," is for one (1) year commencing as follows:

.1 for any portion of the Work that, upon Substantial Completion of the overall Work, is fully and finally complete and usable in all respects independent of other portions of the Work that are not fully and finally complete, on the date of Substantial Completion of such portion of the Work;

.2 for space beneficially occupied or for separate systems fully utilized prior to Substantial Completion, from the first date of such beneficial occupancy or full utilization, as established by an appropriate written notice by County of intent to take beneficial occupancy; or

.3 for all Work other than that described in Subparagraph 13.3.1.1, above or Subparagraph 13.3.1.2, above, from the date of Final Completion of the Work.

13.3.2 Repair by Contractor. Subject to the provisions of Paragraph 13.3.3, below, Contractor shall do the following: (1) correct, repair, replace, remove and restore, to the County's satisfaction, any Defective Work that becomes apparent during the progress of the Work or during the Guarantee To Repair Period; (2) correct, repair, replace, remove and restore, to the County's satisfaction, any other parts of the Work and any other real or personal property which is damaged or destroyed as a result of Defective Work or the correction of Defective Work; and (3) remove from the Site all the Work identified by the County as Defective Work, whether incorporated or not and whether discovered before or after Substantial or Final Completion. Ordinary wear and tear, abuse, or neglect by County or by County employees, its staff, visitors, public or others (except for those under the control or responsibility of Contractor or its Subcontractors) who are authorized or admitted by County to enter, use or occupy the Work, or who enter, use or occupy the Work after Final Completion, are excepted from the foregoing guarantee. All Losses resulting from Defective Work, including, without limitation, all costs of such correction, repair, replacement, removal and restoration, additional testing, inspection and additional service fees and costs of the Inspector of Record, Architect, County Consultants or others whose services may be made necessary thereby as well as any Loss to any other parts of the Work and any other real or personal property which is damaged or destroyed as a result of Defective Work or the correction, repair, replacement, removal or restoration of Defective Work, shall be paid for by Contractor at Contractor's Own Expense. Contractor shall correct, repair, replace, remove and restore Defective Work at such times as are acceptable to the County and in such a manner as to avoid, to the greatest extent practicable, disruption to the activities of the County, its staff, visitors, the public or others. Contractor shall notify the County in writing upon the completion of such correction, repair, replacement, removal and restoration.

13.3.3 Notice by County. Except as otherwise provided in this Paragraph 13.3.3 where immediate corrections are needed due to dangerous conditions or risk of imminent Loss or interruption of County operations, the County will give notice to Contractor of Defective Work observed prior to Final Completion in accordance with the provision of Section 15.1, below, governing the occurrence of an Event of Contractor Default and the Contractor shall proceed to cure such Event of Contractor Default in accordance with the requirements of Section 15.1, below, and Paragraph 13.3.2, above. With respect to Defective Work observed after Final Completion, the County will give notice to Contractor with reasonable promptness and Contractor shall commence the correction, repair, replacement, removal and restoration as required by Paragraph 13.3.2, above, no later than ten (10) Days after mailing of such notice to Contractor and Contractor shall thereupon diligently and continuously prosecute such correction, replacement, repair, or restoration to completion. Notwithstanding the foregoing, if in the County's opinion the presence of Defective Work, whether observed prior to Final Completion or after Final Completion and during the Guarantee To Repair Period, poses a risk or threat: (1) to life, safety or the protection of property; (2) of imminent Loss to the County or to any other person or entity; or (3) of causing an interruption in the operations of the County, then County will have the right, in the exercise of its sole and absolute discretion, to proceed with correction or replacement of the Defective Work without prior notice to Contractor, but in such cases will attempt to notify Contractor as soon as possible of the conditions encountered and the action taken by County. Such action by County without prior notice to Contractor shall not relieve Contractor of its responsibility for the costs of such County action or for any Loss occasioned by the Defective Work or necessitated by the County's action, whether such Loss occurs before or after such County action is implemented or completed.

13.3.4 Correction by County. If Contractor fails to perform any of its obligations under Paragraph 13.3.2, above, to correct, repair, replace, remove or restore then County, or Separate Contractors under the County's direction, may, notwithstanding any other provisions of this Article 13, proceed to do so and all costs associated therewith (including, without limitation, the cost to store any materials removed) shall be the responsibility of and paid by Contractor at Contractor's Own Expense. Such action by County will not relieve Contractor of the guarantees provided in this Article 13 or elsewhere in the Contract Documents. In addition to Contractor's other obligations under Paragraph 13.3.2, above, Contractor shall correct, repair, replace, remove and restore, to the County's satisfaction and at Contractor's Own Expense any other parts of the Work and any other real or personal property that are damaged or destroyed as a result of such actions by County or the Separate Contractors.

13.3.5 Sale. If Contractor does not pay the costs of, or any of the Losses associated with, the correction, repair, replacement, removal or restoration required by the provisions of Paragraph 13.3.2 through Paragraph 13.3.4, above, then within five (5) Days after notice by the County, County may sell any materials or other items of Work removed at auction or at private sale or otherwise dispose of such materials or items and shall account for the net proceeds thereof, after deducting all such costs and Losses, and all costs of sale. If such net proceeds of sale do not cover the Losses for which Contractor is liable to the County, the County may at its option reduce the Contract Price or any payments due to Contractor by such deficiency or recover such deficiency from Contractor.

13.3.6 No Limitation. Contractor's obligations under this Article 13 are in addition to, and not in limitation of, its warranty obligations under Section 3.5, above, and any other obligation, guaranty or warranty of Contractor or any other third party under the Contract Documents. Nothing contained in this Article 13 shall be construed to shorten any periods of limitation with respect to other obligations of Contractor under the Contract Documents that are for longer specified periods. Establishment of the Guarantee To Repair Period in no way limits either Contractor's liability for Defective Work or the time within which proceedings may be commenced to enforce Contractor's obligations under the Contract Documents.

13.4 ACCEPTANCE OF NONCONFORMING WORK

Notwithstanding any other provisions of the Contract Documents to the contrary, the County shall have the option, exercised in its sole and absolute discretion after notice to Contractor, in lieu of requiring that Defective Work be remedied or corrected, to reduce the Contract Price to reflect the reduced value of the performance received by County. Such option shall be exercised solely by written notice to Contractor and shall not be implied from any act or omission by County. If there are no remaining payments of the Contract Price to be made to Contractor, or if the remaining payments and retention are insufficient to cover the amount of the reduction of the Contract Price, Contractor shall promptly pay to County the amount of any such deficiency.

ARTICLE 14 MISCELLANEOUS PROVISIONS

14.1 GOVERNING LAW

The interpretation and enforcement of the Construction Contract and other Contract Documents and of the performance by the parties thereunder shall, notwithstanding application of the principles of conflicts of laws, be governed by the laws of the State of California. The Superior Court for the County of Riverside shall have exclusive jurisdiction and venue over any legal proceedings arising out of or involving the interpretation or enforcement of, or other matters relating to, the Construction Contract, the other Contract Documents or the performance of the parties thereunder.

14.2 TIME OF ESSENCE

All time limits stated in the Contract Documents relative to Contractor's performance of its obligations under the Contract Documents are of the essence.

14.3 SUCCESSORS AND ASSIGNS

The Construction Contract and other Contract Documents shall be binding on successors, assigns and legal representatives of County and Contractor, respectively. Contractor shall not assign, sublet or transfer an interest in or claim under this Construction Contract without advance written approval of County, which approval may be granted or withheld by County in its sole and absolute discretion, and any assignment, subletting or transfer without written approval by County shall be deemed void from its inception. Any assignment, subletting or transfer, whether or not approved by County, will not release Contractor from any of its obligations under the Contract Documents to County. County shall have the right to assign, sublet or transfer its interest in or any claim under the Construction Contract upon written notice to Contractor.

14.4 WRITTEN NOTICE

Any notice from one party to the other or otherwise under the Contract Documents shall be in writing and shall be dated and signed by the party giving such notice or by a duly authorized representative of such party. Any such notice shall be deemed to have been duly served if served in the following manner, and in accordance with Civil Code §8100 et seq.:

14.4.1 Notice to County. If notice is given to County: (1) by personal delivery thereof to County; or (2) by depositing same in United States mail, enclosed in a sealed envelope addressed to County at Economic Development Agency, Riverside Centre, 3403 Tenth Street, 4th Floor, Riverside, CA 92501, and to such other address as set forth in the Bidding Documents as the location for submission of Bids and sent by registered or certified mail with postage

prepaid, or express mail or overnight delivery by an express mail carrier; or (3) by leaving the notice and mailing a copy in the manner provided in Code of Civil Procedure §415.20.

14.4.2 Notice to Contractor. If notice is given to Contractor: (1) by personal delivery thereof to Contractor; or (2) by depositing same in United States mails, enclosed in a sealed envelope addressed to Contractor at its address stated in the Construction Contract, or if none is so stated at the address on the records of the Contractor's State License Board and sent by registered or certified mail with postage prepaid or express mail or overnight delivery by an express mail carrier; or (3) by leaving the notice and mailing a copy in the manner provided in Code of Civil Procedure §415.20.

14.4.3 Notice to Claimant. If notice is given to a claimant as defined in Civil Code §8004: (1) by personal delivery thereof to claimant; or (2) by depositing same in United States mail, enclosed in a sealed envelope addressed to claimant at its address stated in: a preliminary notice, stop payment notice, or claim against a payment bond; or on the records of the Contractor's State License Board; and sent by registered or certified mail with postage prepaid or express mail or overnight delivery by an express mail carrier; or (3) by leaving the notice and mailing a copy in the manner provided in code of Civil Procedure §415.20.

14.4.4 Notice to Surety. If notice is given to the Surety: (1) by personal delivery to the Surety; or (2) by depositing same in United States mail, enclosed in a sealed envelope, addressed to the Surety at the address of the Surety shown in the applicable Performance Bond or Payment Bond, or if none is shown, the address on the records of the Department of Insurance, and sent by registered or certified mail with postage prepaid or express mail or overnight delivery by an express mail carrier; or (3) by leaving the notice and mailing a copy in the manner provided in Code of Civil Procedure §415.20.

14.5 RIGHTS AND REMEDIES

14.5.1 County Rights. Rights and remedies available to the County under the Contract Documents are in addition to and not a limitation of County's rights and remedies otherwise available under other provisions of the Contract Documents or Applicable Laws.

14.5.2 Writing Required. Provisions of the Contract Documents may be waived by County only in writing signed by the Director stating expressly that it is intended as a waiver of specified provisions of the Contract Documents.

14.5.3 Subsequent Breach. A waiver by either party of any breach of any term, covenant, or condition contained in the Contract Documents shall not be deemed to be a waiver of any subsequent breach of the same or any other term, covenant, or condition contained therein whether of the same or a different character.

14.6 NO NUISANCE

Contractor shall not maintain, commit or permit the maintenance or commission of any nuisance in connection with the performance of Work.

14.7 EXTENT OF AGREEMENT

The Contract Documents represent the full and complete understanding of every kind or nature between the parties and all preliminary negotiations and prior representations, proposals and contracts, of whatever kind or nature, are merged herein and superseded hereby. No verbal agreement or implied covenant shall be held to vary the provisions of the Contract Documents. Any modification of this Construction Contract or the other Contract Documents will be effective only by written instrument signed by both County and Contractor and shall, if required by Applicable Laws, be formally approved or ratified by the Board of Supervisors.

14.8 NO THIRD-PARTY RIGHTS

Nothing contained in the Construction Contract or the other Contract Documents is intended to make any person or entity who is not a signatory to this Construction Contract a third-party beneficiary of any right of Contractor (including,

without limitation, any right of Contractor to a benefit derived from, or to the enforcement of, an obligation assumed by County) that is expressly or impliedly created by the terms of the Contract Documents or by operation of Applicable Laws.

14.9 SEVERABILITY

Should any part, term, portion or provision of the Construction Contract or the other Contract Documents, or the application thereof to any party or circumstance, be held to be illegal, invalid or in conflict with Applicable Laws, or otherwise be rendered unenforceable or ineffectual, the validity of the remaining parts, terms, portions or provisions, or the application thereof to any other party or circumstances, shall be deemed severable and the same shall remain enforceable and valid to the fullest extent permitted by Applicable Laws.

14.10 PROVISIONS REQUIRED BY APPLICABLE LAWS

Each and every provision of law and clause required by Applicable Laws to be inserted in the Construction Contract or other Contract Documents shall be deemed to be inserted in the Contract Documents shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted or if inserted and requires correction, then upon request of either party these General Conditions shall forthwith be amended by the parties to the Construction Contract to make such insertion or correction.

14.11 SURVIVAL

All provisions of the Contract Documents that either expressly, or by their nature, require performance or assumption by Contractor of an obligation that extends beyond termination of the Construction Contract or Final Completion of the Work, including, without limitation, Contractor's obligations of, or relating to, indemnification, insurance, ownership of documents, retention and audit of books and records, warranties and guaranties and resolution of Claims shall be deemed to survive either termination of the Construction Contract or Final Completion of the Work.

14.12 FEDERAL GRANTS

In the event of a federal grant or other federal financing participation in the funding of the Project, Contractor shall, as required in connection with, or as a condition to, such federal grant or other federal financing participation, permit access to and grant the right to examine its books covering its services performed and expenses incurred under the Construction Contract or other Contract Documents by the federal agency and comply with all applicable federal agency requirements including, without limitation, those pertaining to work hours, overtime compensation, non-discrimination, and contingent fees.

14.13 PROHIBITED INTERESTS

Contractor agrees not to accept any employment or representation which will, or is likely to, make Contractor "financially interested" (as provided in California Government Code §§1090 and 87100, hereinafter "financially interested") in any decision made by County on any matter in connection with which Contractor has been retained in connection with the Project. Without limitation to the foregoing, transactions and interests prohibited by this Section 14.13 include the following: (1) no official or employee of County who is authorized in such capacity and on behalf of County to negotiate, make, accept, or approve, or to take part in negotiating, making, accepting or approving any architectural, engineering, inspection, construction or material supply contract or any subcontract in connection with construction of the Project, shall become directly or indirectly financially interested in the performance of the Construction Contract or in any part thereof; (2) no officer, employee, architect, attorney, engineer or inspector of or for County who is authorized in such capacity and on behalf of County to exercise any executive, supervisory or other similar functions in connection with Construction Contract or in any part thereof; and (3) Contractor shall receive no compensation hereunder, and shall repay County for any compensation received by Contractor hereunder, should Contractor or any of the Subcontractors aid, abet or knowingly participate in violation of this Section 14.13.

14.14 ASSIGNMENT OF ANTI-TRUST ACTIONS

California Public Contract Code §7103.5(b), which is hereby incorporated by this reference, provides:

"In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, contractor or the subcontractor offers and agrees to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act, (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to Contractor, without further acknowledgement by the parties."

Contractor for itself and all the Subcontractors agrees to assign to County all rights, title and interest in and to all such causes of action Contractor and all the Subcontractors may have in connection with purchases related to or under the Contract Documents. This assignment shall become effective at the time County tenders Final Payment to Contractor, and Contractor shall require assignments from all the Subcontractors to comply herewith.

14.15 NO WAIVER

County's approval, acceptance, use or payment for any or part of Contractor's performance of the Work shall not in any way alter Contractor's obligations, or waive any of County's rights, under Contract Documents.

14.16 CONSENT TO PHOTOGRAPHING

Contractor is advised that County intends, from time to time, to take photographs, videotapes and/or motion pictures of the Work, and workers located on the Site and proximate settings. Contractor consents to the use of Contractor's name and likeness in instructional or training uses, news releases, advertising and/or publicity throughout the world in perpetuity, in all media now known or hereafter invented. Contractor shall include in its contracts with its Subcontractors a consent by the Subcontractor to the use of Subcontractor's name and the likenesses of its employees on the same terms as provided for herein applicable to such consent by Contractor.

ARTICLE 15 DEFAULT, TERMINATION AND SUSPENSION

15.1 COUNTY REMEDIES FOR DEFAULT

15.1.1 Event of Default. Each and any of the following shall be considered an Event of Contractor Default:

.1 Contractor files a petition, or has filed against it a petition, for bankruptcy or is adjudged bankrupt;

.2 Contractor makes a general assignment for the benefit of its creditors;

.3 a receiver is appointed on account of Contractor's insolvency;

.4 Contractor defaults, by failing or refusing to perform any obligation set forth in the Construction Contract, General Conditions or elsewhere in the Contract Documents (including, without limitation, the performance or installation of Defective Work) and thereafter: (1) fails to commence to cure such default within two (2) working days after receipt of written notice of default; (2) if the default can be cured within three (3) Days, Contractor fails or refuses after commencing to cure in accordance with Clause (1) hereof to fully cure such default within three (3) Days after receipt of written notice of default; or (3) if the default cannot be fully cured within three (3) Days, Contractor fails after commencing to cure in accordance with Clause (1) hereof to diligently and continuously prosecute and fully cure such default within ten (10) Days after receipt of such written notice;

.5 Contractor fails or refuses to perform an obligation set forth in the Construction Contract, General Conditions or other Contract Documents that either (1) cannot be cured, or (2) cannot be cured within the 10-Day cure period set forth in Subparagraph 15.1.1.4, above;

.6 a breach of any other agreement between County and Contractor as provided in Paragraph 15.1.9, below; or

.7 if Contractor was previously prequalified as a condition for its bidding the Project pursuant to a Prequalification conducted by County, Contractor's prequalification status has been revoked or cancelled due to any of the following: (1) receipt by County of new information indicating that a statement made in Contractor's Prequalification Submittal (as defined in the Prequalification Documents) was false or misleading; (2) ownership of 50% of more of the stock or assets Contractor has changed; (3) if Contractor is a Project Joint Venture, its Principal Managing Partner (as those terms are defined in the Prequalification Documents) has ceased to function, or fully function, in the capacity of a Principal Managing Partner; or (4) Contractor has failed to comply with the requirements of the Prequalification Documents pertaining to minimum safety Prequalification requirements for Subcontractors.

15.1.2 County's Remedies. Without limitation to the County's other rights or remedies under the Contract Documents or Applicable Laws, if there is an Event of Contractor Default, County shall have the right to exercise any one or more of the following remedies:

.1 **Take Over Work.** County may, without terminating the Construction Contract and without incurring any additional liability or responsibility to Contractor (including, without limitation, any obligation to agree to a Contract Adjustment for any portion of the taken-over or non-taken-over Work), take over and perform, or engage others to perform, all or a portion of the Work.

.2 **Suspend Work.** County may, without terminating the Construction Contract and without incurring any additional liability or responsibility to Contractor (including, without limitation, any obligation to agree to a Contract Adjustment for any portion of the suspended or non-suspended Work), suspend Contractor's performance of all or a portion of the Work for as long a period of time as the County determines, in its sole discretion, is appropriate.

.3 **Termination.** County may, without incurring any additional liability or responsibility to Contractor, terminate the Construction Contract, the Work or any portion thereof.

.4 **Surety.** If there is an Event of Contractor Default pursuant to any of Subparagraphs 15.1.1.1 through 15.1.1.5, above, County may, with or without terminating the Construction Contract and without incurring any additional liability or responsibility to Contractor or Surety (including, without limitation, any obligation to agree to a Contract Adjustment), exercise its rights under the Performance Bond furnished by Contractor by giving Surety ten (10) Days' written notice of demand to perform; provided, however, that if the Surety fails, within seven (7) Days after receipt by Surety of written demand, to deliver to the County written notice of its unconditional intention to perform or does not commence performance of the Work within ten (10) Days from receipt of such notice of demand, the County may, at Contractor's Own Expense and/or the expense of the Surety, and with or without terminating the Construction Contract, proceed to complete the Work by any other means County deems expedient. By executing its Performance Bond incorporating the terms of the Construction Contract, Surety shall be deemed to have agreed, without limitation, to the provisions of this Paragraph 15.1.2 as constituting a binding obligation of Surety under its Performance Bond that shall control over any conflicting provisions set forth in the Performance Bond. Neither delivery by Surety of such written notice of unconditional intention to perform nor its timely performance of the Work in accordance with the terms of the Contract Documents and Performance Bond shall constitute waiver by Surety of any rights it may have under the Performance Bond and Applicable Laws to limit its liability to the penal amount of the Performance Bond.

15.1.3 Contractor Tools, Equipment. Upon County's exercise of one or more of its remedies following an Event of Contractor Default, County shall have the right, but not the obligation, to perform or complete all or any portion of the Work using any means that County may deem expedient, including, without limitation, taking possession and utilization of any or all of the materials, equipment, appliances, tools, plant and other property not owned by Contractor that are on the Site for County's use in performing the Work.

15.1.4 Contractor Obligations. Upon exercise by County of its remedies following an Event of Contractor Default, Contractor shall, unless County directs in writing otherwise, do the following:

.1 immediately discontinue performance of the Work to the extent specified in writing by County;

.2 remove no materials, equipment or tools (other than those owned by Contractor and not necessary for performance of a portion of the Work not terminated or discontinued) from the Site unless directed to do so by County and take all actions necessary or appropriate, or that the County may direct in writing, for the protection and preservation of the Work, any materials, equipment or tools at the Site and any materials or equipment in transit to the Site;

.3 place no further orders or subcontracts for materials, equipment, services or facilities, except as may be necessary for Contractor to continue performance of such portion, if any, of the Work that is not discontinued or terminated by County in its written notice;

.4 provide to the County, in writing, no later than two (2) Days after request by County, a statement listing or providing: (1) all subcontract agreements, purchase orders and contracts that are outstanding, as well as any change orders, amendments and modifications thereto; (2) the status of invoicing, payments and balance owing under each such subcontract agreement, purchase order and contract; (3) the status of performance and any claims asserted under each such subcontract agreement, purchase order and contract; and (4) providing such other information as the County may determine to be necessary in order to decide whether to accept assignment of any such subcontract agreement, purchase order or contract;

.5 promptly following and in accordance with County's written direction: (1) assign to the County or its designee those subcontract agreements, purchase orders or contracts, or portions thereof, that the County elects in writing to accept by assignment; (2) cancel, on the most favorable terms reasonably possible, any subcontract agreement, purchase order or contract, or portion thereof, that the County does not elect to accept by assignment; and (3) if requested by County, settle, with the prior written approval of County of the terms of settlement, outstanding liabilities to Subcontractors with respect to the Work terminated or discontinued;

6. not terminate any insurance required by the Contract Documents;

7. thereafter continue only such performance as may be directed by County;

8. deliver to the County the documents required to delivered pursuant to Paragraph 1.3.6, above; and

9. at the written request and option of County, exercised in its sole discretion, deliver to the County, and transfer title to the County of, any completed items, materials, products, equipment or other unincorporated parts of the Work that have not been previously delivered to the Site.

15.1.5 Accounting and Payment

.1 Full Termination or Discontinuance.

(1) **Further Payment.** In the event an exercise by County of any of its remedies following an Event of Contractor Default results in a termination or discontinuance of the entire Work, then no further payment shall be due to Contractor for the Work until an accounting has been conducted in accordance with this Paragraph 15.1.5.

(2) **Time for Accounting.** Within forty-five (45) Days after Final Completion of the Work by Contractor, Surety, County or others at request of County, an accounting shall be made pursuant to this Paragraph 15.1.5 of the amount due to Contractor or County.

(3) **Payment Amount.** If, based on the accounting conducted pursuant to this Paragraph 15.1.5, the Contractor Amount exceeds the County Amount, then the difference shall be paid by County to Contractor within fifteen (15) Days after demand by Contractor following completion of such accounting. If the County Amount exceeds the Contractor Amount, then the difference shall be paid by Contractor to County within fifteen (15) Days after demand by County following completion of such accounting. Payment by Contractor of the amount due to County pursuant to such accounting shall not be construed as a release of Contractor's obligation to County for, or County's right to recover from Contractor, any Losses, of any kind whatsoever, not part of the calculation of the County Amount (including, without limitation, additional Losses related to circumstances that formed the basis for

calculation of the County Amount) that may be then or thereafter owing to or recoverable by County under Applicable Laws or the Contract Documents.

(4) **Contractor Amount.** The Contractor Amount used as the basis for payment pursuant to the accounting under this Paragraph 15.1.5 shall be calculated as follows:

(a) take a portion of the Contract Price determined by multiplying (i) the Contract Price, by (ii) the County's Good Faith Determination of the percentage of the Work properly performed by Contractor and (A) in permanent place, (B) previously fabricated and delivered to the Site or (C) fabricated and en route for delivery to the Site and delivered to the Site within a reasonable time after Contractor's receipt of such written notice; and

(b) subtract therefrom all amounts previously paid by County to Contractor or to Subcontractors.

(5) **County Amount.** The County Amount used as the basis for payment pursuant to the accounting under this Paragraph 15.1.5 shall be calculated based on the sum of all past, present and future Losses to County resulting or reasonably certain to result, directly or indirectly, from any or all of the following: (a) any negligence, willful misconduct, or Defective Work on the part of Contractor or any Subcontractor; (b) any Event of Contractor Default, whether or not constituting the basis of the County's termination or discontinuance; (c) the County's exercise of its rights and remedies under and in accordance with the Contract Documents or Applicable Laws following the occurrence of an Event of Contractor Default; and (d) the payment by County of amounts to Contractor or any Subcontractor that were not owing to Contractor or that were in excess of the amount to which Contractor was entitled under the Contract Documents.

.2 **Partial Termination or Discontinuance.** In the event an exercise by County of its remedies for an Event of Contractor Default results in a discontinuance or termination of only a portion of the Work, then the Contract Price and Contract Time shall be adjusted under the provisions of Article 7 and Article 8, above, applicable to Deleted Work. Contractor shall thereafter continue to be paid for its performance of the other portions of the Work in accordance with the terms of the Contract Documents, less any amounts that County is entitled to withhold under the terms of the Contract Documents.

.3 **Exclusive Compensation.** Contractor agrees to accept such amounts, if any, as allowed under this Paragraph 15.1.5 as its sole and exclusive compensation in the event of an exercise by County of its remedies permitted by the Contract Documents or Applicable Laws following an Event of Contractor Default.

15.1.6 **Surety.** Without limitation to any of the County's other rights or remedies under a Performance Bond furnished by Contractor, Contract Documents or Applicable Laws, the County has the right to suspend, take over or terminate the performance of the Work by Surety in the event of any of the following: (1) failure of Surety or its contractors to begin the Work within a reasonable time in such manner as to ensure full compliance with the Contract Documents within the Contract Time; (2) abandonment of the Work by Surety or its contractors; (3) if at any time the County makes a Good Faith Determination that the Work is unnecessarily or unreasonably delayed by Surety or its contractors; (4) violation by Surety or its contractors of any terms of the Contract Documents, Performance Bond or Applicable Laws; or (5) failure by Surety or its contractors to follow instructions of the County for performance of the Work or for performance of the Work within the Contract Time. By executing its Performance Bond incorporating the terms of the Construction Contract, Surety shall be deemed to have agreed, without limitation, to the provisions of this Paragraph 15.1.6 as constituting a binding obligation of Surety under its Performance Bond that shall control over any conflicting provisions set forth in the Performance Bond.

15.1.7 **Conversion.** In the event a termination for cause by the County is adjudged by a court or by binding arbitration conducted in accordance with the Contract Documents to have been wrongful, such termination shall be deemed converted to a termination for convenience pursuant to Section 15.3, below, in which case Contractor agrees to accept such amount, if any, as permitted by Paragraph 15.3.3, below, as its sole and exclusive compensation and agrees to waive any right to recovery of any other compensation or Loss, including, but not limited to, loss of anticipated profits, loss of revenue, lost opportunity or other consequential, direct, indirect or incidental damages, of any kind.

15.1.8 Substantial Performance Waived. The legal doctrine that a contractor may recover for substantial performance of a building contract is to have no application to the Construction Contract. Any Event of Contractor Default, whether occurring before or after the Work is Substantially Completed, shall be deemed material and shall give rise to the right of County to exercise its remedies permitted under the Contract Documents or Applicable Laws.

15.1.9 Cross Default. Contractor agrees that a breach of any other agreement between Contractor and County, whether related or unrelated to the Project, that is not cured in accordance with the terms of such other agreement constitutes an Event of Contractor Default under the Construction Contract, thereby entitling County to assert all its rights and remedies hereunder including, but not limited to, a specific right of off set by County against any amounts otherwise payable to Contractor under the Construction Contract or any other agreement between Contractor and County.

15.1.10 Rights Cumulative. All of County's rights and remedies under the Contract Documents are cumulative, and shall be in addition to and not a limitation upon those rights and remedies available under Applicable Laws.

15.1.11 Materiality. Designation in the Contract Documents of certain defaults as "material" shall not be construed as implying that other defaults not so designated are not material nor as limiting County's right to terminate or exercise its other rights or remedies for default to only material defaults.

15.1.12 County Action. No termination or action taken by County after termination shall prejudice any rights or remedies of County provided by Applicable Laws or by the Contract Documents, including, without limitation, the right of County to proceed against Contractor to recover all Losses suffered by reason of Contractor's default.

15.2 SUSPENSION BY COUNTY FOR CONVENIENCE

15.2.1 Suspension Order. Without limitation to the County's rights under Section 15.1, above, County may, at any time, for its convenience and without the occurrence of any Event of Contractor Default, order Contractor, in writing, to suspend, delay or interrupt performance of the Work, in whole or in part. Upon receipt of such an order, Contractor shall comply with its terms and take all reasonable steps to minimize additional costs that are incurred applicable to the portion of the Work suspended, delayed or interrupted by County.

15.2.2 Resumption. If an order issued by the County pursuant to this Section 15.2 is canceled or expires, Contractor shall resume and continue with the previously affected portion of the Work. In such event, Contractor shall be entitled to a Contract Adjustment for additional Allowable Costs necessarily caused by such order and compensation allowed under Section 3.3 of the Construction Contract for Compensable Delay; provided, however, that no such Contract Adjustment shall be made: (1) to the extent that performance either is, was or would have been so suspended, delayed or interrupted by another cause for which Contractor or any of the Subcontractors is responsible or for which Contractor would not be entitled to a Contract Adjustment; (2) to the extent that a Contract Adjustment on account thereof is made or denied under another provision of the Contract Documents; or (3) for any general or specific escalation in prices of the Work.

15.2.3 Limitation. The provisions of this Section 15.2 shall not apply unless a written order is issued by County pursuant to this Section 15.2.

15.3 TERMINATION BY COUNTY FOR CONVENIENCE

15.3.1 Right to Terminate for Convenience. Without limitation upon any of County's other rights or remedies under the Contract Documents or Applicable Laws, County shall have the option, at its sole discretion and without the occurrence of any Event of Contractor Default or any other cause, to terminate the Construction Contract or Work, in whole or in part, for its convenience by giving five (5) Days written notice to Contractor.

15.3.2 Contractor Obligations. Upon receipt of notice of termination for convenience pursuant to this Section 15.3, Contractor shall, unless such notice directs otherwise, comply with all of the provisions of Paragraph 15.1.4, above.

15.3.3 Contractor Compensation. Following a termination for convenience pursuant to this Section 15.3 and within sixty (60) Days after receipt of a complete and timely Application for Payment from Contractor, an accounting shall be conducted in accordance with the process set forth in Paragraph 15.1.5, above. In such event, the amount due to Contractor shall be the Contractor Amount as calculated in the same manner provided for in Paragraph 15.1.5, above, except that there shall be added to the calculation of the Contractor Amount an amount for: (1) the reasonable, actual and direct Allowable Costs incurred and paid by Contractor (and not by Subcontractors) for (a) demobilizing Contractor's facilities from the Site, and (b) Contractor's administering the close out of its participation in the Project for a period of no longer than fifteen (15) Days; plus (2) a markup to Contractor on the Contractor's Allowable Costs incurred under Clause (1) of this Paragraph 15.3.4 that is based on the percentage for Allowable Markup that Contractor is permitted to charge pursuant to Article 7, above, for Compensable Changes involving Extra Work that is Self-Performed Work.

15.3.4 Exclusive Compensation. Contractor agrees to accept the compensation allowed under Paragraph 15.3.3, above, as its sole and exclusive compensation in the event of a termination by County for convenience and waives any claim for Loss related to County's termination for convenience, including, but not limited to, loss of anticipated profits, loss of revenue, lost opportunity, or other consequential, direct, indirect, or incidental damages, of any kind.

15.3.5 Subcontractors. Contractor shall include provisions in all of its subcontracts, purchase orders and other contracts with the Subcontractors permitting termination for convenience by Contractor on terms that are consistent with, and that afford no greater rights of recovery against Contractor for termination than are afforded to Contractor under, this Section 15.3.

15.4 TERMINATION BY CONTRACTOR

15.4.1 Contractor's Remedies. Subject to the provisions of Paragraph 15.4.2, below and Paragraph 15.4.3, below, Contractor's sole right to terminate the Construction Contract shall be its right to terminate, for cause only, upon the occurrence of either of the following:

.1 the entire Work is stopped for one hundred sixty (160) consecutive Days, through no act or fault of Contractor or any of the Subcontractors, of any Tier, or any employee or agent of any of them, due to issuance of an order of a court or other Governmental Authority or due to a declaration of a national emergency making material unavailable; or

.2 the entire Work is suspended by Contractor, in accordance with a proper exercise by Contractor of its rights under Section 9.8, above, for a continuous period of thirty (30) Days.

15.4.2 Notice of Intention to Terminate. If one of the reasons to terminate as described in Paragraph 15.4.1, above, exists, Contractor may, upon thirty (30) Days written notice to County, terminate the Construction Contract and recover from County as its sole and exclusive compensation such sums as are permitted under Paragraph 15.3.3, above.

15.4.3 Continuous Performance. Provided that Contractor is paid undisputed sums due in accordance with the requirements of the Construction Contract, Contractor shall not stop, delay or interrupt continuous performance of the Work by reason of any dispute or disagreement with County, including, without limitation, any disputes or disagreements over payments of money claimed due under the Contract Documents.

15.5 WARRANTIES

All obligations of Contractor and the Subcontractors under the Contract Documents with respect to warranties and guarantees of the Work will continue in force and shall apply, notwithstanding a termination or other discontinuance of the Work by County or Contractor pursuant to an exercise of rights by either under this Article 15, to any portion of the Work that at the time of such termination or discontinuance has been completed or partially completed by Contractor to the point that it is substantially ready (exclusive of any incidental work that may be needed to connect such portion to other Work to other Work or Existing Improvements or to energize such portion of the Work for operation) for use or occupancy by County.

ARTICLE 16 NON-DISCRIMINATION

16.1 NON-DISCRIMINATION IN SERVICES

16.1.1 Contractor must, in accordance with Applicable Laws, not discriminate in the provision of services hereunder because of race, color, religion, national origin, ancestry, sex, age, sexual orientation, marital status, AIDS or disability. For the purpose of this Section 16.1, discrimination in the provision of services may include, but is not limited to the following:

- .1** denying any person any service or benefit or the availability of a facility;
- .2** providing any service or benefit to any person which is not equivalent to, or is in a non-equivalent manner or at a non-equivalent time from, that provided to others;
- .3** subjecting any person to segregation or separate treatment in any manner related to the receipt of any service;
- .4** restricting any person in any way in the enjoyment of any advantage or privilege enjoyed by others receiving any service or benefit; or
- .5** treating any person differently from others in determining admission, enrollment, eligibility, membership, or any other requirement or condition which persons must meet in order to be provided any service or benefit.

16.1.2 Contractor shall ensure that services are provided without regard to race, color, religion, national origin, ancestry, sex, age, sexual orientation, marital status, AIDS or disability.

16.1.3 Contractor shall establish and maintain written procedures under which any person applying for, performing or receiving services hereunder, may seek resolution from Contractor of a complaint with respect to any alleged discrimination. Such persons shall be advised by Contractor of these procedures. A copy of such procedures shall be posted by Contractor in a conspicuous place, available and open to the public, in each of Contractor's facilities where services are provided hereunder.

16.2 NON-DISCRIMINATION IN EMPLOYMENT

Contractor must, in accordance with Applicable Laws, not discriminate against any employee or applicant for employment because of race, color, religion, national origin, ancestry, sex, age, sexual orientation, marital status, AIDS or disability. Without limitation to any other provisions of this Section 16.2, in the performance of the obligations under the Contract Documents, Contractor and the Subcontractors shall comply with all applicable provisions of the California Fair Employment Practices Act (California Government Code §§12940-48) and the applicable equal employment provisions of the Civil Rights Act of 1964 (42 U.S.C. §§200e - 217), whichever is more restrictive. Contractor and the Subcontractors shall ensure that qualified applicants are employed and that employees are treated during employment without regard to race, color, religion, national origin, ancestry, sex, age, sexual orientation, marital status, AIDS or disability, in accordance with requirements of Applicable Laws. Such shall include, but not be limited to, the following:

- .1** employment, promotion, demotion, transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation; or
- .2** selection for training, including apprenticeship.

16.2.1 Contractor agrees to post in conspicuous places in each of Contractor's facilities providing services hereunder, available and open to employees and applicants for employment, notices setting forth the provisions of this Section 16.2.

16.2.2 Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, national origin, ancestry, sex, age, sexual orientation, marital status, AIDS or disability, in accordance with requirements of Applicable Laws.

16.2.3 Contractor shall send to each labor union, or workers' representative with which it has a collective bargaining agreement or other contract or understanding, a notice advising the labor union or the workers' representative of Contractor's commitments under this Section 16.2.

16.2.4 Contractor certifies and agrees that it will deal with the Subcontractors, bidders and vendors without regard to race, color, religion, national origin, ancestry, sex, age, sexual orientation, marital status, AIDS or disability, in accordance with the requirements of Applicable Laws.

16.2.5 In accordance with Applicable Laws, Contractor shall allow duly authorized representatives of the County, State, and Federal government access to its employment records during regular business hours in order to verify compliance with the provisions of this Section 16.2. Contractor shall provide such other information and records as such representatives may require in order to verify compliance with the provisions of this Section 16.2.

16.2.6 If County finds that any of the provisions of this Section 16.2 have been violated by Contractor or any of the Subcontractors, such violation shall constitute a material breach of the Construction Contract for which County may cancel, terminate or suspend the Construction Contract. While County reserves the right to determine independently that the anti-discrimination provisions of the Construction Contract have been violated, a determination by the California Fair Employment and Housing Commission or the Federal Equal Employment Opportunity Commission that Contractor or the Subcontractor has violated State or Federal anti-discrimination laws shall constitute a finding by County that Contractor or the Subcontractor has violated the provisions of this Section 16.2.

16.2.7 Contractor hereby agrees that it will comply with §504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794) and similar Applicable Laws relating to employment of or access to persons with disabilities, all requirements imposed by applicable Federal Regulations, and all guidelines and interpretations issued pursuant thereto, to the end that no qualified disabled person shall, on the basis of disability, be excluded from participation in, be denied the benefits of, or otherwise be subjected to discrimination under any program or activity of Contractor receiving Federal Financial Assistance.

END OF GENERAL CONDITIONS

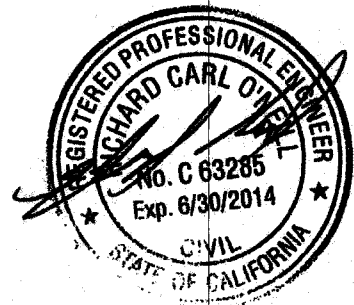
**STANDARD SITE SPECIFICATIONS AND
PROJECT SPECIAL PROVISIONS FOR**

**RIVERSIDE COUNTY
COMMUNICATION CENTER
PARKING LOT EXPANSION**

DATE: OCTOBER 23, 2012

PREPARED BY:

**RICK ENGINEERING COMPANY
1770 IOWA AVE, SUITE 100
RIVERSIDE, CA 92507
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RIVERSIDE COUNTY COMMUNICATION CENTER PARKING LOT EXPANSION
Riverside County, CA

September 2012

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SECTION 02010 – PROJECT SURVEY AND LAYOUT

PART 1 - GENERAL

1.01 SUMMARY

- A. The Contractor shall provide construction stakeout sufficient to construct the proposed improvement in accordance with the approved construction plans.
- B. All stakeout services shall be completed under the direct supervision of a Professional Land Surveyor licensed in the State of California.
- C. The Owner shall provide the following prior to the commencement of any stake-out services:
 - 1. Construction site drawings and associated electronic files.
 - 2. Benchmark: MWD disk stamped "mp 109 1994" in an under sidewalk drain deck along the north curb of Alessandro Blvd, 150 feet east of cannon road in the deck of an undersidewalk drain outlet. Point id: AB5577 Elevation: 1605.700 NAVD 88
 - 3. Copies of a horizontal control sheet including a minimum of 3 horizontal control points plus the benchmark described above.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. The Contractor/Surveyor shall supply all stakeout materials.

2.02 EQUIPMENT

- B. The Contractor/Surveyor shall supply all equipment necessary to accomplish the work.

PART 3 - EXECUTION

3.01 PERFORMANCE STANDARDS

- A. Roadway/Parking Lot Layout
 - 1. Grade stakes shall be located at centerline of roadway at a maximum of 50 foot intervals, including point of curvature, point on curve, point of tangency, and points of vertical curves. Grades shall be at finished grade.
- B. Fence Stakes
 - 1. Stakes will be provided at each angle point along the new fence.
- C. Lighting Stakes
 - 1. A stake shall be provided at each proposed light.

3.02 CONTRACTOR VERIFICATION

- A. Contractor to be responsible for protecting all existing utilities in place, including all utilities shown on plan and those not shown on the plan.
- B. Contractor will field verify the utility location, size and invert elevations at points of connection in area of conflict, prior to construction and protect them from damage.
- C. Notify Owner if it is necessary to destroy or remove control points and/or benchmarks due to construction. Contractor shall be responsible for the protection of benchmarks, including the cost for relocation as required.
- D. Advise Owner of any discrepancies between plans and field layout and obtain owners approval for any design revisions prior to commencing construction in the area of discrepancies.

3.03 QUALITY ASSURANCE

- A. The survey crew shall discuss all layout procedures with the Contractor's supervisor prior to commencing work.

- B. A survey crew daily report detailing that day's work, shall be completed and signed by the Contractor's supervisor at the end of that day's layout.
- C. Copies of sketches, cut sheets, etc. shall be provided to the Contractor by the beginning of the next workday.
- D. All costs related to re-staking due to construction or Contractors' work resulting in destruction or movement of stakes, shall be paid for by the Contractor and at no additional expense to the Owner.

END OF SECTION 02010

SECTION 02020 – EROSION CONTROL

PART 1 - GENERAL

1.01 INTENT

- A. The main concern associated with erosion on a construction site is the movement of soil off the site and its impact on water quality. It is the Owner's intent that the Contractor install and maintain sufficient erosion control practices to retain sediment within the boundaries of the site in addition to complying with regulatory authorities having jurisdiction and local erosion and sedimentation control laws and ordinances. All erosion control methods and devices used shall conform to the latest requirements imposed by federal, state and local authorities. The Contractor shall be responsible for repair of any damage caused and shall be financially responsible for any penalties imposed.
- B. If an erosion control drawing has been included in the drawings prepared by the engineer, it shall be the Contractor's responsibility to review the drawing prior to implementation. If an erosion control drawing is not included in the project documents, the Contractor shall submit, for approval, a proposed sequence of operations and a compatible method of preventing erosion.

1.02 SUMMARY

- A. Work under this Section shall include but not be limited to, installation and maintenance of both temporary and permanent soil erosion control measures, slope protection and stabilization measures, protection of all surface water and property both on and off site. This Work shall include all labor, materials, and equipment necessary to meet all applicable requirements and as specified in the contract documents.

1.03 REFERENCE STANDARDS

- A. All applicable standards and requirements of all regulatory authorities having jurisdiction, including local soil conservation agencies

1.04 QUALITY ASSURANCE

- A. Soil erosion and sediment control measures shall be implemented in accordance with the requirements and procedures outlined in this specification, contract drawings and documents, the state standards or guidelines for soil erosion and sediment control, and all regulatory authorities having jurisdiction. Where conflicts between requirements exist, the more restrictive rules shall govern.
- B. The Contractor shall provide all temporary control measures shown on the drawings (if available), or as directed by the Owner, Owner's representative, or soil conservation district for the duration of the contract. Erosion control drawings (if available) are intended to be a guide to address the stages of Work shown. Additional erosion control measures may be necessary and shall be implemented to address intermediary stages of Work and any conditions that may develop during construction at no cost to the Owner.
- C. Temporary control provisions shall be coordinated with permanent erosion control features to the extent practical to assure economical, effective and continuous erosion control throughout the construction and post-construction period.
- D. Soil erosion and sediment control measures shall at all times be satisfactory to the Owner's Representative. Owner's Representative will inform the Contractor of unsatisfactory construction procedures and operations if observed. If the unsatisfactory construction procedures and operations are not responded to and corrected within 48 hours, the Owner's Representative may suspend the performance of any or all other construction until the unsatisfactory condition has been corrected. Such suspension shall not be the basis of any claim by the Contractor for additional compensation nor for an extension of time to complete the

Work. Any complaints, fines, etc. relating to ineffective erosion control, shall be the sole responsibility of the Contractor.

- E. The Contractor shall inspect all soil erosion and sediment control measures at least at the beginning and end of each day to ascertain that all devices are functioning properly during construction. Maintenance of all soil erosion and sediment control measures on the project site shall be the responsibility of the Contractor until the project is 100% complete, and until the permanent soil erosion controls are established and in proper working condition.
- F. The Contractor shall protect adjacent properties and watercourses from soil erosion and sediment damage throughout construction.

1.05 SEQUENCE OF CONSTRUCTION

- A. The approved construction sequence, as permitted/approved shall be adhered to during the execution of Work under this Section. All soil erosion and sediment control measures shall be installed in accordance with the phasing sequence shown on the contract documents.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Contractor shall provide all materials necessary to perform the Work.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Review the soil erosion and sediment control drawings (if available) as they apply to current site conditions. Any deviation from the drawings must be submitted for approval to the site engineer in writing at least 72 hours prior to commencing that Work.
- B. Notify county or municipal soil conservation district, in writing least 72 hours prior to initial land disturbance.
- C. All soil sediment and erosion control devices shall be in place prior to any earthwork construction, in their proper sequence, and maintained until permanent protection is established.
- D. The limit of the area of any earthwork operations in progress shall be commensurate with the Contractor's capability and progress in keeping the finished grading, mulching, seeding and other such permanent control measures current and in accordance with the accepted schedule for construction phasing. Should seasonal limitations make such coordination unrealistic, as determined by the Owner's Representative, temporary erosion control measures shall be provided immediately by the Contractor at no expense to the Owner.
- E. Temporary erosion control measures shall be used to correct conditions, which develop during construction that are needed prior to installation of permanent control features, or that are temporarily needed to control erosion that develops during normal construction practices, but are not associated with permanent control features on the project.
- F. The Contractor shall incorporate all permanent erosion control features into the project at the earliest practical time to minimize the need for temporary controls.
- G. Any disturbed or stockpiled areas that will be left exposed more than 30 days, and not subject to construction traffic, shall immediately receive a temporary seeding. Mulch/straw shall be used if the season prevents the establishment of a temporary cover. Disturbed areas shall be limed and fertilized prior to temporary seeding.
- H. Permanent vegetation shall be established as specified on all exposed areas within 10 days after final grading, unless otherwise directed by the Owner and permitted by appropriate regulations. Mulch as necessary for seed protection and establishment. Lime and fertilize seedbed prior to permanent seeding.

- I. Cut slopes shall be permanently seeded and mulched as the excavation proceeds to the extent considered desirable and practical. Slopes that erode easily shall be temporarily seeded and mulched.
- J. All storm drainage outlets must be stabilized, as specified, before the discharge points become operational. Equip all inlets with inlet protection immediately upon construction.
- K. Discharge from de-watering operations for the excavated areas shall not be directed to surface waters without first properly removing the suspended sediment through filtration and/or settlement. The Contractor shall obtain any required permits associated with dewatering activities.
- L. The quantity of silt fence to be installed will be affected by the actual conditions that occur during the construction of the project. Silt fence shall be installed at locations shown on the drawings and any additional locations necessary for proper erosion control. The Contractor shall maintain the silt fence until the project is accepted and shall remove and dispose of the silt fence and silt accumulations.
- M. Soil erosion and sediment control shall include but not be limited to the approved measures. The Contractor shall be responsible for providing all additional measures that may be necessary to accomplish the intent of the drawings.
- N. Comply with all other requirements of authorities having jurisdiction.

END OF SECTION 02020

SECTION 02221 - DEMOLITION

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes demolition and removal of site improvements.

1.02 REFERENCED SECTIONS

- A. Section 02230 – Site Clearing

1.03 REFERENCE STANDARDS

- A. Code of Federal Regulations
 - 1. 40 CFR 82
- B. National Fire Protection Association
 - 1. NFPA 241 – Standard for Safeguarding

1.04 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or recycled.
- B. Remove and Salvage: Detach items from existing construction and deliver them to the Owner.
- C. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or recycled.

1.05 MATERIALS OWNERSHIP

- A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to the Owner that may be encountered during demolition shall remain on Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to the Owner.

1.06 SUBMITTALS (WHEN REQUIRED BY OWNER OR AUTHORITIES HAVING JURISDICTION)

A. POLLUTION CONTROL MEASURES

- 1. The Contractor shall prepare and deliver approved pollution and dust control drawings to the Owner with the bid package prior to the commencement of demolition work. The drawing shall outline proposed methods for dust control, noise control and maintaining the surrounding streets and buildings in a clean condition for both demolition operations and during debris removal. The drawing shall be subject to the review and approval by the Owner and the Owner's engineer.

B. DEMOLITION SCHEDULE/PLAN

- 1. The Contractor shall submit for review and approval a detailed schedule for all proposed Work to the Owner with the bid package that conforms to the construction sequencing dictated in Section 02020 – Erosion Control. This submission shall include a calendarized schedule of the proposed Work and a step-by-step description of all aspects pertaining to demolition and protection of existing structures and adjacent community, labor forces, demolition rubble management and disposal and other items of Work required under this contract.

C. UTILITY SCHEDULE

- 1. The Contractor shall submit to the Owner and all affected utility/service companies, a proposed schedule of coordination for all necessary utility/service shut-offs, capping and continuation of utility services as required with the bid package. The Contractor shall

provide the Owner with written confirmation for all utility or service companies serving the site that service has been terminated prior to capping, abandoning or removal of any such utility and prior to commencement of demolition.

2. The Contractor shall, during his work, accurately locate and mark on the contract drawing the location of all underground utility and services that have been capped and those that are to remain within the contract limit area.

D. PERMITS

1. Prior to submission of bid package, the Contractor shall investigate all permit requirements and include any cost for these requirements in the bid. Prior to the commencement of Work, the Contractor shall obtain all necessary permits and certificates associated with utility disconnections, storage tank removals and demolition work from any and all Federal, State or regulatory authorities having jurisdiction over this project. The Contractor shall incur all fees and other requirements associated with obtaining the required permits and certificates. Copies of all permits executed and certificates obtained shall be sent to the Owner. Costs associated with permit and certificate procurements, including drawing and permit preparation, revisions, filing fees, etc., shall be borne by the Contractor.
2. Including but not limited to, the following permits and certificates may be applicable and shall be obtained by the Contractor prior to applying for and obtaining general demolition permits.
 - a. Plumbing permit for water shut-off;
 - b. Water shut-off certificate (original);
 - c. Letters from Electric and Gas Utility companies and gas meter shut-offs.

1.07 QUALITY ASSURANCE

A. PREDEMOLITION CONFERENCE

1. The Contractor along with all designated subcontractors shall schedule a predemolition meeting to be attended by the Owner and other necessary attendees prior to commencement of Work.

B. PREDEMOLITION VIDEO

1. The Contractor shall conduct and provide to the Owner a video of site conditions prior to initiation of demolition activities. The video shall provide documentation of the condition of on-site and adjacent building structures and on-site surface features including, but not limited to curbs, sidewalks, landscapes, pavements, utility structures at grade, light poles, telephone poles, fences, bollards, etc.

1.08 PROJECT CONDITIONS

- A. The Contractor shall maintain access to existing walkways, exits, and other adjacent occupied or used facilities. The Contractor shall not close or obstruct walkways, exits, or other occupied or used facilities without written permission from authorities having jurisdiction.
- B. Owner assumes no responsibility for site improvements to be demolished.
 1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work, unless otherwise identified in the Contract Documents.
 2. If materials suspected of containing hazardous materials are encountered, other than those identified in the Contract Documents, do not disturb; immediately notify Owner.

1.09 COORDINATION

- A. Arrange demolition schedule so as not to interfere with Owner's or other existing on-site operations per the construction sequencing described in Section 02020 – Erosion Control.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. The contractor shall supply all materials as required.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Survey existing conditions and correlate with requirements indicated to determine extent of demolition required.
- B. Review project record documents of existing construction. Owner does not guarantee that existing conditions are same as those indicated in project record documents.
- C. Inventory and record the condition of items to be removed and salvaged.
- D. Verify that all hazardous materials and petroleum products have been removed before proceeding with demolition operations.

3.02 PROTECTION

- A. Existing Facilities: Protect adjacent walkways, loading docks, building entries, and other building facilities during demolition operations.
- B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during demolition. When permitted by Owner items may be removed to a suitable, protected storage location during demolition and reinstalled in their original locations after demolition operations are complete.
- C. Existing Utilities: Maintain utility services indicated to remain and protect them against damage during demolition operations.
 - 1. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction; and,
 - 2. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to authorities having jurisdiction.
 - a. Provide at least 72 hours' notice to Owner if shutdown of service is required during changeover.
- D. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated.
 - 1. Protect existing site improvements, appurtenances, and landscaping to remain;
 - 2. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain;
 - 3. Provide protection to ensure safe passage of people around demolition area and to and from occupied portions of adjacent buildings and structures; and,
 - 4. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to demolition operations.

3.03 DEMOLITION, GENERAL

- A. General: Demolish as indicated on drawings as specifically identified on construction drawings of site improvements completely.
- B. Site Access and Temporary Controls: Conduct debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction; and,

2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.

3.04 EXPLOSIVE DEMOLITION

- A. Explosives: Use of explosives is not permitted at this site for demolition purposes.

3.05 SITE RESTORATION

- A. Below-Grade Areas: Rough grade below-grade areas ready for further excavation or new construction.
- B. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.

3.06 REPAIRS

- A. General: Promptly repair damage to adjacent construction caused by demolition operations.
- B. Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
- C. Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

3.07 DISPOSAL OF DEMOLISHED MATERIALS

- A. General:

1. The Contractor shall remove from the site all debris, rubbish and other materials resulting from demolition and shall safely and legally dispose of all these items in accordance with applicable Federal, State and regulatory authority having jurisdiction codes and regulations. All recycling must be done in accordance with all currently applicable State waste flow regulations, and regulatory authority having jurisdiction requirements. Burning of any demolished materials on-site shall not be permitted. Any recycling of demolition debris shall be approved by the Owner.

- B. Submittals:

1. Written permission shall be obtained from the property Owner on whose property the demolition material is to be disposed. Copies of the agreements shall be furnished to the Owner prior to removing any materials from the demolition site; and,
2. Hazardous Materials: The Contractor shall provide manifests or disposal tickets for each truck that exits and enters the site with demolition and construction material to the Owner's engineer and the Owner. These manifests shall indicate the following:
 - a. Date and time of departure from the demolition site;
 - b. Type of material carted off-site or type of material brought on-site;
 - c. Amount of material brought on-site;
 - d. Amount of material (in tons);
 - e. Truck ID number;
 - f. Final destination of the excess material;
 - g. Date and time of entry to the demolition material;
 - h. Date and time of entry to the demolition site;
 - i. Amount of material; and,
 - j. Source of material brought on-site.

3.08 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing before demolition operations began.

END OF SECTION 02221

SECTION 02230 – SITE CLEARING

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes the following:
 - 1. Protecting existing trees and vegetation that are to remain;
 - 2. Clearing and grubbing; and,
 - 3. Topsoil stripping.

1.02 REFERENCED SECTIONS

- 1. Section 02010 – Project Survey and Layout
- 2. Section 02020 – Erosion Control
- 3. Section 02300 – Earthwork

1.03 MATERIALS OWNERSHIP

- A. Except for materials indicated to be stockpiled or to remain on Owner's property, cleared materials shall become the Contractor's property and shall be removed from the site.

1.04 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
- B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.
- C. Notify utility locator service for area where Project is located prior to site clearing.
- D. All benchmarks and monuments shall be protected during construction. If disturbed or destroyed, they shall be replaced in original position by a licensed surveyor at the Contractor's expense.
- E. Protect areas outside limits of disturbance from encroachment by construction personnel or equipment, regardless of property ownership. Access shall be by specific, written permission or easement only.

PART 2 - PRODUCTS

- A. Contractor shall provide and use all necessary equipment and materials to perform work.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Provide erosion control measures in accordance with Section 02020 - Erosion Control, prior to any construction activity.
- B. Locate and clearly flag trees and vegetation to remain or to be relocated. All trees and vegetation to remain shall be barricaded and protected during the construction process per Article 3.02 of this Section.
- C. Limit of clearing is to be staked in accordance with Section 02010 - Project Survey and Layout, and verified by Owner prior to removal of any trees.
- D. All trees and shrubs not designated to remain within the area to be graded, whether shown or not on the drawings, shall be cut and the removal of stumps shall comply with Article 3.03 of this Section. Burning on site is not permitted, unless otherwise approved by the Owner and authorities having jurisdiction.

3.02 TREE PROTECTION

- A. Protect existing site improvements to remain, from damage during construction. Restore damaged improvements to their original condition, as acceptable to the Owner.
- B. Erect and maintain a temporary fence around drip line of individual trees or around perimeter drip line of groups of trees to remain. Remove fence when construction is complete.
- C. Do not excavate within drip line of trees, unless otherwise indicated.
- D. Where excavation for new construction is required within drip line of trees, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.
- E. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by the Owner.

3.03 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, grass, and other vegetation within the limit of disturbance to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots, unless otherwise specified. In areas outside the construction limits where the depth of fill exceeds 8 feet in height, unless otherwise directed by the Owner, sound trees shall be cut at a height of not more than 6 inches above natural ground.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
 - 1. Place fill material in horizontal layers and compact each layer to a density equal to adjacent original ground as in accordance with Section 02300 - Earthwork.

3.04 TOPSOIL STRIPPING

- A. Strip topsoil to full depth encountered in areas indicated to be graded in a manner to prevent intermingling with underlying subsoil or waste materials.
- B. Stockpile sufficient topsoil material to facilitate seeding and landscaping. Stockpile away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water.
- C. Protect soil stockpiles as per Section 02020 - Erosion Control.

3.05 DISPOSAL

- A. Disposal: Remove surplus soil material, surplus rock, unsuitable or excess topsoil, obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them off Owner's property at Contractor's expense.

END OF SECTION 02230

SECTION 02300 - EARTHWORK

PART 1 - GENERAL

1.01 SUMMARY

- A. Cutting, proofrolling, filling and grading to required lines, dimensions, contours and elevations for proposed improvements as shown and implied on the drawings and required by these specifications.
- B. Scarifying, compaction, moisture content conditioning and control, and removal of unsuitable material to ensure proper preparation of areas for the proposed improvements.
- C. Undertake any special construction procedures for the site recommended in the geotechnical report for preparation of pavement areas.

1.02 REFERENCED SECTIONS

- A. Section 02010 - Project Survey and Layout

1.03 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM) - latest edition
 - 1. D 422 Method for Particle Size Analysis of Soils
 - 2. D 698 Test for Moisture - Density Relations of Soils - Standard Proctor Method
 - 3. D 1557 Test for Moisture-Density Relations of Soils Using 10-lb (4.5 Kg) Hammer and 18-inch (457 mm) Drop (Modified Proctor)
 - 4. D 2216 Laboratory Determination of Moisture content of Soil
 - 5. D 2487 Classification of Soils for Engineering Purposes
 - 6. D 2922 Tests for Density of Soil and Soil- Aggregate in Place by Nuclear Methods (Shallow Depth)
 - 7. D 3017 Test for Water Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
 - 8. D 4318 Test for Plastic Limit, Liquid Limit, and Plasticity Index of Soils
 - 9. D 4429 Standard Test Method for CBR (California Bearing Ratio) of Soils in Place
- B. American Association of State Highway and Transportation Officials (AASHTO) - latest edition
 - 1. T 88 Particle Size Analysis of Soils
- C. Manual of Accident Prevention in Construction by the Associated General Contractor's of America, Inc. 1978 edition.

1.04 QUALITY ASSURANCE

- A. All costs related to reinspection, due to failures, shall be paid for by the Contractor at no additional expense to Owner. The Owner reserves the right to direct any inspection that is deemed necessary. Contractor shall provide free access to site for inspection activities.

1.05 SUBMITTALS

- A. Within 10 days after award of the contract, the Contractor shall submit to the Owner, with his bid package, a schedule detailing the sequence, and time of completion of all phases of Work under this Section.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. On-site fill

1. On-site materials for use as fill shall consist of excavated soil from other portions of the site;
 2. The Contractor shall use the on-site soil judiciously to facilitate the construction schedule including the use of the most readily compactable soil for fill within 2 feet of pavement subgrade;
 3. Topsoil shall not be utilized as engineered fill;
 4. No material greater than 2 inches in its largest dimension may be utilized within 18 inches of proposed subgrade for all areas;
 5. No material greater than 2 inches in its largest dimension may be utilized as backfill for storm drainage or utility trenches.
 6. Prior to placement, on-site material to be used as fill shall not contain:
 - a. Debris other than crushed concrete and brick meeting the above requirements.
 - b. Timber or railroad ties.
 - c. Other deleterious materials such as steel rails, rebar, trash, etc.
 - d. Hazardous material - Unsuitable and deleterious materials and debris shall be disposed of off-site in accordance with all applicable regulations.
- B. Off-site imported fill
1. If necessary, off-site fill shall be obtained and provided by the Contractor;
 2. Fill shall be clean, well graded granular soil which is non-expansive and non-collapsible and shall have less than 20% by weight passing the #200 sieve. The portion passing the #200 shall be non-plastic. Fill with less fines (less than #200) may be required on project specific basis and as required by geotechnical engineer. Likewise, fill with more than 20% fines may be acceptable on a project specific basis or as identified in the geotechnical engineering study;
 3. Imported fill shall be free of all hazardous substances. Certification of compliance and, if requested, test results substantiating compliance shall be furnished to the Owner and geotechnical engineer by the Contractor not less than one week prior to its intended use.
 4. The Owner reserves the right to test off-site fill material for conformance with these specifications; and,
 5. The Contractor shall be responsible for all permits and regulatory requirements associated with offsite borrow sources.
- C. Rock is defined as follows:
1. General Excavation - Any material that cannot be excavated with a single-toothed ripper drawn by a crawler tractor having a minimum draw bar pull rated at not less than 71,000 lbs. (Caterpillar D9N or equivalent), and occupying an original volume of at least 2 cubic yards or more; and,
 2. Trench Excavation - Any material that cannot be excavated with a backhoe having a break out force rated at not less than 44,000 lbs. (Caterpillar 235D or equivalent), and occupying an original volume of at least 2 cubic yards.
- D. Any bituminous concrete on the site shall be milled/removed prior to placing any fill and shall be reused only onsite immediately below the pavement stone base course.

2.02 EQUIPMENT

- A. Compactor for mass earthwork shall be minimum 5 ton static drum weight vibratory roller or 5 ton static drum weight sheep footed compactor as appropriate for the type of soil material at the site or other compactor approved by the geotechnical engineer.
- B. Compactor for trenches and where access or maneuverability is limited use, a double drum walk behind roller or vibratory plate compactor or "jumping jack" tampers.

PART 3 - EXECUTION

3.01 GENERAL

- A. Prior to bidding of all Work within this Section, the Contractor shall become thoroughly familiar with the site, site conditions, and all portions of the Work falling within this Section.
- B. Locate and identify existing utilities that are to remain and protect them from damage.
- C. Notify utility companies to allow removal and/or relocation of any utilities that are in conflict with the proposed improvements.
- D. Protect fences, structures, sidewalks, paving, curbs, etc to remain from equipment and vehicular traffic.
- E. Protect benchmarks, property corners and all other survey monuments from damage or displacement. If a marker needs to be removed/relocated it shall be referenced by a licensed land surveyor and replaced, as necessary, by the same at no additional cost to the Owner.
- F. Remove from the site at contractor's expense, material encountered in grading operations that, in opinion of Owner or geotechnical engineer, is unsuitable or undesirable for backfilling in pavement or areas as per Article 2.01.
- G. Identify required lines, levels, contours and datum to bring site grades to the proposed subgrade conditions inferred from the drawings.
- H. Do not perform any Work associated with this Section prior to completion of all required inspections, tests and approvals.
- I. When performing grading operations during periods of prolonged wet or dry weather, provide adequate measures for surface drainage and ground water control, and moisture control of soils (i.e., wetting or drying, scarify and discing) so as to place and compact the soil within the moisture content range a few percentage points of its optimum water content. Any disturbed areas should be proofrolled at the end of each day.
- J. Sloping, shoring, bracing, and fencing shall be installed in accordance with Federal OSHA requirements as well as the requirements of all regulatory authorities having jurisdiction.
- K. Allow no debris to accumulate on-site. Haul debris away from the site and dispose of at no cost to the Owner.
- L. Export of excess material, including rock not suitable for fills shall be removed from the site at the Contractor's expense. Prior to exporting of material, Contractor shall;
 - 1. Provide the parcel and ownership information of the proposed export site along with a notarized permission form from the property owner acknowledging the quantity and type of material to be placed on the property;
 - 2. Provide a haul route from the construction site to the export site;
 - 3. Comply with any and all Federal, State, or local agency requirements for the export and stockpile of materials.

3.02 EXCAVATION, FILL, AND SUBGRADE PREPARATION

A. GENERAL

- 1. Structures include curbs, mechanical and electrical appurtenances or other man-made stationary features constructed above or below the ground surface;
- 2. The Contractor shall cut or fill to the proposed subgrade elevations based on finished grades and the pavement thicknesses as shown on the drawings. Subgrade elevations shall be constructed to within 0 to minus ½ inch of the proposed grades specified.

B. EXCAVATION

- 1. Excavate organic soils from improvement area. Excavated on-site organic soils, which are unsuitable for onsite fill may be used in landscaped areas. Otherwise this material shall be disposed of off-site at contractor's expense;
- 2. Excavated on-site soils, which meet the requirements of the geotechnical engineering study may be used as onsite fill; and,

3. Unsuitable material, such as wood and any other deleterious materials determined to be unsuitable by the geotechnical engineer for use as on-site fill, shall be disposed of off site at contractor's expense.
- C. **SUBGRADE PREPARATION FOR FILL**
 1. The Contractor shall remove existing lawn and top soil in improvement areas prior to placement of any fill; and,
 2. All existing grades below improvement areas shall be proofrolled and compacted per Article 3.02.
- D. **FILL PLACEMENT**
 1. No fill material shall be placed in areas of standing water, in areas of frozen or thawing ground, or in areas that have not been approved by the geotechnical engineer;
 2. No fill materials shall be placed during unfavorable weather conditions. When Work is interrupted by heavy rains, fill operations shall not be resumed until all saturated surficial soils are returned to a satisfactory moisture content as determined by the geotechnical engineer;
 3. Fill lift surfaces shall be made smooth and free from ruts or indentations at the end of any work day when precipitation is forecast to prevent saturation of surficial fill material. Fill surfaces shall be graded to drain and sealed with a smooth drum roller at the completion of each work day;
 4. The fill shall be placed in uniform loose lifts not exceeding 12 inches and compacted in systemic method to achieve at least 6 passes of the compactor. Larger lift thickness, but no greater than 2 feet shall be permitted if broken rock is utilized and placed at least 6 feet below of finished grade;
 5. Shot rock may be utilized as engineered fill as approved by the geotechnical engineer;
 6. Each lift shall be compacted to the minimum densities listed in Table 3.02 as appropriate for the project and as specified in the geotechnical engineering study;
 7. The Contractor shall adjust the water content by aeration or adding water to achieve the required density. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to achieve proper compaction and facilitate the construction schedule;
 8. Wet, saturated material shall be air dried as necessary to achieve the field densities specified in this Section. Removal and replacement shall not occur without prior approval or Owner. Removal and replacement shall be used if necessary to facilitate the construction schedule;
 9. Remove areas of finished subgrade found to have insufficient compaction density of depth necessary and replace with suitable compacted fill as approved by the Owner or Owners representative. Surface of subgrade after compaction shall be hard, uniform, smooth, stable, and true to grade and cross-section; and,
 10. Fill placed on slopes greater than 1 vertical to 3 horizontal shall have each lift benched onto the slope at least 3 feet.

END OF SECTION 02300

SECTION 02400 – AGGREGATE BASE COURSE

PART 1 - GENERAL

1.01 SUMMARY

- A. The Work covered by this Section consists of the construction of a stone base composed of an approved aggregate material, placed on parking lot areas, outside storage areas, driveways, beneath proposed building slabs, and/or other identified areas, shaped to conform to the grades as provided on the contract drawings. The Contractor shall comply with any provisions of all applicable state and local regulatory authorities having jurisdiction, codes, regulations, and standards.

1.02 REFERENCED SECTIONS

- A. Section 02300 - Earthwork

1.03 REFERENCE STANDARDS

- A. American Association of State Highway and Transportation Officials (AASHTO)
 - 1. T-88 - Particle Size Analysis of Soils
- B. American Society of Testing and Materials (ASTM)
 - 1. D-1557 - Modified Proctor Test

1.04 QUALITY ASSURANCE

- A. The Contractor shall provide at least one supervisory person who shall be present at all times during execution of the Work and who is thoroughly familiar with the type of work being performed and its best methods for completion. This person shall have the authority to act on behalf of the Contractor.
- B. A geotechnical engineer familiar with the requirements of the geotechnical engineering study, selected and paid by the Owner, will be retained to perform construction inspection on site based on density testing, visual observation, and judgment. This inspection will not relieve the Contractor from his responsibility to complete the Work in accordance with the drawings and specifications.
- C. One compaction test per 2000 square yards for each lift, shall be performed within the pavement area.

1.05 SUBMITTALS

- A. At least two weeks in advance of imported aggregate use, the Contractor shall submit the following laboratory test data, in conformance with the specified DOT aggregate materials:
 - 1. Particle Size Analysis: AASHTO T-88; and,
 - 2. Density: Modified Proctor Test (ASTM D1557).
- B. Submit the name of aggregate base course material supplier and specific type and source of each material, including relevant DOT compaction or specifications. Any change in source or aggregate base course type throughout the job requires approval of the Owner and the geotechnical engineer.
- C. The geotechnical engineer shall prepare field reports that indicate compaction test location, elevation data, testing results and acceptability. The Owner and Contractor shall be provided with copies of reports within 24 hours of time test was performed.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. All aggregate materials shall meet the state department of transportation specifications for gradation and other specified material requirements.
- B. Recycled Concrete Aggregate may be approved by the Owner for use in lieu of aggregate base course under the following conditions:
 - 1. The gradation, plasticity, soundness, and abrasion requirements of the material shall meet the governing department of transportation specifications for recycled concrete aggregate or aggregate base course;
 - 2. The Contractor shall be required to submit a sieve analyses to the Owner for review and approval;
 - 3. The recycled concrete aggregate shall not contain foreign materials, which includes reinforcing steel, wood, and other friable material; and,
 - 4. The Contractor shall obtain all required permits and report recycled materials usage as required by the regulatory authorities having jurisdiction.
- C. The Owner reserves the right to not approve usage of recycled concrete aggregate, for both pavement base structure and building pad construction. Approval shall be granted on a project by project basis.

PART 3 - EXECUTION

3.01 PLACEMENT OF AGGREGATE BASE MATERIAL

- A. The subgrade shall be shaped to conform to the grades shown on the drawings and shall meet the requirements of Article 3.06, Section 02300 - Earthwork.
- B. The aggregate material shall be placed in a uniform loose depth and without segregation. All stone base delivered to the site shall be spread and rolled by the end of each day.
- C. Where the required compacted thickness of base is 8 inches or less, the base material may be spread and compacted in one layer. Where the required compacted thickness is more than 8 inches, the base material shall be spread and compacted in 2 or more approximately equal layers. The minimum compacted thickness of any one layer shall be 4 inches.
- D. Each layer of material shall have been sampled, tested, compacted, and approved prior to placing succeeding layers of base material or pavement.
- E. No base material shall be placed on frozen subgrade or base.
- F. The Contractor shall utilize methods of handling, hauling, and placing which will minimize segregation and contamination. Aggregate, which is contaminated with foreign materials, shall be removed and replaced by the Contractor at no additional cost to the Owner.

3.02 COMPACTION OF AGGREGATE BASE MATERIAL

- A. Each stone layer/lift shall be maintained to the required cross section during compaction and each layer be compacted to the required density prior to placing the next layer.
- B. Each layer of the base shall be compacted to a density equal to at least 98% of Modified Proctor density (ASTM D1557).
- C. The base material shall be compacted at a moisture content which is approximately that required to produce the maximum density, as determined by the geotechnical engineer and approved by the Owner. The Contractor shall dry or add moisture to the material when required to provide a uniformly compacted and acceptable base.
- D. The final layer of base material shall be shaped to conform to the lines, grades, and typical sections as shown on the drawings or established by the engineer. When completed, the base course shall be smooth, hard, dense, unyielding, and well bonded.

- E. All stoned areas shall be proofrolled in accordance with Article 3.06, Section 02300 - Earthwork.

3.03 QUALITY CONTROL

- A. The thickness of the base course shall be within a tolerance of plus or minus 1/2 inch of the required thickness as specified on the drawings for pavement areas.
- B. The elevation of the base course shall be within a tolerance of +/- 0.10 feet.
- C. The Contractor shall be required to repair any areas, which do not comply with this specification. Any repairs required shall be at no cost to the Owner, and shall meet these specifications.

END OF SECTION 02400

SECTION 02585 - SIGNALIZATION

PART 1 - GENERAL

1.01 SUMMARY

- A. Installation of inductive loops and detectors shall be furnished, funded, and installed by the contractor. The Developer shall also be responsible to arrange for and fund all utility relocations required for the installation of the improvements.

1.02 REFERENCE STANDARDS

- A. MVP-D-TEK Vehicle Loop Detector

1.03 DETECTORS

- A. Detectors shall conform to the provisions in these Specifications.
- B. All sensor units shall have delay timers adjustable from zero to a minimum of 30 seconds and extensions timers adjustable from zero to a minimum of 7 seconds. If a vehicle departs the area of detection prior to expiration of the assigned delay period, the timer shall reset and no call shall be placed upon the controller.
- C. Inductive loop detectors shall be furnished and installed, in accordance with the detection specified on the plans and the Specifications. Loop wire shall be Type 2. Loop sealant shall be the elastomeric sealant type, unless otherwise directed by the Engineer. Loop conductors and sealant shall be installed on the same day the loop slots are cut. Loop detector lead in cable shall be by Type B. Detectors shall be MVP-D-TEK Vehicle Loop Detector (or approved equivalent) unless otherwise shown on the construction plan or as directed by the Engineer. The conduit shall extend 18 inches (460 mm) into the paved roadway. All loops shall be tested sequentially by three methods: by megger (measured by megaohms), by resistance (in ohms), by inductance (measured in microhenries).

PART 2 - INDUCTIVE LOOP DETECTORS GENERAL

- A. Inductive loop detector includes a completely installed loop or group of loops, in the roadway and a lead-in cable installed and connected inside a controller cabinet.

2.01 PRODUCTS

- A. Conductor for each inductive loop detector must be continuous, unspliced, and one of the following:

Conductor Options for Inductive Loop Detector

Option	Specifications
Type 1 loop wire	Type RHW-USE neoprene-jacketed or Type USE crosslinked polyethylene insulated, No. 12, stranded copper wire with a 40 mils minimum thickness at any point.
Type 2 loop wire	Type THWN or Type XHHW, No. 14, stranded copper wire in a plastic tubing. Plastic tubing must be polyethylene or vinyl, rated for use at 105 °C, and resistant to oil and gasoline. Outside diameter of tubing must be 0.27 inch maximum with a wall thickness of 0.028 inch minimum.

- B. Conductor for loop detector lead-in cable must be two no. 16, 19 by 29, stranded, tinned copper wires, comply with the calculated cross sectional area of ASTM B 286, Table 1, and be one of the following:

Conductor Options for Loop Detector Lead-In Cable

Option	Specifications
Type B lead-in cable	Insulated with 20 mils of HDPE. Conductors must be twisted together with at least 2 turns per foot and the twisted pair must be protected with a copper or aluminum polyester shield. A no. 20, minimum, copper drain wire must be connected to equipment ground within cabinet. Cable must have a HDPE or high-density polypropylene outer jacket with a nominal thickness of 32 mils. Include an amorphous interior moisture penetration barrier of nonhydroscopic polyethylene or polypropylene fillers.
Type C lead-in cable	Comply with International Municipal Signal Association (IMSA) Specification No. 50-2. A No. 20, minimum, copper drain wire must be connected to equipment ground within cabinet.

C. Sealant for filling slots must be one of the following:

1. Elastomeric
 - a. Polyurethane material that will within stated shelf life cure only in the presence of moisture. Sealant must be suitable for use in both HMA and concrete pavement.
 - b. The cured sealant must have the performance characteristics shown in the following table:

PERFORMANCE CHARACTERISTICS OF CURED SEALANT

Characteristic	ASTM	Requirement
Hardness (indentation) at 25 °C and 50% relative humidity. (Type A, Model 1700 only)	D 2240 Rex.	65-85
Tensile strength: Pulled at 508 mm per minute	D 412 Die C	3.45 MPa, min
Elongation: Pulled at 508 mm per minute	D 412 Die C	400%, min
Flex at -40 °C: 0.6-mm free film bend (180°) over 13-mm mandrel		No cracks
Weathering resistance: Weatherometer 350 h, cured 7 days at 25 °C @ 50% relative humidity	D 822	Slight chalking
Salt spray resistance: 28 days at 38 °C with 5% NaCl, Die C & pulled at 508 mm per minute	B 117	3.45 MPa, minimum tensile 400%, minimum elongation
Dielectric constant over a temperature range of -30 °C to 50 °C	D 150	Less than 25% change

2. Asphaltic emulsion
 - a. Comply with the Department's Specification 8040-41A-15. Use for filling slots in HMA pavement of a maximum of 5/8 inch in width. Do not use where the slope causes the material to run from the slot. Material must not be thinned beyond the manufacturer's instructions. Place material when the air temperature is at least 7 degrees C.
3. Hot-melt rubberized asphalt
 - a. Hot-Melt Rubberized Asphalt Sealant
 - b. Hot-melt rubberized asphalt must be:

- c. In solid form at room temperature and fluid at application temperature of 190 to 205 degrees C. Fumes must be nontoxic.
- d. Suitable for use in both HMA and concrete pavement.
- e. Melted in a jacketed, double-boiler type melting unit. Temperature of heat transfer medium must not exceed 245 degrees C.
- f. Applied with a pressure feed applicator or a pour pot when the pavement surface temperature is greater than 4 degrees C.
- g. Packaged in containers clearly marked "Detector Loop Sealant" and specifying manufacturer's batch and lot number.
- h. The cured sealant must have the performance characteristics shown in the following table:

PERFORMANCE CHARACTERISTICS OF CURED SEALANT

Characteristic	ASTM	Requirement
Cone penetration, 25 °C, 150 g, 5 s	D 5329, Sec. 6	3.5 mm, max
Flow, 60 °C	D 5329, Sec. 8	5 mm, max
Resilience, 25 °C	D 5329, Sec. 12	25%, min
Softening point	D 36	82 °C, min
Ductility, 25 °C, 50 mm/min	D 113	300 mm, min
Flash point, COC, °C	D 92	288 °C, min
Viscosity, Brookfield thermosel, No. 27 Spindle, 20 rpm, 190 °C	D 150	Less than 25% change

- 4. Epoxy sealant for inductive loops
 - a. Use for repair work on existing spalls, cracks, and other deformations in and around saw cuts housing inductor loops and leads. The maximum gel time of the combined components must be 30 minutes when tested under California Test 434. The rapid cure allows minimum traffic delay when tested under California Test 434.

PART 3 - EXECUTION

3.01 INSTALLATION DETAILS

- A. Install loop conductors without splices and end in the nearest pull box. Seal the open end of the cable jacket or tubing similar to splicing requirements to prevent water from entering. Do not make final splices between loops and lead-in cable until loop operations under actual traffic conditions are authorized.
- B. Splice all loop conductors for each direction of travel, in the same pull box, to a detector lead-in cable that runs from the pull box adjacent to the loop detector to a sensor unit mounted in the controller cabinet.
- C. End all loop conductors in a pull box or a terminal strip in the cabinet.
- D. Identify and band conductors for inductive loop installations. Band conductors, in pairs in the pull box adjacent to the loops and near the end of the conductors in the cabinet. Bands must comply with section 86-2.09.
- E. If HMA surfacing is to be placed, install loop conductors before placing the uppermost layer of HMA. Install conductors in a compacted layer of HMA immediately below the uppermost layer. Install conductors as shown, except fill the slot with a sealant flush to the surface.
- F. When cutting loops:

1. Saw cuts must be cleaned with compressed air to remove all excess moisture and debris. For repairing damaged saw cuts, all loose spalled material must be cleaned away from the saw cut, chipping back to sound asphalt concrete or concrete pavement, and cleaned away from the loop wires.
2. Residue from slot cutting activities must not be allowed to flow across shoulders or lanes occupied by traffic and must be removed from the pavement surface before residue flows off. Dispose of residue from slot cutting activities.
3. Before setting, surplus sealant must be removed from the adjacent road surface without using solvents.

END OF SECTION 02585

SECTION 02630 - STORM DRAINAGE

PART 1 - GENERAL

1.01 SUMMARY

- A. Work under this Section shall consist of providing all labor, plant facilities, materials, tools, equipment, shop drawings and supervision necessary and required to install all of the storm drainage facilities, including piping, fittings, structures, bedding, and backfilling, as specified in accordance with the contract documents.

1.02 REFERENCED SECTIONS

- A. Section 02305 – Trench Excavation and Backfill

1.03 REFERENCE STANDARDS

- A. American Society For Testing and Materials (ASTM)
 - 1. A185 – Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
 - 2. A615 – Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
 - 3. A760 – Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains
 - 4. C76 – Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
 - 5. C443 – Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
 - 6. C478 – Precast Reinforced Concrete Manhole Sections
 - 7. D1056 – Flexible Cellular Materials-Sponge or Expanded Rubber
 - 8. D3034 – Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
 - 9. D3212 – Joints for Drain and Sewer Plastic Pipes Using Elastomeric Seals
 - 10. F477 – Elastomeric Seals (Gaskets) for Joining Plastic Pipe
 - 11. F794 – Poly(Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter
 - 12. F949 – Poly(Vinyl Chloride) (PVC) Corrugated Sewer Pipe With a Smooth Interior and Fittings
- B. American Association of State Highway and Transportation Officials (AASHTO)
 - 1. M252 – Corrugated Polyethylene Drainage Tubing
 - 2. M294 – Corrugated Polyethylene Pipe. 12 to 14 inch Diameter
 - 3. M36 – Metallic Coated Corrugated Steel Culverts and Underdrains
 - 4. M190 – Bituminous Coated Corrugated Metal Culvert Pipe and Pipe Arches
 - 5. M199 – Standard Specification for Precast Reinforced Concrete Manhole Sections
- C. American Water Works Association (AWWA)
 - 1. C110 – Ductile-Iron and Gray-Iron Fittings, 3 in through 48 in (75 mm through 1200 mm), for Water and Other Liquids (revision of ANSI/AWWA C110/A21.10-93)
 - 2. C111 – Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
 - 3. C151 – Ductile-Iron Pipe, Centrifugally Cast, for Water
- D. American Concrete Institute (ACI)
 - 1. 301 – Structural Concrete for Buildings, Specifications for
 - 2. 318 – Building Code Requirements for Structural Plain Concrete

1.04 PROJECT RECORD DOCUMENTS

- A. Accurately record as-built locations of pipe runs, connections, catch basins, cleanouts, top elevations and invert elevations.
- B. Identify and describe unexpected variations of subsurface conditions and location of any utilities encountered.

1.05 QUALITY ASSURANCE

- A. All costs related to reinspection due to failures shall be paid for by the Contractor at no additional expense to the Owner. Owner reserves the right to direct any inspection that is deemed necessary. Contractor shall provide free access to site for inspection activities.

1.06 SUBMITTALS

- A. The Contractor and the Subcontractor shall execute the Conformance Submittal(s) at the end of this Section.

PART 2 - PRODUCTS

2.01 PIPES AND FITTINGS

- A. High Density Polyethylene Pipe (HDPE) Smooth Interior

1. Pipe and fittings shall conform to AASHTO M252 and M294;
2. Rubber gaskets shall meet the requirements of ASTM F477 with joints conforming to ASTM D3212; and,
3. Maximum permitted diameter of 24 inches and only where indicated on drawings; and,
4. Approved pipe and manufactures:

ADS – “N12” Pipe Advance Drainage Systems, Inc. 3300 Riverside Drive Columbus, Ohio 43221 (614) 457-3051	“SURELOK” Pipe Hancor, Inc. 401 Olive Street Findlay, OH 45840 (888) 367-7473	“Type S Lok-Tite” Pipe Lane Enterprises, Inc. 34 Strohm Road Shippensburg, PA 17257 (717) 532-5959
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- B. Aluminized Steel Type 2 Corrugated Steel Pipe

1. May be used in lieu of BCCMP and shall meet the requirements of Article 2.01(C) noted above; and,
2. Externally Ribbed Pipe, such as “ULTRA FLO” shall not be permitted.

- C. Polyvinyl Chloride Pipe (PVC)

1. Pipe shall meet the requirements of ASTM D3034, SDR 35; and,
2. Rubber gaskets shall meet the requirements of ASTM F477 with joints conforming to ASTM D3212.

2.02 DRAINAGE STRUCTURES, DROP INLETS, CATCH BASINS, MANHOLES AND JUNCTION BOXES (All structures shall be precast unless otherwise approved by the Owner)

- A. Structures:

1. Precast Concrete Drainage Structures;
 - a. Heavy-duty traffic rated (H20) conforming to ASTM C478.
2. Cast In-Place Concrete Drainage Structures; and,
 - a. Heavy-duty traffic rated in accordance with Department of Transportation Standards.
3. Solid concrete Brick Masonry.
 - a. Heavy-duty traffic rated in accordance with Department of Transportation Standards.

- B. Cast Iron Frames, Hoods, and Grates per details shown on drawings.

- C. Steps

1. Shall meet the requirements of AASHTO M199 for design, materials, and dimensions;
2. Built into the walls of all structures over 3 feet 6 inches in height; and,
3. Steps shall be 16 inches on center with lowest step being no more than 16 inches from the bottom.

- D. Reinforcement
 - 1. Deformed reinforcing bars, grade 40 or 60, meeting the requirements of ASTM A615; and,
 - 2. Wire fabric meeting the requirements of ASTM A185.

2.03 CLEANOUTS & PLUGS

- A. Installation shall be in accordance with the details and at locations shown on the drawings.
- B. All Cleanouts shall have a 2 feet x 2 feet x 8 inches thick concrete apron.

2.04 MISCELLANEOUS

- A. Headwall: Construction shall be in accordance with details shown on drawings and concrete shall be in accordance with Article 2.06 of this Section.
- B. Stone Rip-Rap: Meeting State DOT specifications, and unless noted otherwise on drawings, shall have a median stone size of 6 inches. All rip-rap shall be installed over a medium weight non-woven geotextile fabric.
- C. Concrete Lined Channels: Construction shall be in accordance with details shown on drawings and concrete shall be in accordance with Article 2.06 of this Section.

2.05 BEDDING AND BACKFILL MATERIAL

- A. Where the foundation material is found to be of poor supporting value or of rock, the Owner may make minor adjustments in the location of the pipe to provide a more suitable foundation. Where this is not practical, the foundation shall be conditioned by removing the existing foundation material by undercutting to the depth as directed by the geotechnical engineer and backfilling with either a suitable local material secured from unclassified excavation or borrow excavation at the nearest accessible location along the project, or foundation conditioning material consisting of crushed stone or gravel or a combination of sand and crushed stone or gravel approved by geotechnical engineer as being suitable for the purpose intended. The selection of the type of backfill material to be used for foundation conditioning will be made by the geotechnical engineer.

2.06 CONCRETE

- A. No concrete or masonry shall be placed when the temperature is below 40 degrees Fahrenheit, or when indications are for lower temperatures within 24 hours, unless protection of concrete and masonry is approved by the Owner. Damage to the structure because of freezing shall be corrected by the Contractor at his own expense, to the satisfaction of the Owner.
- B. Concrete shall conform to ACI 301 and applicable referenced specifications and shall have a 28-day compressive strength of 4,000 psi.

PART 3 - EXECUTION

3.01 GENERAL

- A. The Contractor shall install all drainage structures and pipe in the locations shown on the drawings and/or as approved by the Owner. Pipe shall be of the type and sizes specified on the drawings and shall be laid accurately to line and grade. Structures shall be accurately located and properly oriented.
- B. Excavation and Backfill – The provisions in Section 02305 - Trench Excavation and Backfill shall govern all work under this Section.
- C. Storage and Handling of Pipe – All pipe shall be protected against impact, shock and free fall, and only equipment of sufficient capacity and proper design shall be used in the handling of the pipe. Storage of pipe on the job shall be in accordance with the pipe manufacturer's recommendations.

- D. Damage to Pipe
 - 1. Pipe which is defective from any cause, including damage caused by handling, and determined by the Owner as unrepairable, shall be unacceptable for installation and shall be replaced at no cost to the Owner and as directed by the Owner; and,
 - 2. Pipe that is damaged or disturbed through any cause prior to acceptance of the work, shall be repaired realigned or replaced as directed by the Owner, at the Contractor's expense.
- E. Manholes, catch basins and drain inlets shall be constructed as soon as the pipe laying reaches the location of the structures. Should the Contractor continue his pipe laying without making provisions for completion of the structures, the Owner shall have the authority to stop the pipe laying operations until the structure is completed.
- F. Any structure, which is mislocated or oriented improperly, shall be removed and re-built in its proper location, alignment and orientation at the Contractor's expense.

3.02 BEDDING

- A. Bedding material, when required, shall be in accordance with Section 02305 - Trench Excavation and Backfill for work described within this Section.

3.03 PIPE INSTALLATION

- A. Comply with Section 02305 - Trench Excavation and Backfill
- B. Laying Pipe
 - 1. Unloading and Handling: All pipes shall be unloaded and handled with reasonable care. Pipes shall not be rolled or dragged over gravel or rock during handling. The Contractor shall take necessary precautions to ensure the method used in lifting or placing the pipe does not induce stress fatigue in the pipe and the lifting device used uniformly distributes the weight of the pipe along its axis or circumference;
 - 2. Each length of pipe shall be inspected for defects and cracks before carefully lowered into the trench. Any damaged or any pipe that has had its grade disturbed after laying shall be removed and replaced. Bituminous coated pipe shall be handled with special care and repair of damaged coating shall conform with AASHTO M190;
 - 3. Lay pipe on prepared foundation starting at the downgrade end according to line and grade with the necessary drainage structures, fittings, bends and appurtenances as shown on the drawings. Rigid pipes shall be laid with the bell or groove ends upgrade with the spigot or tongue fully inserted. Flexible pipes shall be laid with the inside circumferential laps pointing downstream and with the longitudinal laps at the side or quarter points. HDPE pipes shall be installed in accordance with pipe manufacture's installation guidelines for heavy duty drainage applications; and,
 - 4. Pipe sections shall be firmly joined together with appropriate gaskets or bands with joints made watertight.

3.04 DROP INLET, CATCH BASIN, MANHOLE, AND JUNCTION BOX INSTALLATION

- A. Precast Drainage Structures
 - 1. Structure units shall be assembled in accordance with the manufacturer's instructions to form a sound structural unit.
- B. Cast in Place Drainage Structures
 - 1. Structures shall be installed in accordance with the details or referenced specifications shown on the drawings; and
 - 2. Concrete shall comply with requirements of Article 2.06 of this Section.
- C. Solid Concrete Brick Masonry Structures
 - 1. Structures shall be installed in accordance with the details or referenced specifications shown on the drawings;
 - 2. Only solid masonry units shall be utilized;

3. Minimum wall thickness shall be 8 inches; and,
 4. Minimum bottom slab thickness shall be 6 inches and extended a minimum of 6 inches outside the structure.
 - D. Fittings and Connections
 1. Pipe connections shall be made so that the pipe does not project 3 inches beyond the inside wall of the drainage structure, and shall be grouted as necessary to make smooth and uniform surfaces on the inside of the structure. Boxes to have bottoms filled with concrete to provide a bench between pipe inverts.
 - E. Frames, Grates and Hoods
 1. Shall be set to grade in accordance with the drawings;
 2. Firmly embedded in mortar approximately 1 inch thick and aligned to fit the top section of the structure; and,
 3. Brick set in mortar used to adjust the frame to finished grade shall be limited to no more than four courses for precast structures and have a minimum wall thickness of 8 inches.
 - F. Interface with Existing Facilities
 1. Compliance with Facility Owner Requirements: Connections made into existing drainage facilities shall be performed in accordance with the requirements of the Owner of the facility. The Contractor will be required to comply with all such requirements, including securing of all required permits, and paying the costs thereof. The cost of making the connections in accordance with the requirements of the Owner of the existing facility shall be included in the Contract Sum; and,
 2. Requirements: The Contractor shall make all required connections of the proposed drainage facilities into existing drainage facilities, where and as shown on the Drawings and/or as approved by the Owner.
- 3.05 CONSTRUCTION WITHIN THE PUBLIC R.O.W.
- A. Construction within the public right-of-way shall conform to all requirements of the regulatory authority having jurisdiction.
- 3.06 MODIFICATIONS OF EXISTING STRUCTURES
- A. General: The Contractor shall alter, reconstruct and/or convert existing structures where and as shown on the drawings, and/or as approved by the Owner. In general, alterations shall be performed with the same type of material used in the original construction unless otherwise indicated on the drawings or approved by the Owner.
 - B. Damage to Existing Installations: The Contractor shall exercise extreme care during such alteration, reconstruction and/or conversions so as not to damage any portions of the structure and/or pipe shown to remain. Any such damage shall be repaired by the Contractor at his own expense and to the satisfaction of the Owner.
- 3.07 CONCRETE PLACEMENT
- A. Place cast-in-place concrete according to ACI 318 and ACI 350R.
- 3.08 PROTECTION AND CLEANING
- A. The Contractor shall maintain all pipe installations and drainage structures in a condition such that they will function continuously and shall be kept clean of silt, debris and other foreign matter from the pipe and drainage structure is installed until the project is accepted.
- 3.09 FINAL INSPECTION
- A. Upon completion of the work and before final acceptance by the Owner, the entire drainage system shall be subject to a final inspection in the presence of the Owner and/or Site Engineer.

The work shall not be considered as complete until all requirements for line, grade, cleanliness, and workmanship have been completed.

END OF SECTION 02630

SECTION 02741 - HOT-MIX ASPHALT PAVING

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes hot-mix asphalt paving, patching and overlay.

1.02 REFERENCE STANDARDS

- A. American Association of State Highway and Transportation Officials (AASHTO)
 - 1. M140 - Standard Specification for Emulsified Asphalt Nineteenth Edition; Revised Per Interim Specifications - Specifications - 1999 R(1998)
 - 2. M226 -Standard Specification for Viscosity Graded Asphalt Cement Nineteenth Edition R(1996)
 - 3. T245 - Standard Method of Test for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus Nineteenth Edition; ASTM D1559-76
- B. American Society for Testing and Materials (ASTM)
 - 1. D1559 – Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus.
 - 2. D2041 - Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
- C. Asphalt Institute (AI)
 - 1. MS-2 – Mix Design Method for Asphalt Concrete and Other Hot Mix Types
 - 2. MS-22 – Principles of Construction of Hot-Mix Asphalt Pavement, Addendum

1.03 SUBMITTALS

- A. Job Mix Designs: Contractor shall submit a mix design for each pavement course proposed for construction for the Owner's review and approval 45 days prior to schedule production and lay down of the mix. The design mix submittal shall be formatted as indicated in Asphalt Institute Manual MS-2, the "Marshall Stability Method"; and shall include type/name of mix, gradation analysis, grade of asphalt cement, Marshall Stability in pounds flow, effective asphalt content in percent (%), and corresponding copies of governing State Department of Transportation (DOT) material specifications or regulatory authorities having jurisdiction for each proposed material.
- B. The Contractor may submit to the Owner a superpave asphalt mix design for review and approval, in lieu of a Marshall Mix Design asphalt, meeting the specifications of the governing State Department of Transportation or regulatory authorities having jurisdiction.
- C. Material Certificates: Contractor shall submit certificates stating that asphalt mix to be supplied complies with the specifications of the governing State Department of Transportation (DOT) or regulatory authority having jurisdiction, as well as copies the regulatory specifications corresponding to the asphalt mix formula and material. The certificates shall be signed by the asphalt mix producer and the Contractor.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer shall be registered with and approved by authorities having jurisdiction and the DOT of the State of California.
- B. Regulatory Requirements: Comply with applicable standards and requirements of the regulatory authority having jurisdiction and State DOT for asphalt paving work.
- C. Asphalt-Paving Publication: Comply with Asphalt Institute Manual MS-22, "Construction of Hot Mix Asphalt Pavements," unless more stringent requirements are indicated.

1.05 PROJECT CONDITIONS

- A. Environmental/Weather Limitations: Do not apply or produce asphalt materials if the underlying course is wet or excessively damp, the subgrade or base course is frozen, , during rainy weather, or if the air temperature, measured in the shade away from artificial heat at the location of the paving operations, does not meet the following requirements:
1. Tack Coat and Prime Coat: Minimum ambient temperature in the shade has been 40 degree F for at least 12 hours, immediately prior to application;
 2. Asphalt Base Course: Minimum surface temperature of 35 degree F and rising at time of placement;
 3. Asphalt Binder (Intermediate) Course: Minimum surface temperature of 40 degree F and rising at the time of placement; and,
 4. Asphalt Surface Course: Minimum surface temperature is above 50 degree F at time of placement for 1 inch lift or 40° F for all lifts greater than 1 inch in depth.

PART 2 - PRODUCTS

2.01 ASPHALT MATERIALS

- A. Asphalt Cement – The type and grade of asphalt cement for the paving mixture shall comply with the applicable requirements of AASHTO Specification M226, Table 2, and meet governing DOT specifications.
- B. Prime Coat - emulsified asphalt applications shall meet the requirements of AASHTO M140, and the governing DOT specifications.
- C. Tack Coat - emulsified asphalt applications shall meet the requirements of AASHTO M140 and meet governing DOT specifications.
- D. Hot Mix Asphalt – Unless otherwise noted on the drawings, the design mix shall have the minimum stability base on 50-blow Marshall Mix Design in accordance with AASHTO T245 or ASTM D1559.
- E. The use of reclaimed asphalt pavement/mixes is not permitted.

PART 3 - EXECUTION

3.01 COLD MILLING

- A. Milling of existing asphalt pavement shall be at the depth and location as indicated on the Construction Drawings or as directed by the Owner.
- B. The milled surface shall be reasonably smooth and free of excessive scarification marks, gouges, ridges, continuous grooves, or other damage. The milled pavement surface shall be thoroughly cleaned of all loose aggregate particles, dust, and other objectionable material by the use of power brooms, power blowers, power vacuums or other means.
- C. The Contractor shall coordinate the adjustment of manholes, meter boxes, drainage inlets, and valve boxes with the milling operation.
- D. All milled material shall become the property of the Contractor. and shall be disposed of off-site or used in conformance with Section 02300 - Earthwork, as approved by the Owner.

3.02 PATCHING

- A. Hot-Mix Asphalt Pavement: Saw cut perimeter patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into adjacent sound pavement, unless otherwise indicated or directed by the Owner. Re-compact existing unbound-aggregate base course to form new subgrade.
- B. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving at a rate of 0.05 gal/sy.

- C. Patching: Fill excavated pavements with hot-mix asphalt base mix, and while it is still hot, compact flush with adjacent surface.

3.03 SURFACE PREPARATION

- A. Proofroll stone base in conformance with Article 3.06, Section 02300 - Earthwork, immediately prior to paving.
- B. Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared substrate surface is ready to receive paving. Sweep loose granular particles from surface of unbound-aggregate base course. Do not dislodge or disturb aggregate embedded in compacted surface of base course.
- C. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 gal./sy.
 - 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving; and,
 - 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.
 - 3. Adequate traffic control shall be provided to prohibit traffic from traversing applied area.
- D. Prime Coat: Apply uniformly to non-asphalt surfaces when specified on the drawings at a rate of .20 Gal/Sy.

3.04 HOT-MIX ASPHALT PLACING

- A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
- B. Spread mix at minimum temperature of 250°F and maximum temperature of 325°F.
- C. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.
- D. Place paving in consecutive strips not less than 10 feet wide unless infill or edge strips of a lesser width are required. Joint patterns shall be constructed parallel to traffic flow.
- E. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.05 COMPACTION

- A. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct lay-down and rolling operations to comply with requirements.
- B. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density.
- C. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- D. Protection: After final rolling, erect barricades to protect paving from traffic until pavement has cooled and hardened.
- E. Density: Compare density of in-place material against laboratory specimen of same mixture, subjected to 50 blows of a Standard Marshall hammer on each side of specimen. Minimum acceptable density of in-place material shall be:
 - 1. Density: **95%** of reference maximum theoretical density according to ASTM D2041 for binder (intermediate) and surface courses.
 - 2. Density: **92%** of reference maximum theoretical density according to ASTM D2041 for base courses.

3.06 INSTALLATION TOLERANCES

- A. Thickness: Compact each course to produce the thickness indicated within the following tolerances:
 - 1. Base Course: $\pm 1/4$ inch;
 - 2. Binder (Intermediate) Course: $\pm 1/4$ inch; and,
 - 3. Surface Course: $\pm 1/8$ inch.
- B. Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:
 - 1. Base Course: $1/2$ inch;
 - 2. Binder (Intermediate) Course: $1/4$ inch; and,
 - 3. Surface Course: $1/8$ inch.
- C. Contractor's duties relating to testing include:
 - 1. Notify Owner 72 hours prior to asphalt paving;
 - 2. Notifying laboratory of conditions requiring testing; and,
 - 3. Coordinate with laboratory for field-testing.

3.07 DISPOSAL

- A. Except for material indicated to be recycled, remove excavated or milled materials from Project site and legally dispose of them in an EPA-approved landfill.

3.08 QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests, inspections, and to prepare test reports. Testing agency shall be paid by the Owner.
- B. The Owner shall pay for and have testing agency take two 4-inch diameter cores per 5,000 sq. yds. of intermediate course, at locations selected by Owner, for thickness tests. Contractor shall repair holes resulting from coring to match existing paving. The Owner reserves the right to take additional testing and should these tests show insufficient thickness, all areas shall be remediated as prescribed by the Owner.
- C. The Owner shall provide on-site nuclear density testing at random locations during paving operations for all proposed asphalt courses.
- D. The Contractor may be required to remove and replace hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements, at not cost to the Owner.

END OF SECTION 02741

SECTION 02745 - PAVEMENT MARKINGS AND REMOVAL

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes specifications for proposed temporary and permanent pavement markings, including pavement marking removal.

1.02 PROJECT CONDITIONS

- A. Pavement-Marking Paint: Proceed with pavement marking only on a clean, dry surface and at a minimum ambient or surface temperature of 40 degrees F for oil base materials, 50 degrees F for water-based materials, and not exceeding 90 degrees F.
- B. Surface Preparation: The surface shall be clean and free of dirt, grease, oil, or other contaminants, which could interfere with adhesion.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Temporary and Permanent Pavement-Marking Paint:
 - 1. **Enterprise Latex Traffic Marking Paint** – white on asphalt, yellow on concrete, or as indicated on the drawing(s).
 - 2. **Sherwin Williams "Promar Traffic Marking"** – white on asphalt, yellow on concrete, or as indicated on the drawing(s).

PART 3 - EXECUTION

3.01 PERMANENT PAVEMENT MARKINGS

- A. Allow new asphalt paving to age a minimum of 48 hours before painting. New concrete pavement shall age a minimum of 30 days before painting, unless otherwise approved by the Owner.
- B. Sweep and clean surface to eliminate loose material and dust prior to application.
- C. Apply paint material at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils and dry film thickness of 10 mils.
- D. Paint shall be applied in 2 coats to a clean, dry surface using template or a striping machine. Stripes shall be of uniform width of 4 inches wide, unless otherwise noted on the drawing(s). Other markings shall be provided as on the construction drawings.

3.02 TEMPORARY PAVEMENT MARKINGS

- A. Temporary paint shall be applied in accordance with permanent pavement marking specifications. However, only 1 coat of paint shall be required to a clean, dry surface using template or a striping machine. The Contractor may also propose to utilize temporary/removable pavement marking tape, as approved by the Owner.
- B. Markings shall be applied using butyl adhesive pads or paint to clean dry pavement surfaces which are free of cracking, checking, spalling, or failure of underlying base material.
- C. When required, removable marking tape or pavement marking paint shall be applied on clean dry surfaces at designated locations. Tape that has become damaged and is no longer serviceable shall be replaced without additional compensation.
- D. All temporary markings and striping shall be removed when no longer required. Any pavement area that has been determined to be damaged as a result of the removal operation shall be repaired at no cost to the Owner.

3.03 PAVEMENT MARKING REMOVAL

PAVEMENT MARKINGS AND REMOVAL

- A. Existing pavement marking lines and symbols shall be removed as to not materially or structurally damage the surface or texture of the pavement. A motorized abrasive device shall be utilized to remove existing markings. The Contractor shall repair any damage to the pavement at no expense to the Owner. The pavement surface shall be left in a condition that will not mislead or misdirect customers or motorists. Pavement marking removal within public rights of way shall be completed in accordance with the regulatory authority having jurisdiction and the specifications.

END OF SECTION 02745

SECTION 02751 - CONCRETE PAVEMENT, CURB, AND SIDEWALK

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes all portland concrete pavement outside the building limits, including but not limited to:
1. Fence Post Footings
 2. Gate Footings
 3. Bollard Footings

1.02 REFERENCE STANDARDS

- A. American Society of Testing Materials (ASTM)
1. A82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement
 2. A185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
 3. A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
 4. C33 - Standard Specification for Concrete Aggregates
 5. C94 - Standard Specification for Ready-Mixed Concrete
 6. C150 - Standard Specification for Portland Cement
 7. C171 - Standard Specification for Sheet Materials for Curing Concrete
 8. C260 - Standard Specification for Air-Entraining Admixtures for Concrete
 9. C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
 10. C494/C494M - Standard Specification for Chemical Admixtures for Concrete
 11. C979 - Standard Specification for Pigments for Integrally Colored Concrete
 12. C1116 - Standard Specification for Fiber-Reinforced Concrete and Shotcrete
 13. D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
 14. D1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
 15. D3405 - Standard Specification for Joint Sealants, Hot-Applied, for Concrete and Asphalt Pavements
 16. D5249 - Standard Specification for Backer Material for Use with Cold- and Hot-Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints
 17. D5893 - Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements
- B. American Concrete Institute (ACI)
1. 301R-99 - Specifications for Structural Concrete
 2. 304R - Placing and Handling Concrete, etc.
 3. 309R-96 - Guide for Consolidating of Concrete
 4. 330.1 - Standard Specifications for Plain Concrete Parking Lots
 5. 330R-92 - Guide for Design & Construction of Concrete Parking Lots
 6. 211.1R-91 - Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete
- C. American Association of State Highway and Transportation Officials (AASHTO)
1. M182 - Standard Specifications for Burlap Cloth made from Jute for Kenaf
 2. M153 - Standard Specifications for Preformed Sponge Rubber and Cork Expansion Joint Filler.

1.03 SUBMITTALS

- A. Mix Design: For each concrete mix indicated (see attached form).
- B. The Contractor and the Subcontractor shall execute the Conformance Submittal(s) at the end of this Section.

PART 2 - PRODUCTS

2.01 STEEL REINFORCEMENT

- A. The type of steel reinforcement shall be as shown on the drawings.
 - 1. Plain-Steel Welded Wire Fabric: ASTM A 185, 6 inches x 6 inches #10 mesh fabricated from steel wire into flat sheets;
 - 2. Reinforcement Bars: ASTM A 615/A 615M, Grade 40, deformed;
 - 3. Plain Steel Wire: ASTM A 82, as drawn; and,
 - 4. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening steel reinforcement. Manufacture bar supports according to CRSI's Manual of Standard Practice.

2.02 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I, II or III.
- B. Aggregate: ASTM C 33, uniformly graded, from a single source.
- C. Water/Ready Mix Concrete: ASTM C 94.
- D. Admixtures: Certified by manufacturer to contain not more than 0.1 % water-soluble chloride ions by mass of cement and to be compatible with other admixtures, as follows:
 - 1. Air-Entraining Admixture: ASTM C 260;
 - 2. Water-Reducing Admixture: ASTM C 494, Type A;
 - 3. Water-Reducing and High-Range Admixture: ASTM C 494, Type F;
 - 4. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E; and,
 - 5. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
- E. Fly Ash: The use of fly ash is prohibited.
- F. Calcium Chloride: The use of calcium chloride or admixtures containing more than 0.05% chloride ions is prohibited.
- G. Curing Materials:
 - 1. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry;
 - 2. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet;
 - 3. Water: Potable;
 - 4. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete;
 - 5. Clear Solvent-Borne Liquid-Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B;
 - 6. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B;
 - 7. White Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 2, Class B.

2.03 CONCRETE MIXES AND MIXING

- A. Concrete Mixes: Prepare design mixes, proportioned according to ACI 211.1R-91 and ACI 304, with the following properties:
 - 1. Compressive Strength (28 Days): 6,000 psi;
 - 2. Slump Limit: maximum of 5 inches at time of placement for footings;
 - 3. Air Content: 5% to 8%.

- B. Coloring Agent: When required, add coloring agent to mix according to manufacturer's written instructions.
 - 1. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork; and,
 - 2. Coloring Agent: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, nonfading, and resistant to lime and other alkalis.
- C. Ready-Mixed Concrete: Comply with requirements and with ASTM C 94 and ASTM C 1116.
- D. Project-Site Mixing: the Owner must approve on-site mixing. Comply with requirements and measure, batch, and mix concrete materials and concrete according to ASTM C 94. Mix concrete materials in appropriate drum-type batch machine mixer.

2.04 JOINTS, FILLERS, AND SEALANTS

- A. Joint-Sealant Backer Materials: ASTM D5249, Non-Staining, compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by joint sealant manufacturer based on field experience and laboratory testing.
- B. Joint Sealant: Non-priming, pourable self-leveling polyurethane sealant for concrete and asphalt.
 - 1. Cold-Applied Joint Sealant ASTM D5893, self-leveling silicone sealant. Crafcro Inc. "Roadwaver Silicone-SL"; Dow Corning "888, or 890-SL"; Sonneborn "Sonomeric 1 Sealant"; Mameaco "Vulken 45"; and,
 - 2. Hot-Applied Joint Sealant: ASTM D3405, Polymeric sealant. Crafcro Inc. "ROADSAVER 22"; W.R. Meadows, Inc. "SEALTIGHT HI-SPEC".
- C. Joint Fillers: Resilient pre-molded bituminous impregnated fiberboard units complying with ASTM D 1751, asphalt-saturated cellulosic fiber, ASSHTO M 153, Type I: or ASTM D 1752, cork or self-expanding cork.
- D. Exterior Concrete Sealant: Sonneborn "Kure-N-Seal 30" exterior acrylic sealer, or Euclid "Super Rez-Seal".

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Surface Preparation: Proofroll prepared subbase, per Section 02300 - Earthwork and remove loose material from surface.
- B. Forms: Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations, per Section 02010 - Project Survey and Layout.
 - 1. Maintain sufficient quantity of forms to allow continuance of work so that forms remain in place a minimum of 24 hours after concrete placement;
 - 2. Forms shall be cleaned and casted with form release agent thoroughly after each use and before concrete is placed; and,
 - 3. Flexible or curved forms shall be used on curves. Forms shall be of full depth of the concrete and of a strength when staked, sufficient to resist the presence of the concrete and the loads resulting from the finish operations without springing, setting or losing their shape.
- C. Reinforcement: Accurately position and support reinforcement, and secure against displacement. Set wire ties with ends directly into concrete.
 - 1. Install welded wire fabric in lengths as long as practicable; lap at least one full mesh, and lace splices with wire; and,
 - 2. Support reinforcing steel on wire chairs to ensure that wire stays mid-depth of sidewalk section during concrete pour.

- D. Joints: Construct pre-molded expansion and contraction joints, tied construction joints, thickened edge expansion joints, isolation joints, and construction joints, straight with face perpendicular to concrete surface. Construct transverse joints perpendicular to centerline unless otherwise detailed.
1. Expansion joints and Contraction joints: Pre-molded as indicated on the drawings;
 - a. Provide joint filler for the entire depth of the slab section and not less than 1 inch below finished surface so as to allow for joint sealer.
 - b. Provide thickened edge expansion joint as indicated on the drawings.
 - c. Provide 1/2 inch contraction joints for curb and gutter at 10 feet on center.
 - d. Provide 1/2 inch expansion joints for curb and gutter at 100 feet on center
 2. Tied construction joints: As indicated on drawings;
 3. Control joints: Depth shall be equal to 1/4 of the concrete thickness or 1 inch, whichever is deeper. For sidewalks, control joint spacing shall be equal to the sidewalk width. For concrete pavement, control joint spacing shall be placed as shown on the drawings, no greater than 15 feet on center either way;
 - a. Form tooled joints in fresh concrete by grooving top portion with recommended tool and finishing edges with jointer.
 - b. Form sawed joints using powered saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut joints into hardened concrete within 24 hours of the concrete placement and as soon as surface will not be torn, abraded, or otherwise damaged by cutting action.
 4. Construction Joints: Place construction joints at end of placements and at locations where placement operations are stopped for period of more than 1/2 hour, except where such placements terminate at expansion joints. Construct joints using standard metal keyway-section forms or as shown on the drawings;
 5. Isolation Joints: Locate isolation joints as indicated on the drawings. Provide premolded joint filler for expansion joints abutting concrete curbs, catch basins, manholes, inlets, structures, walks and other fixed objects;
 6. Joint Fillers: Extend joint fillers full-width and depth of joint, and not less than 1/2 inch or more than 1 inch below finished surface where joint sealer is indicated. Furnish joint fillers in one-piece lengths for full width being placed, wherever possible. Where more than one length is required, lace or clip joint filler sections together; and,
 7. Joint Sealants: All joints shall be sealed with approved exterior pavement joint sealants and shall be installed per manufacturer's recommendations.
- E. Concrete Placement: Comply with recommendations in ACI 304R for measuring, mixing, transporting, and placing concrete. Place concrete in a continuous operation within planned joints or sections.
1. Moisten subbase to provide a uniform dampened condition at time concrete is placed;
 2. Consolidate concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping according to recommendations in ACI 309R;
 3. Screed and initial-float concrete surfaces with darby or bull float before excess moisture or bleed water appears on the surface;
 4. Protect concrete from cold or hot weather during mixing, placing, and curing; and,
 5. All concrete walks and aprons shall be a minimum of 4 inches thick as shown on the drawings, with a turned down edge as detailed.
- F. Evaporation Retarder: Apply to concrete surfaces if hot, dry, or windy conditions exist. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- G. Pavement Tolerances: Comply with tolerances in ACI 330.1, Specification for Plain Concrete Parking Lots.

3.02 FINISHES AND CURING

- A. All exterior concrete shall receive a medium broom finish.
- B. Curing: Begin curing after finishing concrete, but not before free water has disappeared from concrete surface. Cure concrete by one or a combination of the following methods:
 - 1. Moisture cure concrete by water, continuous fog spray, continuously wet absorptive cover, or by moisture-retaining-cover curing. Keep surfaces continuously moist for not less than 7 days; and,
 - 2. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
- C. All exterior concrete surface shall receive one coat of exterior sealer.

3.03 REPAIRS AND PROTECTION

- A. Remove and replace concrete pavement that is broken, damaged, or defective, or does not meet requirements in this Section.
- B. Protect concrete from damage. Provide adequate traffic control to prevent traffic from pavement for at least 14 days after placement.
- C. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than 2 days before date scheduled for substantial completion inspections.

3.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
- B. ACI Publications: Comply with ACI 301R-99 and ACI330R-92, unless modified by the requirements of the Contract Documents.
- C. The owner shall provide and pay for testing services. A slump test and air test shall be performed for each load delivered. Four standard test cylinders shall be taken for each 55 cubic yards of concrete or each days pour, whichever is more frequent. Two cylinders shall be broken at 7 days and two cylinders shall be broken at 28 days.

END OF SECTION 02751

SECTION 02770 – ASPHALT SEAL COAT

PART 1 - GENERAL

1.01 SUMMARY

- A. Work under this Section shall include repairing pavement cracks, cleaning and preparing the pavement surface, mixing the pavement sealer, and applying the asphalt pavement sealer over bituminous pavement surfaces.

1.02 REFERENCED SECTIONS

- A. Section 02745 - Pavement Markings and Removal

1.03 REFERENCE STANDARDS

- A. American Society of Testing and Materials
 - 1. ASTM D-140 Standard Practice for Sampling of Bituminous Materials
 - 2. ASTM D-449 Asphalt Used in Damp-proofing and Waterproofing, Type II and III
 - 3. ASTM D-2939 Standard Test Methods Emulsion Bitumen's Use as Protective Coatings
 - 4. ASTM D-3405 Joint Sealant Hot-Applied for Concrete and Asphalt Pavement
 - 5. ASTM D-3320 Emulsified Coal Tar Pitch (Mineral Colloid Type)
 - 6. ASTM D-3910 Design, Testing and Construction of Slurry Seal

1.04 SUBMITTALS

- A. Material Certificates: Submit materials certificate to the Owner's engineer which is signed by the Contractor, certifying that materials comply with, or exceed, the requirements herein.
- B. Seal Coat design shall be as per the requirement of the regulatory authority having jurisdiction or as approved by the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. A refined rubberized coal tar emulsion meeting the following specifications:
 - 1. ASTM D-3320 US Airforce Requirements
 - 2. R.P.355a (GSA-FSS) Federal Government Spec.
 - a. Water, % - 40% Maximum
 - b. Non-Volatile, % - 51% Minimum
 - c. Ash of Non-Volatile, % - 35% Minimum
 - d. Specific Gravity 25oc – 1.23 Minimum

Only materials meeting the above specifications will be accepted, Certificate of Compliance from the refined coal tar manufacturer is required prior to application.
- B. Oil Spot Treatment: SealMaster PetroSeal or prep seal oil spot primer as specified by the manufacturer for pavement sealer.
- C. Pavement Sealer:
 - 1. SealMaster® Asphalt Pavement Sealer as manufactured by SealMaster®;
 - 2. Armor Seal A-100 as manufactured by Armor Manufacturing;
 - 3. Star-Seal Asphalt Pavement Sealer as manufactured by Star-Seal of Florida Inc.;
 - 4. Seal Guard by JAO Corporation; and,
 - 5. Slurry Seal.
- D. Water

- E. Aggregate or sand as required and specified by the manufacturer
- F. Polymer Additive (optional)
- G. Fortifier
 - 1. Water based epoxy-latex additive, designed as a fortifier for refined coal tar emulsions to increase resistance to power steering marks, fuel and chemical effects to assist in fast drying of the coating is acceptable.
 - 2. Thickeners only are not permitted.

2.02 EQUIPMENT

- A. Self-propelled squeegee equipment shall have a least 2 squeegee or brush devices (one behind the other) to assure adequate distribution and penetration of sealer into the bituminous pavement. Equipment shall have continuous agitation or mixing capabilities to maintain homogenous consistency of pavement sealer mixture throughout the application process.
- B. Pressurized spray application equipment shall be capable of spraying pavement sealer with sand added. Equipment shall have continuous agitation or mixing capabilities to maintain homogenous consistency of pavement sealer mixture throughout the application process.
- C. Hand squeegee and brushes shall be acceptable only in areas where practicality prohibits the use of mechanized equipment.

2.03 MIX DESIGNS

- A. Sealer concentrate – 100 Gallon
- B. Silica Sand 400 to 500 lb. Meeting 50 to 75 fineness rating.
- C. Water 40% maximum.
- D. Fortifier 3%
- E. Curing agents on high traffic areas (when applicable)

PART 3 - EXECUTION

3.01 WEATHER LIMITATIONS

- A. Apply pavement sealer when ambient temperature is 60° F and rising for a period of 24 hours after application. Do not apply when temperature is expected to drop below 50° F in a 24-hour period. Do not apply if rain is imminent within 8 hours.
- B. Between September 15 and May 1, check the specifications and requirements of the State Department of Transportation on the permitted dates of applying the seal coats.

3.02 SURFACE PREPARATION

- A. New asphalt must be allowed to cure at least 30 to 60 days under good weather condition before apply the sealer, and should be sealed within 6 to 12 months from the date of installation.
- B. Surface must be free from dirt, dust and includes grass along the edges. Remove and dispose of any loose and unsuitable materials, dirt, and debris from pavement surface by power blower or mechanical sweeping equipment.
- C. Surface hairline cracks up to ½ inch must be filled with crack filler; cracks larger than ½ inch must be cleaned and filled with elastomeric emulsion crack filler.
- D. When using a high performance crack sealant, please note on your proposal.
- E. Potholes, alligator areas, and similar surface defects must be cut out and repairs made.
- F. Treat all grease, oil and gasoline spots with compatible primer of the manufactured coating. In hot weather, the surface should be fogged with water prior to sealing.
- G. Prior to spreading pavement sealer, paint all existing white paint stripes with black paint.
- H. Contractor to dispose of all cans, bags and leftover materials off-site.

3.03 APPLICATION

- A. Mix pavement sealer in accordance with the manufacturer's procedure to a uniform consistency before using. For each coat, the sealant shall be diluted with clean potable water while agitating. The percent of water to be added will be as per the manufacturer specification based on the asphalt surface quality, and the type of traffic it will experience. When the rubberized mixture has thickened, add sand or aggregate slowly to the mixing tank. Mix thoroughly before and slowly during the application.
- B. First Application (New store having no prior application)
 - 1. Two coats on all parking areas at a rate of .18 gallons per square yard or 5.5 yards per gallon of diluted material/per coat applied.
 - 2. A third coat on all drive lanes and approaches at a rate of .18 gallons per square yard or 5.5 yards per gallon of diluted material.
- C. Additional Applications (Stores having a previous application)
 - 1. Two coats on all parking areas at a rate of gallon per square yard or 7.0 yards per gallon of diluted material/per coat applied.
 - 2. A third coat on all drive lanes and approaches at a rate of 7.5 yards per gallon of diluted material.
- D. Allow a minimum of 24 hours of curing time before allowing traffic over treated surface or application of traffic marking paint. Use of solvent borne paint shall not be permitted.
- E. Lines, stencils, and markings shall be repainted in original size & location, unless otherwise directed by the Owner, in accordance with Section 02745 - Pavement Markings and Removal.
- F. It is the Contractor's responsibility to check local zoning codes & regulations.
- G. All seal coat and re-striping projects must be performed during available time periods (usually at night) that DO NOT interfere with normal business hours. Applications must be staged to provide free access to the justice center the following business day.

END OF SECTION 02770

SECTION 02795 – PERMEABLE INTERLOCKING CONCRETE PAVEMENT

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Permeable interlocking concrete pavers.
 - 2. Crushed stone bedding material.
 - 3. Open-graded subbase aggregate.
 - 4. Open-graded base aggregate.
 - 5. Bedding and joint/opening filler materials.
 - 6. Edge restraints.
- B. Related Sections
 - 1. Section 02751: Curbs.
 - 2. Section 02400: Aggregate base.
 - 3. Section 02630: Storm Drainage
 - 4. Section 02300: Earthwork

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1. C 131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - 2. C 136, Method for Sieve Analysis for Fine and Coarse Aggregate.
 - 3. C 140, Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
 - 4. D 448, Standard Classification for Sizes of Aggregate for Road and Bridge Construction.
 - 5. C 936, Standard Specification for Solid Interlocking Concrete Pavers.
 - 6. C 979, Specification for Pigments for Integrally Colored Concrete.
 - 7. D 698, Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures Using a 5.5-lb (2.49 kg) Rammer and 12 in. (305 mm) drop.
 - 8. D 1557, Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures Using a 10-lb (4.54 kg) Rammer and 18 in. (457 mm) drop.
 - 9. D 1883, Test Method for California Bearing Ratio of Laboratory-Compacted Soils.
 - 10. D 2922 Standard Test Methods for Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).
 - 11. D 4254, Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
- B. Interlocking Concrete Pavement Institute (ICPI)
 - 1. Permeable Interlocking Concrete Pavement manual.
 - 2. Permeable Design Pro software for hydrologic and structural design

1.03 SUBMITTALS

- A. In accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.
- B. Paver manufacturer's/installation subcontractor's drawings and details: Indicate perimeter conditions, junction with other materials, expansion and control joints, paver [layout,] [patterns,] [color arrangement,] installation [and setting] details. Indicate layout, pattern and relationship of paving joints to fixtures, and project formed details.
- C. Minimum 3 lb (2 kg) samples of subbase, base and bedding aggregate materials.
- D. Sieve analysis of aggregates for subbase, base and bedding materials per ASTM C 136.

- E. Project specific or producer/manufacturer source test results for void ratio and bulk density of the base and subbase aggregates.
- F. Soils report indicating density test reports, classification, and infiltration rate measured on-site under compacted conditions, and suitability for the intended project.
- G. Erosion and sediment control plan.
- H. [Stormwater management (quality and quantity) calculations; structural analysis for vehicular applications] using ICPI Permeable Interlocking Concrete Pavements manual, Permeable Design Pro or [specify] design methods and models.
- I. Permeable concrete pavers:
 - 1. Paver manufacturer's catalog sheets with product specifications.
 - 2. [Four] representative full-size samples of each paver type, thickness, color, and finish. Submit samples indicating the range of color expected in the finished installation.
 - 3. Accepted samples become the standard of acceptance for the work of this Section.
 - 4. Laboratory test reports certifying compliance of the concrete pavers with ASTM C 936.
 - 5. Manufacturer's certification of concrete pavers by ICPI as having met applicable ASTM standards.
 - 6. Manufacturers' material safety data sheets for the safe handling of the specified paving materials and other products specified herein.
 - 7. Paver manufacturer's written quality control procedures including representative samples of production record keeping that ensure conformance of paving products to the product specifications.
- J. Paver Installation Subcontractor:
 - 1. Demonstrate that job foremen on the project have a current certificate from the Interlocking Concrete Pavement Institute Concrete Paver Installer Certification program.
 - 2. Job references from projects of a similar size and complexity. Provide Owner/Client/General Contractor names, postal address, phone, fax, and email address.
 - 3. Written Method Statement and Quality Control Plan that describes material staging and flow, paving direction and installation procedures, including representative reporting forms that ensure conformance to the project specifications.

1.04 QUALITY ASSURANCE

- A. Paver Installation Subcontractor Qualifications:
 - 1. Utilize an installer having successfully completed concrete paver installation similar in design, material and extent indicated on this project.
 - 2. Utilize an installer with job foremen holding a current certificate from the Interlocking Concrete Pavement Institute Concrete Paver Installer Certification program.
- B. Regulatory Requirements and Approvals: [Specify applicable licensing, bonding or other requirements of regulatory agencies.].
- C. Review the manufacturers' quality control plan, paver installation subcontractor's Method Statement and Quality Control Plan with a pre-construction meeting of representatives from the manufacturer, paver installation subcontractor, general contractor, engineer and/or owner's representative.
- D. Mock-Ups:
 - 1. Install a 10 ft x 10 ft (3 x 3 m) paver area.
 - 2. Use this area to determine surcharge of the bedding layer, joint sizes, and lines, laying pattern, color and texture of the job.

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3. This area will be used as the standard by which the work will be judged.
4. Subject to acceptance by owner, mock-up may be retained as part of finished work.
5. If mock-up is not retained, remove and properly dispose of mock-up.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with Division 1 Product Requirement Section.
- B. Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.
- C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged container packaging with identification tags intact on each paver bundle.
 1. Coordinate delivery and paving schedule to minimize interference with normal use of buildings adjacent to paving.
 2. Deliver concrete pavers to the site in steel banded, plastic banded, or plastic wrapped cubes capable of transfer by forklift or clamp lift.
 3. Unload pavers at job site in such a manner that no damage occurs to the product or existing construction
- D. Storage and Protection: Store materials in protected area such that they are kept free from mud, dirt, and other foreign materials.

1.06 ENVIRONMENTAL REQUIREMENTS

- A. Do not install in rain or snow.
- B. Do not install frozen bedding materials.

1.07 MAINTENANCE

- A. Extra materials: Provide [Specify area] [Specify percentage] additional material for use by owner for maintenance and repair.
- B. Pavers shall be from the same production run as installed materials.

PART 2 PRODUCTS

- A. Manufacturer: Acker-Stone Industries – 13296 Temescal Canyon Rd., Corona, CA 92883 (or approved equivalent)
 1. Contact: Angelica Wright 951-674-0047 ext. 1313
- B. Permeable Interlocking Concrete Paver Units:
 1. Paver Type: Aqua-Via Series (or approved equivalent)
 - a. Material Standard: Comply with ASTM C 936.
 - b. Color [and finish]: [Specify color.] [Specify finish].
 - c. Color Pigment Material Standard: Comply with ASTM C 979.

2.02 PRODUCT SUBSTITUTIONS

- A. Substitutions: Permitted for gradations for crushed stone jointing material, base and subbase materials. Base and subbase materials shall have a minimum 0.32 void ratio. All substitutions shall be approved in writing by the project engineer.

2.03 CRUSHED STONE FILLER, BEDDING, BASE AND SUBBASE

- A. Crushed stone with 90% fractured faces. LA Abrasion < 40 per ASTM C 131, minimum CBR of 80% per ASTM D 1883.
- B. Do not use rounded river gravel for vehicular applications.
- C. All stone materials shall be washed with less than 1% passing the No. 200 sieve.
- D. Joint/opening filler, bedding, base and subbase: conforming to ASTM D 448 gradation as shown in Tables 1, 2 and 3 below:

PERMEABLE INTERLOCKING CONCRETE PAVEMENT

Table 1
ASTM No. 8 Grading Requirements
Bedding and Joint/Opening Filler

Sieve Size	Percent Passing
12.5 mm (1/2 in.)	100
9.5 mm (3/8 in.)	85 to 100
4.75 mm (No. 4)	10 to 30
2.36 mm (No. 8)	0 to 10
1.16 mm (No. 16)	0 to 5

Table 2
ASTM No. 57 Base
Grading Requirements

Sieve Size	Percent Passing
37.5 mm (1 1/2 in.)	100
25 mm (1 in.)	95 to 100
12.5 mm (1/2 in.)	25 to 60
4.75 mm (No. 4)	0 to 10
2.36 mm (No. 8)	0 to 5

Table 3
Grading Requirement for ASTM No. 2 Subbase

Sieve Size	Percent Passing
75 mm (3 in.)	100
63 mm (2 1/2 in.)	90 to 100
50 mm (2 in.)	35 to 70
37.5 mm (1 1/2 in.)	0 to 15
19 mm (3/4 in.)	0 to 5

PART 3 EXECUTION

3.01 ACCEPTABLE INSTALLERS

- A. Acceptable paver installation subcontractors shall be selected by the owner.

3.02 EXAMINATION

A. Acceptance of Site Verification of Conditions:

1. General Contractor shall inspect, accept and certify in writing to the paver installation subcontractor that site conditions meet specifications for the following items prior to installation of interlocking concrete pavers.
 - a. Verify that subgrade preparation, compacted density and elevations conform to specified requirements.
 - b. Provide written density test results for soil subgrade to the Owner, General Contractor and paver installation subcontractor.
 - c. Verify location, type, and elevations of edge restraints, [concrete collars around] utility structures, and drainage pipes and inlets.
2. Do not proceed with installation of bedding and interlocking concrete pavers until subgrade soil conditions are corrected by the General Contractor or designated subcontractor.

3.03 PREPARATION

- A. Verify that the soil subgrade is free from standing water.
- B. Stockpile joint/opening filler, base and subbase materials such that they are free from standing water, uniformly graded, free of any organic material or sediment, debris, and ready for placement.
- C. Edge Restraint Preparation:
 - 1. Install edge restraints per the drawings [at the indicated elevations].

3.04 INSTALLATION

A. General

- 1. Any excess thickness of soil applied over the excavated soil subgrade to trap sediment from adjacent construction activities shall be removed before application of the [geotextile] and subbase materials.
- 2. Keep area where pavement is to be constructed free from sediment during entire job. [Geotextiles] Base and bedding materials contaminated with sediment shall be removed and replaced with clean materials.
- 3. Do not damage drainpipes, overflow pipes, observation wells, or any inlets and other drainage appurtenances during installation. Report any damage immediately to the project engineer.

B. Geotextiles

- 1. Place on [bottom and] sides of soil subgrade. Secure in place to prevent wrinkling from vehicle tires and tracks.
- 2. Overlap a minimum of [0.3 m (12 in.)] [0.6 m (24 in.)] in the direction of drainage.

C. Open-graded subbase and base

- 1. Moisten, spread and compact the No. 2 subbase in 4 to 6 in. (100 to 150 mm) lifts [without wrinkling or folding the geotextile. Place subbase to protect geotextile from wrinkling under equipment tires and tracks.]
- 2. For each lift, make at least two passes in the vibratory mode then at least two in the static mode with a minimum 10 t (10 T) vibratory roller until there is no visible movement of the No. 2 stone. Do not crush aggregate with the roller.
- 3. The surface tolerance of the compacted No. 2 subbase shall be $\pm 2 \frac{1}{2}$ in. (± 65 mm) over a 10 ft (3 m) straightedge.
- 4. Moisten, spread and compact the No. 57 base layer in one 4 in. (100 mm) thick lift. On this layer, make at least two passes in the vibratory mode then at least two in the static mode with a minimum 10 t (10 T) vibratory roller until there is no visible movement of the No. 2 stone. Do not crush aggregate with the roller.

5. Control Strip

- a. The Testing Company shall construct a control strip for the determination of a target density consisting of a single uniform lift as specified in the contract documents, but not more than 4 in. (100 mm) thick and covering approximately 600 yd² (500 m²) in area. No testing shall be performed within 10 ft (3 m) from any unrestrained outside edge of the work area. The control strip may be incorporated into the project upon acceptance of density measurements by the Testing Company.
- b. During construction of the control strip, the surface of the aggregate shall be visibly moist and maintained as such throughout construction and compaction.
- c. After initial placement of the aggregate base material, the compaction equipment shall make two passes over the entire surface of the control strip. Field densities and field moisture contents, using the backscatter/indirect method, shall be determined at five randomly selected locations at least 15 ft (5

- m) apart. The dry density and moisture content shall be calculated for each of these locations and the averages shall be used as initial values. The maximum compacted thickness of the aggregate base layer measured for density shall be 4 in. (100 mm).
 - d. The compaction equipment shall then make two additional passes over the entire surface of the control strip. After compaction, three separate, random field density and moisture content determinations shall be made, using the backscatter/indirect method, and a new average dry density and moisture content shall be calculated.
 - e. If the new average dry density exceeds the previous value by more than 1.2 pcf (20 kg/m³) then two additional passes of the equipment shall be carried out as described above. If the new average dry density does not exceed the previous value by more than 1.2 pcf (20 kg/m³), then compaction of the control strip will be considered satisfactory and complete.
 - f. Upon satisfactory completion of the control strip, an additional seven (7) field density and moisture tests, using the backscatter/indirect method, shall be taken at random locations and the dry density and moisture content values shall be determined. The final dry density and moisture content of the control strip shall be the average of these seven values plus the three most recent values obtained upon completion.
6. Compaction Equipment
- a. Use a smooth dual or single smooth drum, minimum 10 ton (10 T) vibratory roller or a minimum 13,500 lbf (60 kN) centrifugal force, reversible vibratory plate compactor that provides maximum compaction force without crushing the aggregate base.
7. Test Report
- a. The test report shall include the following:
 - 1) Project description.
 - 2) Sketch of test area and test locations.
 - 3) Aggregate type and layer thicknesses.
 - 4) Aggregate characteristic properties: gradation, void ratio, bulk density.
 - 5) Compaction equipment type and weight.
 - 6) Static or vibratory compaction.
 - 7) Number of passes of the compaction equipment.
 - 8) Test number and location.
 - 9) Individual and average field wet density, moisture content, and dry density values determined after each compaction operation in accordance with ASTM D 2922 *Standard Test Methods for Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth)*.
 - 10) Calculation of target density.
- D. The surface tolerance the compacted No. 57 base should not deviate more than ± 1 in. (25 mm) over a 10 ft (3 m) straightedge.
- E. Bedding layer
- 1. Moisten, spread and screed the No. 8 stone bedding material.

2. Fill voids left by removed screed rails with No. 8 stone.
 3. The surface tolerance of the screeded No. 8 bedding layer shall be $\pm 3/8$ in (10 mm) over a 10 ft (3 m) straightedge.
 4. Do not subject screeded bedding material to any pedestrian or vehicular traffic before paving unit installation begins.
- F. Permeable interlocking concrete pavers and joint/opening fill material
1. Lay the paving units in the pattern(s) and joint widths shown on the drawings. Maintain straight pattern lines.
 2. Fill gaps at the edges of the paved area with cut units. Cut pavers subject to tire traffic shall be no smaller than 1/3 of a whole unit.
 3. Cut pavers and place along the edges with a [double-bladed splitter or] masonry saw.
 4. Fill the openings and joints with No. 8 stone.
 5. Remove excess aggregate on the surface by sweeping pavers clean.
 6. Compact and seat the pavers into the bedding material using a low-amplitude, 75-90 Hz plate compactor capable of at least 5,000 lbf (22 kN) centrifugal compaction force. This will require at least two passes with the plate compactor.
 7. Do not compact within 6 ft (2 m) of the unrestrained edges of the paving units.
 8. Apply additional aggregate to the openings and joints if needed, filling them completely. Remove excess aggregate by sweeping then compact the pavers. This will require at least two passes with the plate compactor.
 9. All pavers within 6 ft (2 m) of the laying face must be left fully compacted at the completion of each day.
 10. The final surface tolerance of compacted pavers shall not deviate more than $\pm 3/8$ (10 mm) under a 10 ft (3 m) long straightedge.
 11. The surface elevation of pavers shall be 1/8 to 1/4 in. (3 to 6 mm) above adjacent drainage inlets, concrete collars or channels.

3.05 FIELD QUALITY CONTROL

- A. After sweeping the surface clean, check final elevations for conformance to the drawings.
- B. Lippage: No greater than 1/8 in. (3 mm) difference in height between adjacent pavers.
- C. The surface elevation of pavers shall be 1/8 to 1/4 in. (3 to 6 mm) above adjacent drainage inlets, concrete collars or channels.
- D. Bond lines for paver courses: $\pm 1/2$ in. (± 15 mm) over a 50 ft (15 m) string line.

3.06 PROTECTION

- A. After work in this section is complete, the General Contractor shall be responsible for protecting work from sediment deposition and damage due to subsequent construction activity on the site.
- B. PICP installation contractor shall return to site after 6 months from the completion of the work and provide the following as required: fill paver joints with stones, replace broken or cracked pavers, and re-level settled pavers to initial elevations. Any additional work shall be considered part of original bid price and with no additional compensation.

END OF SECTION 02795

SECTION 02800 – SECURITY GATES

LOSS PREVENTION SYSTEMS
K12 ENGINEERED CRASH GATE

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. The contractor shall provide all labor, materials and appurtenances necessary for installation of the anti-crash gates.

1.02 SYSTEM DESCRIPTION

- A. K12 engineered aluminum crash gate. LPS designed and engineered crash gate shall be constructed of welded aluminum tubing. Matching Ameristar or equal fence pickets will be mounted to the gate to match the fence line. All steel to be black powder coated to ensure corrosion protection. Heavy duty solid steel wheels with no-maintenance sealed ball bearings will be utilized to support the load and heavy traffic. A total of three, 3/4" inch aircraft cables, will be strung across the gate to DOD ATFP requirements to provide anti-vehicle crash protection. The cables are secured to the line post at each end of the gate opening. Gate operator shall be an ultra-reliable and secure hydraulic slide gate operator containing fully enclosed hydraulic motors drive a rigid drive rail passing between two compressed polyurethane wheels. The gate has a 12' (twelve) foot opening with a height of 8' (eight) feet.

1.03 QUALITY ASSURANCE

- A. The contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and materials and techniques specified.

1.04 PRODUCT HANDLING AND STORAGE

- A. Upon receipt at the job site, all materials shall be checked to ensure that no damage occurred during shipping or handling. Materials shall be stored in such a manner to ensure proper ventilation and drainage, and to protect against damage, weather, vandalism and theft.

PART 2 - MATERIALS

2.01 MATERIAL

- A. Steel posts - Locking and Receiver posts to be of .5 inch thick square tube. The pinch posts to be .25 inch thick square tube. Post sleeves and roller bars to be .188 inch tube. Receiver pegs to be 2 inch round SS bar. All steel to be black powder coated to ensure corrosion protection. Rollers shall be 4 inch poly rollers. Receiver posts require 110 vac power at 20 amps.
- B. Eight foot high gates - Framing shall be .25 inch 6061 aluminum tube. Connection ends shall be 1 inch 6061 plate. Picket rails shall be .25 inch 6061 plate. Straps shall be .125 inch 6061 plate. All gate parts to be black powder coated to ensure corrosion protection.
- C. Pickets - Matching Ameristar or equal fence pickets will be mounted to the gate to match the fence line.
- D. Cable - A total of three, .75 inch aircraft cables, will be strung across the gate to DOD ATFP requirements to provide anti-vehicle crash protection. The cables are secured to the line post at each end of the gate opening.
- E. Track and Wheels - Track to be .1875 x 1.25 Steel Angle welded to .25 flat bar with .095 square tube down rods. The sections shall be hot dipped galvanized. Heavy duty solid steel

wheels with no-maintenance sealed ball bearings will be utilized to support the load and heavy traffic.

- F. Gate operator - Operator shall be an ultra-reliable and secure hydraulic slide gate operator containing fully enclosed hydraulic motors drive a rigid drive rail passing between two compressed polyurethane wheels. Operator motor requires 208v 3 phase power at 30 amps.
- G. Concrete Footings: Concrete Notes and Specifications Note, these are minimum requirements only. You may exceed these requirements with no reduction in the rating of the equipment.
1. Contractor shall verify and be responsible for all dimensions and conditions at the job site.
 2. Foundation concrete may be placed directly into neat excavations, provided the sides of the excavation are stable. Where caving occurs, provide shoring. Type and method of shoring shall be at the contractor's option.
 3. The excavation shall be kept dry at all times. Groundwater, if encountered, shall be pumped from the excavation.
 4. Concrete shall be laboratory designed, machine mixed, producing 6000 psi at 28 days, w/ Fiber mess.
 5. Cement shall be tested Portland cement conforming to ASTM C150, Type I or II.
 6. Aggregates shall conform to ASTM C33. Maximum size of aggregate shall be 1.5 inch.
 7. Reinforcing steel shall be deformed bars conforming to ASTM A615, Grade 60 (60,000 psi).
 8. Hooks and bends shall conform to AIC Standard 318, latest revision. Inside diameter of hooks and bends shall be at least 6 bar diameters.
 9. Provide spacer bars, chairs, spreaders, blocks, etc, as required to positively hold the steel in place. All dowels shall be firmly wired in place before concrete is poured.
 10. Concrete shall be conveyed from the mixer to final deposit by methods that will prevent separation or loss of materials. Troughs, buckets or the like may be used to convey concrete. In no case shall concrete be allowed to free drop more than 5 feet.
 11. Concrete shall be thoroughly consolidated by suitable means during placement and shall be thoroughly worked around reinforcement, embedded fixtures and into corners of forms.
 12. Concrete shall be maintained above 50°F [10°C] and in a moist condition for at least 7 days after placement. Adequate equipment shall be provided for heating concrete materials and protecting concrete during freezing or near freezing weather.
 13. Where exterior wall face requires shoring and/or forming, the forms shall be substantial and sufficiently tight to prevent leakage. Forms shall not be removed until the concrete is 7 days old.
 14. Backfilling shall be done by depositing and tamping into place clean sand or pouring lean concrete. Water jetting shall not be allowed.
 15. Conduits and pipes of aluminum shall not be embedded in concrete unless effectively coated or covered to prevent aluminum/concrete reaction or electrolytic action between aluminum and steel.
 16. Construction joints not indicated on the drawings shall not be allowed. Where a construction joint is to be made, the surface of concrete shall be thoroughly cleaned and all standing water removed.

	SlideDriver 50VF2 (222 X2)	SlideDriver 50VF3 (222 X3)	
General	Commercial industrial, high security	Commercial industrial, high security	
Gates	Variable frequency drive (easy start and stop) heavy gates (5,000 lbs.) and fast (26 inches/sec.)	Variable frequency drive (easy start and stop) heavy gates (5,000 lbs.) and fast (36 inches/sec.)	
Duty	Continuous	Continuous	
Modular	50VF2M	50VF3M	
Prison	50VF2C	50VF3C	
HP	2 hp	2 hp	
Speed	26 inches/sec.	36 inches/sec.	
Soft Stop	yes	yes	
Brake Valves	yes	yes	
Soft Start	ultra soft start and stop	ultra soft start and stop	
Drawbar Pull	300 lbs.	300 lbs.	
Weight Capacity	5,000 lbs.	5,000 lbs.	
Drive Wheels	2, 8" drive wheels	2, 8" drive wheels	
UL Class	III, IV	III, IV	
Warranty	5 years	5 years	

This project shall use SlideDriver 50VF2.

END OF SECTION 02800

SECTION 02810 - IRRIGATION SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 REQUIREMENTS:

- A. All work and materials shall be in accordance with the uniform plumbing code published by the Western Plumbing officials association, all state and local codes and regulations. Should the construction documents or instructions be at variance with the aforementioned rules and regulations, notify the municipal water district and await their instructions before proceeding with the work effected.
- B. Manufacturer's directions: Manufacturer's directions and detailed drawings shall be followed in all cases where the manufacturer or articles used in this contract furnish directions covering points not shown in the drawings and specifications.
- C. Manufacturer's Warranties: Manufacturer's warranties shall not relieve liabilities under guarantee.
- D. All work called for on the drawings by notes shall be furnished and installed whether or not specifically noted in the specifications. Do not willfully install the sprinkler system as indicated on the drawings when it is obvious in the field that unknown obstructions or grade differences exist that might not have been considered in the irrigation design, or if discrepancies in the construction details, legend, or specific notes are discovered. All such obstructions or discrepancies shall be brought to the attention of the Landscape Architect. In the event that this is not done, the Contractor shall assume full responsibility for the necessary revisions.
- E. Due to the scale of drawings, it is not possible to indicate all offsets, fittings, sleeves, etc. which may be required. The Contractor shall carefully investigate the structural and finished conditions affecting all of his work and plan his work accordingly, furnishing such fittings, etc., as may be required to meet such conditions. Drawings are generally diagrammatic and indicative of the work to be installed. The work shall be installed in such a manner as to avoid conflicts between irrigation systems, planting and architectural features.

1.03 PROTECTION AND DAMAGE:

- A. Protect work and materials from damage during construction and storage. PVC pipe and fittings shall be protected from direct sunlight.
- B. Assume all responsibility for damage to existing construction and restore to its original condition should damage occur as a result of this work.
- C. Contractor shall securely cover openings into system and cover apparatuses, equipment, and appliances both before and after being set in place to prevent obstruction in the pipes and prevent breakage, misuse, or disfigurement of the apparatuses, equipment or appliances.

1.04 DESCRIPTION OF WORK:

- A. The work consists of furnishing labor, tools, machinery, materials, and processes required to complete the sprinkler irrigation system described herein and shown on the drawings.
- B. The intent of the drawings and specifications is to indicate and specify a complete sprinkler system, installed ready for use without further cost in labor or materials to the Owner.

1.05 QUALITY ASSURANCE:

- A. Subcontract work to a single firm specializing in irrigation work. Contractor shall possess all

licenses and permits required to perform the work of this contract including a C-27 landscaping license.

1.06 SUBMITTALS:

- A. The Contractor shall furnish the articles, equipment, materials or processes specified by name in the drawings and specifications. No substitution will be allowed without prior written approval by the Landscape Architect, or the Owner's authorized representative.
- B. The Contractor shall submit to the Landscape Architect catalog data and full descriptive literature for approval of items different than those specified.
- C. Equipment or materials installed or furnished without the prior approval of the Landscape Architect may be rejected and the Contractor may be required to remove such materials from the site at his own expense.
- D. Approval of any item, alternate or substitute indicates only that the product(s) apparently meet the requirements of the drawings and specifications on the basis of the information or samples submitted.
- E. Manufacturer's warranties shall not relieve the Contractor of his liability under the guarantee. Such warranty shall only supplement the guarantee.

1.07 GUARANTEE:

- A. Furnish guarantee in accordance with the General Conditions, for a period of one (1) year from the date of final acceptance - at the conclusion of the Maintenance Period - on complete water irrigation system, including non-settling of the backfill in trenches, which, if occurs, shall be corrected, including repairs and/or replacement of any material damaged thereby or there from.
- B. Manufacturer's warranties shall not relieve the Contractor of his liability under the guarantee. Such warranty shall only supplement the guarantee.

PART 2 - PRODUCTS

1.01 MATERIALS:

- A. Pressure Pipe: Comply with following:
 - 1. PVC Plastic Pressure Lines: For piping upstream of remote control valves and quick couplers. All two (2) inches and larger shall be Class 315 Polyvinyl Chloride (PVC) Simpson or approved equal. All one and one-half (1-1/2) inches and smaller shall be Type I, Grade 2, designated as PVC 1220, Schedule 40.
 - 2. Non-pressure Pipe: (downstream from remote control valves): Comply with following:
- B. Plastic Non-Pressure Lines: For piping downstream of remote control valves, Type 1, Grade 2 (Impact Modified), as designated as PVC 1220, Class 200, (SDR21), conforming to Commercial Standards CS256-63.
- C. Pipe sleeves shall be PVC schedule 40.
- D. Identification: Furnish plastic pipe continuously and permanently marked with following information: Manufacturer's name or trade mark, size, class and type of pipe, working pressure at 73.4 degrees F., and National Sanitation Foundation (NSF) rating.
- E. Pipe Fittings and Connections: Comply with following:

1.02 FITTINGS AND CONNECTIONS:

- A. Polyvinyl Chloride Pipe Fittings and Connections: Type II, Grade 1, Schedule 40, high impact molded fittings, manufactured from virgin compounds as specified for piping tapered socket or molded thread type, suitable for either solvent weld or screwed connections. Machine threaded fittings and plastic saddle and flange fittings are not acceptable. Furnish fittings permanently marked with following information: Nominal pipe size, type and schedule of material, and National Sanitation Foundation (NSF) seal of approval. PVC fitting shall conform to ASTM D2464 and D2466.
 - 1. All PVC threaded nipples shall be standard weight Schedule 80 with molded threads and shall conform to ASTM D1785:
 - B. Compression Fittings shall be molded from UV-resistant ABS material and shall accept all polyethylene tubing sizes as specified on the plans providing a leak-free compression fit.
 - C. Brass Pipe Fittings and Connections: Standard 125 pound class 85% red brass fittings and connections.
 - D. For copper tubing, ANSI B 16.22 wrought copper or cast brass, recessed solder joint type fittings.
 - E. Flexible tubing shall be of line size IPS, PVC plastic barb adaptors securely held to heavy-duty PVC flex tubing, pressure rated to 150 pound minimum. Hunter or approved equal.
 - F. Triple Swing Assembly shall be made of hi-impact type II material with EPDM O'rings, pressured rated to 315 PSi. King Bros. or approved equal.
 - G. Solvent cements shall comply with ASTM D2564. Socket joints shall be made per recommended procedures for joining PVC plastic pipe and fittings with PVC solvent cement by the pipe and fitting manufacturer and procedures outlined in the Appendix of ASTM D2564.
 - H. Thread lubricant shall be Teflon ribbon-type, or approved equal, suitable for threaded installations as per manufacturer's recommendations.
- 1.03 VALVES: Manufacturer's standard, of type and size indicated, and as follows:
- A. Remote control valves shall be of the manufacturer size, and type indicated on the plans. Valve shall be operable manually without electricity.
 - B. Master control valve(s) shall be of the manufacturer size, and type indicated on the plans.
 - C. Quick coupler valves shall be of the manufacturer size, and type indicated on the plans.
 - 1. Quick coupler key shall be of brass/bronze with a hose bib assembly. Supply two (2) hose bib assemblies.
 - D. Ball and Gate valves shall be of the manufacturer size, and type indicated on the plans.
 - E. Drip valve assembly shall be of the manufacturer size, and type indicated on the plans and shall consist of a remote control valve, wye filter, and pressure regulating device.
- 1.04 SPRINKLER HEADS:
- A. Sprinkler heads shall be of the types and sizes with diameter (or radius) of throw, pressure, nozzle discharge and/or other designations indicated on the drawings. All sprinkler heads of the same type and size shall be of the same manufacturer.
- 1.05 VALVE BOXES:
- A. For remote control valves: green standard 12" nom. plastic valve box shall be manufactured by ARMOR (PART# 170106)
 - B. For electrical pull box, ball or gate valve: green 10" round diameter plastic valve box shall be manufactured by ARMOR (PART# 181104)
 - C. For drip assembly valve: green jumbo plastic valve box shall be manufactured by ARMOR (PART# 190106)

- D. For wire splices: green 10" diameter valve box shall be manufactured by ARMOR (PART# 181104)

2.06 CONCRETE THRUST BLOCK AND SUPPORTS:

- A. All concrete work shall be 2,000 PSi minimum compressive strength at twenty-eight (28) days, 5 sack mix, tool finished on exposed surfaces.

1.07 AUTOMATIC CONTROL SYSTEM:

- A. General: Furnish low voltage system manufactured expressly for control of automatic circuit valves of underground irrigation systems. Provide unit of capacity to suit number of circuits as indicated.
- B. Automatic Controller:
 - 1. Controller shall be furnished and installed complete with all electrical connections, ready for operation.
 - 2. Controller shall be the latest model of the particular manufacturer supplied.
 - 3. Unit shall have an input of 110/120 volt, 60 cycle and be completely automatic.
- C. Irrigation controller enclosure shall be of the manufacturer size, and type indicated on the plans.
- D. Irrigation Assembly and options shall be of the manufacturer size, and type indicated on the plans.

1.08 AUTOMATIC CONTROL WIRE:

- A. Electric wiring runs from Controller to the automatic control valves shall be solid, single conductor, copperwire, 4/64 in. insulation, 4/64 in. neoprene jacket, Style DB (Direct Burial) or equal, color code wires to each valve, common wire shall be black. (Except as noted on Drawings for City standard requirements). Wires shall conform to federal specification JC-30.

2.09 FLOW SENSOR

- A. Flow sensor shall be of the manufacturer size, and type indicated on the plans.

2.10 CHECK VALVES

- A. Provide check valves and/or anti-drain valves as required/needed to prevent drainage of irrigation water from sprinkler system due to changes in elevation.

2.11 DRIP WYE FILTER

- A. Wye filter shall be of the manufacturer size and type indicated on the plans.

2.12 DRIP PRESSURE REGULATOR

- A. Pressure regulator shall be of the manufacturer size and type indicated on the plans.

2.13 DRIP FLUSH VALVE

- A. Flush valve shall be of the manufacturer size and type indicated on the plans.
- B. Flush valve shall operate automatically with the operation of the control valve.

PART 3 - EXECUTION

1.01 SYSTEM DESIGN:

- A. All scaled dimensions are approximate. The Contractor shall check and verify all dimensions on the site prior to proceeding with work under this Contract.
- B. The Contractor shall locate and mark all existing utilities such as power, telephone, domestic water, water, and tile drains. Extreme care shall be taken by the Contractor when excavating or working in these areas, and coordination and cooperation between the Owner's representative and the Contractor is required as the work progresses to the area. Contractor shall give 24 hours notice to representative as work progresses of underground utility areas. Contractor shall be responsible for damage to any utilities.
- C. Should utilities not located or marked be found during excavation, the Contractor shall promptly notify the Owner and shall discontinue with work in the area, except for necessary emergency work, to repair or prevent damage until instructions are given to the Contractor by the Owner's representative.
- D. Failure to notify the Owner of discovery of such utilities or damage thereto will result in the Contractor being liable for any and all damage caused to the utilities as a result of his actions.
- E. The Contractor shall, before starting work on the sprinkler system, carefully note all finish grades in order to satisfy himself that he may proceed with the work, and to restore finish grades to original contours before completion.
- F. The installation of all irrigation materials, including pipe, shall be coordinated with the landscape drawings to avoid interfering with the trees, shrubs, or other planting.
- G. Lay out sprinkler heads and make any minor adjustments required due to difference between site and drawings. Any such deviations in layout shall be within the intent of the original drawings, and without additional cost to the Owner. When directed by the Owner, the layout shall be approved before installation.
- H. Do not willfully install the irrigation system as indicated on the drawing when it is obvious in the field that previously unknown obstructions or grade differences exist, that might not have been considered in the engineering. Such obstructions or differences should be brought to the attention of the Landscape Architect.
- I. Water Supply: The Contractor shall connect to the water source as indicated on the drawings. The Contractor shall verify static pressure as stated on the plans prior to beginning work. If static pressure or point of connection differ from that shown on the plans, the Contractor will promptly notify Landscape Architect before starting work.
- J. Workmanship and Procedure: The routing of the pressure supply lines as indicated on the drawings is diagrammatic. Locate all pressure supply lines in planting areas. Cross perpendicular under pavement in a sleeve as described in these specifications.

3.02 INSTALLATION:

- A. General: Unless otherwise indicated, comply with requirements of Uniform Plumbing Code.
 - 1. Excavation of Trenches: Excavate trenches, prepare subgrade, and backfill to line and grade with sufficient room for pipe fittings, testing and inspecting operations. Do not backfill until the pipe system has been subjected to a hydrostatic test as specified.
 - 2. Depth of Trench:
 - a. Polyvinyl Chloride Pressure Line 18" min.
 - b. Polyvinyl Chloride Non-Pressure Line 12" min.
 - 3. Subsoil shall be free of all rocks over one (1) inch diameter, debris, and litter prior to use as backfill.
 - 4. Repair any leaks and replace all defective pipe or fittings until lines meet test requirements. Do not cover any lines until they have been checked and approved for tightness, quality of workmanship and materials.

5. Backfill trenches, after approval of piping, with suitable and approved material, tamping soil around pipe and thoroughly compacting all trench fills until 90% compaction has been achieved.
6. Backfill material shall be sand as indicated on the plans. Provide backfill under, around and above top of pipe for PVC plastic pipe and brass piping.
7. Pipes installed in common trench shall have a 4" minimum space between pipes.
- B. Installation of Polyvinyl Chloride Pipe:
 1. Because of the nature of plastic pipe and fittings, exercise caution in handling, loading and storing, to avoid damage.
 2. The pipe and fittings shall be stored under cover until using, and shall be transported in a vehicle with a bed long enough to allow the length of pipe to lay flat so as not be subjected to undue bending or concentrated external load at any point.
 3. Any pipe that has been dented or damaged shall be discarded unless such dent or damaged section is cut out and pipe rejoined with a coupling.
 4. Trench depth shall be as specified above from the finish grade to the top of the pipe. The bottom of the trench shall be free of rocks, clods, and other sharp-edged objects.
 5. Pipe ends and fittings shall be wiped with "MEK" primer, or approved equal, before welding solvent is applied. Welded joints shall be given a minimum of 15 minutes to set before moving or handling. All field cuts shall be beveled to remove burrs and excess material before fitting and gluing together.
 6. Pipe shall be snaked from side-to-side of trench bottom to allow for expansion and contraction.
 7. Center load pipe with small amount of backfill to prevent arching and slipping under pressure. Leave joints exposed for site observation during testing.
 8. No water shall be permitted in the pipe until site observation has been completed and a period of at least 24 hours has elapsed for solvent weld setting and curing.
 9. Plastic to metal joints shall be made with plastic male adapters, metal nipple hand tightened, plus one turn with a strap wrench.
 10. All threaded Plastic to Plastic connections shall be assembled using Teflon tape.
 11. Solvent-Weld Joints: Assemble per manufacturer's recommendations.
 12. Pipe sleeve under existing or future paving shall be installed prior to paving or re-paving and shall extend 12" beyond each side of paving edge. Sleeve shall be a minimum of two times than pipe or wire bundle it encloses. Install only one pipe per sleeve.
- C. Installation of Metal Pipe:
 1. Cut brass piping by power hacksaw, circular cutting machine using an abrasive wheel, or hand hacksaw. Cut no piping with metallic wheel cutter of any description. Ream and remove rough edges of burrs so smooth and unobstructed flow is obtained.
 2. Carefully and smoothly place thread lubricant on male thread only. Tighten screwed joints with tongs or wrenches. Caulking is not permitted.
- D. Remote Control Wiring:
 1. Direct Burial Control Wire Sizes: As shown and specified herein before.
 2. Provide one control wire and one common ground wire to service each valve in system. Provide 4 foot minimum expansion loop at each valve to permit removal and maintenance of valves.
 3. Install control wires at least 12" below finish grade and minimum of 4" from any pipe or fittings except at terminal points. All wire shall follow the pressure main insofar as possible.
 4. Install control wires and irrigation piping in common trenches wherever possible.
 5. In case of damage to any common or control wire, contractor is to run an extra common and control wire on each leg of mainline to the farthest RCV back to the controller.
 6. Control Wire Splices: Allow only on runs of more than 300-feet, splices as follows:

- a. Strip off minimum of 2-1/2" of insulation from each wire.
 - b. Twist on Scotchlok electrical spring connector, minimum four complete turns.
 - c. Seal connector in epoxy resin.
 - d. Tape completed splice with Scotch 33 electrical tape.
7. Numbering and Tagging: Identify direct burial control wires from automatic valves to terminal strips of controller at terminal strip by tagging wire with number of connected valves.
- E. Automatic Sprinkler Controller:
 1. Automatic Controller shall be installed as shown and as detailed on the plans. Controller shall be tested with complete electrical connections. The Contractor shall be responsible for temporary power to the Controller for operation and testing purposes.
 2. Connections to control wiring shall be made within automatic controller enclosure.
 3. Electrical wiring shall be on a rigid PVC plastic conduit from controller to electrical outlet. The Electrical Contractor shall be responsible for installing all wiring to the sub-panels, clocks, or elsewhere as required, in order to complete this installation.
 4. Contractor shall supply and install battery in controller to prevent loss of program.
 5. Irrigation Controller Enclosure shall be installed as shown on plans and per the manufacturer's requirements.
 6. Irrigation Controller Assembly shall be installed as shown on plans and per the manufacturer's requirements.
- F. Remote Control Valves:
 1. Install remote control valves in locations approximately as shown on the drawings, with a cover of 8 inches minimum over top of flow control stem. Fit with plastic valve box and cover.
- G. Valve Box:
 1. Install valve boxes as shown on detail. Install no more than one valve per box. Valve boxes shall be located in shrubs areas wherever possible.
- H. Sprinkler Heads:
 1. All sprinkler heads shall be installed as per details shown.
 2. Nozzle size of all heads shall be adjusted to suit any particular conditions of the area. This shall be done after the system has been thoroughly tested, immediately after written notification by the Landscape Architect to do so.
- I. Quick Coupler Assembly:
 1. Install all quick couplers as indicated on drawings. Set all valves plumb and true to finish grade and a maximum of 12 inches from paving, walks, headers or curbs, and as shown on plans and as directed.
- J. Ball and Gate Valves:
 1. Install approximately where shown and as detailed. Fit with plastic valve box and cover.
 2. Install Drip valve assembly as detail and shown on plans.
- K. Thrust Blocks and Footings:
 1. Thrust blocks and footings shall be placed on ninety-percent (90%) minimum compacted or undisturbed subgrade. Construct to shapes specified and parallel to walkways. Tool finish exposed surface.
 2. Backflow Preventer Enclosure shall be installed as shown on plans and per the manufacturer's requirements.
- L. Flow Sensor:
 1. Install Flow sensor as detailed and shown on plans.
- M. Check Valves:
 1. Unless designed as an integral part of the irrigation head, anti-drain valves will be installed under every head. The anti-drain valve will be the same diameter as the riser and integral to the riser assembly.

3.03 FLUSHING AND TESTING OF SYSTEMS:

- A. After piping and risers are in place, but prior to the installation of the sprinkler heads, a full head of water shall be used to flush out the system. After system is thoroughly flushed, cap all risers:
- B. Testing:
 - 1. General: Notify Landscape Architect in writing when testing will be conducted. Conduct tests in presence of Landscape Architect.
- C. Pressure Test:
 - 1. All pressure lines shall be tested under hydrostatic pressure of 125 lbs. per square inch and all non-pressure lines shall be tested under the existing static pressure and both be proven watertight. (Contractor to supply all equipment needed for testing.)
 - 2. Pressure shall be sustained in the lines for not less than four hours. If leaks develop, the joints shall be replaced and the test repeated until the entire system is proven watertight.
 - 3. Tests shall be observed and approved by the Landscape Architect and/or Owner prior to backfill. Backfilling trenches prior to inspection will not be allowed and all prematurely filled trenches shall be subject to reopening as directed by the Landscape Architect.
- D. Coverage Testing: Perform operational testing after hydrostatic testing is completed, backfill is in place, and sprinkler heads adjusted to final position:
 - 1. After completion of landscape work, carefully adjust heads so they will be flush with lawn areas or not more than 1/2" above finish grade or top of mulch in groundcover area.

3.04 SITE OBSERVATION VISITS BY THE ARCHITECT:

- A. In all cases where site observation visits of the irrigation system work is required and/or where portions of the work are specified to be performed under the direction and/or site observation of the Architect or his representative, the Contractor shall notify the Architect at least three (3) working days in advance of the time such site observation and/or direction is required:
- B. Site observation will be required for the following parts of the work:
 - 1. 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 any lines until they have been checked and approved.
 - 2. Upon installation and testing of valves, quick couplers, devices, automatic controllers, and control valves and wires.
 - 3. When the sprinkler system is completed prior to planting, the Contractor, in the presence of the Architect, shall perform a coverage test to determine if the coverage of water afforded the lawn and planting areas is complete and adequate. The Contractor shall furnish all materials and perform all work required to correct any inadequacies.
 - 4. Final site observation visit by the Architect and performance test shall be at the same time as the final site observation of the specified landscape maintenance period work.

3.05 RECORD DRAWINGS:

- A. Before final acceptance of work, the Contractor shall provide a "redline" record set of drawings showing the sprinkler system work:
- B. Any changes in location of items or type of installations from that shown on drawings shall be so indicated on the record drawings:
- C. Valves shall be numbered and corresponding numbers shall be shown on the record drawings:
- D. All remote control valves, shut-off valves, quick coupler valves shall be located by measured dimensions. Dimensions shall be given to permanent objects and shall be to the nearest one-half foot:
- E. On the inside surface of the cover of each Automatic Controller, prepare and mount a color-coded chart showing the valves, mainline, and sprinkler heads serviced by that particular

Controller. All valves shall be numbered to match the operation schedule and the drawings. Only those areas controlled by that Controller shall be shown. This chart shall be a plot plan, entire or partial, showing building, walks, roads and walls. A photostatic print of this plan, reduced as necessary and legible in all details, shall be made to a size that will fit into the Controller cover. This print shall be approved by the Landscape Architect and shall be hermetically sealed by plastic. This plan shall then be secured to the back of the enclosure door:

- F. Immediately upon the installation of any buried pipe or equipment, the Contractor shall indicate on the drawings the locations of said equipment. Dimensions shall be given from permanent objects such as buildings, sidewalks, curbs and driveways:

END OF SECTION 02810

SECTION 02900 - LANDSCAPE PLANTING

PART 1 - GENERAL

1.01. RELATED DOCUMENTS

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

1.02. SUMMARY

- A. This Section includes provisions for the following items:
 - 1. Trees
 - 2. Shrubs
 - 3. Groundcover
 - 4. Soil Amendments
 - 5. Finish Grading
 - 6. Maintenance Period
- B. Related sections and reference documents: The following sections and reference documents contain requirements that relate to this section.
- C. Underground sprinkler system is specified in Division 2 Section 02810, "Irrigation System."
- D. Reference Documents:
 - 1. American Joint Committee on Horticulture Nomenclature (AJCHN), standardized plant names, Latest Edition.
 - 2. American Association of Nurserymen, Inc. (AAN), American Standard for Nursery Stock, Latest Edition.
 - 3. Standard Specifications for Public Works Construction.
 - 4. Agricultural Code of California.

1.03. QUALITY ASSURANCE

- A. Subcontract landscape work to a single firm specializing in landscape work. The Contractor shall possess all licenses and permits required to perform the work including a C-27 landscaping license.
- B. Source Quality Control:
 - 1. General: Ship landscape materials with certificates of inspection required by governing authorities. Comply with regulations applicable to landscape materials.
 - 2. Do not make substitutions. If specified landscape material is not obtainable, submit proof of non-availability to Landscape Architect, together with proposal for use of equivalent material.
 - 3. Analysis and Standards: Package standard products with manufacturer's certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists, wherever applicable.
 - 4. Trees, Shrubs, and Plants: Provide trees, shrubs, and plants of quantity, size, genus, species, and variety shown and scheduled for landscape work and complying with recommendations and requirements of ANSI Z60.1 "American Standard for Nursery Stock". Provide healthy, vigorous stock, grown in recognized nursery container sizes, in accordance with good horticultural practice and free of disease, insects, eggs, larvae, and defects such as knots, sun-scald, injuries, abrasions, or disfigurement.
 - 5. Label each tree and shrub with securely attached waterproof tag bearing legible designation of botanical and common name.

6. Where formal arrangements or consecutive order of trees or shrubs are shown, select stock for uniform height and spread, and label with number to assure symmetry in planting.
7. Selection: The Landscape Architect may check trees and shrubs either at place of growth or at site before planting, for compliance with requirements for genus, species, variety, size, and quality. The Contractor shall submit photographs to Landscape Architect of typical trees (15 gal. and larger container sizes) for landscape work. Landscape Architect retains right to further check trees and shrubs for size and condition of root ball root systems, insects, injuries and latent defects, and to reject unsatisfactory or defective material at any time during progress of work. Contractor shall remove rejected trees or shrubs immediately from project site upon request.

1.04 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Plant and Material Certifications:
 1. Certificates of inspection as required by local municipality and/or governmental authorities.
 2. Manufacturer's or vendor's certified analysis for soil amendments and fertilizer materials.
 3. Label data substantiating that plants, trees, shrubs and planting materials comply with specified requirements.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Packaged Materials: Deliver packaged materials in containers showing weight, analysis, and name of manufacturer. Protect materials from deterioration during delivery and while stored at site.
- B. Trees and Shrubs: Do not prune prior to delivery unless otherwise approved by Landscape Architect. Do not bend or bind-tie trees or shrubs in such manner as to damage bark, break branches, or destroy natural shape. Provide protective covering during delivery.
- C. Do not remove container-grown stock from containers until planting time.
- D. Contractor shall provide complete care to all on-site storage of container-grown stock. All container-grown stock found to be damage during storage shall be removed and replaced at no additional cost.

1.06 JOB CONDITIONS

- A. Utilities: Determine location of underground utilities and perform work in a manner, which will avoid possible damage. Hand excavate, as required. Maintain grade stakes set by others until removal is mutually agreed upon by parties concerned.
- B. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify Landscape Architect before planting.

1.07 SEQUENCING AND SCHEDULING

- A. Planting Time: Proceed with, and complete landscape work as rapidly as portions of site become available, and shall be performed during those periods when weather and soil conditions are suitable in accordance with locally accepted horticultural practice.

1.08 SPECIAL PROJECT WARRANTY

- A. Warranty lawns and groundcovers through specified maintenance period and until final acceptance.
- B. Warranty shrubs for a period of 90 days after date of final acceptance.

- C. Warranty trees, for a period of one year after date of final acceptance against defects, including death, except for defects resulting from neglect by Owner, abuse or damage by others, or unusual phenomena or incidents, which are beyond Landscape Installer's control.
- D. Contractor shall remove and replace trees, shrubs, or other plants found to be dead or in an unhealthy condition during warranty period. Make replacements within 14 calendar days. Replace trees and shrubs, which are in doubtful condition at end of warranty period; unless, in opinion of Landscape Architect, it is advisable to extend warranty period for a full growing season.
- E. Another warranty site observation visit will be conducted at end of extended warranty period, if any, to determine acceptance or rejection. Replacement shall be the plants used for same kind and size as specified for landscape work. Replacements shall be furnished, and planted as originally specified by the contractor.

PART 2 - PRODUCTS

2.01 SOIL AMENDMENTS

- A. Commercial Fertilizer: Complete fertilizer of neutral character, with some elements derived from organic sources and containing the following percentages of available plant nutrients:
 - 1. Pre-plant Fertilizer: Provide fertilizer with not more than 6 percent total nitrogen; and not less than 20 percent available phosphoric acid and 20 percent soluble potash.
 - 2. Post-plant Fertilizer: Provide fertilizer with percentage of nitrogen required to provide not less than 6 pounds of actual nitrogen, 2 percent phosphoric acid, 4 percent potassium, 5 percent Sulfur, 20% Humic Acids (from Leonardardite) and 75% Humate (Minerals/organic matter/carbon). Post-plant fertilizer shall be Tri-C 6-2-4 or approved equal.
 - 3. Mycorrhizal Inoculum Paks, Tri-C Myo Paks
- B. Iron Sulphate, iron shall be expressed as metallic-derived from sulfate-deep green ($\text{FeSO}_4 \cdot \text{H}_2\text{O}$) a minimum analysis of 200% and 98.3% retained on a 10 mesh screen.
- C. Gypsum, agricultural grade gypsum shall be a ($\text{CaSO}_4 \cdot \text{H}_2\text{O}$) calcium sulfate 94.3%. 90% shall pass a 50 mesh screen.
- D. Soil Sulphur, shall be elemental sulphur (99.5%) commercially manufactured so that a pure sulphur product is used.
- E. Organic Soil Conditioner, shall be a product that aids the structure of the soil consisting of rapidly decaying slowly decaying, and non-decaying material. Nitrogen (organic or ammoniac) 0.5% to 0.8%, pH between 5.5 to 6.5 salinity ($\text{EC}_e \times 10^3$ at 25°C) = 2.5, organic matter more than 87% (dry weight basis). The commercial grade product used shall be Numex Lif, Loamex, or Forest Humus or approved equal by Landscape Architect.
- F. Soil Conditioner, granular, Tri-C Humate Plus, shall contain 25% Humic Acids. It shall be free flowing, suitable for application with approved equipment and shall contain the minimum available percentages of 7% calcium and 5% sulphur.
- G. Planting Backfill, shall be a thoroughly blended mixture of excavated soil from the pits and soil amendments at the following mixture soil conditioner:
 - 1. Organic Soil Conditioner 50%
 - 2. On Site Soil 50%
 - 3. Soil Conditioner 8 lbs per cubic yard mix
 - 4. Pre-plant Fertilizer 2 lbs per cubic yard mix

2.02 PLANT MATERIALS

- A. Quality: Provide trees, shrubs, and other plants of size, genus, species, and variety shown and scheduled for landscape work and complying with recommendations and requirements of ANSI Z60.1 "American Standard for Nursery Stock."
- B. Container stock (1 gal., 5 gal., 15 gal., boxes) shall have been grown in container for at least six months, but not over two years. No container plants that have cracked or broken balls of earth when taken from the container shall be planted, except upon special approval. No trees with damaged roots or broken balls shall be planted.
- C. Trees: Provide trees of height and width scheduled or shown and with branching configuration recommended by ANSI Z60.1 for type and species required, unless otherwise specified quantities shall be furnished as needed to complete work shown on drawings. Provide single stem trees except where special forms are shown or listed.
- D. Shrubs: Provide shrubs of the height and width shown or listed as required by ANSI Z60.1 for type and height of shrub required.

2.03 GROUNDCOVER MATERIALS

- A. Bark Mulch: A 3-inch minus blend created from clean and landscape trimmings. Bark mulch shall be dark colored product recommended for mulching in shrub beds. Bark mulch shall be Plant Choice Brush Mulch, Organic Recycling West Brush Mulch, or AJ Ecology Ecohumus Compost or approved equal by Landscape Architect.

2.04 GROUNDCOVER (FLATTED PLANT MATERIAL)

- A. Provide plants established and well rooted in flat removable containers, or integral peat pots and with not less than minimum number and length of runners required by ANSI Z60.1 for the pot size shown or listed.

2.05 MISCELLANEOUS LANDSCAPE MATERIALS

- A. Guying Materials: Provide 8" x 8" x 16" concrete block deadmen set 18" below grade. Provide wire ties and guys of 2-strand, twisted, pliable galvanized iron wire, not lighter than 10 ga. with zinc-coated turnbuckles. Provide not less than 1/2 inch diameter rubber or plastic hose, cut to required lengths and of uniform color, material, and size to protect tree trunks from damage by wires. Provide 1/2" dia. by 5' long white plastic pipe to cover each guy wire.
- B. Staking Material: Stakes shall be of lodgepole pine. These shall be straight shafts, shaved and cut clean and bare of branches and stubs, of uniform thickness with a minimum diameter of 2 inches, free of loose knots, splits or bends. Stakes shall be no less than ten (10) feet in length. Tree ties shall be V.I.T. cinch-tie or approved equal.

2.06 WEED CONTROL

- A. Pre-planting herbicide: Roundup or equal
- B. Pre-emergent weed control: Ronstar-G, Treflan, Eptam, Vegitex, or equal, as recommended by licensed pest control applicator.

PART 3 - EXECUTION

3.01 PREPARATION - GENERAL

- A. Lay out planting areas shall mean all areas to be planted with trees, shrubs, groundcovers and areas for multiple plantings. Stake locations and outline areas and secure Landscape Architect's acceptance before start of planting work. Make minor adjustments as may be required.
- B. All rock and other growth or debris accumulated during the duration of the project shall be removed from the site. Upon completion of all grading operations, soil samples (3 locations

min.) with identify reference shall be taken by the Contractor and analyzed by a soil laboratory. The results of these tests are to be reviewed by the Landscape Architect for any required modifications to specified soil preparation.

- C. Grading and soil preparation work shall be performed only during the period when beneficial and optimum results may be obtained. If the moisture content of the soil should reach such a level that working it would destroy soil structure, spreading and grading operations shall be suspended until the moisture content is increased or reduced to acceptable levels and the desired results are likely to be obtained.
- D. All scaled dimensions are approximate. Before proceeding with any work, carefully check and verify all dimensions and immediately inform the Landscape Architect of any discrepancy between the drawings and/or specifications and actual conditions.
- E. Quantities for plant materials are shown for convenience only, and not guaranteed. Check and verify count and supply sufficient number to fulfill intent of drawings. Certify any clarifications with the Landscape Architect. Adequately stake, barricade, and protect all irrigation equipment, manholes, utility lines, and other existing property during all phases of the soil amending planting and grading operations.
- F. Upon delivery of material and/or completion of all soil conditioning and grading but prior to initiating planting operations, the Landscape Architect with the heretofore specified signed copies of required certificates, trip slips, and invoices for soil preparation materials, shall invoice such material, comparing the total quantities of each material furnished against the total area to each operation. If the minimum rates of application have not been met, the Landscape Architect will require the distribution of additional quantities of these materials to fulfill the minimum application requirements specified at no cost to owner.

3.02 FINISH GRADING

- A. Finish Grading: Finish grades shall be as indicated on the Civil Engineer's drawings and landscape drawings.
- B. Finish grades shall be measured as the final water compacted and settled surface grades; and shall be within plus or minus 0.1 foot of the spot elevations and grade lines indicated on the drawing.
- C. Finish grades shall be measured at the top surface of surface materials.
- D. Molding and rounding of the grades shall be provided at all changes in slope.
- E. All undulations and irregularities in the planting surfaces resulting from tillage, rototilling and all other operations shall be leveled and floated out before planting operations are initiated.
- F. The Contractor shall take every precaution to protect and avoid damage to sprinkler heads, irrigation lines, and other underground utilities during his grading and conditioning operations.
- G. Final finish grades shall insure positive drainage of the site with all surface drainage away from buildings, walls, and toward roadways, drains and catch basins.
- H. Final grades shall be acceptable to the Landscape Architect before planting operations will be allowed to begin.
- I. Planting surfaces shall be graded with no less than 2 percent surface slope for positive drainage unless otherwise noted on plans.

3.03 PREPARATION FOR GROUND COVER AREAS (FLATTED PLANT MATERIAL)

- A. "Schedule of planting soil mixture:
 - 1. Organic Soil Conditioner: 6 cu. yd. per 1,000 sq. ft.
 - 2. Soil Conditioner: 75 lbs per 1,000 sq. ft.
 - 3. Pre-Plant Fertilizer: 20 lbs per 1,000 sq. ft.
 - 4. Iron Sulphate: 20 lbs per 1,000 sq. ft.
- B. Schedule of Planting Soil Mixture is for bidding purposes only. Soil test may reduce or increase total soil amendment yardage. Adjustment (plus or minus) may be necessary.

Contractor shall obtain at least three soil tests of final grade at site and submit results to Landscape Architect for interpretation and recommendation. Soil analysis services shall be provided by Sunland Analytical Labs and soil analysis kits are available by calling 800-927-3311. Contractor shall submit, in addition to his base bid; unit cost for each schedule of planting soil mixture.

3.04 PREPARATION FOR SLOPE PLANTING

- A. Soil Conditioning & Fertilizing: After the planting areas have been graded, apply soil amendments and initial fertilizers as specified.
1. Apply specified soil amendment and commercial fertilizer at rates specified.
 - a. "Schedule of planting soil mixture:
 - i. Iron Sulphate: 20 lbs per 1,000 sq. ft.
 - ii. Gypsum: 120 lbs per 1,000 sq. ft.
 - iii. Pre-Plant Fertilizer: 20 lbs per 1,000 sq. ft.
 2. Schedule of Planting Soil Mixture is for bidding purposes only. Soil test may reduce or increase total soil amendment yardage. Adjustment (plus or minus) may be necessary. Contractor shall obtain at least three soil tests of final grade at site and submit results to Landscape Architect for interpretation and recommendation. Soil analysis services shall be provided by Sunland Analytical Labs and soil analysis kits are available by calling 800-927-3311. Contractor shall submit, in addition to his base bid; unit cost for each schedule of planting soil mixture.

3.05 DEEP WATERING AND WEED CONTROL:

- A. After complete installation and testing of the irrigation system and preparation of planting areas, all planting areas shall be deep watered and compacted and settled by continuous application of irrigation water until the soil is moist to a minimum depth of 8".
- B. Care shall be taken that the rate of application of water does not cause erosion or sloughing of soils.
- C. All depressions, voids, erosion scars and settled trenches generated by the deep watering shall be filled with conditioned topsoil and brought to finish grade.
- D. Weed Control:
1. Manually remove all existing weeds and grasses and remove from site.
 2. Apply 200 lbs/acre commercial fertilizer to all planting areas. Irrigate 4 times per day during the summer season and 2 times per day during other seasons for 3 weeks to germinate seeds.
 3. Discontinue irrigation for 2 days and apply a non-selective contact herbicide, per manufacturer's direction, to eradicate germinated weeds and grasses. Allow herbicide to kill weeds and grasses. Manually remove weeds and grasses from site. Minimize soil disturbance on sloped areas of the site.
 4. If weeds and grasses still exist, irrigate 2 or 4 times per day, as above, for 2 weeks or until new growth appears. Reapply herbicide per manufacturer's direction. Allow herbicide to kill weeds and grasses. Manually remove weeds and grasses from the site.
 5. No pre-emergent herbicide shall be used in landscape areas to be seeded.
 6. Contractor shall obtain approval by the owner to apply any herbicide, insecticide, fungicide, or other chemicals to be used onsite. Contractor shall abide by all applicable governmental standards regulating the application of any chemicals, and shall follow all manufacturer's recommendations. All workers applying such chemicals shall be licensed if required by law.

3.06 EXCAVATION FOR TREES AND SHRUBS

- A. Container grown stock in cans shall be cut on two sides with an approved can cutter. Stock grown in boxes shall have bottoms removed. All used containers shall be removed to the storage areas or from the site. Each tree and shrub shall be placed in the center of the hole and shall be set plumb, remove sides of boxes where required, and held rigidly in position until the planting backfill has been tamped from around each root ball.
- B. For container grown stock, excavate as specified for size of container width and depth.
- C. Dispose of excess subsoil removed from planting excavations.
- D. Fill excavations for trees and shrubs with water and allow water to percolate out prior to planting.

3.07 PLANTING TREES AND SHRUBS

- A. Set container grown stock as specified, cut cans on 2 sides with an approved can cutter; remove bottoms of wooden boxes after partial backfilling so as not to damage root balls. All used containers shall be removed to the storage areas or from the site. Each tree and shrub shall be placed in the center of the hole and shall be set plumb and held rigidly in position until the planting backfill has been tamped from around each root ball.
- B. All plants shall be set at such a level that after settling, they bear the same relationship to the surrounding finish grade as they bore to the soil line grade in the container.
- C. Planting tablets shall be placed in each tree planting hole at the following rate:
 - 1. 1-pak per 1 gallon container.
 - 2. 3-paks per 5 gallon container.
 - 3. 8-paks per 15 gallon container.
 - 4. 1-pak per each 2.5 inch of box size
- D. No plant will be accepted if the root ball is broken or cracked; either before, during or after the process of installation.
- E. Water basin shall be formed around each tree and shrub per detail. All plants shall be thoroughly watered into the full depth of each plant hole immediately after planting.
- F. Prune, thin out, and shape trees and shrubs in accordance with standard horticultural practice. Prune trees to retain required height and spread. Unless otherwise directed by Landscape Architect, do not cut tree leaders, and remove only injured or dead branches from flowering trees, if any. Prune trees and shrubs to retain natural character.
- G. Remove and replace excessively pruned or malformed stock resulting from improper pruning.
- H. Guy and stake trees immediately after planting, as indicated. All trees, 36" box and smaller shall be staked (or guyed) as indicated on drawings. The stakes shall be driven in plumb and secure. Special care shall be taken that the driving in of the stake does not damage the tree roots or root ball. Tree ties shall be fastened per detail.

3.08 PLANTING GROUND COVER (FLATTED PLANT MATERIAL)

- A. Space ground cover plants as indicated or scheduled.
- B. Dig holes large enough to allow for spreading of roots and backfill with planting soil. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water. Water thoroughly after planting taking care not to cover crowns of plants with wet soils.

3.09 PLACEMENT OF BARK MULCH

- A. Bark mulch shall be spread evenly throughout shrub beds as indicated on the plans. Contractor shall subgrade area adjacent to paving so that bark mulch will be flush with top of adjacent edge of paving. Provide not less than following thickness of bark mulch in planting areas specified.
- B. Provide a 2-inch thickness of bark mulch.

3.10 POST FERTILIZATION

- A. Post Fertilization for all lawn and ground cover areas (Tri-c 6-2-4) shall occur 45 days after planting at a rate of 10 lbs. per 1,000 sq. ft.
- B. Post Fertilization for all shrubs and trees (Tri-c 6-2-4) shall occur 45 days after planting at a rate of 10 lbs. per 1,000 sq. ft.:
 - 1. Shrubs: Sprinkle $\frac{1}{4}$ cup evenly around dripline and work into top 1 inch of soil.
 - 2. Tress: Apply $\frac{1}{2}$ lb. Per 1 inch of trunk diameter. Distribute evenly under branches out to dripline.

3.11 MAINTENANCE PERIOD

- A. The Maintenance Period begins on the first day after all landscape and irrigation work and all other indicated or specified work on this project is complete, checked, accepted and written approval from the Landscape Architect is given to begin the Maintenance Period.
- B. The Contractor shall continuously maintain all involved areas of the Contract during the progress of the work and during the Maintenance Period until the Final Acceptance of the work.
- C. Regular planting maintenance operations shall begin immediately after each plant or lawn is planted. Plants and lawns shall be kept in a healthy, growing condition and in a visually pleasing appearance by watering, pruning, mowing, rolling, trimming, edging, fertilizing, re-staking, pest and disease control, spraying, weeding, cleaning-up and any other necessary operation.
- D. The maintenance period shall continue until final acceptance, but under no circumstances less than following period:
 - 1. 60 days after substantial completion of planting.
- E. The Contract completion date of the Contract Maintenance Period will be extended when in the opinion of the Landscape Architect, improper maintenance and/or possible poor or unhealthy condition of planted material or unestablished, non-covering lawns are evident at the termination of the scheduled Maintenance Period. The Contractor shall be responsible for additional maintenance of the work at no change in Contract price until all of the work is completed and acceptable.
- F. The Contractor shall be responsible for maintaining adequate protection of the areas. Damaged areas shall be repaired immediately at the Contractor's expense.
- G. Maintain trees, shrubs, and other plants by pruning, cultivating, and weeding as required for healthy growth. Restore planting water basins. Tighten and repair stake and guy supports and reset trees and shrubs to proper grades or vertical position as required. Spray as required to keep trees and shrubs free of insects and disease.
- H. Permanent post construction BMP devices shall not be removed or modified without the approval of the Landscape Architect.

3.12 CLEANUP AND PROTECTION

- A. During landscape work, keep pavements clean and work area in an orderly condition.
- B. Protect landscape work and materials from damage due to landscape operations, operations by other Contractors and trades, and trespassers. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged landscape work as directed.
- C. Contractor shall provide and incorporated all Best Management Practices (BMP), Storm Water Pollution Prevention Plan (SWPPP) and erosion and sediment control as described in the project conditions or required by local and state requirement.

3.13 SITE OBSERVATION VISITS:

- A. Site observation visits herein specified shall be made by the Landscape Architect. The Contractor shall request site observation a minimum of 24 hours in advance.
- B. Site observation will be required for the following parts of the work:

1. Incorporation of soil conditioner and fertilizer into the soil
 2. Upon completion of finish grading prior to planting
 3. Approval of plant materials
 4. When trees and shrubs are spotted in place for planting, but before planting holes are excavated.
 5. When planting, and all other indicated or specified work, except the Maintenance Period, has been completed. Acceptance and written approval shall establish beginning of the Maintenance Period.
 6. Final site observation visit at the completion of the Maintenance Period. This site observation visit shall establish the beginning date for the warranty period of plant material.
 7. Upon completion of the warranty period.
- C. Acceptance: Upon completion of the final site observation visit and the work of this section, the Contractor will be notified in writing (1) whether the work is acceptable; (2) of any requirements necessary for completion and acceptance.
- D. This Contractor or his authorized representative shall be onsite at the time of each site observation visit by the Landscape Architect.

END OF SECTION 02900

SECTION 16130-RACEWAY BOXES FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the following:
 - 1. Rigid polyvinyl chloride conduit (PVC)
 - 2. Galvanized intermediate metal conduit (IMC) or galvanized rigid steel (RGS)
 - 2. Pull Boxes

1.2 SUBMITTALS

- A. Provide shop drawings and/or catalog data sheets for each type of conduit and box type.
- B. Submit conduit layout drawings showing sections/elevations.

1.3 PROJECT AS-BUILT

- A. Record actual routing and elevations of underground conduit and locations and sizes of pull boxes.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Accept conduit on site. Inspect for damage.
- B. Protect conduit from entrance of debris by storing above grade.
- C. Protect PVC conduit from sunlight by providing appropriate cover.

1.5 FIELD CONDITIONS

- A. Verify routing and termination locations of conduit and boxes prior to rough-in.
- B. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.
- C. Pull Boxes installed outdoor, in-grade, and within the roadway Right of Way shall be labeled per Drawings.

PART 2 - PRODUCT

2.1 RIGID POLYVINYL CHLORIDE CONDUIT (PVC)

- A. PVC shall be Schedule 40. The polyvinyl-chloride plastic compound shall meet, as a minimum, ASTM D1784 cell classification PVC 12233-A, B, or C. PVC shall be rated for direct sunlight exposure, 90°C wire, and fire retardant with low smoke emission.
- B. Standards:
 - 1. ANSI C33.91.
 - 2. NEMA TC-2.
 - 3. UL 651.

2.2 INTERMEDIATE METAL CONDUIT (IMC)

- A. IMC shall be manufactured from high grade mild steel with continuous welded seam and have a metallic zinc coating applied by hot-dip galvanizing or electro-galvanizing. IMC shall be internally coated with a baked lacquer, varnish, or enamel for a smooth surface

B. Threads shall be galvanized after cutting.

C. Standards:

1. UL 1242.
2. ANSI C80.6

2.3 RIGID GALVANIZED STEEL CONDUIT (RGS)

A. RGS shall be manufactured from high strength steel with continuous welded seam and shall have an external and internal metallic zinc coating applied by hot-dip galvanizing or electro-galvanizing.

B. Threads: Galvanized after cutting.

C. Standards:

1. ANSI C80.1

2.4 CONDUIT FITTINGS AND ACCESSORIES

A. Fittings for Use with RGS and/or IMC:

1. Materials: Following minimum requirements unless otherwise noted.
 - a) Body: Malleable iron, zinc- or cadmium-plated; steel, hot-dipped galvanized; or steel zinc plated with aluminum lacquer or aluminum enamel finish.
 - b) Covers: Malleable iron, zinc plated and gasketed.
 - c) Gaskets: Neoprene or PVC.
 - d) Insulators-phenolic, thermosetting: minimum 105 Deg C UL rating.
 - e) Grounding saddles tin-plated copper or bronze suitable for use with copper and aluminum conductors.
 - f) Bonding jumpers: Tinned copper flexible braid.
 - g) Locknuts: Malleable iron, zinc plated.
2. All fittings: Threaded unless otherwise noted.
3. Conduit Hubs shall be cast aluminum with insulated throat.
4. Straight couplings: Same material and finish as the conduit with which they are used.
5. Expansion and/or Deflection couplings:
 - a) 2 or 4IN nominal straight-line conduit movement in either direction.
 - b) 30-degree nominal deflection from the normal in all directions.
 - c) Watertight.
 - d) Insulating bushing.
 - e) End couplings/hubs - bronze; or steel zinc-plated with aluminum cellulose lacquer finish.
 - f) Outer jacket-neoprene.
 - g) Jacket clamps-stainless steel.
 - h) Inner sleeve (when used) - molded plastic.
6. Service entrance heads:
 - a) Weather resistant.
 - b) Body: Malleable iron, hot-dipped galvanized or copper-free aluminum.

7. Mogul pulling elbows and tees:
 - a) Die cast copper free aluminum.
 - b) Rain tight.
8. Conduit seals:
 - a) Drain and breather: Stainless steel or brass.
 - b) Fiber and sealing compound: UL listed for use with the sealing fitting.
9. Standards:
 1. UL 6
 2. UL 1242
 3. ANSI C80.1 (RGS)
 4. ANSI C80.6 (IMC)
 5. ARTICLE 342

B. Fittings for Use with PVC:

1. Fittings shall be of the same material, thickness, and construction as the conduits with which they are used.
 - a) Standards:
 1. UL 651.
 2. NEMA TC-2
2. Solvent cement for welding fittings shall be supplied by the same manufacturer as the conduit and fittings.
 - a) Shall not be more than 1 year past date of manufacture.
 - b) Standard: ASTM D2564.

2.5 PULL BOXES

A. Construction:

1. Type No. 3 ½ Pull Box (15-3/8" x 10-1/8")
2. Comply with Caltrans Standard Specifications Section 86-2.06

PART 3 – EXECUTION

3.1 GENERAL

- A. All wires for power, lighting, systems, and controls shall be installed in conduit. Conduit shall be of the sizes required to accommodate the number of conductors in accordance with the National Electrical Code, or as noted on the drawings. The sizes shown on the plans may be increased if approved to facilitate the pulling of conductors. The minimum conduit size shall be one inch (1"), unless noted otherwise.
- B. Clearly identify Schedule 40 PVC conduit may be used under concrete slabs, grasses and parking lot areas, and buried to a minimum depth of twenty-four inches (24"). All stub-ups up through concrete or out of the ground shall be RGS or IMC. PVC raceways shall not be used where exposed.
- C. Install PVC conduit in accordance with manufacturer's instructions.
- D. RGS (Rigid Galvanized Steel Conduit) or IMC (Galvanized Intermediate Metal Conduit) shall be used where conduit is exposed and subjected to the weather or possible physical damage. All RGS/IMC runs shall be terminated with an insulated throat threaded steel bushing.

- E. Conduit shall be installed at a minimum of 24 inches below final grade.
- F. All raceways above slab or ground shall be metallic.
- G. Provide a pull wire in all empty raceways. Pull wire shall be 3/16" polypropylene or equal.
- H. There shall be no bends exceeding 90 degrees in any run of conduit.
- I. No aluminum raceways will be accepted.
- J. Backfill shall be compacted to 95%

3.2 CONDUITS

- A. Conduit: 1" unless otherwise specified or noted.
- B. Conduit route: Per plan whenever possible or as best dictated by field conditions.
- C. Cut conduit square using saw or pipe cutter; de-burr cut ends.
- D. Join PVC conduit using adhesives as recommended by manufacturer.
- E. Conduit must maintain a minimum of 5 ft. clearance with parallel utilities and 1 ft. at utility crossings.
- F. Conduit must maintain a minimum of 1 ft. clearance with footers, foundations and tree root balls.

3.3 PULL BOXES

- A. Install within five (5) feet of each streetlight unless within 10 feet of utility company service point.
- B. Install on both sides of street crossings.
- C. Install within 10 feet of utility service point.
- D. Install every 190 feet or as indicated on the Drawings.
- E. The bottom of the pull box shall rest firmly on a six (6) inch-thick bed of one-inch crushed rock extending six (6) inches beyond the outside edges of the pull box.
- F. Pull boxes shown in the vicinity of curbs shall be placed adjacent to the back of the curb, and where practical, shall be installed with the short side parallel to the curb.
- G. Pull boxes shall not be installed in any part of a driveway or other traveled way unless approved by the Public Works Inspector.
- H. A steel "traffic-rated" cover shall be provided on any pull box installed in a travel way or driveway.
- I. Pull box covers shall be labeled as noted on the Drawings.

PART 4 – MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

- A. The determination of quantities of work performed under the contract will be made by the Engineer, based upon the lines and grades as shown on the plans and as given during the progress of the work or by measurements made by the Engineer.
- B. Underground electric conduit shall be measured as linear feet as shown on the drawings and as determined by the Engineer.
- C. Fittings, pull boxes, and accessories shall be measured as each unit as shown on the drawings and as determined by the Engineer.

4.02 CHANGE ORDERS

The Contractor's claims for extra work will not be paid unless the extra work covered by such claims was authorized by a change order.

END OF SECTION 16130

SECTION 16400-LOW VOLTAGE DISTRIBUTION SYSTEMS

PART 1 GENERAL

1.01 SCOPE

- A. The Contractor shall furnish and install the panelboard as specified and as shown on the contract drawings.

1.02 RELATED SECTIONS

- A. Section 16410 – Enclosed Switches and Circuit Breakers

1.03 REFERENCES

- A. The panelboard and all components shall be designed, manufactured and tested in accordance with the latest applicable standards of NEMA and UL as follows:
 - 1. UL 67 – Panelboards
 - 2. UL 50 – Cabinets and boxes
 - 3. NEMA PB1
 - 4. Fed. Spec. W-P-115C
 - 5. Circuit breaker – Type I class I

1.04 SUBMITTALS

- A. The following information shall be submitted to the Engineer:
 - 1. Breaker layout drawing with dimensions indicated and nameplate designation
 - 2. Component list
 - 3. Conduit entry/exit locations
 - 4. Assembly ratings including:
 - a. Short-circuit rating
 - b. Voltage
 - c. Continuous current
 - 5. Cable terminal sizes
 - 6. Product data sheets
- B. Where applicable, the following additional information shall be submitted to the Engineer:
 - 1. Key interlock scheme drawing and sequence of operations

1.05 SUBMITTALS – FOR CONSTRUCTION

- A. The following information shall be submitted for record purposes:
 - 1. Final as-built drawings and information for items listed in Paragraph 1.04, and shall incorporate all changes made during the installation process
 - 2. Installation information
 - 3. Seismic certification and equipment anchorage details as specified

1.06 QUALIFICATIONS

- A. The manufacturer of the assembly shall be the manufacturer of the major components within the assembly.
- B. For the equipment specified herein, the manufacturer shall be ISO 9001 or 9002 certified.
- C. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of five (5) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.
- D. Provide Seismic tested equipment as follows:
 - 1. The equipment and major components shall be suitable for and certified to meet all applicable seismic requirements of the California Building Code (CBC) through zone 4 application. Guidelines for the installation consistent with these requirements shall be provided by the switchgear manufacturer and be based upon testing of representative equipment. The test response spectrum shall be based upon a 5% minimum damping factor, CBC: a peak of 2.15g's, and a ZPA of 0.86g's applied at the base of the equipment. The tests shall fully envelop this response spectrum for all equipment natural frequencies up to at least 35 Hz.
 - 2. The following minimum mounting and installation guidelines shall be met, unless specifically modified by the above referenced standards.
 - a. The Contractor shall provide equipment anchorage details, coordinated with the equipment mounting provision, prepared and stamped by a licensed civil engineer in the state. Mounting recommendations shall be provided by the manufacturer based upon approved shake table tests used to verify the seismic design of the equipment.
 - b. The equipment manufacturer shall certify that the equipment can withstand, that is, function following the seismic event, including both vertical and lateral required response spectra as specified in above codes.
 - c. The equipment manufacturer shall document the requirements necessary for proper seismic mounting of the equipment. Seismic qualification shall be considered achieved when the capability of the equipment, meets or exceeds the specified response spectra.

1.07 REGULATORY REQUIREMENTS

- A. The panelboards shall be UL labeled.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Equipment shall be handled and stored in accordance with manufacturer's instructions. One (1) copy of these instructions shall be included with the equipment at time of shipment.

1.09 OPERATION AND MAINTENANCE MANUALS

- A. Equipment operation and maintenance manuals shall be provided with each assembly shipped and shall include instruction leaflets, instruction bulletins and renewal parts lists where applicable, for the complete assembly and each major component.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Eaton / Cutler-Hammer products or equal.

The listing of specific manufacturers above does not imply acceptance of their products that do not meet the specified ratings, features and functions. Manufacturers are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the Engineer ten (10) days prior to bid date.

2.02 RATINGS

- A. Panelboards rated 240 Vac or less shall have short-circuit ratings as shown on the drawings or as herein scheduled, but not less than 10,000 amperes RMS symmetrical.
- B. Panelboards shall be labeled with a UL short-circuit rating. When series ratings are applied with integral or remote upstream devices, a label or manual shall be provided. It shall state the conditions of the UL series ratings including:
1. Size and type of upstream device
 2. Branch devices that can be used
 3. UL series short-circuit rating

2.03 CONSTRUCTION

- A. Interiors shall be completely factory assembled. They shall be designed such that switching and protective devices can be replaced without disturbing adjacent units and without removing the main bus connectors.
- B. Trims for branch circuit panelboards shall be supplied with a hinged door over all circuit breaker handles. Doors in panelboard trims shall not uncover any live parts. Doors shall have a semi flush cylinder lock and catch assembly. Door-in-door trim shall be provided. Both hinged trim and trim door shall utilize three point latching. No tools shall be required to install or remove trim. Trim shall be equipped with a door-actuated trim locking tab. Equip locking tab with provision for a screw such that removal of trim requires a tool, at the owner's option. Installation shall be tamper resistant with no exposed hardware on the panelboard trim.
- C. Distribution panelboard trims shall cover all live parts. Switching device handles shall be accessible.
- D. Surface trims shall be same height and width as box. Flush trims shall overlap the box by 3/4 of an inch on all sides.
- E. A directory card with a clear plastic cover shall be supplied and mounted on the inside of each door.
- F. All locks shall be keyed alike.

2.04 BUS

- A. Main bus bars shall be tin-plated aluminum sized in accordance with UL standards to limit temperature rise on any current carrying part to a maximum of 65 degrees C above an ambient of 40 degrees C maximum.

- B. Full-size (100%-rated) insulated neutral bars shall be included for panelboard shown with neutral. Bus bar taps for panels with single-pole branches shall be arranged for sequence phasing of the branch circuit devices. Neutral busing shall have a suitable lug for each outgoing feeder requiring a neutral connection. 200%-rated neutrals shall be supplied for panels designated on drawings with oversized neutral conductors.

2.05 DISTRIBUTION PANELBOARDS – CIRCUIT BREAKER TYPE

- A. Distribution panelboards with bolt-on devices contained therein shall have interrupting ratings as specified herein or indicated on the drawings. Panelboard shall be fully rated. Panelboard shall be Cutler-Hammer type Pow-R-Line 3a or equal. Panelboard shall have molded case circuit breakers as indicated below.
- B. Where indicated, provide circuit breakers UL listed for application at 100% of their continuous ampere rating in their intended enclosure.

2.06 MAIN AND FEEDER PROTECTIVE DEVICESMOLDED CASE CIRCUIT BREAKERS – 1200 A AND BELOW

- A. Protective devices shall be molded case circuit breakers with inverse time and instantaneous tripping characteristics and shall be Eaton or approved equal.
- B. Circuit breakers shall be operated by a toggle-type handle and shall have a quick-make, quick-break over-center switching mechanism that is mechanically trip-free. Automatic tripping of the breaker shall be clearly indicated by the handle position. Contacts shall be nonwelding silver alloy and arc extinction shall be accomplished by means of DE-ION arc chutes. A push-to-trip button on the front of the circuit breaker shall provide a local manual means to exercise the trip mechanism.
- C. Circuit breakers shall have a minimum symmetrical interrupting capacity as indicated on the drawings.
- D. Circuit breakers 225ampere frame and below shall be have thermal-magnetic trip units and inverse time-current characteristics.
- E. Ground fault protection shall be provided where indicated.
- F. Where indicated circuit breakers shall be UL listed for series application.
- G. Where indicated circuit breakers shall be current limiting.

2.07 ENCLOSURE

- A. Enclosures shall be at least 20 inches wide made from galvanized steel. Provide minimum gutter space in accordance with the National Electrical Code. Where feeder cables supplying the mains of a panel are carried through its box to supply other electrical equipment, the box shall be sized to include the additional required wiring space. At least four interior mounting studs with adjustable nuts shall be provided.
- B. Enclosures shall be provided with blank ends.
- C. Where indicated on the drawings, branch circuit panelboard shall be column width type.
- D. NEMA TYPE 3R rated for outdoor use.

2.08 NAMEPLATES

- A. Provide an engraved nameplate for each panel section.

2.09 FINISH

- B. Surfaces of the trim assembly shall be properly cleaned, primed, and a finish coat of gray ANSI 61 paint applied.

PART 3 EXECUTION

3.01 FACTORY TESTING

- A. The following standard factory tests shall be performed on the equipment provided under this section. All tests shall be in accordance with the latest version of NEMA and UL standards.

3.02 INSTALLATION

- A. The Contractors shall install all equipment per the manufacturer's recommendations and the contract drawings.

PART 4 – MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

- D. Panelboard shall be measured as each unit as shown on the drawings and as determined by the Engineer.

4.3 CHANGE ORDERS

The Contractor's claims for extra work will not be paid unless the extra work covered by such claims was authorized by a change order.

END OF SECTION 16400

SECTION 16410-ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 – GENERAL

1.1 SUMMARY

A. This section includes the following:

1. Individually mounted circuit breakers, rated 600 V and less, used for disconnecting and protection functions.

1.2 SUBMITTALS

- A. Product Data: For each type of circuit breaker indicated.
- B. Field quality-control test reports.
- C. Operation and maintenance data.

1.3 QUALITY ASSURANCE

- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- E. Source Limitations: Obtain circuit breakers through one source from a single manufacturer.
- F. Comply with NFPA 70.

PART 2 - PRODUCT

2.1 MANUFACTURER

- A. Eaton / Cutler-Hammer products or equal

The listing of specific manufacturers above does not imply acceptance of their products that do not meet the specified ratings, features and functions. Manufacturers listed above are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the Engineer ten (10) days prior to bid date.

2.2 MOLDED CASE CIRCUIT BREAKERS – 1200 A AND BELOW

- A. Protective devices shall be molded case circuit breakers with inverse time and instantaneous tripping characteristics and shall be Eaton or approved equal.
- B. Circuit breakers shall be operated by a toggle-type handle and shall have a quick-make, quick-break over-center switching mechanism that is mechanically trip-free. Automatic tripping of the breaker shall be clearly indicated by the handle position. Contacts shall be nonwelding silver alloy and arc extinction shall be accomplished by means of DE-ION arc chutes. A push-to-trip button on the front of the circuit breaker shall provide a local manual means to exercise the trip mechanism.

- C. Circuit breakers shall have a minimum symmetrical interrupting capacity as indicated on the drawings.
- D. Circuit breakers 225 ampere frame and below shall have thermal-magnetic trip units and inverse time-current characteristics.
- E. Circuit breakers 225 ampere through 1200-ampere frame shall have microprocessor-based rms sensing trip units.
- F. Ground fault protection shall be provided where indicated.
- G. Where indicated circuit breakers shall be UL listed for series application.
- H. Where indicated circuit breakers shall be current limiting.
- I. Where indicated provide UL listed circuit breakers for applications at 100% of their continuous ampere rating in their intended enclosure.

2.3 TRIP UNITS

- A. Each molded case circuit breaker microprocessor-based tripping system shall consist of three (3) current sensors, a trip unit and a flux-transfer shunt trip. The trip unit shall use microprocessor-based technology to provide the adjustable time-current protection functions. True rms sensing circuit protection shall be achieved by analyzing the secondary current signals received from the circuit breaker current sensors, and initiating trip signals to the circuit breaker trip actuators when predetermined trip levels and time-delay settings are reached. The trip unit shall be Eaton type Digitrip 310, Digitrip 310+ or approved equal.
- B. An adjustable trip setting dial mounted on the front of the trip unit, or interchangeable ratings plugs shall establish the continuous trip ratings of each circuit breaker. Rating plugs shall be fixed or adjustable as indicated. Rating plugs shall be interlocked so they are not interchangeable between frames, and interlocked such that a breaker cannot be closed and latched with the rating plug removed.
- C. System coordination shall be provided by the following microprocessor-based time-current curve shaping adjustments:
 - 1. Adjustable long-time setting (set by adjusting the trip setting dial or rating plug)
 - 2. Adjustable short-time setting and delay with selective curve shaping
- D. The microprocessor-based trip unit shall have both powered and unpowered thermal memory to provide protection against cumulative overheating should a number of overload conditions occur in quick succession.
- E. When the adjustable instantaneous setting is omitted, the trip unit shall be provided with an instantaneous override.
- F. Where internal ground fault protection is specified, adjustable settings shall not exceed 1200 amperes. Provide neutral ground fault sensor for four-wire loads.
- G. Breakers shall have built-in test points for testing the long-time delay, instantaneous, and ground fault functions of the breaker by means of a test set.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Identify components; provide warning signs as specified in Division 16 Section "Basic Electrical Materials and Methods."

3.2 FIELD QUALITY CONTROL

- G. Testing: After installing disconnect switches and circuit breakers and after electrical circuits have been energized, demonstrate product capability and compliance with requirements.
- H. Inspections and Tests for Switches and Circuit Breakers: Make internal and external inspections and perform tests, including the following:
 - 1. Inspect for freedom from physical damage, proper unit rating, mechanical condition, enclosure integrity, cover operation, unit anchorage, clearances, and tightness of electrical connections. If a loose electrical connection is observed on any unit, check each electrical connection for each switch and circuit breaker with a torque wrench for compliance with manufacturer's torquing instructions.
 - 2. Test insulation resistance of each pole, phase-to-phase, and phase-to-ground, following manufacturer's written instructions. Use 500-V minimum test voltage for units and circuits rated up to 250 V, 1000-V minimum test voltage for units rated more than 250 V. Measured insulation resistance must be 25 megohms, minimum, for switches rated up to 250 V, and 100 megohms, minimum, for switches rated more than 250 V.
 - 3. Test cover and other interlocks and interlock release devices for proper operation.
- I. Additional Inspections and Tests for Circuit Breakers: Include the following:
 - 1. Inspect for proper frame, trip, and fault current interrupting rating.
 - 2. Test shunt trip devices, circuits, and actuating components for proper operation.
- J. Correct defective and malfunctioning units on-site, where possible, and reinspect and retest to demonstrate compliance; otherwise, remove and replace with new units and retest.

PART 4 – MEASUREMENT AND PAYMENT

4.4 MEASUREMENT

- E. Circuit breaker shall be measured as each unit as shown on the drawings and as determined by the Engineer.

4.5 CHANGE ORDERS

The Contractor's claims for extra work will not be paid unless the extra work covered by such claims was authorized by a change order.

END OF SECTION 16410

SECTION 16520-EXTERIOR LIGHTING UNITS

PART 1 – GENERAL

1.01 SUMMARY

- A. This section includes the following:
 - 1. Exterior luminaires with lamps and ballast.
 - 2. Poles and accessories

1.02 DEFINITIONS

- A. MH: Metal Halide
- B. Luminaire: A complete lighting unit, including ballast housing. Luminaires include a lamp or lamps and parts required to distribute the light, position and protect lamps, and connect lamps to the power supply. Also called a Fixture.
- C. Pole: Luminaire support structure, including tower used for large area illumination.
- D. Standard: A raised source of light.
- E. Full Cutoff: No direct uplight emitted from the fixture (0% light output at 90° from vertical (nadir) and <10% at 80° from vertical (nadir)).

1.03 STRUCTURAL ANALYSIS CRITERIA FOR POLE SELECTION

- A. Dead Load: Weight of luminaire and its horizontal and vertical supports, lowering devices, and supporting structure, applied as stated in AASHTO LTS-4
- B. Live Load: Single load of 500lbs, distributed as stated in AASHTO LTS-4
- C. Ice Load: Load of 3lbs/sq.ft., applied as stated in AASHTO LTS-4
- D. Wind Load: Pressure of wind on pole and luminaire, calculated and applied as stated in AASHTO LTS-4.
 - 1. Wind speed for calculating wind load for poles is 100 mph

1.04 SUBMITTALS

- A. Product Data: For each luminaire, pole, and support component, arranged in order of lighting unit designation. Include data on features, accessories, finishes and the following. (Note: Where substitute lighting equipment and devices are proposed, the contractor shall be responsible for submitting a complete lighting level study to satisfy that the substitute equipment is equivalent to what was specified.):
 - 1. Physical description of luminaire, including materials, dimensions, effective projected area (EPA), and verification of indicated parameters.
 - 2. Details of attaching luminaires and accessories.
 - 3. Details of installation and construction.

4. Luminaire materials.
 5. Photometric data based on laboratory test of each luminaire type, complete with indicated lamps, drivers, and accessories.
 - a. For indicated luminaires, photometric data shall be certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.
 - b. Photometric data shall be certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.
 6. Ballast, including energy-efficiency data.
 7. Lamps, including life, output, and energy efficiency data.
 8. Materials, dimensions, and finishes of poles.
 9. Means of attaching luminaires to supports, and indication that attachment is suitable for components involved.
 10. Anchor bolts for poles.
 11. Pole base and bolt requirements and special installation instructions.
 12. Maintenance data for products for inclusion in Operating and Maintenance Manual.
- B. Shop Drawings:
1. Anchor-bolt templates keyed to specific poles and certified by manufacture.
 2. Design calculations, certified by a qualified professional engineer, indicating strength of screw foundations and soil conditions on which they are based.
 3. Wiring diagrams: Power and control wiring.
- C. Pole and support component certificates: signed by manufacturers of poles, certifying that products are designed for indicated load requirements in AASHTO LTS-4 and that load imposed by luminaire has been included in design.
- D. Qualification Data: For agencies providing photometric data for lighting fixtures.
- E. Field quality-control test reports.
- F. Operation and Maintenance Data: For luminaires and poles to include in emergency, operation, and maintenance manuals.
- G. Warranty: Special warranty specification in this Section.

1.05 QUALITY ASSURANCE

- A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by manufacturers' laboratories that are accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products.
- B. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7

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- C. **Manufacturer's Qualifications:** The manufacturer(s) shall be regularly engaged in the manufacture of exterior lighting units of the types and sizes required, whose products have been in satisfactory use in similar service for not less than ten (10) years.
- D. **Installer's Qualifications:** The installer shall have at least three (3) years successful installation experience on projects with similar external lighting units. Submit proof when requested by the project owner.
- E. **Listing and Labeling:** All luminaires and accessories shall be listed and labeled for their indicated use and location by a "nationally recognized testing laboratory" as defined in OSHA Regulation 1910.7. The terms "listed" and "labeled" are defined in the National Electrical Code, Article 100.
- F. **Comply with IEEE C2, "National Electrical Safety Code."**
- G. **Comply with NFPA 70.**

f. DELIVERY, STORAGE, AND HANDLING

- A. **Inspect poles and luminaires for visual damage.** All damaged poles and luminaires must be repaired or replaced by the contractor prior to installation. Whether damaged poles and luminaires are repaired or replaced shall be at the discretion of the project owner.
- B. **Store luminaires in original containers and as directed by the manufacturer.** Store poles on decay-resistant treated skids at least 1 ft. above grade and vegetation. Support poles to prevent distortion and arrange to provide free air circulation.
- C. **Retain factory-applied pole wrappings until just before pole installation.** Handle poles with web fabric straps or special rope used for this purpose.

g. WARRANTY

- A. **Submit manufacturer's and installer's warranty** stating that all lighting equipment furnished under this contract shall be guaranteed against defective design, materials, and workmanship for the full warranty time, which is standard with the manufacturer or supplier, but in no case less than one year from the date of system acceptance. Pole finish of lighting units shall have a warranty period of one year minimum. The warranty shall be mutually executed by the manufacturer and the installer, agreeing to replace light poles and luminaires exhibiting damages such as cracks and failure of finish. Finishes shall be warranted against perforation or erosion due to weathering. Color retention shall be warranted against fading, staining, and chalking due to effects of weather and solar radiation.

PART 2 – PRODUCTS

2.01 LUMINAIRE COMPONENTS, GENERAL REQUIREMENTS

- A. **Luminaires shall comply with UL 1598 and be listed and labeled for installation in wet locations by NRTL acceptable to authorities having jurisdiction.**
- B. **Comply with IESNA RP-8 for parameters of lateral light distribution patterns indicated for luminaires.**
- C. **Metal Parts: Free of burrs and sharp corners and edges**

- D. Sheet Metal Components: Corrosion-resistance aluminum, unless otherwise indicated. Form and support to prevent warping and sagging.
- E. Housing: Rigidly formed, weather- and light-tight enclosures that will not warp, sag, or deform in use.
- F. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of specialty tools. Designed to prevent door, frames, lenses, diffusers and other components from failing accidentally during relamping and when secured in operating position. Doors shall be removable for cleaning or replacing lenses.
- G. Exposed Hardware Material: Stainless steel.
- H. Plastic Parts: Resistant to yellowing and other changes due to aging and exposure to heat and UV radiation.
- I. Lenses and Refractors: Materials are indicated on drawings. Use heat- and aging-resistant, resilient gaskets to seal and cushion lens and refractor mounting in fixture doors.
- J. Luminaire Finish: Manufacturer's standard finish applied to factory-assembled and tested luminaire before shipping. Where indicated, match finish process and color of pole or support material.
- K. Photoelectric Controls: Materials and controls will be indicated on drawings.

2.02 LAMP

- A. Luminaires: Conform to UL 1598, "Luminaires"
 - 1. Lamp to be Pulse Start Metal Halide
 - 2. Color temperature of 3,600 K
 - 3. Optics: Wide, uniform beam (7x6) with twin parabolic batwing reflectors.
 - 4. Housing: Die cast aluminum, door with bottom hinge and 2 3/8" O.D. cast aluminum slipfitter or three hole mounting pattern (based on fixture type).
 - 5. Finish: factory standard bronze powder paint.
 - 6. Ballast: Shall be HPF 277v 50Hz, Quad-Tap

2.03 POLES AND SUPPORTING COMPONENTS, GENERAL REQUIREMENTS

- A. Pole-Mounted Luminaires: Conform to AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals."
- B. Wind-Load Strength: 100 mph (160.9 km/h) and 1.3 gust factor for total support assembly, including pole, base, and anchorage, where used, to carry the fixtures, supports, and appurtenances at the indicated heights above grade without deflection or whipping.
- C. Vibration dampers shall not be utilized.
- D. Arm, Bracket, and Tenon Mount Materials: Match requirements of the poles.

- E. Luminaire Attachment Provisions: Comply with luminaire manufacturers' mounting requirements. Use stainless-steel fasteners and mounting bolts, unless otherwise indicated.
- F. Mountings, Fastenings, and Appurtenances: Corrosion-resistant components compatible with the poles and fixtures that will not cause galvanic action at contact point. Provide mountings that will correctly position the luminaire to provide the indicated light distribution.
- G. Breakaway Supports: Frangible breakaway supports, tested by an independent testing agency acceptable to authorities having jurisdiction, according to AASHTO LTS-4
- H. Anchor bolts shall conform to the specifications of ASTM A 307, and shall be provided with two nuts and two washers each. Bolts, nuts and washers shall be galvanized by the hot-dip process conforming to ASTM A 153, or cadmium plated with Type NS coating conforming to ASTM A 165.

2.04 STEEL POLE

- A. Poles: Comply with ASTM A 500, Grade B, carbon steel with a minimum yield of 46,000 psi; 1 piece construction up to 40 feet in height with access handhole in pole wall.
 - 1. Shape: Round, tapered
- B. Mounting Adaptor: Bullhorn type, secured per manufacturer specifications. Material and finish same as pole.
- C. Grounding and Bonding Lugs: Welded ½-inch threaded lug and accessible through handhole.
- B. Cable Support Grip: Wire-mesh type with rotating attachment eye, sized for diameter of cable and rated for a minimum load equal to weight of supported cable times a 5.0 safety factor.
- C. Finish: Comply with NAAMM's, "Metal Finished Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 - 1. Surface Preparation: Clean with an alkaline rinse to remove surface contaminants. Shot blast to specification as published by the Steel Structures Painting Council Standards SSPC-SP10.
 - 2. Exterior surface of pole: Chemically pretreated with iron phosphate conversion coating then rinsed with ambient fresh water containing special surfactants and sealers forming a dry tight microcrystalline coating.
 - 3. Apply a polyester thermosetting powder coating to the surface of the substrate to a minimum of 3 mils.
 - 4. Interior Surface of Pole: Coated with thermoplastic hydrocarbon resin system formulated for application over untreated steel surfaces to a thickness of 3 mils. Shall contain special corrosion inhibitors and be capable of passing 1000 hours of salt spray exposure (ASTM B-117)

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Set units plumb, square, level, and secure according to manufacturer's written instructions and shop drawings. Install wiring and connections in accordance with the drawings. All scratches in pole and fixture finish shall be touched up with manufacturer's furnished matching paint.

- B. Pole Installation: Use fabric web slings (not chain or cable) to raise and set poles or use special rope approved for this purpose.
- C. Install lamps in each luminaire
- D. Luminaire Attachment: Fasten to indicated structural supports per manufacturer's recommendation.
- E. Clearances: Maintain the following minimum horizontal distances of poles from surface and underground features, unless otherwise indicated on Drawings:
 - 1. Fire Hydrants and Storm Drainage Piping: 5 feet
 - 2. Water, Gas, Electric, Communication and Sewer Lines: 5 feet
- D. Concrete Pole Foundations: Cast in place, with anchor bolts to match pole-base flange. Concrete, reinforcement, and formwork are specified in Division 3 Section "Cast-in-Place Concrete"
- G. Foundation-Mounted Poles: Mount pole with leveling nuts, and tighten top nuts to torque level recommended by pole manufacturer.
 - 3. Use anchor bolts and nuts selected to resist seismic forces defined for the application and approved by manufacturer.
 - 4. Grout void between pole base and foundation. Use nonshrink or expanding concrete grout firmly packed to fill space.
 - 5. Install base covers, unless otherwise indicated.
 - 6. Use a short piece of ½-inch diameter pipe to make a drain hole through grout. Arrange to drain condensation from interior of pole.

3.02 FIELD WIRING

- A. Service runs to lights shall be THHW/THWN stranded copper wire #8 minimum per plan details. Copper wire shall conform to the applicable portion of ASTM B3 and B8. Size of wire shall be determined by means of voltage drop calculations and shall also be indicated on the "As-Built" plans. Wire connectors shall be of type approved by the County Inspector, and bear the UL seal of approval. The installation procedure, including connector size and crimping tools shall conform to the manufacturer's recommendations. Aluminum conductors are not to be allowed. #10 wire shall be used from the base of the pole to the luminaire.
- B. Fuse holders shall be completely waterproof and shall grip the fuse in load side section when it is opened. (Type HEX for 277 volt circuits).
- C. Fuses shall be slow blow 10A, 13/32" x 1 ½" In-line type fuse. The fuse shall be installed in the hot leg of the lighting conductor of each luminaire. The luminaire shall be fused in the base of the pole (not in the adjacent pull box).

3.03 CONCRETE FOUNDATIONS

Comply with details shown on drawings and manufacturer's recommendations for reinforcing, anchor bolts, nuts, and washers.

3.04 GROUNDING

- A. Ground metal poles and support structures.
 - 1. Install grounding electrode for each pole, unless otherwise notes
 - 2. Install grounding conductor pigtail in the base for connecting luminaire to grounding system.

3.05 FIELD QUALITY CONTROL

- A. Inspection: Inspect installed units for damage or malfunction and take corrective action as required. Ensure that lighting units are in first-class condition, completely lamped, cleaned, and finish is in excellent condition.
- B. Illumination Observations: Verify normal operation of lighting units after installing luminaires and energizing circuits with normal power source.
- C. Illumination Tests: Measure light intensities at night. Use photometers with calibration referenced to NIST standards. Comply with IESNA testing guide LM-50, "Photometric Measure of Roadway Lighting Installation."
- D. Prepare a written report of tests, inspections, observations and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

3.06 ADJUSTING AND CLEANING

Clean components on completion of installation. Use methods and materials recommended by manufacturer. Where applicable, adjust aimable fixtures to provide required light intensities.

PART 4 – MEASUREMENT

4.01 MEASUREMENT

- A. The determination of quantities of work performed under the contract will be made by the Engineer, based upon the lines and grades as shown on the plans and as given during the progress of the work or by measurements made by the Engineer.
- B. Underground electric, conduit, wiring and trenches shall be measured as linear feet as shown on the drawings and as determined by the Engineer.
- C. Luminaire, poles, fittings, pull boxes, and accessories shall be measured as each unit as shown on the drawings and as determined by the Engineer.

4.02 CHANGE ORDERS

The Contractor's claims for extra work will not be paid unless the extra work covered by such claims was authorized by a change.

END OF SECTION 16520

