TECHNICAL SPECIFICATIONS

For

ROBIN SWEENY PARK IMPROVEMENTS

CITY OF SAUSALITO, CALIFORNIA

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SEALS PAGE

CITY OF SAUSALITO

ROBIN SWEENY PARK IMPROVEMENTS

LANDSCAPE ARCHITECT
Carducci & Associates, Inc.
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ROBIN SWEENY PARK IMPROVEMENTS

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3	L0.02A	EXISTING SITE PLAN
4	L0.02B	EXISTING SITE SECTIONS
5	L0.02C	SITE SURVEY
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7	L0.03	EXISTING TREES
8	L0.04	ACCESS LEGEND AND PLAN
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END OF DOCUMENT

SECTION 00040

GEOTECHNICAL DATA

PART 1 GENERAL

1.1 SUMMARY

This document describes geotechnical data at or near the Project that is in the City of Sausalito possession available for Contractor's review, and use of data resulting from various investigations.

1.2 GEOTECHNICAL REPORTS

A. Geotechnical reports have not been prepared for and around the Site by soil investigation engineers hired by the City of Sausalito, and its consultants, contractors, and land owners.

B. Geotechnical reports may not be inspected at the City offices, and copies may not be obtained at cost of reproduction and handling upon Bidder's agreement to pay for such copies. These reports are not part of the Contract Documents.

C. The reports and drawings of physical conditions that may relate to the Project and referenced on the title sheet of the drawings are available.

1.3 USE OF DATA

A. Geotechnical data were not obtained only for use of City and its consultants, contractors, and tenants for planning and design and are not a part of Contract Documents.

B. Except as expressly set forth below, City does not warrant, and makes no representation regarding, the accuracy or thoroughness of any geotechnical data. Bidder represents and agrees that in submitting a Bid it is not relying on any geotechnical data supplied by City, except as specifically allowed below.

C. Under no circumstances shall City be deemed to make a warranty or representation of existing above ground conditions, as-built conditions, or other actual conditions verifiable by independent investigation. These conditions are verifiable by Contractor by the performance of its own independent investigation, which Contractor should perform as a condition to bidding and Contractor must not and shall not rely on information supplied by City.

1.4 LIMITED RELIANCE PERMITTED ON CERTAIN INFORMATION

A. Reference is made herein for identification of:

Drawings of physical conditions in or relating to existing subsurface structures (except underground facilities) which are at or contiguous to the Site and have been utilized by City in preparation of the Contract Documents.

B. Bidder may rely upon the general accuracy of the "technical data" contained in the reports and drawings identified above, but only insofar as it relates to subsurface conditions, provided Bidder has conducted the independent investigation required pursuant to Instructions to Bidders, and discrepancies are not apparent. The term "technical data" in the referenced reports and drawings shall be limited as follows:

1. The term "technical data" shall include actual reported depths, reported quantities, reported soil types, reported soil conditions, and reported material, equipment or structures that were encountered during subsurface exploration. The term "technical data" does not include, and Bidder may not rely upon, any other data, interpretations, opinions or information shown or indicated in such drawings or reports that otherwise relate to subsurface conditions or described structures.

2. The term "technical data" shall not include the location of underground facilities.

3. Bidder may not rely on the completeness of reports and drawings for the purposes of bidding or construction. Bidder may rely upon the general accuracy of the "technical data" contained in such reports or drawings.

4. Bidder is solely responsible for any interpretation or conclusion drawn from any "technical data" or any other data, interpretations, opinions, or information provided in the identified reports and drawings.

1.5 INVESTIGATIONS/SITE EXAMINATIONS

A. Before submitting a Bid, each Bidder should be responsible for conducting or obtaining any additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and underground facilities) at or contiguous to the Site or otherwise, which may affect cost, progress, performance, or furnishing of Work or which relate to any aspect of the means, methods, techniques, sequences, or procedures of construction to be employed by Bidder and safety precautions and programs incident thereto or which Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the time, price, and other terms and conditions of Contract Documents.

B. On request, City will provide each Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies, as each Bidder deems necessary for submission of a Bid. Bidders must fill all holes and clean up and restore the Site to its former condition upon completion of its explorations, investigations, tests, and studies. Such investigations and Site examinations may be performed during any and all Site visits indicated in the Notice Inviting Bids and only under the provisions of the Contract Documents, including, but not limited to, proof of insurance and obligation to indemnify against claims arising from such work.

END OF SECTION

SECTION 00050

EXISTING CONDITIONS

PART 1 SUMMARY

This document describes existing conditions at or near the Project, and use of information available regarding existing conditions.

1.1 REPORTS AND INFORMATION ON EXISTING CONDITIONS

A. Documents providing a general description of the Site and conditions of the Work may have been collected by the City of Sausalito, its consultants and contractors. These documents may include previous contracts, contract specifications, improvement contracts, record drawings, utility drawings, and information regarding underground facilities.

B. Information regarding existing conditions may be inspected at City offices, and copies may be obtained at cost of reproduction and handling upon Bidder's agreement to pay for such copies. These reports, documents, and other information are not part of the Contract Documents.

C. Information regarding existing conditions may also be included in the Bid Documents, but shall not be considered part of the Contract Documents.

D. The reports and other data or information regarding existing conditions and underground facilities at or contiguous to the Project are the following:

1. Original Construction Drawings

2. Surveys of Site

3. Reference Drawings

4. Utility Maps

1.2 USE OF INFORMATION

A. Information regarding existing conditions was obtained only for use of City and its consultants, contractors, and tenants for planning and design and is not part of the Contract Documents.

B. City does not warrant, and makes no representation regarding, the accuracy or thoroughness of any information regarding existing conditions. Bidder represents and agrees that in submitting a bid it is not relying on any information regarding existing conditions supplied by City.

C. Under no circumstances shall City be deemed to warrant or represent existing aboveground conditions, as-built conditions, or other actual conditions, verifiable by independent investigation. These conditions are verifiable by Contractor by the performance of its own independent investigation, which Contractor must perform as a condition to bidding, and Contractor should not and shall not rely on this information or any other information supplied by City regarding existing conditions.

D. Any information shown or indicated in the reports and other data supplied herein with respect to existing underground facilities at or contiguous to the Project may be based upon

information and data furnished to City by the City's employees and/or consultants or builders of such underground facilities or others. City does not assume responsibility for the completeness of this information, and Bidder is solely responsible for any interpretation or conclusion drawn from this information.

E. City shall be responsible only for the general accuracy of information regarding underground facilities, and only for those underground facilities that are owned by City, and only where Bidder has conducted the independent investigation required of it pursuant to the Instructions to Bidders, and discrepancies are not apparent.

1.3 INVESTIGATIONS/SITE EXAMINATIONS

A. Before submitting a Bid, each Bidder should be responsible for conducting or obtaining any additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and underground facilities) at or contiguous to the Site or otherwise, which may affect cost, progress, performance, or furnishing of Work or which relate to any aspect of the means, methods, techniques, sequences, or procedures of construction to be employed by Bidder and safety precautions and programs incident thereto or which Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the time, price, and other terms and conditions of Contract Documents.

B. On request, City will provide each Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies, as each Bidder deems necessary for submission of a Bid. Bidders must fill all holes and clean up and restore the Site to its former condition upon completion of its explorations, investigations, tests, and studies. Such investigations and Site examinations may be performed during any and all Site visits indicated in the Notice to Bidders and only under the provisions of the Contract Documents, including, but not limited to, proof of insurance and obligation to indemnify against claims arising from such work.

END OF SECTION

SECTION 01110

SUMMARY OF WORK

PART 1 GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of this Contract is for Robin Sweeny Park Improvements. The work includes but is not limited to: dust and noise control, tree protection & transplanting, site preparation & demolition, staking, clearing & grubbing, earthwork, trenching, erosion control, subgrade preparation, drilled piers, water systems, landscape drainage system, landscape brick masonry, site carpentry, concrete, paving, non-infill synthetic turf, rubberized surfacing for playgrounds, play equipment, signage, chain link fencing, ornamental fencing, site furnishings, electrical work, precast concrete posts with lights, graffiti resistant coatings, handrails & railings, potable water line & drinking fountain, irrigation, planting, and planting establishment period.

B. The construction period is 180 calendar days.

C. The Engineer's Estimate is to be determined.

D. The Work shall include all the work as shown and specified except work indicated "N.I.C." or "Not in Contract" or "Future."

1.2 CONTRACTS

A. The Work will be under a single lump sum contract.

B. The Work indicated "N.I.C." or "Not in Contract" will be provided by the Owner directly or under separate contract.

END OF SECTION

SECTION 01120

FIELD ENGINEERING

PART 1 GENERAL

1.1 SUMMARY

A. Inspect the site and location of the Work and become acquainted with conditions relating to the construction and completion of the Project.

B. Contractor shall provide and pay for field engineering services required for the Project, including subgrade survey and civil, structural or other professional engineering services required to construct the Project.

1.2 DESCRIPTION

A. Provide layout of work and establish lines and grades.

B. Related requirements specified elsewhere include making record documents - Section 01770, CLOSEOUT.

1.3 QUALITY ASSURANCE

A. The Contractor shall engage a California Registered Civil Engineer or licensed Land Surveyor to perform field engineering.

B. Submit name and address of professional engineer or surveyor for Owner's approval.

C. When discrepancies between drawings and actual site conditions are discovered, notify the City of Sausalito for instruction on how to proceed.

1.4 PERFORMANCE

A. Stakes and marks will be set by the Contractor as required to establish the lines, grades and locations required for the completion of the work specified on the plans. The minimum requirements for survey construction staking are as follows:

1. Establish indicated layout in relation to the property survey and existing reference points.

2. Layout work and be responsible for lines elevations and measurements of grading, paving, utilities and all other Work executed under Contract.

3. Establish and preserve permanent reference points during construction.

4. Existing Utilities: Verify onsite the location and depth (elevation) of existing utilities and services before performing excavation work.

5. Locate and protect control points prior to starting site work and preserve permanent reference points during construction.

6. Make no changes or relocations without prior written notice to the Owner's Representative.

7. Report to Owner' Representative when any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations.

8. Contractor shall have its surveyor replace Project control points that may be lost or destroyed and establish replacements based on the Owner's original survey with associated costs borne solely by Contractor.

9. Record "as-built" conditions.

B. Accuracy of Data: Site data indicated on the Drawings are as exact as could be obtained, but their accuracy cannot be guaranteed. Exact locations, distances, elevations and similar data shall be governed finally by field conditions and the Owner's instructions.

C. Verify layout from time to time as work progresses.

D. Exercise caution to verify figures shown on the Drawings and on surveys furnished by Owner before starting work. Contractor will be responsible for any error resulting from failure to exercise such caution.

1. Report errors and inaccuracies, in writing to the Landscape Architect and Owner's Representative for clarification.

2. Offsets will be as agreed upon, in writing by the Contractor and Landscape Architect and Owner.

END OF SECTION

SECTION 01292

SCHEDULE OF VALUES

PART 1 GENERAL

1.1 SUMMARY

A. Pursuant to the General Conditions, Contractor's accepted Schedule of Values shall constitute the basis for determining the value of work installed for the purpose of progress payments.

B. Submit for the City of Sausalito approval proposed Schedule of Values, after award of Contract and at least twenty-one days before submitting first application for payment. Upon request by the City of Sausalito, support values given with data that will substantiate their correctness.

C. The Schedule of Values and conformance with the Contract schedule shall serve as Contractor's basis for application for payment based on percentage of completion of each activity.

1.2 FORM AND CONTENT OF SCHEDULE OF VALUES

A. Type schedule on 8-1/2-inch x 11-inch white paper. Contractor's standard forms and automated printout will be considered for approval by the City of Sausalito upon Contractor's request.

1. Identify Schedule with:

a. Title of Project, Owner, and Location.

b. Name of Landscape Architect.

c. Owner's Contract Number.

d. Name and address of Contractor.

e. Date of submission.

B. Schedule shall list the installed value of the component parts of the work in sufficient detail to serve as a basis for computing values for progress payments during construction.

C. Follow the Table of Contents of this Project Manual as the format for listing component items.

1. Identify each line item with the number and title of the respective major Section of the Specifications.

2. Overhead and profit shall not be shown as a separate line item. Each line item shall include prorated amounts for the Contractor's costs, overhead, profit, bond, temporary facilities, and other expenses in connection with the item of work.

D. For each line item, that has an installed value of $20,000.00 or more, beak down the item and list value of major products or operations.

E. For the various Portions of the Work:

1. Each item shall include a directly proportional amount of the Contractor's overhead and profit.

2. There shall be no listing for payment of mobilization or shop drawings.

3. There shall be no listing for payment of materials or equipment or both when off-site.

4. For items on which progress payments will be requested for stored materials, break down the value into:

a. The cost of materials, delivered and unloaded, with taxes paid.

b. The total installed value.

F. The sum of all values listed in the schedule shall equal the total Contract Sum.

G. Following initial acceptance of Contractor's Schedule of Values, the City of Sausalito may request a revised schedule of Values due to a revision in work or inaccuracies in originals.

H. Upon approval of Schedule of Values, submit an electronic copy.

END OF SECTION

SECTION 01310

PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project coordination.
2. Pre-construction conference.
3. Progress meetings.
4. Project Schedule.
5. Short Interval Schedules.
6. Delays and extensions of time.
7. Correspondence and notices.

1.2 PROJECT COORDINATION

A. Coordinate scheduling, submittals, and work of the various sections to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

1.3 PRECONSTRUCTION CONFERENCE

A. After Notice of Award, a Pre-construction Conference to discuss Project Work will be held at a time and location designated by the City of Sausalito.

B. Agenda:

1. Submission of Contractor-signed Owner-Contractor Agreement.
2. Submission of executed bonds and insurance certificates.
3. Distribution of Contract Documents.
4. Submission of list of subcontractors, list of products, schedule of Values and progress schedule.
5. Designation of personnel representing parties in Contract and the Landscape Architect.
6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal requests, Change Orders and contract closeout procedures.
7. Schedule.

C. Unless followed up in writing by the Owner, verbal authorizations or instructions by anyone present is not binding.

D. Attendance Required:

1. Owner.

2. Landscape Architect.

3. Contractor.

4. Inspector.

5. Major subcontractors.

1.4 PROGRESS MEETINGS

A. At a time designated by Owner, Periodic Progress Meetings will be held at a location to be determined.

B. Agenda: The purpose of these meetings is to discuss schedule, progress, coordination, submittals, and job related problems.

1. Review minutes of previous meetings.

2. Review of Work progress.

3. Field observations, problems, and decisions.

4. Identification of problems that impede planned progress.

5. Review of submittals schedule and status of submittals.

6. Review of delivery schedules.

7. Special Project Procedures.

8. Maintenance of progress schedule.

9. Corrective measures to regain projected schedules.

10. Planned progress during succeeding work period.

11. Coordination of projected progress.

12. Maintenance of quality and work standards.

13. Effect of proposed changes on progress schedule and coordination.

14. Other business relating to Work.

C. The City of Sausalito will conduct the meetings, prepare and distribute meeting notes.

D. Verbal authorizations or acknowledgments by anyone present will not be binding unless followed up in writing by authorized representatives of the Owner or Contractor.

E. Attendance:

1. Owner.

2. Landscape Architect.

3. Contractor.

4. Contractor's Superintendent.

5. Inspector.

6. Major Subcontractors.

7. Suppliers and others as deemed necessary by the City of Sausalito.

F. Contractor will be responsible for notifying subcontractors and supplier of their required attendance.

1.5 CONSTRUCTION SCHEDULE

A. The Contractor shall, within 10 calendar days after Notice to Proceed is issued, furnish the City of Sausalito with three copies of a schedule that addresses the work required during the Contract. The schedule must be developed using the Critical Path Method (CPM) and shall be produced using a software package meeting the approval of the City of Sausalito. The schedules shall include the following information as a minimum:

1. Details of activities required for mobilization and start of Project.

2. A plan for completion of work in sufficient detail to allow observation and monitoring by the City of Sausalito. Any activity longer than two weeks, with the exception of submittal and procurement activities, should be broken down into phases two weeks or less in length.

3. Long lead procurement requirements.

4. Submittal and shop drawings preparation and review times. Indicate critical dates for submission of specified shop drawings, product data, samples, and certificates. Allow 14 calendar days for review of submittals by Landscape architect.

5. Include decision dates for selection of colors/finishes.

6. Duration of all activities.

7. Dependencies and logic between activities.

8. Owner furnished materials and equipment, if any.

9. The CPM schedule will be time-scaled and cost loaded. The cost for performing each activity shall include all labor, material and equipment, including overhead and profit. The sum of all costs of all activities shall equal the total contract value.

10. The Contractor's Schedule shall be submitted with acknowledgements signed and authorized officials of each subcontractor listed in the bid, confirming their review of the schedule and their ability to perform their portion of the Work according to said Schedule.

B. The schedule shall be the basis for establishing starting and completing dates of Work for the Project.

C. Conform to accepted schedule, and arrange work in such a manner that it will be installed in accordance with the schedule

D. Update the schedule in accordance with requirements of the Project and the General Conditions.

E. Coordinate letting of subcontractors, material purchases, delivery of materials, sequence of operations, and similar activities to conform to accepted schedule, and furnish proof of conformance as may be required by Owner.

F. The Contractor shall be responsible for planning and scheduling the Work and monitoring progress of the Work with respect to the schedule. The Contractor shall be responsible for scheduling all work activities, including those of its subcontractors. The Schedules shall be feasible, workable and reasonable for the work, and shall be the Contractor's plan of construction for completing the contract work within the specified time periods.

1. On-site production activity durations shall be the total of the actual days required to perform that activity and shall not include non-production time.

2. Failure of the Construction Schedule to include any element of the work required for the performance of this contract, or any inaccuracy in the Construction Schedule, will not relieve the Contractor from its responsibility for accomplishing all the work required for a complete contract within the time specified and will not constitute grounds for delay.

G. The City of Sausalito will review the Contractor's proposed Construction Schedule within fifteen working days and will provide comments and make inquires regarding the schedule. The Contractor shall re-submit its revised Construction Schedule for review after incorporating the necessary changes and revisions. The revised Construction Schedule shall be submitted to the City of Sausalito within 10 working days of the issuance of the City of Sausalito's comments.

H. The Construction Schedule, upon acceptance, will become the basis for determining schedule compliance, for determining the impact of changes to the Contract and delays to the Work.

I. The Schedule shall be prepared and updated as directed by the City of Sausalito.

1.6 SHORT INTERVAL SCHEDULES

A. Short Interval Scheduling will be used throughout the on-site construction process.

B. The interval will be three weeks and will include the week submitted and two weeks thereafter.

C. The schedules will be in sufficient detail to evaluate daily milestones and will correspond to the updated Construction Schedule.

D. The Contractor shall prepare its short interval schedule and deliver several copies of it to each job site meeting where it will be discussed, revised if necessary, and distributed to parties present.

1.7 DELAYS AND EXTENSIONS OF TIME

A. The scheduled completion date shall be the same as the contractual completion date.

1.8 CORRESPONDENCE AND NOTICES

A. Clearly identify correspondence, notices and submittals with project name, subject and detailed references to Drawings and Specifications.

B. Notify the City of Sausalito two working days in advance of required inspection.

END OF SECTION

SECTION 01330

SUBMITTALS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Submittals of test reports and certifications are specified in Section 01450, QUALITY CONTROL.

B. Requirements regarding substitutions, product options, and color selections are described in Section 01600, MATERIAL AND EQUIPMENT.

C. Submittals for project closeout are specified in Section 01770, CONTRACT CLOSEOUT.

D. Requirements regarding shop drawings, product data, and samples are described in the various sections of these Specifications.

1.2 SUBMITTALS SCHEDULE

A. Submit complete list (index) of all items by specification section number and paragraph called for in Part I of each applicable section on "cover sheets" with a space to receive approval stamp.

B. Submit all submittals at one time within twenty-eight (28) calendar days from Notice to Proceed. Allow minimum fourteen (14) calendar days for review. Items returned marked for re-submittal shall have an allowance of an additional fourteen (14) calendar days after resubmission. Schedule first submittal no earlier than scheduled date of installation less manufacturer's lead time, less delivery, less submittal preparation time doubled, less review time. Refer to Specification Section 10810 Building Performance Specifications for submittal timeline for Pre-manufactured buildings.

C. Identify each submittal sequentially by section and page number (e.g., 02810-1, 02810-2).

1.3 MATERIALS LIST

A. List all items where called for by the specifications; show manufacturer's name, catalog number, and model number as applicable; grade or other identifying data as applicable; supplier's name, address and phone.

B. Identify materials list by specification section number, project name and submittal sequence number; one list for each section of specifications.

C. Make copies on bond paper only; slick-type paper is not acceptable. Submit four (4) original copies 8-1/2” x 11” maximum size to the Construction Manager. One (1) original copy will be returned to Contractor to be retained at the job site. The Contractor may make additional copies as necessary. The Landscape Architect shall retain one copy and distribute one copy to the Construction Manager.

D. Only those copies bearing Landscape Architect's review stamp shall be used at the project site.

E. Submit in conformance with Submittals Schedule.

1. 4 PRODUCT DATA

A. Submit for items as called for in the specifications. Actual catalog sheets or clear bond paper copies from catalogs may be submitted. Where more than one product is shown on the catalog sheet, clearly indicate which product is being submitted for review by highlighting applicable information.

B. Identify catalog data with specification section number, paragraph number, project name, and submittal sequence number. Apply sticker in upper right hand corner for slick or dark catalog pages.

C. Submit in same quantity and timing for Materials List.

D. Substitutions and Product Options: If a substitution may be considered pursuant to Section 01600, MATERIAL AND EQUIPMENT, or if a required product is not specified by name, submit complete information for review, substantiating compliance of proposed product with the Contract Documents. If tests are required, they shall be made by an agency acceptable to the City of Sausalito and paid for by the Contractor.

1. Submit data as an original copy.

2. If requested, submit sample in duplicate. Samples of accepted substitutions will be retained by the City of Sausalito.

3. The above submittals are for evaluating products and are not intended to serve in place of specified shop drawings, product data, or samples. After a proposed product is found to be acceptable, specified submittals shall be made as described hereinafter.

1.5 SHOP DRAWINGS

A. Clearly detail all aspects of work where called for by specifications.

B. Identify by specification number, detail number, and project name and submittal sequence number.

C. Submit four bond prints to the Landscape Architect, who will review drawings, make comments, make copies for distribution, and return one copy to Contractor. Contractor shall make copies for his use as required.

1.6 SAMPLES

A. Submit a minimum of two items for any and all items called for in specifications. Submit actual item; photographic or printed reproductions are not acceptable.

B. Where a piece of an item is appropriate, submit a large enough piece to fully explain, 8-1/2" x 11" minimum.

C. Landscape Architect's review comments will be in writing. If Contractor desires comments attached to sample, submit additional samples with request.

D. Field Samples, "Mockups": Specified field samples shall be constructed at the job site for approval before start of the work represented. Accepted samples shall serve as standard

during installation of the work. Remove samples after the corresponding work has been accepted.

1.7 MAINTENANCE AND OPERATIONS DATA

A. Submit any and all data where called for in the specifications. Submit full manufacturer's data, identify with project name, specification section number and paragraph number.

B. Submit number of copies and follow timing as described in Materials List above.

1.8 OWNER'S MANUAL

A. The Contractor shall submit technical operation and maintenance information for each item of mechanical, electrical and instrumentation equipment in an organized manner in the Owner's Manual. It shall be written so that it can be used and understood by the Owner's operation and maintenance staff.

B. The Owner's Manual shall be subdivided first by specification section number; second by equipment item; and last, by "Part." "Parts" shall conform to the following (as applicable):

1. Equipment Summary:

a. Summary: A summary table shall indicate the equipment name, equipment model number, equipment serial number, and location where the equipment is installed.

2. Preventive Maintenance Procedures:

a. Procedures: Preventive maintenance procedures shall include all manufacturer-recommended procedures to be performed on a periodic basis, both by removing and replacing the equipment or component, and by leaving the equipment in place.

b. Schedules: Recommended frequency of preventive maintenance procedures shall be included. Lubrication schedules, including lubricant SAE grade, type, and temperature changes, shall be covered.

3. Parts List:

a. Parts List: A complete parts list shall be furnished, including a generic description and manufacturer's identification number for each part. Addresses and telephone numbers of the nearest supplier and parts warehouse shall be included.

b. Drawings: Cross-sectional or exploded view drawing shall accompany the parts list.

4. Wiring Diagrams:

a. Diagrams: Include complete internal and connection wiring diagrams for electrical equipment items.

5. Shop Drawings:

a. Drawings: Include approved shop or fabrication drawings, complete with dimensions.

6. Safety:

a. Procedures: Describe the safety precautions to be taken when operating and maintaining the equipment or working near it.

7. Documentation:

a. All equipment warranties, affidavits, and certifications required by the Technical Specifications shall be included.

C. The Contractor shall furnish to the City of Sausalito two (2) identical Owner's Manuals for each school site. Each set shall consist of one or more volumes, each of which shall be bound in a standard size, 3-ring, loose-leaf, vinyl plastic hard cover binder suitable for bookshelf storage. Binder ring size shall not exceed 2.5 inches. A table of contents indicating all equipment in the manuals shall be prepared.

D. Owner's Manuals shall be submitted in final form to the Construction Manager not later than the seventy-five percent (75%) of construction completion date. All discrepancies found by the City of Sausalito/Landscape Architect in the Technical Manuals shall be corrected by the Contractor within thirty (30) days from the date of written notification by the Engineer.

1.9 RECORD DRAWINGS

A. The Contractor shall keep and maintain, at the job site, one record set of Drawings. On these, it shall mark all project conditions, locations, configurations, and any other changes or deviations which may vary from the details represented on the original Contract Drawings, including buried or concealed construction and utility features which are revealed during the course of construction. Special attention shall be given to recording the horizontal and vertical location of all buried utilities that differ from the locations indicated, or which were not indicated on the Contract Drawings. Said record drawings shall be supplemented by any detailed sketches as necessary or directed to indicate, fully, the work as actually constructed. These master record drawings of the Contractor's representation of as-built conditions, including all revisions made necessary by addenda, change orders, and the like shall be maintained up-to-date during the progress of the work.

B. Record drawings shall be accessible to the Construction Manager at all times during the construction period.

C. Final payment will not be acted upon until the Contractor-prepared record drawings have been prepared and delivered to the Construction Manager.

D. Upon substantial completion of the work and prior to final acceptance, the Contractor shall complete and deliver a complete set (all project plan sheets) of reproducible record drawings on mylar to the Construction Manager, conforming to the construction records of the Contractor. This set of drawings shall consist of corrected drawings showing the reported location of the work. Record drawings will be assumed to be correct, and the Contractor shall be responsible for the accuracy of such information, and for any errors or omissions which may appear on the record drawings as a result.

1.10 CONTRACTOR RESPONSIBILITIES

A. Review Materials List, Catalog Data, Shop Drawings, Product Data, and Samples prior to submission.

B. Be responsible for confirming and correlating all quantities and dimensions.

C. Sign each submittal and verify that field measurements have been determined and verified, field construction criteria have been verified, catalog numbers and similar data are correct and complete, and conformance with specifications is confirmed.

D. Notify Construction Manager in writing at the time of submission of any deviations in the submittals from requirements of the Contract Documents.

E. Begin no fabrication or work which requires submittals until return of approved submittals.

F. Shop drawings submitted for Construction Manager review shall not be used to obtain approval for substitutions unless it has been brought to the attention of Construction Manager that specific changes are being offered.

1.11 REVIEW

A. Review of Materials List, Catalog Data, Shop Drawings, Product Data, and Samples will be for general conformance with the project's design concept and for general compliance with information given in the Contract Documents.

B. Review comments shall not relieve Contractor from compliance with design intent and concept and with requirements of the Contract Documents.

1.12 RESUBMITTALS

A. If required by the City of Sausalito/Landscape Architect, submittals shall be revised and resubmitted as specified for initial submittals. Indicate clearly on the resubmittal any changes which have been made other than those requested on the previous submittal.

1.13 REQUESTS FOR INFORMATION (RFI'S)

A. RFI's shall be submitted by the Contractor to the Construction Manager.

B. The Contractor shall be responsible for assuring there aren't excessive RFI's by subcontractors.

1. RFI's containing only questions will be returned without a response.

2. Subcontractors and/or Contractor shall state their interpretation of the Contract Documents or propose their solution for conflict resolution in the RFI.

3. The Landscape Architect's response to RFI's will confirm a stated interpretation otherwise interpret the design intent and may include furnishing an alternative conflict resolution.

C. Contractor shall allow a minimum of 5 working days for review and processing time of RFI's by Landscape Architect.

END OF SECTION

SECTION 01410

REGULATORY REQUIREMENTS

PART 1 GENERAL

1.1 PERMITS, FEES, AND NOTICES

A. The Contractor (or the Contractor's assigned subcontractors) shall obtain any and all required permits from any and all required governing authorities, including but not limited to the following:

1. City of Sausalito – Business License
2. City of Sausalito – Building Permit (no cost)
3. City of Sausalito – Electrical Permit (no cost)
4. City of Sausalito – Grading Permit (no cost)
5. State Water Resources Control Board

1.2 COMPLIANCE

A. The Contractor shall give notices required by law and comply by all laws, ordinances, rules and regulations pertaining to the conduct of the Work. The Contractor shall be liable for violations of the law in connection with the Work provided by Contractor. If the Contractor observes that the Drawings, Specifications, or other portions of the Contract Documents are at variance with any laws, ordinances, rules or regulations, it shall promptly notify the Landscape Architect in writing of such variance. The Owner shall promptly review the matter and, if necessary, issue a Change Order or take any other action necessary to bring about compliance with the law, ordinance, rule or regulation in question. Contractor agrees not to perform Work know to be contrary to any laws, ordinances, rules or regulations.

1.3 APPLICABLE LAWS AND REGULATIONS

A. All applicable federal, state, and local laws and the rules and regulations of governing utility districts and the various other authorities having jurisdiction over the construction and completion of the project, including the latest rules and regulations of the State Fire Marshal, OSHA, and the California Labor Code, shall apply to the contract throughout, and they shall be deemed to be included in the contract the same as though printed in these specifications.

B. Where the Drawings or Specifications call for or describe materials, workmanship, or construction of a better quality, high standard, or larger size than is required by said laws, codes, rules, and regulations, the provisions of the Drawings and Specifications shall take precedence over said laws, codes, rules, and regulations.

END OF SECTION

SECTION 01420

DEFINITIONS AND STANDARDS

PART 1 GENERAL

1.1 DEFINITIONS

A. The term “accepted”, where used herein shall mean “accepted” in writing by the Landscape Architect or the City of Sausalito.

B. The term "approved," where used herein, shall mean approved in writing by the Landscape Architect.

C. The term "Landscape Architect," where noted herein, shall mean Carducci and Associates, Landscape Architects, or its authorized representative.

D. The terms "if directed," "when directed," or "as directed," where used herein, shall mean if, when, or as directed by the Landscape Architect.

E. The term "equal or equivalent," where used herein, shall mean equal or equivalent in the opinion of the Landscape Architect and approved.

F. The term "indicated," where used herein, shall mean indicated by graphic representations or notes or schedules on the Drawings, or other paragraphs or schedules in the Specifications or other Contract Documents.

G. The term "Owner," where used herein, shall mean the City of Sausalito.

H. The term "provide," where used herein, shall mean furnish and install complete.

I. The terms "if required," "when required," or "as required," where used herein, shall mean if, when, or as required by the best building practices in the opinion of the Landscape Architect.

J. The term "as selected," where used herein, shall mean as selected by the Landscape Architect.

K. Unless otherwise stated in the Contract Documents, words which have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

1.2 DRAWINGS AND SPECIFICATIONS

A. The Drawings and Specifications are integral documents and cannot be separated.

B. In case of a difference between Drawings and Specifications or within either document itself in describing the work, the better quality, greatest quantity, or more costly work will be assumed to be and shall be included in the Contract Price. The Landscape Architect will be the sole interpreter of the Contract Documents.

1.3 STANDARDS

A. Various standards are referenced in the Specifications and notes on the Drawings. Reference standards shall be the current edition, as of the date of these specifications, of the document indicated.

B. In addition to sources identified in individual sections of the Specifications, standards of the following organizations may be referenced by initials only.

1. ASHO: American Association of State Highway and Transportation Officials.
2. ACI: American Concrete Institute.
3. AIA: American Institute of Architects.
4. AIEE: American Institute of Electrical Engineers.
5. AISI: American Iron and steel Institute.
6. ANSI: American National Standards Institute.
7. ASTM: American Society for Testing and Materials.
8. AWWA: American Water Works Association.
9. AWS: American Welding Society, Inc.
10. AWSC: American Welding Society Code.
11. AWPA: American Wood Preservers Association.
12. AWPI: American Wood Preservers institute.
13. AI: Asphalt Institute.
14. AGC: Associated General Contractors.
15. CBC: California Building Code.
16. CCR: California Code of Regulations.
17. CRA: California Redwood Association.
18. CRSI: Concrete Reinforcing Steel Institute.
19. CSI: Construction Specifications Institute.
20. ICBO: International Conference of Building Officials
21. IEEE: Institute of Electrical and Electronic Engineers.
22. IES: Illuminating Engineering Society.
23. NEC: National Electric Code.
24. NEMA: National Electrical Manufacturers' Association.
25. NFPA: National Fire Protection Association.
26. PCA: Portland Cement Association.
27. CALTRANS: Station of California Business and Transportation Agency, Department of Transportation.

28. UBC: Uniform Building Code.
29. UL: Underwriters' Laboratories, Inc.
30. USDA: United States Department of Agriculture.
31. WCLIB: West Coast Lumber Inspection Bureau (Grading Rules).
32. WPOA: Western Plumbing Official Association.
33. WWPA: Western Wood Products Association (Grading Rules).

END OF SECTION

SECTION 01450

QUALITY CONTROL

PART 1 GENERAL

1.1 OBSERVATION AND SUPERVISION

A. The Landscape Architect or his appointed representative will review the Work. Provide facilities and access to the Work at all times as required to facilitate this review.

B. Supervise and direct the work and maintain a competent superintendent on the job who is authorized to act in all matters pertaining to the Work. Contractor's superintendent shall also inspect all materials, as they arrive, for compliance with the Contract Documents. Superintendent shall reject defective work or materials immediately upon performance or delivery.

1.2 INSPECTION

A. This project is subject to inspection procedures. Inspections will be made by the City of Sausalito representatives. Provide facilities and access to the Work at all times as required to facilitate these inspections.

B. The City of Sausalito may require tests or special examination of any materials or part thereof, unidentified material, or material substituted for that previously approved to confirm compliance with Specifications; and they may reject for satisfactory replacement any material judged defective as a result thereof. Provide such tests as required.

C. The City of Sausalito will provide a Project Inspector.

1.3 TESTING AGENCIES

A. Testing and inspection in connection with earthwork shall be under the direction of the Project Inspector, referred to hereinafter as the "Inspector."

B. Provide testing and inspection of construction materials and workmanship by a qualified laboratory, referred to hereinafter as the "Testing Laboratory." The Testing Laboratory shall be under direction of civil engineer registered in the State of California, shall have operated successfully for four years prior to this work, shall conform to requirements of ASTM B329, and shall be acceptable to the City of Sausalito.

1.4 TESTS AND INSPECTIONS

A. Contractor shall furnish promptly, without additional charge, all reasonable facilities; labor and materials necessary for safe, thorough and convenient inspection; and tests that may be required by the Contract Documents. Tests and inspections shall be performed in a manner as to not delay the Work unnecessarily.

B. Contractor shall submit samples of materials for required tests or inspections.

1. Contractor shall be solely responsible for delays due to such samples' not being submitted (and resubmitted, if necessary) in the time required to allow for tests or inspections before material is incorporated into the Work.

2. Materials furnished shall be equal to approved test samples in every respect.

3. Samples which are of value after testing will remain the property of the Contractor, but no such samples shall be incorporated in the Work without written approval of the Landscape Architect.

C. The owner will provide and pay for:

1. Inspections and tests necessary to comply with laws, ordinances, rules, regulations, and orders of public authorities pursuant to General Conditions.

2. Tests of materials and special inspections required by Specifications.

D. The Contractor is required to provide and pay for:

1. Tests and inspections of underpinning, earthwork and paving required by Specifications.

2. A schedule of tests is required at least ten (10) days in advance of the first test.

3. Give 48 hours' notice, minimum, to Testing Agency, Project Inspector and Construction Manager for required tests and inspections.

4. Furnish, prepare and deliver test samples and specimens as required by Testing Agency (except where such preparation and handling is to be performed by Testing Agency).

5. Cooperate with Testing Agency personnel in providing access to materials being tested or inspected and furnishing incidental labor, equipment and facilities to facilitate inspections and tests.

6. Coordinate the services of all testing and inspection required by the separate Specification Sections.

7. Testing, adjusting and balancing of equipment and systems required by Specifications.

8. Retests or re-inspections, if required, and tests or inspections required due to errors in sequencing of work or improper workmanship.

9. Retests or re-inspections when source of material is changed after original test/inspection.

10. Make necessary repairs to in-place work caused by removal of required test samples.

E. Provide Construction Manager and the Landscape Architect with a copy of the agency or laboratory report of each test or inspection in duplicate.

F. Additional requirements for inspections and testing are included in the General Conditions.

1.5 REQUIRED TEST AND INSPECTIONS

A. Earthwork: Compaction tests for subgrade and aggregate base under pavements.

B. Slump Test: UBC Standard 19-7.

C. Concrete Tests: Testing agency shall test concrete used in the Work as follows:

1. Compressive Strength:

a. Minimum number of tests required: One (1) set of four (4) cylinders for each 50 cubic yards of concrete or major fraction thereof, place in one (1) day.

b. One cylinder of each set shall be tested in seven (7) days and two (2) cylinders at twenty-eight (28) days. One (1) cylinder shall be held in reserve and tested only when directed by the Landscape Architect or Inspector.

c. Concrete shall test the minimum ultimate compressive strength in 28 days, as specified. In the event that the seven (7) day tests indicate the twenty-eight (28) day test will fall below specified strength, the proportioning of concrete shall be changed by the Contractor and submitted to the Landscape Architect for review before subsequent pours.

d. In the event that the twenty-eight (28) day test falls below the minimum specified strength, the effective concrete in place shall be tested by taking cores in accordance with ASTM C42 and tested as required for cylinders.

e. In the event that the test on core specimens falls below the minimum specified strength, the concrete will be deemed defective and shall be removed and replaced upon direction of the Landscape Architect, and in a manner acceptable to the City of Sausalito.

D. Additional Tests and Inspections: See also various Technical Sections of the Specifications.

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Requirements for regulatory agencies.
2. Utilities and adjacent properties.
3. Temporary electricity.
4. Protection and safety.
5. Water control.
6. Parking.
7. Maintenance of traffic and access.
8. Tools, cords, and electrical equipment.
9. Temporary signs and notices.
10. Trash removal.
11. Security.
12. Dust control.
13. Noise control.
14. Removal.
15. Use and storage of hazardous or flammable chemicals.
16. Temporary sanitary facilities.
17. Temporary trailer.

B. Furnish, install, and pay for meters, equipment, wiring, and piping necessary to provide such utilities.

C. Additional requirements for construction facilities and temporary controls are included in the General Conditions.

D. Provide for erosion control in accordance with Section 02275, Erosion Control.

1.2 REQUIREMENTS FOR REGULATORY AGENCIES

A. Contractor shall:

1. Take suitable steps to ensure that public utilities encountered in connection with the Work will not be damaged.

2. Send notices, make necessary arrangements and provide services required for the care of gas mains, water pipes, sewer pipes, telephone and telegraph conduits, cables, and other equipment or property.

3. Arrange with utility companies for fees required to move or remove their meters, poles, cables, guy wires, or equipment in or set under the property which will interfere with the construction work or which will not be required in the new construction.

4. Assure that temporary utility by-passes that may be required are in-place prior to start of Work, so no interference with day-to-day operation of existing facilities occurs because of construction activities.

B. Prior to interruption of service on site, provide 72-hour written notice to Owner's Representative.

1.3 UTILITIES AND ADJACENT PROPERTY

A. Contractor shall be responsible for damage to streets, public utilities and public property damaged as a result of Work performed under this Contract. Owner will inform Contractor of any exceptions.

B. Notify public and private owners of conduits, wires, pipes, poles and utilities, running to or located on the property, of necessary movement of these facilities. Notify adjacent property owners by registered mail at least seven days in advance of excavation. Notify the Owner in writing at least seven days in advance of any activities regarding the above activities.

1.4 TEMPORARY ELECTRICITY

A. Contractor shall put in its own service and meters and pay for all temporary utilities.

1. Provide connections to existing power source.

2. Size to provide service required for power and lighting during construction work.

1.5 PROTECTION AND SAFETY

A. Follow construction procedures necessary to provide a safe working condition through all phases of the Project. Procedures shall conform to the Safety Orders, Division of Industrial Safety, Title 8, California Code of Regulations.

B. Conform to applicable requirements of the State Occupational Safety and Health Administration.

C. Safety Programs:

1. Contractor shall have sole and complete responsibility for initiating, maintaining and supervising safety precautions and programs in connection with the project.

2. Contractor will, in conformance with General Conditions, identify their designated Safety Supervisor to the Owner's Representative and provide a copy of their safety program along with program revisions and updates within ten (10) calendar days from the issuance of the contract award. The first progress payment may be delayed in processing pending submission of the Contractor's safety program.

D. Contractor is solely responsible for outlining safety procedures to be followed by its workmen, subcontractors, and related trades working on its Project. Provide for safety of the public both day and night where they are exposed to construction operations.

E. Contractor shall also take whatever care is necessary to avoid damage to existing facilities or utilities to remain, whether on the Project or adjacent to it, and shall be liable for any damage thereto or interruption of service as a result of its operations.

F. Emergencies: In an emergency affecting the safety of persons or property, Contractor shall act, at their own discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by Contractor on account of emergency work shall be determined as provided in General Conditions for changes in the Work.

1.6 WATER CONTROL

A. Water for construction purposes shall be paid for by the Contractor until construction is complete through 90 day maintenance period until final acceptance by City of Sausalito.

B. Furnish and maintain pumps or other devices that may be required by Contractor's work under this Contract.

C. Provide control on the site as required to abate any dust or other air pollution nuisance on or adjacent to the site. Dirt shall not be allowed to accumulate on streets or sidewalks nor be washed into sewer.

D. The Work shall be kept free of standing water during construction.

1.7 PARKING

A. Coordinate availability of existing parking areas for construction personnel with the Owner's Representative.

1.8 MAINTENANCE OF TRAFFIC AND ACCESS

A. Do not access site at any points other than those indicated by Owner's Representative.

B. Do not block access to facilities at any time unless approved by Owner's Representative.

C. Perform work in stages to provide for public convenience including those activities indicated below.

D. Throughout progress of work, do not interfere with use of or access to adjacent buildings or property.

E. Do not close or otherwise obstruct sidewalks or streets without obtaining and paying for encroachment permits from the City.

F. Maintain accessibility from street at all times to fire hydrants within construction area.

G. Vehicles (wheels in particular) shall be cleaned before leaving site so as to minimize impact on City streets. In designated bermed area to prevent wash water contact with storm water, creeks, rivers, and other water bodies. As little water as possible will be used to avoid having to install erosion and sediment controls for the wash area.

H. Vehicle and equipment storage, cleaning, and maintenance areas will be located in designated, confined areas, as delineated on the Site Map. These areas should be located away from significant drainage courses.

I. Clean and sweep all streets muddied, soiled, or littered owing to construction activity during the work week to the satisfaction of the City.

J. All construction equipment will be maintained so as to prevent oil or other fluid leaks. Drip pans will be used for any oil or fluid changes that are required for maintenance of equipment.

K. Stockpiled spill cleanup materials will be placed where they will be readily accessible.

L. On-site vehicles and equipment will be inspected regularly for leaks, and repaired immediately. Leaking vehicles or equipment will not be allowed on site.

M. Off-site fueling stations will be used as much as possible. If fueling must occur on-site, designated areas located away from drainage will be used.

1.9 TOOLS, CORDS, ELECTRICAL EQUIPMENT

A. Tools, cords, and electrical equipment shall conform with Underwriters' Laboratory standards and OSHA requirements and shall be in proper working order to preclude hazard to occupants and premises.

1.10 TEMPORARY SIGNS AND NOTICES

A. Contractor shall post and maintain all notices, signs, and safeguards required by law or ordinance; no other advertisements will be permitted on the premises without approval of the Owner.

1.11 TRASH REMOVAL

A. Store trash or rubbish resulting from Project operations within the Contract work area.

B. Provide the necessary on-site containers for the collection of waste materials, debris, and rubbish.

C. Remove waste materials, debris, and rubbish from the site periodically and dispose of at legal disposal areas off the site.

D. Keep the work area reasonably clean at all times. Increase frequency of trash removal, when requested by the Owner, to conform to this requirement.

E. Waste material and debris shall not be buried at the site.

F. Burning of trash and debris on the site will not be permitted.

G. Keep construction site clean of metal debris.

H. Dumpsters will be placed under roofs or covered with plastic sheeting at the end of each work day and during rainy weather. If plastic is used, dumpster contents will be protected from storm water by securing it around the outside of the dumpster.

I. Dumpsters will be inspected regularly for leaks, and any dumpster that is not water-tight will be repaired or replace.

J. Dumpsters will not be cleaned out by hosing them down on the construction site. Dumpsters will be returned to the trash hauling contractor for cleaning.

K. See requirements for recycling demolished materials as specified in Section 01505, “Construction Waste Management.”

1.12 SECURITY

A. Provide and maintain barriers, security measures, and other facilities as required to protect the Work from unauthorized entry, vandalism, and theft.

B. Provide a temporary fence at limits of project area.

C. Security provisions shall be provided 24 hours a day, 7 days a week, including holidays, until acceptance of the Project by Owner.

1.13 DUST CONTROL

A. Blowing dust shall be reduced by timing construction activities so that paving and building construction begin as soon as possible after completion of grading and by landscaping disturbed soils as soon as possible.

B. All portions of the site shall be watered as many times a day as required to ensure proper dust control seven (7) days a week for the duration of the Project.

1. Cover stockpiles of soil, sand, and other similar materials.

2. Cover trucks hauling debris, soil, sand, and other similar materials.

1.14 NOISE CONTROL

A. Construction equipment which operates at noise levels in excess of 85-decibels measured on the A-weighted scale defined in ANSI S-1.4, at a distance of 100-feet from the construction equipment is prohibited.

1.15 REMOVAL

A. Completely remove temporary materials and equipment when their use is no longer required.

B. Clean and repair damage caused by temporary installations or use of temporary facilities.

C. Restore existing facilities used for temporary services to specified, or to original, condition.

D. Prior to acceptance by Owner, remove construction debris, nails, scraps, rocks larger than 1-1/2 inches and all metal debris in construction areas.

E. Full compensation for cleanup shall be included in other items of work. No separate compensation will be allowed for work pertaining to cleanup or disposal of material.

1.16 USE AND STORAGE OF HAZARDOUS OR FLAMMABLE CHEMICALS

A. Use and store hazardous or flammable chemicals, liquids, or gases brought into the Project site in approved containers, conforming to local, state, and national fire codes.

B. Use hazardous materials in a manner that will prevent their accidental release into other areas.

C. Do not discard hazardous materials into the jobsite waste-disposal facilities.

D. Disposal of volatile fluid wastes (mineral spirits, cleaners or paint thinner) in sewer systems is not permitted.

E. Remove empty containers from the premises immediately, and disposed of in a legal manner.

1.17 TEMPORARY SANITARY FACILITIES

A. Provide, pay for, install and maintain for duration of the Work, necessary enclosed toilet and sanitary facilities for construction personnel within the Project work area.

1.18 TEMPORARY TRAILER

A. Temporary trailer will be required for this project. All project documentation must be stored on site in a weather-protected unit.

END OF SECTION

SECTION 01505

CONSTRUCTION WASTE MANAGEMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section specified diversion of construction and demolition debris from landfill.

B. Related requirements specified elsewhere include:

1. Section 01310, Project Management and Coordination

2. Section 01330, Submittals

3. Section 01420, Definitions and Standards

1.2 SYSTEM DESCRIPTION

A. In accordance with the requirements of the City of Sausalito, the Contractor shall recycle construction and demolition materials.

B. The City's Construction and Demolition Ordinance requires that at least 50 percent of all construction and demolition debris generated by this project be reused or recycled.

C. The City has developed a standard Waste Management Plan and list of the City's permitted recycling transporters to assist the Contractor in meeting this requirement.

D. A complete copy of the City's Construction and Demolition Ordinance, as well as a directory of construction and demolition recycling facilities in the Bay Area, are available from the City upon request.

1.3 DEFINITIONS

A. "Conversion Rate" means the rate set forth in the Conversion Rate Table approved by the City of Sausalito for use in estimating the weight of materials identified in the Waste Reduction and Recycling Plan.

B. "Divert" means to use material for any purpose other than disposal in a landfill or transfer facility.

C. "Good faith" per the City of Sausalito's Construction and Demolition Debris Waste Reduction and Recycling Ordinance.

D. "Net cost" means that the following have been subtracted from the cost of separating and recycling:

1. Revenue from the sale of recycled or salvaged materials.

2. Landfill tipping fees saved due to diversion of materials from the landfill.

E. “Recycling Service means an off-site service that provides processing of material and diversion from landfill.

F. “Hauler” means the entity who transports construction and demolition debris to either a landfill or a recycling service.

1.4 SUBMITTALS

A. Submit specified Waste Reduction and Recycling Plan, included in Appendix of this Project Manual, to indicate how waste will be diverted from landfills.

B. Submit completed Waste Reduction and Recycling Summary Reports forms, included in Appendix of this Project Manual, at the completion of the demolition work and at 50 and at 100 percent completion of the construction work.

1.5 QUALITY ASSURANCE

A. Regulatory requirements:

1. Comply with City of Sausalito’s Construction and Demolition Debris Waste Reduction and Recycling Ordinance.

2. Approval of the Waste Reduction and Recycling Plan by the City of Sausalito is required before issuing a demolition, building permit, and beginning of demolition and on-site mobilization work.

B. Recycling Service Company: See requirements for recycling transporters included in the Appendix of this Project Manual. Any recycling service that will certify in writing that accepted construction and demolition debris will be diverted from landfill, not dumped illegally, or dumped at sea.

1.6 WASTE MANAGEMENT PLAN

A. Plan Development: The plan shall include the following information:

1. The estimated volume or weight of project construction and demolition debris, by materials type to be generated; and

2. The maximum volume or weight of such materials that can feasibly be diverted via reuse or recycling; and

3. The estimated volume or weight of such material that will be landfilled; and

4. If self-hauling the waste, the facilities proposed to recycle/landfill the debris; or

5. If sub-contracting with a recycling transporter, the name of the transporter.

B. Plan Review: The City will review and approve the Contractor’s Recycling Plan prior to construction.

1. Within 30 days after the project completion, the Contractor shall complete the remainder of the Waste Reduction and Recycling Form and return to the City with the appropriate receipts.

2. If the City determines that the Contractor has not made a food faith effort to comply with the City Ordinance, or if the Contractor fails to submit the documentation required within the required time period, then a reduction of $10,000.00 towards payment on the Contract shall be made. These funds shall be deposited into a special account and used for the purposes of promoting recycling within the City.

C. Plan Implementation:

1. Maintain log of each load, of each category item diverted from landfill. Log in separately debris sent to a Class III landfill and materials sent to recycling facilities.

   a. Include in log, type of load, load weight, name of hauling service; recycling service or landfill, and date accepted by recycling service or by landfill.

   b. Owner reserves the right to audit the log at any time, retain and make available, all weight tickets, copies of receipt and invoices.

   c. Units of Measure: Use same units as stated in the approved plan “good faith” estimate of construction waste that would be generated if no remedial methods were implemented.

2. Material handling

   a. Separation Facilities:

      1) Designate a specific on site area or areas to facilitate separation of materials for potential reuse, salvage, recycling, and return.

      2) Keep waste bins and pile areas neat and clean. Clearly mark bins for each category of waste. Do not commingle non-recyclable waste with materials designated for reuse or recycling.

   b. Environmental Controls During Handling, Storage, or Transport: Do not permit-designated materials to become contaminated or to contaminate site or surround areas.

3. Training and Coordination:

   a. Furnish copies of the Waste Management Plan to all on-site supervisors, each subcontractor, the City of Sausalito, and the Landscape Architect.

   b. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse and return methods to be used by all entities at the appropriate stages of the Project.

   c. Meeting: Include construction waste management on the agenda of meetings. At a minimum, discuss waste management goals and issues at the following meetings:

      1) Pre-bid meetings.

      2) Pre-construction meeting.

      3) Regularly scheduled job-site meetings.

D. Hazardous waste: Separate hazardous waste. Store and dispose of according to local regulations.

END OF SECTION

SECTION 01600

MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.1 PRODUCTS

A. Use only products acceptable to the City of Sausalito and approved by the Landscape Architect.

B. Submit lists of products and other product information in accordance with Section 01330 - SUBMITTALS.

1.2 SUBSTITUTIONS AND PRODUCT OPTIONS

A. Whenever a product is identified on the Drawings or in the Specifications by reference to a manufacturer's or vendor's name, trade name, catalogue number, or the like, it is so identified for the purpose of establishing a standard; and, except when "no substitution" is indicated, a product of another manufacturer or vendor which will perform equally the duties imposed by the general design will be acceptable provided the product so proposed is, in the opinion of both the Landscape Architect and the City of Sausalito, of equal substance, appearance, and function, and equal in available selection of colors and patterns.

B. If a proposed substitution would involve a change in type of material or assembly requiring listing or approval by state or local governing agencies, it must carry all required listings and approvals prior to submittal for the Landscape Architect's consideration.

C. The burden of proof of compliance with project requirements rests with the Contractor. Submit product information in accordance with Section 01330, SUBMITTALS.

D. Coordinate installation of accepted substitutions and product options into the Work, making such changes as necessary to accommodate the proposed products without additional cost to Owner.

1.3 MATERIAL AND EQUIPMENT COLORS

A. The Landscape Architect will provide a schedule of colors.

B. No individual color selections will be made until after approval of all pertinent materials and equipment and after receipt of appropriate samples in accordance with Section 01330, SUBMITALS.

C. Any one type of material shall be from a single source or batch and shall be uniform throughout in dimension, color, texture, and appearance.

D. Contractor shall request priority for any item requiring advance order to maintain schedule.

END OF SECTION

SECTION 01770

CLOSEOUT

PART 1 GENERAL

1.1 FINAL CLEANING

A. At completion, leave project clean and ready for use.

1. Legally dispose of waste materials, debris, and rubbish off the site.

2. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from exposed and semi-exposed surfaces.

3. Repair, patch, and touch up marred surfaces to specified finish, to match adjacent surfaces.

4. Broom clean paved surfaces, rake clean planting areas and other surfaces of grounds.

1.2 RECORD DOCUMENTS

A. The Contractor shall make "as-built" documents for the Owner.

1. Make a record of changes during construction on prints of the Drawings and Specifications provided by the Owner for this purpose. This set of documents shall be kept at job site office and shall be used only for marking as-built condition.

2. Upon project completion, transfer "as-built" information to mylar reproducible copies of the Contract Drawings. The Contractor shall provide a complete set of Contract Drawings on mylar sheets. Indicate all changed conditions by drawing a "cloud" around the added information; add date and name of the Contractor.

3. The prints on which changed conditions are recorded and the revised reproducible copies shall be returned to the Owner.

B. Refer to Section 01330, Submittals.

1.3 OPERATION AND MAINTENANCE DATA

A. Assemble all operation and maintenance data required by various sections of the Specifications, label and submit to the Landscape Architect for review and transmittal to the Owner.

B. Refer to Section 01330, Submittals.

1.4 WARRANTIES

A. Special warranties are required by various sections of the Specifications. Assemble written warranties, label and submit to the Landscape Architect for review and transmittal to the Owner.

1. Equipment warranties shall be written in the manufacturer's standard form and shall be countersigned by the subcontractor or supplier and the Contractor.

2. All other warranties shall be written in the following form on the subcontractor's or supplier's letterhead and shall be countersigned by the Contractor:

   WARRANTY FOR _____ YEARS

   We hereby warrant that the _____ _____ which we have installed at _____ has been done in accordance with the Drawings and Specifications, and that the work as installed will fulfill the warranty requirements included in the Specifications.

   We agree to repair or replace any or all of our work, together with any other adjacent work which may be displaced by so doing, that may prove to be defective in its workmanship or material within a period of ___ year(s) from date of acceptance of the above-named project by _____ (Owner), without any expense whatsoever to the Owner, ordinary wear and tear and unusual abuse or neglect excepted.

   In the event of our failure to comply with the above-mentioned conditions within thirty (30) days after being notified in writing by the Owner, we collectively or separately do hereby authorize the Owner to proceed to have such defects repaired and made good at our expense, and will honor and pay the costs and charges therefore upon demand.

   Signed:_____ _____
   Subcontractor (or Supplier) Date

   Countersigned:_____ _____
   Contractor Date

1.5 SPARE PARTS AND MAINTENANCE MATERIALS

A. Spare parts and maintenance materials are required by various sections of the specifications.

   1. Parts and materials shall be packaged so as to preclude damage in normal handling and storage.

   2. Packages shall be labeled with full description of contents and project name.

   3. Deliver packaged parts and materials to Owner as directed.

1.6 SUBSTANTIAL COMPLETION

A. Certify in writing to the Landscape Architect that the Work is substantially complete and include list of items remaining to be completed or corrected.

B. Within seven (7) days after receipt of certification, the Landscape Architect will make a site visit to review the work.

C. Should the Landscape Architect find the Work to be substantially complete, he will verify and amend the list of items to be completed or corrected and accordingly certify substantial completion.

D. The construction period is considered concluded upon the Landscape Architect's certification that the project is substantially complete.

1.7 FINAL REVIEW and PROJECT ACCEPTANCE

A. Certify in writing that the work has been completed in accordance with the Contract Documents.

B. Within seven (7) days after receipt of certification, the Landscape Architect will conduct the final review with the Owner and the Contractor.

C. Should the Landscape Architect and the Owner find the Work to be acceptable and the Planting Establish Maintenance Period to be complete, he will accordingly certify project acceptance. Formal acceptance of the project will occur upon City Council approval that will be the beginning of the warranty period.

END OF SECTION

SECTION 02000

DUST CONTROL

PART 1 GENERAL

1.1 WORK INCLUDED

A. This work shall consist of alleviation of dust nuisance throughout the duration of work applying either water or soil stabilizers, or both.

1.2 QUALITY ASSURANCE

A. Dust Control shall conform to the requirements of the SWPPP prepared by the Contractor and Section 10 of the CalTrans Standard Specifications.

B. The Contractor shall also comply with all City of Sausalito dust control regulations and ordinances, as well as AQMD Rule 403, which apply to any work pursuant to the Contract.

C. The Project Inspector will review the dust control measures performed by the Contractor. If for any reason the Project Inspector or the City of Sausalito is not satisfied with the dust control operation on any day, the Contractor shall be obligated to take whatever measures are required by the Project Inspector or the City of Sausalito to correct the situation, at no additional cost to the Owner.

D. During construction of the project, if the dust control measure being taken by the Contractor proves inadequate to control dust, the City of Sausalito may direct the Contractor to revise his operations and/or his dust control program. If the Contractor fails to adequately revise his operations after such direction, the City of Sausalito may cause the dust control measures to be performed by others, the costs to be deducted from any monies due or become due the Contractor.

E. Whenever the Contractor shall appear to be negligent in controlling dust, the Project Inspector or the City of Sausalito may direct attention to the existence of the dust hazard and instruct the Contractor to alleviate the hazard immediately. The Project Inspector or the City of Sausalito may order all grading and/or trenching operations stopped until the dust problem is eliminated.

F. The Project Inspector or the City of Sausalito may require, at any time, that the Contractor use a soil stabilizer, mulch, or other approved measures to increase dust control effectiveness.

PART 2 PRODUCTS

2.1 SOIL STABILIZERS

A. Soil stabilizers shall be non toxic and shall be approved by the City of Sausalito.

2.2 HYDROSEED

A. The Landscape Architect shall approve Hydroseed for dust control. Submit materials if required.

PART 3 EXECUTION

3.1 PERFORMANCE

A. Water all active construction areas daily or more frequently as required by City of Sausalito.

B. Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard.

C. Apply water daily, or apply non-toxic soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites as required by City of Sausalito.

D. Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites.

E. Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets. Wash down of dirt and debris into the storm drain system will not be allowed.

F. Hydroseed or apply non-toxic soil stabilizers to construction areas that have been previously graded and that in the opinion of the City of Sausalito cause excessive neighborhood dust problems.

G. Enclose, cover, water daily or apply non-toxic soil binders to exposed stockpiles (dirt, sand, etc.) including weekends and holidays.

H. Limit traffic speeds on unpaved roads to 10 mph.

I. Install sandbags or other erosion control measures to prevent silt runoff to public roadways.

J. Replant vegetation in disturbed areas as quickly as possible.

K. Install wheel washers for all exiting trucks, or wash off the tires or tracks of all trucks and equipment leaving the site.

L. Suspend excavation and grading activities when winds (instantaneous gusts) exceed 25 mph. Except that, regardless of wind speed, construction-grading activity shall be discontinued in wind conditions that in the opinion of the City of Sausalito cause excessive neighborhood dust problems.

M. Contractor shall be responsible for implementing dust control measures at all times including Saturdays, Sundays, Public Holidays and as ordered by the Architect or City of Sausalito's Representative.

END OF SECTION

SECTION 02010

NOISE CONTROL

PART 1 GENERAL

1.1 WORK INCLUDED

A. Construction activities shall be scheduled to have the least impact on residents.

PART 2 PRODUCTS

NONE

PART 3 EXECUTION

3.1 PERFORMANCE

A. Noise Control shall conform to Section 7-1.01I of the CalTrans Standard Specifications.

B. The Contractor shall also comply with all District sound control and noise level rules, regulations, and ordinances, which apply to any work performed pursuant to the Contract.

C. Each internal combustion engine, used for any purpose on the job or related to the job, shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without said muffler.

D. The Contractor shall demonstrate to the District that all construction equipment that will be used on the project site are equipped with manufacturer recommended mufflers or equivalent mitigation.

E. Comply with the Cities of Sausalito and County of Marin requirements for a special permit for construction noise outside of the Cities of Sausalito and County of Marin allowable work hours.

Location	Monday-Friday	Saturday	Sunday-Holidays
Sausalito	7:30AM – 7:00PM	8:00AM – 6:00PM	9:00AM – 6:00PM
County of Marin	7:00AM – 6:00PM	9:00AM – 5:00PM	N/A

3.2 NOISE CONTROL

A. The Contractor shall use equipment and methods during the course of renovation work that are least disruptive to the adjacent residents. Noise level for trenchers, graders and trucks shall not exceed 90 dBSA at 50-feet as measured under the noisiest operating condition. For all other equipment, nose levels shall not exceed 85-dBA at 50 feet.

B. Jackhammers shall be equipped with exhaust mufflers and steel muffling sleeves. All diesel equipment shall have exhaust muffled. Air compressors shall be of a quiet type such as a whisperized compressor.

C. Machines shall not be left idling. Electric power shall be used in lieu of internal combustion engine power wherever possible. Equipment shall be maintained to reduce noise from vibration, faulty mufflers or other sources.

D. Noisy operations shall be scheduled so as to minimize their disturbance to occupied adjacent areas and duration at any given time.

E. Stationary noise source such as generators shall be located away from perimeter of the project site to minimize noise level near buildings and pedestrian pathways.

F. All construction vehicles and equipment should be properly maintained and equipped with exhaust mufflers that are State standards.

G. The Contractor shall develop a construction noise mitigation plan and submit for review prior to start of construction. The plan would be based on the exact phasing of the project and the potential for each phase to disrupt normal activities at nearby noise sensitive areas.

H. The Contractor shall designate a construction noise coordinator. This person shall be available to respond to complaints and have the authority to implement the appropriate noise mitigation measures.

I. The costs of creating and implementing a noise control plan/program will be included in the various bid items and Contract Price. No additional compensation shall be made for noise control.

END OF SECTION

SECTION 02205

SITE PREPARATION AND DEMOLITION

PART 1 GENERAL

1.1 DESCRIPTION

A. Protecting existing trees, storm drainage system, utilities, improvements, and vegetation to remain.

B. Removing vegetation, debris, trash and other materials.

C. Clearing and grubbing.

D. Topsoil stripping where applicable.

E. Removal of existing concrete, paving, curbs, fencing, underground pipes and utilities and irrigation system.

F. Preserve and protect adjoining properties during removal work, site preparation work and construction.

G. Pruning of existing trees, if required.

1.2 RELATED SECTIONS

A. Section 02231 Tree Protection & Transplanting

B. Section 02275, Erosion Control

C. Section 02335, Subgrade Preparation & Base Material

D. Section 02810, Irrigation

E. Section 02850, Landscape Drainage

1.3 QUALITY ASSURANCE

A. Stipulations

1. Plant Protection:

a. References and Standards: American National Standard for Tree Care Operations; ANSI Z133.1-1988 International Society of Arboriculture l (ISA).

b. Protect planting to remain against cutting, breaking, skinning and bruising of bark; permit no traffic or stockpiling within drip line.

c. Refer to Section 02231 Tree Tree Protection & Transplanting

d. Any trenching within the root zone shall be done by hand and as directed by the Landscape Architect.

e. Provide watering for all planting within Contract limit and any adjacent areas affected by the work.

2. Plant Replacement

a. Contractor shall replace any damaged planting in kind using "specimen" plants as follows and at no cost to Owner:

1) See Section 02231 Tree Protection & Transplanting.

2) Shrubs, 15-gallon can size.

3) Lawn, sod.

b. Coordinate shutoff of irrigation systems with the Owner and be responsible for any damage caused to adjacent landscaping by Contract work.

3. Site Preparation and Demolition

a. Work shall be executed in accordance with the Drawings and Specifications and includes but is not necessarily limited to the following:

1) Clearing and grubbing.

2) Identification and protection of vegetation indicated to remain.

3) Removal of existing site improvements, such as, paving and bases, concrete curbs, fences, footings, foundations, irrigation system, overhead utilities, underground pipes and utilities and structures.

b. Locate and identify existing utility services and protect or disconnect, remove and cap as required for new work.

c. Remove, clean, store and protect all items designated and directed to be salvaged to Owner.

d. Remove, store and protect all items designated and directed to be reinstalled.

e. Obtain and pay for permits required for execution of this work.

1.4 SUBMITTALS

A. Photographs or videotape, sufficiently detailed, of existing conditions of adjacent streets, adjacent parking areas, trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site demolition.

B. Provide video record of existing storm drainage facilities and utilities where noted on drawings prior to commencing work.

C. Provide record drawings of existing storm drainage facilities and utilities to remain prior to commencing work.

1.5 PROJECT CONDITIONS

A. Before proceeding with work, field verify the materials, sizes and elevations of existing storm drainage facilities and utilities to remain and be connected to. Perform specified tree protection work before commencing site preparation, excavation, trenching and construction.

B. Coordination: Coordinate this work with the work of other Sections to avoid delay and interference with other work.

C. Nuisances: Keep dirt, dust, noise and other objectionable nuisance to a minimum. Use temporary enclosures, coverings and sprinkling, and combinations thereof, as necessary to limit dust to lowest practicable level, except do not use water to the extent that it causes flooding or contaminated run-off.

D. Traffic: Conduct work to ensure minimum interference with vehicular and pedestrian traffic, and to permit unencumbered access to the school property located outside of the project areas.

   1. Do not close or obstruct streets, sidewalks, or other public passageways without permission from authorities having jurisdiction.

   2. If required, by governing authorities, provide alternate routes around closed and obstructed traffic ways.

E. Dispose of cleared, grubbed and removed material that will not be salvaged or recycled on site. Burning on site is prohibited.

F. Salvable Improvements: Carefully remove items indicated to be salvaged and store where designed by Owner. Avoid damaging salvage material. Photograph prior to removal.

G. Protections:

   1. Prevent movement and settlement of adjacent structures. Install temporary barriers, fences, guard rails, enclosures, shoring, bracing, planking, warning signs and other protections required to protect structures, utilities, landscaping and other items that are to remain in place.

   2. Protect benchmarks, monuments and reference points from displacement and damage; and if displaced or damaged, replace at no cost to the Owner.

   3. Install and maintain required bracing, shoring and supports when removing structural elements and be responsible for safety and support of structure. If safety of structure appears to be endangered, cease operations and immediately notify the Owner. Do not resume operations until safety is restored.

PART 2 PRODUCTS

2.1 MATERIALS

A. Construction/Tree Protection Fence: Minimum of a temporary fence 6-foot high metal chain link fence. Refer to drawings.

B. References and Standards: American National Standard for Tree Care Operations; ANSI Z133.1-1988 International Society of Arboriculture l (ISA).

2.2 SOILS MATERIALS

A. Satisfactory Soil Materials. See Section 02900 Planting for satisfactory soil material for backfilling excavations and depressions resulting from site clearing.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas in which work is to be performed. Report in writing to the Owner's Representative all prevailing conditions that will adversely affect satisfactory execution of work. Do not proceed with work until unsatisfactory conditions have been corrected.

B. Starting work constitutes acceptance of the existing conditions and the Contractor shall then, at his expense, be responsible for correcting all unsatisfactory and defective work encountered.

C. For the duration the project, provide a construction fence at the perimeter of project (s) as required to secure the project from trespass and provide a safe construction site. Field verify the perimeter and gate locations with the City. The fence location may be adjusted as the project progresses based on the approval of City.

3.2 CLEARING

A. Remove designated structures, rubbish, undergrowth and deadwood as well as fences and incidental structures that interfere with the construction as shown on the Drawings and as specified. Obtain verification from Project Inspector prior to removal.

B. Prior to commencing work, meet with Owner’s Representative and identify and mark all existing trees that are within the construction zone and are likely to require protection measures and pruning as specified herein.

C. Perform work in accordance to applicable section of the standard specifications.

3.3 GRUBBING

A. Remove all roots in their entirety, brush, organic materials and debris. When indicated, such materials as topsoil and leaf mold, or other organic materials above the ground surface suitable for use as mulch or topsoil, shall be salvaged and stockpiled.

B. Roots: Remove completely. Dispose of at a green waste composting facility.

C. Remove grasses and weeds. Apply systemic weed killer and confirm weed kill prior to removal in conformance with the City of Sausalito IPM policy.

3.4 TOPSOIL STRIPPING

A. Protect existing topsoil in existing planting areas to remain.

B. Limit to areas required by the need to prepare subgrade for improvements shown on material plans and grading plans including: paving, concrete work, fences. Coordinate with Section 02900, Planting, Drawings and Section 02335, Subgrade Preparation & Base Material. Strip

topsoil to required depths in a manner to prevent intermingling with underlying subsoil or other waste materials.

C. Remove heavy growths of grass from areas before stripping. Remove trash, debris, weeds, roots, and other waste materials.

D. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.

3.5 UTILITIES

A. Contractor's attention is directed to Section 8-1.10 "Utility - Non-Highway Facilities", of the Standard Specifications and these Specifications.

B. Contact local utility companies 48 hours minimum prior to start of demolition work. Confirm verbal notices and written notices. Verify locations of all utilities entering site and their locations on site.

C. Cooperate with the Owner's Representative, utility companies, adjacent property owners, and other building trades in maintaining, protecting, re-routing or extending utilities passing through work areas which serve structures located on project site and on adjacent properties.

D. Verify that utilities that are to be removed, capped or abandoned are turned off, or are disconnected, or are re-routed to new locations before starting demolition.

E. Utilities may be abandoned in place in many cases provided that low strength cement grout completely fills any void in the utility.

3.6 REMOVAL

A. General:

1. Remove materials in an orderly and careful manner.

2. Repair or replace all removal work performed in excess to that required at no cost to the Owner. Repair or replacement shall match and equal construction, condition and finish existing at time of award of Contract.

3. Backfill voids from removed materials with clean fill as defined in Section 02300, Earthwork.

B. Remove following from locations to the extent required or directed for new construction.

1. Clear all structures, concrete slabs, asphalt pavement, over-size debris and organic matter.

2. Fencing, including posts, and footings. Be careful of soil caving.

3. Remove roots in the entirety.

4. Miscellaneous structural elements that interfere with the new construction and as directed.

5. Paving. Remove asphalt and concrete paving including aggregate base rock completely to the minimum depth required for subgrade of new improvements. Dispose of demolished concrete, asphalt and base rock at a material recycling facility. Existing aggregate base may be reused on site if it meets requirements of Section 02335, Subgrade Preparation & Base Material and the approval of the engineer.

6. Underground pipes and utilities serving improvements to be removed.

7. Other items noted on the drawings and required to be removed to install the new improvements.

8. Rocks or concrete pieces larger than 6 inches encountered during demolition shall be removed from the site.

9. Salvage, store and protect, materials noted to be salvaged and reused as part of the improvements.

C. Cutting asphalt, concrete curbs and concrete pavement:

1. All lines shall be marked and accepted by Owner's Representative before the cutting operation.

2. Cut edges of pavement at 90-degree angle to the surface in a true and straight line in accordance with dimensions shown on the Drawings. Make cuts with a concrete saw, to a 1-1/2" minimum depth.

D. Backfill and compact areas excavated and open pits and holes resulting from removal operations. Comply with requirements specified in Section 02300, Earthwork for backfill materials, compaction and installation methods.

E. Rough grade site within removal areas to meet adjacent contours and to provide positive drainage. Leave site in clean condition acceptable for performance of subsequent construction operations.

3.7 CLEANUP AND DISPOSAL, per General Conditions.

A. Transport trash, rubbish and debris daily from site and legally dispose of:

1. Demolished and waste materials encountered.

2. Remove and promptly dispose of contaminated, vermin-infested and dangerous materials encountered.

3. Do not burn or bury materials on site.

B. Clean excess soil may be distributed on site as accepted by the engineer, if it does not adversely affect specified finish grades. Coordinate with Section 02900, Planting, Drawings and Section 02335, Subgrade Preparation & Base Material.

C. Excess soil may need to be legally disposed of off site. Coordinate with Section 02900, Planting, Drawings and Section 02335, Subgrade Preparation & Base Material.

D. Upon completion of work under this Section, remove all tools, equipment and temporary enclosures and structures.

END OF SECTION

SECTION 02231

TREE PROTECTION & TRANSPLANTING

PART 1 GENERAL

1.1 DESCRIPTION

A. Protecting existing trees.

B. Transplanting of existing trees, other vegetation, debris, trash and other materials.

C. Pruning of trees.

1.2 RELATED SECTIONS

A. Division 1, General Requirements
B. Section 02300, Earthwork
C. Section 02810, Irrigation
D. Section 02900, Planting

1.3 QUALITY ASSURANCE

A. Stipulations

1. Plant Protection:

a. Protect trees against cutting, breaking, skinning and bruising of bark; permit no traffic or stockpiling within drip line.

b. Do not change earth surface within drip line of trees.

c. Do not park vehicles or store materials, supplies and construction equipment within drip line of trees.

d. Install a temporary 6-foot high metal chain link fence at the "drip line" of the tree(s) as shown on the drawings and as directed by the Landscape Architect.

e. Obtain specific instruction from Landscape Architect for pruning of trees, or disturbance of soil within spread of tree branches and for removal of roots.

f. Any trenching required within the root zone shall be done by hand and as directed by the Landscape Architect.

g. Provide watering for all planting within Contract limit and any adjacent areas affected by the work.

2. Plant Replacement

a. Contractor shall replace any damaged planting in kind using "specimen" plants as follows and at no cost to Owner:

1) Any protected trees that perish during construction or lost during the maintenance period, shall be replaced by contractor. Tree value shall be determined by Owner's arborist using formula adopted by the "guide for plant appraisal", latest edition, international society of arboriculture or with 48" box tree, whichever is larger. An International Society of Arboriculture or National Arborist's Association qualified tree surgeon may be retained by the school district to determine the condition of trees in question as to their ability to survive. Comply with recommendations to rehabilitate or to replace in accordance with paragraph above.

2) Shrubs, 15-gallon can size.

3) Lawn, sod.

b. Coordinate shutoff of irrigation systems with the Owner and be responsible for any damage caused to adjacent landscaping by Contract work.

3. Preparation

a. Work shall be executed in accordance with the Drawings and Specifications and includes but is not necessarily limited to the following:

1) Identification and protection of vegetation indicated to remain.

2) Refer to Architectural and Civil Drawings and Specifications for other demolition not shown on landscape Drawings and Specifications.

b. Locate and identify existing utility services and protect or disconnect, remove and cap as required for new work.

c. Remove, clean, store and protect all items designated and directed to be salvaged to Owner.

d. Remove, store and protect all items designated and directed to be reinstalled.

e. Obtain and pay for permits required for execution of this work.

1.4 SUBMITTALS

A. Photographs or videotape, sufficiently detailed, of existing conditions of adjacent streets, adjacent parking areas, trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site demolition.

1.5 PROJECT CONDITIONS

A. Perform specified tree protection work before commencing site preparation, excavation, trenching and construction.

B. Coordination: Coordinate this work with the work of other Sections to avoid delay and interference with other work.

C. Nuisances: Keep dirt, dust, noise and other objectionable nuisance to a minimum. Use temporary enclosures, coverings and sprinkling, and combinations thereof, as necessary to

limit dust to lowest practicable level, except do not use water to the extent that it causes flooding or contaminated run-off.

D. Traffic: Conduct work to ensure minimum interference with vehicular and pedestrian traffic, and to permit unencumbered access to the school property located outside of the project areas.

1. Do not close or obstruct streets, sidewalks, or other public passageways without permission from authorities having jurisdiction.

2. If required, by governing authorities, provide alternate routes around closed and obstructed traffic ways.

E. Salvable Improvements: Carefully remove items indicated to be salvaged and store where designed by Owner. Avoid damaging salvage material. Photograph prior to removal.

F. Protections:

1. Prevent movement and settlement of adjacent structures. Install temporary barriers, fences, guard rails, enclosures, shoring, bracing, planking, warning signs and other protections required to protect structures, utilities, landscaping and other items that are to remain in place.

2. Protect benchmarks, monuments and reference points from displacement and damage; and if displaced or damaged, replace at no cost to the Owner.

3. Install and maintain required bracing, shoring and supports when removing structural elements and be responsible for safety and support of structure. If safety of structure appears to be endangered, cease operations and immediately notify the Owner. Do not resume operations until safety is restored.

1.6 WARRANTY AND REPLACEMENT

A. Warrant trees to be in a healthy, thriving condition until the end of the maintenance period specified in Section 02900, Planting.

B. Replace plants and trees not in a vigorous condition immediately as directed by the Project Inspector at Contractor's expense. Install replacement plants before the final acceptance at the size specified. Refer to article above for plant replacement.

PART 2 PRODUCTS

2.1 TREE PROTECTION FENCE

A. Construction/Tree Protection Fence: Minimum of a temporary fence 6-foot high metal chain link fence. Refer to drawings.

B. References and Standards: American National Standard for Tree Care Operations; ANSI Z133.1-1988 International Society of Arboriculture l (ISA).

2.2 SOILS MATERIALS

A. Satisfactory Soil Materials. See Section 02300, Earthwork for satisfactory soil material for backfilling excavations and depressions resulting from work under this section.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas in which work is to be performed. Report in writing to the Owner's Representative all prevailing conditions that will adversely affect satisfactory execution of work. Do not proceed with work until unsatisfactory conditions have been corrected.

B. Starting work constitutes acceptance of the existing conditions and the Contractor shall then, at his expense, be responsible for correcting all unsatisfactory and defective work encountered.

A. For the duration the project, provide a tree protection fencing as shown on the drawings. Field verify the perimeter and gate locations with the Construction Manager. The fence location may be adjusted as the project progresses based on the approval of the Construction Manager.

3.2 UTILITIES

A. Contractor’s attention is directed to Section 8-1.10 “Utility - Non-Highway Facilities”, of the Standard Specifications and these Specifications.

B. Contact local utility companies 48 hours minimum prior to start of demolition work. Confirm verbal notices and written notices. Verify locations of all utilities entering site and their locations on site.

C. Cooperate with the Owner's Representative, utility companies, adjacent property owners, and other building trades in maintaining, protecting, re-routing or extending utilities passing through work areas which serve structures located on project site and on adjacent properties.

D. Verify that utilities that are to be removed, capped or abandoned are turned off, or are disconnected, or are re-routed to new locations before starting demolition.

E. Utilities may be abandoned in place in many cases provided that low strength cement grout completely fills any void in the utility.

3.3 TREE TRANSPLANTING

A. General:

1. Locate existing underground utilities before excavating.

2. Protect (E) underground and proposed underground utilities.

3. Orient transplanted trees in the same north-south direction as the existing orientation.

4. Install irrigation system as shown on irrigation plan.

5. Set finish grade, of trees 2” above adjacent finish grade.

6. Install 3” layer of bark mulch to cover the existing tree root mass and install a soil berm around the outside of the root mass to contain water.

7. Provide supplemental hand water to transplanted trees.

8. Maintain existing trees for 365 days.

B. Backfill and compact areas excavated and open pits and holes resulting from removal operations. Comply with requirements specified in Earthwork Section for backfill materials, compaction and installation methods.

C. Rough grade site within removal areas to meet adjacent contours and to provide positive drainage. Leave site in clean condition acceptable for performance of subsequent construction operations.

3.4 CLEANUP AND DISPOSAL, per Division 1, General Requirements.

A. Transport trash, rubbish and debris daily from site and legally dispose of:

1. Demolished and waste materials encountered.

2. Remove and promptly dispose of contaminated, vermin-infested and dangerous materials encountered.

3. Do not burn or bury materials on site.

B. Upon completion of work under this Section, remove all tools, equipment and temporary enclosures and structures.

END OF SECTION

SECTION 02275

EROSION CONTROL

PART 1 GENERAL

1.1 SCOPE OF WORK

A. General: Provide all materials, equipment, and labor necessary to furnish and install straw wattle barriers at locations shown on the drawings.

B. Erosion control facilities shall be installed complete and shall be maintained daily until project completion. The name of the person responsible for the daily maintenance of these facilities shall be on record along with a phone number where they can be reached 24 hours a day with the public works department. These facilities shall control and contain erosion-caused silt deposits and provide for the safe discharge of silt-free storm water into existing storm drain facilities. Design of these must be approved updated each year prior to September 30 and shall be signed by the engineer.

1.2 SUMMARY

A. This Section includes the following:

1. Permanent and temporary erosion control.

B. Related Sections include the following:

1. Division 1 Sections

2. Section 02300 – Earthwork

1.3 QUALITY ASSURANCE

A. General: Comply with governing codes and regulations.

1.4 SUBMITTALS

A. General: Comply with Section 01330 Submittals.

B. Submit material certifications and cut sheets for materials specified under this section.

PART 2 PRODUCTS

2.1 MATERIALS

A. Straw Wattles: Straw Wattles shall be manufactured from rice straw and be wrapped in a tubular plastic netting. The netting shall have a strand thickness of 0.03 inch, and a knot thickness of 0.055 and a weight of 0.35 ounce per foot (each +/- 10%) and shall be made from 85% high density polyethylene, 14% ethyl vinyl acetate and 1% color for UV inhibition. Straw Wattles shall be nine inches in diameter (+/- one inch), twenty-five feet long (+/- 0.5 feet) and weigh approximately 35 pounds (+/- 10%).

PART 3 EXECUTION

3.1 INSTALLATION

A. Storm Water Pollution Prevention: provide tailored to the Contractor's operations, methods, and equipment for the work in this contract. The Contractor shall as a minimum address:

1. Cut and fill operations.

2. Temporary stockpiles.

3. Vehicle and equipment storage, maintenance, and fueling operations.

4. Concrete disposal.

5. Dust control.

6. Tracking of dirt, mud on off-site streets.

7. Pipe flushing.

B. Straw Wattles: Straw Wattles shall be installed as shown on the drawings. They shall be placed on contour and staked with 18 or 24-inch wood stakes at four foot on center. The ends of adjacent Straw Wattles shall be abutted to each other snugly.

3.2 MAINTENANCE AND REMOVAL

A. General: Maintain and repair erosion control facilities throughout the construction period. Remove silt buildup at straw wattles as needed. Repair damage to earth slopes and banks.

B. Cleaning: Keep area clean of debris.

END OF SECTION

SECTION 02300

EARTHWORK

PART 1 GENERAL

1.1 DESCRIPTION

A. Provide earthwork complete, including removal work and clearing, grading, excavating, fill, and dewatering.

B. Related work specified elsewhere includes:

1. Section 01120, Field Engineering
2. Section 01450, Testing and Inspection
3. Section 02335, Subgrade Preparation and Base Material
4. Section 02850, Landscape Drainage
5. Section 02775, Landscpe Concrete
6. Section 02810, Irrigation
7. Section 02870, Site Furnishings

1.2 QUALITY ASSURANCE

A. Qualifications

1. All Earthwork sub-contractors bidding on this project must have a California license and be experienced in the installation, in Northern California, of playground or park installation for at least 5 years and have completed five (5) projects in Northern California of comparable size, type and complexity, in the past three (3) years.

B. Reference standards

1. Perform work in compliance with the rules and regulations of the Division of Industrial Safety and other local and State agencies having jurisdiction. Nothing contained herein shall be construed as permitting work that is contrary to such rules, regulations and codes.
2. Work shall conform to local codes and regulations.
3. References to "Standard Specifications" shall mean the Standard Specifications of the State of California, Business and Transportation Agency, Department of Transportation, CALTRANS.
4. ASTM Standards.
5. The grading contractor shall visit the site prior to bidding the project.
6. The contractors shall comply with the recommendations of the Geotechnical Engineer at all times.

7. If unforeseen circumstances are encountered during the grading operations, the Landscape Architect shall be contacted immediately for additional recommendations from the Geotechnical Engineer.

8. No deviations from the project specifications shall be made except upon written approval from the Geotechnical Engineer or Landscape Architect.

9. All existing surface and subsurface structures that will not be incorporated in the final development shall be removed prior to any grading operations.

1.3 SUBMITTALS, per General Conditions.

A. Submit a list of grading equipment to be used.

B. Submit an analysis of physical and chemical properties and certificate of compliance of environmental clearance for import soil.

C. Before the grading operation is underway, submit a letter identifying the approximate quantities and type of soil required to be imported and exported in order to accomplish a balance of the earthwork materials without additional compensation.

1.4 TESTING

A. Testing and Inspection: Testing shall be performed by a qualified independent testing laboratory under the supervision of a registered professional engineer, specializing in soils engineering.

B. The Owner will direct, provide and pay for initial testing and inspection during earthwork operations.

C. Provide and pay for re-testing and inspection during earthwork operations. Laboratory and inspection service shall be acceptable to the Owner.

D. Where reference is made to relative compaction, it shall be the in-place dry density of soil expressed as a percentage of the maximum dry density of the same material, determined by the ASTM D1557 laboratory test procedure. Optimum moisture is the water content that corresponds to the maximum dry density.

E. For structural fills under footings, slabs or pavements, determine moisture-density relationships in accordance with ASTM D1557.

F. Plasticity Index: ASTM D4318.

1.5 PROJECT CONDITIONS

A. Protect excavations by shoring, bracing, sheeting, underpinning, or other methods as required to prevent cave-ins or loose dirt from entering excavations. Barricade open excavations and post warning lights at work adjacent to public streets and walks.

B. Underpin adjacent structure(s), including utility service lines, which may be damaged by excavation operations.

C. Promptly repair damage to adjacent facilities caused by earthwork operations. Cost of repair at Contractor's expense.

D. Promptly notify the Inspector of unexpected subsurface conditions.

1.6 FIELD QUALITY CONTROL

A. Contractor shall provide adequate notice, cooperate with, provide access to the work, and assist testing agency and their representatives in execution of their function.

B. The Soil Engineer shall be notified at least two days, prior to commencement of any grading operations so that he may coordinate the work in the field with the contractor.

C. When, during the progress of work, field tests indicate that installed compacted materials do not meet specified requirements, provide additional compaction until specified density is achieved, or remove and replace defective materials with new materials as directed by the Inspector. Cost of additional labor, materials, and testing to attain specified density at Contractor's expense.

1.7 EXISTING CONDITIONS

A. A topographic survey of the property has been included in the drawings for reference only. Upon beginning the earthwork, Contractor represents that he has inspected the site and satisfied himself as to actual grades and levels and the true conditions under which the work is to be performed.

1.8 PROTECTION

A. Furnish, place and maintain all supports, shoring and sheet piling which may be required for the sides of the excavation or for the protection of adjacent existing improvements.

B. Maintain all benchmarks, monuments, and other reference points. If disturbed or destroyed, replace as directed.

C. Adequate protection measures shall be provided to protect workmen, passers-by, and the site. Streets and adjacent property shall be fully protected throughout the operations.

D. In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for working conditions on the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and not be limited to normal working hours.

E. Any construction review of the Contractor's performance conducted by the Inspector is not intended to include review of the adequacy of the Contractor's safety measures in, on, or near the construction site.

F. Adjacent streets, sidewalks, and property shall be kept free of mud, dirt, or similar nuisances resulting from earthwork operations.

G. Provide for surface drainage during the period of construction in a manner to avoid creating a nuisance to adjacent areas.

H. Water as required to suppress dust nuisance.

I. Protection of Existing Improvements: Provide barricades, covering, or other types of protection necessary to prevent damage to existing improvements indicated to remain in place. Protect improvements on adjoining properties. Repair damaged existing improvements to original condition as approved by authority having jurisdiction.

J. Provide erosion control measures as required.

1.9 UTILITY TRENCHING

A. Contractor shall conduct operations and schedule cleanup in a manner to cause the least possible obstruction and inconvenience to traffic, pedestrians, and any adjacent property owners or tenants.

B. Contractor shall protect open excavations, trenches and such with covers, railings, and fences as required together with signs, lights, and other warning devices sufficient to protect and maintain safe pedestrian, bicycle, or vehicular traffic through the work.

C. Contractor shall conduct operations in such a manner that existing facilities and utilities that are to remain in place will not be damaged. Excavation, trenching and other work under or adjacent to existing pipelines, conduit runs, or structures of any kind, shall be prosecuted in such a manner as to not interfere with the safe operation and use of such installations. Contractor, at his expense, shall furnish and install sheet piling, cribbing, shoring, or whatever means may be necessary to adequately support material carrying such facilities or to support the facilities themselves and shall maintain such supports until they are no longer needed. The installation and removal of such supports shall be performed in a manner that does not disturb the line, grade or operation of the facilities or utilities being installed or adjacent to the installation. Should any damage to existing facilities or structures be incurred during the operations of the Contractor, he shall immediately notify the proper owners or authorities, and shall arrange for the immediate repair of the facilities at his own expense. Temporary pavements, facilities, utilities, and other installations shall also be protected until they are no longer required. When temporary supports and other protective means are no longer required, they shall be removed and disposed of by the Contractor.

D. During trenching operations, the Contractor shall furnish, install, and operate adequate pumps or other devices as may be necessary to remove any seepage, storm water, or sewage that may be encountered during the progress of the work. All excavations shall be kept free from water during bedding, pipe laying, backfilling and when concrete is being placed, and thereafter until such water will do no damage to the work.

E. Damage resulting from movement of the sides or bottom of trenches or other excavations, whether sides are braced or not, and any portions of the area and work affected by such movement, shall be repaired or restored by the Contractor at his expense to the satisfaction of the Geotechnical Consultant and the Owner.

F. Contractor shall protect all existing facilities.

PART 2 MATERIALS

2.1 FILL

A. Structural Fill Materials: Inert subsoil material free of organic matter, rubbish, debris and rocks greater than 3" diameter, and meeting the following requirements:

1. Plastic index of not more than 12 - ASTM D424.

2. Resistance R-Value: Not less than 25.

3. Liquid Limit: 30% or less.

4. Expansion Index: 20% or less.

5. Percent Passing #200 Sieve: between 10 and 20%.

6. Minimum laboratory dry weight at optimum moisture content of 110 pounds per cubic foot.

7. Fill soil to be used under planting areas shall be capable of sustaining healthy plant life and shall have a pH value of between 6.0 and 7.5, a boron concentration of the saturation extract of less than 1 ppm, salinity of the saturation extract at 25 degrees C of less than 4.0 millimoles, and a Sodium Absorption Rate (SAR) of less than 8.

8. Provide imported fill material as required to complete the work. Obtain rights and pay all cost for imported materials.

9. Proposed fill material shall be inspected, tested, and laboratory report issued prior to use in the work.

10. Suitable excavated material removed to accommodate new construction may be used as fill material subject to inspection and approval.

11. All fill material is subject to testing and inspection.

2.2 TOPSOIL

A. Topsoil is defined as on-site surface soil. Satisfactory topsoil shall be free of subsoil, clay, lumps, stones and other objects over 1" in diameter, and without weeds, roots and other objectionable material.

B. If herbicide contamination is suspected, then a radish/ryegrass growth trial must be performed. Consult with Inspector prior to decision to test or not.

C. Herbicide contamination is suspected in areas of topsoil that show no or poor of vegetative ground cover or grass. Do not use topsoil from these areas for use in the natural turf playing field.

2.3 UTILITY TRENCH BACKFILL

A. Sand bedding, native soil and permeable material per Section 02850, Landscape Drainage.

PART 3 EXECUTION

3.1 PREPARATION

A. Establish extent of grading and excavation by area and elevation. Designate and identify datum elevation and project engineering reference points. Set required lines, levels and elevations.

B. Do not cover or enclose work of this Section before obtaining required inspections, tests, approvals and location recording.

3.2 EXISTING UTILITIES

A. Notify the Underground Service Alert (U.S.A.) Center 48 hours in advance of performing any excavation work by calling (800) 227-2600. Verify the grade and location of existing utilities prior to any work where conflicts may arise by careful hand digging. Be responsible for the protection of all existing utilities. Be responsible for the protection of all existing survey monuments.

B. Before starting grading and excavation, establish the location and extent of underground utilities in the work area. Exercise care to protect existing utilities during earthwork operations. Perform excavation work near utilities by hand and provide necessary shoring, sheeting and supports as the work progresses.

C. Maintain, protect, relocate or extend as required, existing utility lines which pass through the work area. Pay costs for this work, except as covered by the applicable utility companies.

D. Protect active utility services uncovered by excavation.

E. Remove abandoned utility service lines from areas of excavation. Cap, plug or seal abandoned lines and identify termination points at grade level with markers.

F. Accurately locate and record abandoned and active utility lines rerouted or extended on project record documents.

G. The holes, left by the removal of subsurface structures shall be cleaned of all debris, backfilled with clean on site soil, and compacted to not less than 90% relative compaction, using ASTM D1557 test procedure. This backfill must be structural fill and the operation must be conducted under the supervision of the Soil Engineer.

3.3 SITE GRADING

A. Perform grading with in contract limits, including adjacent transition areas, to new elevations, levels, profiles and contours indicated. Provide subgrade surfaces parallel to finished surface grades. Provide uniform levels and slopes between new elevations and existing grades.

B. Grade surfaces to assure areas drain away from structures and to prevent ponding and pockets of surface drainage. Provide subgrade surfaces free from irregular surface changes and as follows:

1. Rough Grading: Plus or minus 0.10 ft. subgrade tolerance. Finish required will be that ordinarily obtained from a laser controlled blade-grader or scraper operations.

2. Provide subgrade surface free of exposed boulders or stones exceeding 3" in greatest dimension in paved areas.

3. Granular Base: Grade subgrade surface smooth and even, free of voids to the required subgrade elevation. Provide compacted subgrade suitable to receive granular base materials. Tolerance 1/2" in 10'-0". Refer to Section 02335 and for Subgrade Preparation and Base Material.

4. Drainage Swales: Grade as shown on drawings.

5. Storm Drainage and Subsurface Drainage: Install swales as shown on drawings. Refer to Section 02850, Landscape Drainage.

3.4 EXCAVATING

A. Excavate for structures to elevations and dimensions shown. Extend excavation a sufficient distance from foundations to permit placing and removal of formwork, installation of materials, services and inspection. Hand trim foundation excavations to final grade just before concrete is placed. Remove loose, soft materials, and all organic matter. Footings shall bear on approved undisturbed bearing soil.

B. Obtain inspection and testing of foundation excavations by Inspector before base rock is placed.

C. Excavate for structures and paving to cross-sections, elevations and grades indicated. Allow for base material.

D. Extra Excavation: Excavate unsatisfactory soil materials extending below required elevations to depth as directed. Such extra excavation will be paid for as a change in work. Obtain Landscape Architect's written authorization before performing extra excavation work.

E. Unauthorized Excavation: Backfill and fill all overexcavation to proper grades. Fill overexcavation at footings with 1,500 psi concrete. Additional labor and material for unauthorized excavation and remedial work at Contractor's expense.

F. Shore, sheet or brace excavations as required to maintain them secure. Remove shoring and bracing as backfilling progresses, when banks are safe against caving.

G. Do not excavate footings or slabs to the full depth when freezing temperature may be expected, unless footings or slabs are placed immediately after the excavation has been completed. Protect excavation bottoms from freezing when the placing of concrete is delayed.

H. Rock Excavating:

1. Rock: Material which cannot be removed with 3/4 cu. yd. capacity power shovel without drilling or solid boulders with a volume of more than 1/2 cu. yd.

2. Rock Excavation: Material excavation of buried boulders and rock in excess of 1/2 cu. yd. that requires continuous systematic drilling or continuous use of ripper or other special equipment. All other excavation shall be classified as earth excavation.

3. Contractor will be paid cost of rock excavation as a change in work. Obtain Inspector's written authorization prior to performing rock excavation work.

3.5 SITE DRAINAGE: Performed under Section 02850, Landscape Drainage.

3.6 DRAINAGE

A. Provide necessary pumps and drainage lines and maintain excavations, including footings and pits, free from water (ice and snow) during excavating and subsequent work operations.

B. Provide drainage of the working area at all times.

3.7 FILLING, BACKFILLING AND COMPACTING

A. Obtain inspection and approval of subgrade surfaces by Inspector prior to filling operations. Scarify, dry and compact soft and wet areas; remove and replace unsuitable subgrade materials with an approved compacted fill material. Take corrective measures before placing fill materials.

B. No fill placement shall be made without the approval of the Geotechnical Engineer.

C. For voids resulting from the removal of existing subsurface pipes and structures, the bottom of the excavation shall be scarified to a depth of 12 inches (if required), moisture conditioned and then compacted to a minimum of 90% relative compaction. Additional fill material placed in the trenches shall be benched into the supporting material (to minimize differential settlement) with 2:1 criteria (horizontal to vertical) and compacted a minimum of 90% relative compaction.

D. Subgrade Preparation for paving:

1. Topsoil and roots are not permitted as fill or backfill material under paved areas. Remove existing topsoil and roots to the complete satisfaction of the Geotechnical Engineer. Fill holes with approved backfill satisfaction of the Geotechnical Engineer.

2. Scarify the entire subgrade to minimum depth of 12” to remove the over-saturated soils. Turn the soil over time and again to lower the moisture content to the level required by the Geotechnical Engineer.

3. Prepare subgrade free of any depressions, voids and irregularities to achieve a uniform condition as required and compacted a minimum of 90% relative compaction.

4. If additional fill is required, spread approved engineered fill material uniformly in layers not greater than 8" of loose thickness over entire fill area prior to compaction.

5. Lift thickness requirements may be modified by Inspector to suit equipment and materials or other conditions when required to assure satisfactory compaction.

6. Moisture-condition fill material by aerating or watering and thoroughly mix material to obtain moisture content permitting proper compaction.

7. Place and compact each layer of fill to indicated density before placing additional fill material. Repeat filling until proposed grade, profile or contour is attained.

8. Suspend fill operations when satisfactory results cannot be obtained because of environmental or other unsatisfactory site conditions. Do not use muddy (or frozen) fill materials. Do not place fill material on muddy (or frozen) subgrade surface.

9. Maintain surface conditions which permit adequate drainage of rainwater and prevent ponding of surface water in pockets. When fill placement is interrupted by rain, remove wet surface materials or permit to dry before placing additional fill material.

E. Place backfill materials in uniform layers not greater than 8" loose thickness over entire backfill area.

1. Use hand tampers at foundation retaining walls and similar locations. Do not use large rolling equipment adjacent to retaining walls.

2. Do not backfill against retaining walls until walls for bearing surfaces have reached design strength or are properly braced, and backfilling operations approved. Provide clean backfill materials or granular materials as required. Compact in maximum 8" layers.

F. Fill all areas of settlement to proper grade before subsequent construction operations are performed.

G. Compaction:

1. Provide minimum and maximum compaction control for all fill and backfill.

2. Engineered Fill

a. Compact top 12" of subgrade and each layer of engineered fill or backfill material to 90% relative compaction. Extend compaction at least 1'-0" beyond paving.

b. Compact top 12" of subgrade and each layer of engineered fill or backfill material at foundations, slabs-on-grade, retaining walls, concrete borders, mow bands, curbs, concrete, and paved areas to 90% relative compaction. Extend compaction at least 5'-0" at both sides of foundations and retaining walls and at least 1'-0" beyond slabs-on-grade and paving.

3. Water settling, puddling and jetting of fill and backfill materials as a compaction method is not acceptable.

4. Maintain moisture content of materials during compaction operations within required moisture range to obtain indicated compaction density.

5. Provide proper equipment to achieve consistent and uniform compaction of fill and backfill materials.

H. Maintenance of Finish Grades:

1. Protect finish graded areas from traffic and erosion. Keep free of trash and debris. Repair and re-establish grades in settled, eroded and damaged areas.

2. Where completed areas are disturbed by construction operations or adverse weather, scarify, reshape and compact or scarify to achieve required density.

3.8 FIELD QUALITY CONTROL

A. The owner will provide and pay for field quality control soils testing and inspection during earthwork operations. Provide a minimum of 48 hours notice.

B. Contractor shall provide adequate notice, cooperate with, provide access to the work, obtain samples, and assist testing agency and their representatives in execution of their function.

C. Fill Materials: The owner will test proposed materials to verify suitability for use, gradation of material, moisture-density relation, design bearing value, and percent of organic materials.

D. Subgrade Surfaces: Based on visual examination at the site, the owner will provide and pay for bearing tests as required to verify subgrade surfaces are adequate and meet or exceed design bearing values.

1. Paved Areas: Make at least one test for each 2,000 sq. ft. of paved area.

E. Compaction Operations: The owner will provide and pay for inspection and testing during paved area filling and compaction operations. Test each lift of fill to verify compaction meets specified requirements. The owner will provide and pay for periodic inspection and testing during site area filling and compaction operations.

F. When, during progress of work, field tests indicate that installed compacted materials do not meet specified requirements, provide additional compaction until specified density is achieved, or remove and replace defective materials with new materials as directed by the Inspector. Cost of additional labor, materials, and testing to attain specified density is at Contractor's expense.

3.9 TRENCHING AND EXCAVATION

A. Where utility trenches are required in existing asphalt concrete or Portland cement concrete roadways, the existing asphalt concrete or Portland cement concrete shall be full depth sawcut a minimum of 12" beyond the edge of the trench, unless otherwise directed by the Landscape Architect.

B. Trenches may be excavated either by hand, or by machine. For gravity systems, excavation shall begin at the outlet end and proceed upgrade. Trench sides shall be parallel to and at equal distance from the centerline of the pipe.

C. Pipe trenches shall be excavated below the bottom of the pipe to provide for pipe bedding material.

D. Where a trench has been excavated below the designed grade, the bottom of the trench shall be refilled with approved bedding material, compacted in place in an approved manner and to the satisfaction of the Geotechnical Consultant and the Landscape Architect at no additional cost to the Owner.

E. Trenches shall not be left open overnight in existing public street areas. In other areas the Geotechnical Consultant and the Landscape Architect shall have the right to limit the amount of trench which is opened or partially opened at any one time, and also to limit the amount of trench left without backfill, at any one time.

F. The bottom of trenches shall be free of loose material at the bottom of the trenches compacted and tested by the assigned Field Engineer to a minimum of 90% relative compaction, prior to placement of the geotextile fabric or pipes in the trenches.

3.10 CONTROL OF GROUND WATER

A. Contractor shall be solely responsible for dewatering trenches and excavations and subsequent control of ground water. Contractor shall provide and maintain such pumps or other equipment as may be necessary to control ground water and seepage until backfilling is completed.

3.11 BRACING AND SHORING

A. All work shall be in conformance with California and Federal OSHA requirements.

B. The Contractor shall furnish, place, and maintain such bracing and shoring as may be required to support the sides of the excavations for the proper protection of workmen; to facilitate the work; to prevent damage to the pipes and appurtenances being constructed; and to prevent damage to adjacent structures or facilities. Upon completion of the work, all bracing and shoring shall be removed.

C. The Contractor shall be solely responsible for all bracing and shoring for excavations five feet or more in depth, and shall, if requested by the Project Inspector, submit details and calculations to the Project Inspector for an adequate shoring system. The Project Inspector may forward the submittal to the Geotechnical Engineer, the Landscape Architect and/or the California Division of Industrial Safety for their review. The Contractor's submittal shall include the basic design, assumed soils conditions, and estimation of forces to be resisted, together with plans and specifications of the materials and methods to be used, and shall be prepared by a Civil Engineer or Structural Engineer registered in California. No excavations in trench section or around structures shall precede a response to the submittal by the Project Inspector.

D. The Contractor is solely responsible for installing and extracting the shoring in a manner, which will not disturb the line, grade, compaction, or operation of the utility being installed or adjacent utilities and facilities.

3.12 PIPE BEDDING

A. Bedding material, from bottom of trench to bottom of pipe, shall be accurately shaped to the line and grade called for on the plans. Bedding material shall be carefully placed and compacted under the haunches of the pipe. Bedding material shall be compacted to at least 90 percent relative compaction. Jetting or ponding of bedding material will not be permitted.

B. Upon completion of bedding operations and prior to the installation of pipe, Contractor shall notify the Geotechnical Engineer, who will then inspect the bedding layer. Pipe laying shall not commence until the Geotechnical Engineer and the Project Inspector representative have approved the bedding.

3.13 BACKFILLING

A. Initial backfill, from top of bedding to 12” above top of pipe, shall be carefully brought up simultaneously on both sides of the pipe, so as to prevent any displacement of the pipe from its true alignment. Initial backfill shall continue to be carefully placed and compacted under the haunches of the pipe. The initial backfill shall be compacted in layers not more than eight (8) inches in uncompacted thickness and in a manner that will preclude moving the pipe. Compaction shall be to at least 90 percent relative compaction. Jetting or ponding of backfill material will not be permitted.

B. Subsequent backfill, from top of initial backfill to pavement structural section subgrade, shall be placed in loose lifts not exceeding eight (8) inches in thickness before compaction, and compacted by the use of pneumatic tampers or other mechanical means approved by the Geotechnical Engineer. Each layer shall be moisture conditioned to 2 to 5 percent of optimum moisture content. Compaction equipment or methods that produce horizontal or vertical earth pressures that may cause excessive displacement or may damage the pipeline will not be permitted. Lifts of subsequent backfill material shall be compacted to 90 percent relative compaction, except that in planted areas compaction may be reduced to 85% of relative compaction. Jetting or ponding of backfill material will not be permitted.

C. Utility backfill shall be inspected and tested by the Geotechnical Engineer during placement. Contractor shall cooperate with the Geotechnical Engineer and shall provide working space for such tests in his operations. Backfill not compacted in accordance with these specifications shall be recompacted or removed as necessary and replaced to meet the specified requirements, all to the satisfaction of the Geotechnical Engineer and the Project Inspector, prior to proceeding with the Work.

3.14 DUST ALLEVIATION AND CONTROL

A. Contractor shall be responsible for and shall provide pollution and dust abatement and control measures satisfactory to the Project Inspector continuously during the course of the work.

3.15 DISPOSAL OF WASTE MATERIALS

A. Perform work in accordance to Section 7, 1.13 “Disposal of Materials Outside the Highway Right of Way” of the Standard Specifications.

B. Stockpile, haul from site, and legally dispose of export and waste materials, including trash, excess soil and debris.

C. Maintain disposal route clear, clean and free of debris.

D. Clean excess soil may be distributed on site as accepted by the City, if it does not adversely affect specified finish grades. Coordinate with Drawings and Section 02335, Subgrade Preparation & Base Material, Section 02900 Planting

E. Excess soil may need to be legally disposed of off site. Refer to Coordinate with Drawings and Section 02335, Subgrade Preparation & Base Material, Section 02900 Planting.

3.16 CLEANUP

A. Upon completion of utility earthwork all lines, manholes, catch basins, inlets, utility boxes and other structures shall be thoroughly cleaned of dirt, rubbish, debris, and obstructions of any kind. The entire work site shall be cleaned of all waste, rubbish, and construction debris of any nature.

B. Other surplus materials, including soil, remaining upon completion of the work shall become the property of the Contractor unless otherwise specified herein or noted on the plans, and shall be removed from the work site by the Contractor and disposed of outside the project limits in a lawful manner.

C. Upon completion of earthwork operation, clean areas within contract limits, remove tools and equipment. Provide a clear, clean site, free of debris and suitable for site work operations.

3.17 CLOSEOUT, per Section 01770, Closeout.

A. The Contractor shall engage a California Registered Civil Engineer or licensed Land Surveyor to perform a conformance survey at completion of the project and provide a hard copy of the survey and an AutoCAD copy of the survey as part of the closeout documents.

END OF SECTION

SECTION 02335

SUBGRADE PREPARATION AND BASE MATERIAL

PART 1 GENERAL

1.1 DESCRIPTION

A. Provide subgrade preparation and the base material installation complete, including clearing, grading, excavation, filling and compaction and dewatering.

B. Subgrade is that area on which concrete, aggregate base, or layer of any other non-organic material is to be placed.

1.2 QUALITY ASSURANCE

A. Reference Standards

1. Perform all work in accordance with all applicable laws, codes and regulations required by the City of Sausalito, and County of Marin.

2. Perform work in accordance to applicable sections of the Caltrans Standard Specifications.

3. Reference to "Caltrans Standard Specifications" shall mean the Standard Specifications of the State of California, Business and Transportation Agency, Department of Transportation, CALTRANS.

B. Related work specified elsewhere includes:

1. Section 01450, Testing and Inspection

2. Section 02300, Earthwork

3. Section 02775, Landscape Concrete

4. Section 02810, Irrigation

5. Section 02900, Planting

C. Stipulations

1. The finished surface of the subgrade, at any point, shall not vary more than 0.05' above or below the elevation indicated on the drawings.

2. Finish Surface Tolerance: 1/4-inch maximum variation in 10 feet.

D. ASTM Standards.

1.3 SUBMITTALS

A. Provisions: Comply with Division 1 Requirements.

B. Material list and product data of all items proposed to be provided under this Section.

C. Certificates (certified analysis of certificate of compliance) signed by the material producer.

1.4 PROJECT CONDITIONS

A. Coordination: Coordinate this work with the work of other Sections to avoid delay and interference with other work.

1.5 PROJECT CONDITIONS

A. Coordination: Coordinate this work with the work of other Sections to avoid delay and interference with other work.

B. Protect excavations by shoring, bracing, sheeting, underpinning, or other methods as required to prevent cave-ins or loose dirt from entering excavations. Barricade open excavations and post warning lights at work adjacent to public streets and walks.

C Underpin adjacent structure(s), including utility service lines, which may be damaged by excavation operations.

D. Promptly repair damage to adjacent facilities caused by earthwork operations. Cost of repair at Contractor's expense.

E. Promptly notify the Inspector of unexpected subsurface conditions.

F. If during the course of operations, an area of pumping or otherwise unstable soil is encountered, the contractor shall immediately modify his operations in such a way as to limit the frequency and weight of vehicles traveling over the area and promptly notify the Inspector who will contact the Geotechnical Engineer for an evaluation.

1.6 EXISTING CONDITIONS

A. A topographic survey of the property has been included in the drawings for reference only. Upon beginning the work, Contractor represents that he has inspected the site and satisfied himself as to actual grades and levels and the true conditions under which the work is to be performed.

1.7 PROTECTION

A. Furnish, place and maintain all supports, shoring and sheet piling which may be disturbed by earthwork operations.

B. Maintain all benchmarks, monuments, and other reference points. If disturbed or destroyed, replace as directed.

C. Adequate protection measures shall be provided to protect workmen, passers-by, and the site. Streets and adjacent property shall be fully protected throughout the operations.

D. In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for working conditions on the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and not be limited to normal working hours.

E. Any construction review of the Contractor's performance conducted by the Inspector is not intended to include review of the adequacy of the Contractor's safety measures in, on, or near the construction site.

F. Adjacent streets, sidewalks, and property shall be kept free of mud, dirt, or similar nuisances resulting from earthwork operations.

G. Provide for surface drainage during the period of construction in a manner to avoid creating a nuisance to adjacent areas.

H. Water as required to suppress dust nuisance.

I. Protection of Existing Improvements

1. Provide barricades, covering, or other types of protection necessary to prevent damage to existing improvements indicated to remain in place. Protect improvements on adjoining properties. Repair damaged existing improvements to original condition as approved by authority having jurisdiction.

J. Provide erosion control measures as required.

K. Protection of Other Property: Excavation and other work over, under and adjacent to existing pipelines, cables, conduit runs or structures of any kind shall be procured in such a manner as not to interfere with the safe operation and use of such installations. Should any damage be incurred to existing facilities during the Contractor's operations, the Contractor shall immediately notify the Owner's Representative and authorities, and shall arrange for the immediate repair of same at his own expense.

L. Underground Obstruction: The locations of existing underground utilities and structures, insofar as they are known from information furnished by the respective utility companies and agencies, have been shown on the drawings. The Owner assumes no responsibility for the accuracy or completeness of said data, which is offered solely for the convenience of the Contractor.

M. Control of Water: Take measures as may be required and furnish, install and operate such pumps or other devices as may be necessary to remove any seepage, storm water or sewage that may be found or may accumulate in the excavations during the progress of the work. Keep excavations entirely free from water at all times during the construction of the work, and until the Geotechnical Engineer gives permission to cease pumping.

N. Pavement Restoration: Pavement, bases and compacted subgrade disturbed by trenching operations shall be replaced in an acceptable manner with materials equal to the adjacent compacted subgrade, bases and pavement for a minimum distance of 12" on each side of the trench, and shall conform to the requirements of these Specifications or to local ordinances governing such replacement.

1.8 FIELD QUALITY CONTROL

A. Contractor shall provide adequate notice, cooperate with, provide access to the work, and assist testing agency and their representatives in execution of their function.

B. When, during the progress of work, field tests indicate that installed compacted materials do not meet specified requirements, provide additional compaction until specified density is achieved, or remove and replace defective materials with new materials as directed by the Inspector. Cost of additional labor, materials, and testing to attain specified density at Contractor's expense.

C. The Contractor shall engage a California Registered Civil Engineer or licensed Land Surveyor to perform field engineering.

1.9 TESTING

A. Testing and Inspection: Testing shall be performed by a qualified independent testing laboratory under the supervision of a registered professional engineer, specializing in soils engineering.

B. The Owner will direct, provide and pay for initial testing and inspection during operations.

C. Provide and pay for re-testing and inspection during operations. Laboratory and inspection service shall be acceptable to the Owner.

D. Where reference is made to relative compaction, it shall be the in-place dry density of soil expressed as a percentage of the maximum dry density of the same material, determined by the ASTM D1557 laboratory test procedure. Optimum moisture is the water content that corresponds to the maximum dry density.

E. For structural fills under footings, slabs or pavements, determine moisture-density relationships in accordance with ASTM D1557.

F. Plasticity Index: ASTM 4318.

1.10 GENERAL REQUIREMENTS

A. When rain is forecast, temporary measures to protect areas of the exposed subgrade from saturation by rainfall or runoff shall be taken. These include, but are not limited to, covering grading and sloping of subgrade surfaces to prevent ponding, sealing disturbed, uneven subgrade, surfaces with a smooth drum roller, grading and excavating diversionary swales, trenches or detention basins.

B. Failure by the Contractor to comply with the above requirements to take reasonable and adequate measures or exercise sound engineering and construction practices to protect the work from damage. All repair work shall be performed at no additional cost to the Owner.

PART 2 MATERIALS

2.1 AGGREGATE BASE - CLASS 2

A. Aggregate base shall be Class 2, and free from vegetable matter or other deleterious substances. The percentage composition by weight of aggregate base shall conform to Section 26 of the Caltrans Standard Specifications.

2.2 RECYCLED AGGREGATE BASE - CLASS 2

A. Subject to the approval of the Geotechnical Engineer, recycled aggregate base shall be Class 2, and free from vegetable matter or other deleterious substances. The percentage composition by weight of aggregate base shall conform to Section 26 of the Caltrans Standard Specifications.

PART 3 EXECUTION

3.1 SUBGRADE PREPARATION

A. Remove topsoil, stumps, roots, grasses and weeds to the satisfaction of the Project Inspector.

B. For areas of fill to receive organic material refer to Sections 02900 Planting, and Drawings.

C. Scarify subgrade to a depth of at least 12" below the final subgrade. Rip and cross rip the soil to a depth of at least 12 inches. After ripping the soil, disk the soil and cross disk the soil to produce a maximum particle size of 3 inches. Harrow, dry roll and break clods to achieve a finely divided condition.

D. Remove all boulders, hardened material or rock encountered that is over 3 inches in size. The earth shall be uniform for the full depth and width of the subgrade.

E. Relative compaction, maximum dry density, and optimum moisture content of fill materials shall be determined in accordance with ASTM Test Method D1557, “Moisture-Density Relations of Soils and Soil Aggregate Mixtures Using a 10-lb. Rammer and 18-in. Drop.

F. The finished subgrade surface shall be firm and unyielding under the weight of a loaded water truck traveling over the surface.

G. The subgrade under paving and structures shall be compacted to at least 90 percent relative compaction and meet the requirements specified in the referenced geotechnical evaluation.

3.2 AGGREGATE BASE

A. Deliver to site as a uniform mixture and spread each layer in one operation without segregation.

B. Class 2 Aggregate Base shall be readily compacted and spread with equipment that will provide a uniform layer conforming to the planned section, and as specified in Section 26 of the Caltrans Standard Specifications.

C. The aggregate base shall be compacted to at least 95 percent relative compaction.

D. Proof roll and mark “soft spots” for additional compaction or correction. Proof rolling operations must be performed in the presence of the Project Inspector and conform to their requirements.

E. Unsatisfactory material shall be removed and repaired to the satisfaction of the Project Inspector.

3.3 CLEANUP

A. Per Section 01770.

END OF SECTION

SECTION 02350

DRILLED PIERS

PART 1 GENERAL

1.1 WORK INCLUDED

A. This specification covers requirements for drilled pier construction.

B. The provisions of this specification shall govern unless otherwise specified in the contract documents. In case of conflicting requirements, the contract documents shall govern.

1.2 RELATED WORK

A. Section 01450, Quality Control

B. Section 02300, Earthwork

C. Section 02335, Subgrade Preparation and Base Material

D. Section 02775, Landscape Concrete

E. Section 02820, Chain Link Fencing and Gates

F. Section 02870, Site Furnishings

G. Division 16000, Electrical

1.3 REFERENCES

A. ASTM Standards (Latest Edition)

A82 – Standard specification for cold dawn steel wire for concrete reinforcement.

A615 – Standard specification for deformed and plain billet-steel bars for concrete reinforcement.

C33 – Concrete Aggregates.

C39 – Standard Specification for Compressive Strength of Cylindrical Concrete Specimens.

C94 – Ready Mixed Concrete.

C150 – Portland Cement.

E329 – Standard Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction

B. ACI Standards

301 – Specifications for Structural Concrete for Buildings.

318 – Building Code Requirements for Reinforced Concrete.

C. AWS Standards

01.1– Structural Welding Code.

012.1 – Reinforcing Steel Welding Code.

A5.1- Mild Steel Covered Arc-Welding Electrodes

D1.4- Reinforcing Steel Welding Code

D. ICC International Code Council

CBC- California Building Code

1.4 QUALITY ASSURANCE

A. Testing and inspection services will be retained by the owner at his own expense except that when tests or inspections reveal failure of materials to meet Contract requirements, costs for subsequent tests and inspections will be deducted from moneys due to Contractor. Excessive inspection time required by Contractor's failure to provide sufficient workmen or to properly pursue the progress of the work shall likewise be deducted from moneys due to the Contractor.

1. Geotechnical Engineer: Will observe all phases of drilled pier construction.

   Drilling of piers. Final pier depths will be determined and recorded by the Geotechnical Engineer prior to placing concrete. Prior to placing concrete, bottom of each pier will be inspected by Geotechnical Engineer to ensure that proper conditions existing to permit the placement of concrete. No concrete shall be placed until each hole and its reinforcing steel have been observed and approved. Contractor shall notify the Geotechnical Engineer at least two (2) working days prior to commencing operations to allow for proper scheduling of construction observation.

2. Testing Laboratory: Will provide services conforming to the requirements of ASTM D329, for sampling, testing, inspection, and reporting with respect to reinforcing and concrete.

   One set of four cylinders per day of operation but not less than required by ACI 318 and CBC section 1903A & 1905A. Test one sample at 7 days and two at 28 days; keep one sample in reserve for testing in the event of a low break.

3. Surveyor: Contractor shall provide the services of a qualified surveyor for performing all surveys and layouts and to determine vertical and horizontal alignments. Contractor shall protect reinforcing steel from contamination.

1.5 SUBMITTALS

Contractor shall submit the following:

A. List of products to be used.

B. Concrete Mix designs

C. Reinforcing steel shop drawings.

1. Fully detailed Shop Drawings for pier reinforcement shall be submitted to the Architect for review. Shop Drawings shall show placing and details, and size, spacing and location of reinforcing steel.

2. Reinforcing steel shall not be fabricated or placed before the Shop Drawings have been reviewed by the Architect and returned to the Contractor. Review of Shop Drawings by

the Architect will not relieve the Contractor of responsibility for errors or for failure in accuracy and complete placing of the work.

D. Certified mill test reports for reinforcing steel.

E. Evidence that proposed materials and mix designs conform to all requirements of "Specifications for structural Concrete for Buildings (ACI 301)", except as modified by these specifications.

F. Details procedures for casing removal, if any.

G. Detailed procedures for tremie concrete, if any.

H. Notification to Engineer to permit in-place inspection of reinforcing steel prior to placing concrete.

I. Reports of actual location, alignment, elevations, and dimensions of drilled piers.

J. Reports of material quantities.

1. Submit ticket for each batch of concrete delivered to job site. Ticket shall bear the following information:

a. Design Mix Number.

b. Signature or initials of ready mix representative.

1.6 CONSTRUCTION TOLERANCES

A. Maximum permissible variation of location – 1/24th of shaft diameter or 3 inches, whichever is less.

B. Pier and reinforcing cage, as set, shall not vary from a straight line drawn between the center of the pier hole at the top and at the bottom by more than 3" at any point.

C. Concrete shafts out of plumb. Not more than 1.5 percent of the length nor exceeding 12.5 percent of shaft diameter or 15 inches, whichever is less.

D. Concrete Cover on Reinforcing Steel: Clear distance between reinforcing steel and the pier hole sidewall shall not be less than 3".

E. Projecting reinforcing steel and anchor bolts shall be set by template and firmly anchored. Allowable deviation shall be +/- ¼"

F. Concrete cutoff elevation tolerances – plus 1 inch to minus 3 inches.

G. Hole diameter: Diameters shall be as shown on Drawings for each individual pier. Diameters shown shall be the diameter of the drilling bucket or auger bit.

H. If the tolerances above are exceeded, furnish and pay for corrective design and construction that may be required.

PART 2 PRODUCTS

2.1 MATERIALS

A. Steel casing, if required – ASTM A252, Grade 2, or ASTM A36, as specified. Furnish 100 percent penetration welds for vertical joints in non-corrugated permanent casings.

B. Reinforced steel – ASTM A615, A616, A617, or A706, as specified, or as shown on the contract drawings.

C. Concrete: Concrete work shall conform to requirements of "Specifications for Structural Concrete for Buildings (ACI 301)."

PART 3 EXECUTION

3.1 EXCAVATION

A. Excavate drilled piers to dimensions and required elevations shown on contract drawings. Maintain sidewall stability during drilling. Closely spaced piers shall be drilled and concrete placed alternately with adjacent holes.

B. Determine suitability of supporting materials for drilled piers, as follows:

1. If directed by the Geotechnical Engineer, explore bearing stratum to depth equal to the diameter of the bearing area below the bottom of the drilled pier with probe hole.

2. Inspection of the bottom of each pier will be by the Geotechnical Engineer.

3. Excavate for drilled pier bells (if required) immediately upon confirmation by the Geotechnical Engineer.

4. If the stratum is not capable of providing the required load bearing, notify the Engineer for a determination of adjustments to be made. These may include, but not be limited to, advancing the shaft length as directed by the Geotechnical Engineer and repeating the above steps, or enlarging the bell diameter as determined by the Engineer for appropriate bearing pressure as determined by the Geotechnical Engineer.

C. Provide gas testing equipment, protective cage, or temporary casing of proper diameter, length, and thickness and other safety equipment called for by law for inspection or testing of drilled piers and to protect workmen during hand belling or other operations necessitating entry into shaft.

D. Check each drilled pier for toxic and explosive gases prior to personnel entering. If gas is found, ventilate with forced air until safe for entry.

E. Remove from bottom of drilled piers, loose material or free water in quantities sufficient to cause settlement or affect concrete strength as determined by the Geotechnical Engineer. Excavate pier bottoms to a level plane. If bottoms are sloping rock, excavate to a level plan or step with maximum step height less than one-quarter the width or diameter of the bearing area.

F. Remove excavated material from site or as otherwise directed by the Owner.

3.2 STEEL CASING

A. Provide steel casing for shaft excavation where subsurface water is encountered and causes caving of overburdened soils or as required by Geotechnical Engineer. Provide casing of sufficient strength to withstand handling stresses, concrete pressure, and surround earth and/or fluid pressure. Make diameter of excavation in relation to diameter of casing, such as to create a minimum of void space outside of casing. Provide permanent casing, if required, with minimum outside diameter equal to nominal outside diameter of shaft.

B. Hole may be drilled as deep as it will stand prior to setting casing, thus allowing maximum casing length sections. Hole shall not, however, be drilled ahead of casing any further than

hole will stand with out sloughing. At any time that soughing occurs, holes shall be cased to the bottom of the sloughing area immediately and prior to drilling deeper in hole.

C. Inside casing diameter shall be not less that required pier diameter.

D. Casing may be removed at option of Contractor unless otherwise specified. If casing is removed during or after concreting, follow special requirements specified in Article 3.4.

3.3 DEWATERING

A. Dewater drilled pier excavation prior to placing concrete. Perform pumping a manner that will not create ground loss problems that might adversely affect this and existing adjacent structures as determined by the Geotechnical Engineer. If during pumping, excessive water inflow is noted, use alternative means to reduce inflow such as extending casing, outside deep wells, or grouting, or other acceptable means. If water seepage still is considered by the Geotechnical Engineer to be excessive for safe removal, follow procedure as specified:

1. Holes shall be dewatered and poured dry where such dewatering does not cause instability of hole and is feasible with respect to quantity of seepage flow.

2. No more that 6” of water is allowable in the bottom of the hole at the beginning of the pouring. If there is more that 6” but less than 18” of water in the hole at the time the pour is begun, dry, neat cement shall be dropped down the hole in the amount of one sack for each 6 gallons of water in excess of the 6” allowable depth, just prior to pouring

3. If the depth of the water in the hole exceeds 18” the pour shall not be made until the hole is either dewatered to within the specified limits or the hole is poured by the tremie method.

4. If the rate of flow of seepage of water into the hole at the time of pouring is such that the volume of water which will enter the hole during the time of pouring exceeds ½ gallon per sack of cement in the concrete poured, then cement shall be added to the concrete in the mixer in the amount of one sack for each 5 gallons of water in excess of the above limit. If the seepage rate at the time of pour exceeds 2 gallons of water per sack of cement in the concrete to be poured, the hole shall be poured by the tremie method.

3.4 REINFORCING STEEL

A. Place reinforcement for drilled piers in accordance with the contract documents.

B. Use reinforcement at time of placement, which is free of mud, oil, or other coatings that adversely affect bond.

C. Reinforcement with rust, scale, or a combination of both may be used provided the minimum dimensions, including height of deformations and weight of wire brushed specimens, are not less than required by applicable ASTM specifications. Engineer will determine acceptability of such reinforcement.

D. Use metal reinforcement without kinks or non-specified bends. Straighten or repair bars in a manner that will not damage the bars or adjacent construction.

E. Place bars as shown on contract drawings with cover of not less than 3-inches where exposed to soil.

F. Make splices in reinforcement as shown on contract drawings, unless otherwise accepted.

G. Provide clear distance between bars of not less than one and one-half times the bar diameter, nor one and one-half times the maximum aggregate size.

H. Adequately tie and brace cages as required to retain shape. Furnish bracing and spacers required for accurate centering of cages whether shown on drawing or not.

3.5 CONCRETE

A. Obtain permission of Project Inspector prior to placing concrete.

B. Place concrete immediately after completion of excavation and after Geotechnical Engineer has verified bearing capacity. Do not leave uncased or belled excavations open overnight.

C. Sloughage or other loose material shall be removed from the hole prior to pouring.

D. Free fall concrete may be used provided it is directed through a hopper, or equivalent, such that fall is vertical down center of shaft without hitting sides or reinforcing. Vibrate top 5-feet of concrete, but only after casing has been pulled or when casing is permanent.

E. Place concrete in pier in one continuous operation. If a construction joint is unavoidable, level, roughen, and clean surface prior to re-commencement of concrete placement. Provide reinforcing dowels for uplift piles or a shear key when required by Engineer.

F. If casing is withdrawn, the Geotechnical Engineer will provide inspection during the removal of casing and placing of concrete. Withdraw casing only as shaft is filled with concrete. Maintain adequate head of concrete to balance outside soil and water pressure above the bottom of the casing at all times during withdrawal. Specific procedures that the Contractor will follow to accomplish this objective shall be submitted for approval.

G. If casing is left in place, fill void space between casing and shaft excavation with concrete or fluid grout by means of grout pipe and pump pressure, as required.

H. For placing concrete under water, where permitted, use tremie pipe or concrete pumping with special procedures, as specified or accepted.

I. The pouring of any pier shall be completed in one (1) hour. This means that the elapsed time from the beginning of pouring until completion of pouring shall not exceed one (1) hour. In any case where the time of the pouring of the pier exceeds one (1) hour, it will be assumed that the pier is defective and has a reduced or zero load capacity, and the Contractor shall remove these piers and construct additional piers, as found necessary by the Geotechnical Engineer to remedy the deficiency, at the expense of the Contractor.

J. Pouring shall not be started in any hole until enough concrete to complete the pier is on the job waiting to be poured. Concrete trucks for any pier shall not be ordered with staggered arrival times, but shall be on the job when pouring commences.

3.6 TREMIE POUR

A. Should any pier holes have an excessive amount of water and the dewatering procedure is not capable of achieving or maintaining the specific maximum water depth, then the concrete shall be placed with the tremie method in accordance with placement techniques detailed below.

B. Tremie pouring shall be performed by pumping the concrete to the tremie pipe, using concrete pumping equipment capable of pumping at least 50 cubic yards per hour against a head of concrete of 20” under job conditions. Tremie pouring using a hopper and milking the tremie pipe into the hole is not acceptable.

C. A special concrete mix shall be used for tremie pours, unless otherwise directed by the Geotechnical Engineer. Requirements for compressive strength of the concrete shall be

determined by the Geotechnical Engineer. Mixes for concrete being placed in dry excavations shall be designed for a 4" to 6" slump. For concrete placed below the water level, slump shall be 6" to 8".

D. Tremie pipe shall be rigid steel pipe with tight couplings. The tremie pipe shall be straight within ½" in 10", and crooked or bent tremie pipe shall not be acceptable. Pipe shall be at least 4" diameter, but not more than half of the inside diameter of the reinforcing cage. Only rigid steel pipe shall be used in the hole; using hose in the hole is not acceptable.

E. Tremie pipe shall be lowered through the center of the cage, with caution, to within 1" of the bottom of the excavation.

F. Hose and tremie pipe shall be slicked with Portland cement slurry on clay. Bentonite or other material except Portland cement is permitted unless approved by Geotechnical Engineer.

G. Pumping of concrete shall commence after setting the reinforcing cage and tremie pipe in hole. The tremie pipe shall not be raised until the surface of the concrete in the hole is at least 10' above the bottom of the tremie pipe, unless otherwise approved by the Geotechnical Engineer. The bottom of the tremie pipe shall be kept at least 5' below the top of the concrete until the pour is complete, including removal of muck, laitance and unsuitable concrete.

3.7 UNDERMINING FOUNDATION SOIL

A. Contractor shall take necessary precautions to prevent caving or soughing of a hole, which may endanger load capacity of adjoining pier or piers. The Geotechnical Engineer will make determination of loss of load bearing capacity of adjoining piers.

B. Contractor will be required to provide additional piers at his own expense wherever sloughing or caving in a hole endangers load-bearing capacity of adjoining piers. The Geotechnical Engineer will make determination of loss of load bearing capacity of adjoining piers.

3.8 CLEANING

A. Contractor shall keep the site as free of debris and rubbish as possible at all times. At the completion of his work, he shall remove all materials and apparatus from the premises and streets, scrape all drippings, and leave the entire work clean and free of debris.

END OF SECTION

SECTION 02515

LANDSCAPE BRICK MASONRY

PART 1GENERAL

1.1 SUMMARY

A. Provide all labor, materials and equipment for the installation of brick pillars (stage pillars), brick planters and brick paving as shown on the drawings and as specified.

B. Related work included elsewhere:

1. Section 02775 - Landscape Concrete.

1.2 SUBMITTALS

A. Per Section 01330 - Submittals.

B. Mock-ups: Provide mock up of brick colors and patterns (including mortar joints).

C. Product Data: Submit data for brick masonry units and anchors, ties, flashings, and joint materials.

D. Samples: Submit four samples of each of color brick paver units, to illustrate color, texture and extremes of color range.

E. Manufacturer’s Certificate: Certify products meet or exceed specified requirements.

1.3 QUALITY ASSURANCE

A. Perform Work in accordance with TMS MSJC Code and TMS MSJC Specification.

B. Job Mock-ups: Construct a job mock-up of at least 9 sq. ft. for flatwork, showing expected quality of in-place masonry work, including expected workmanship, joint treatment, reinforcement, patterns, color, and texture. Mock-up to be prepared by the trade, which will perform the completed work. Obtain approval of mock-up from the Project Inspector prior to beginning the remainder of the masonry work. With the approval of the Project Inspector, the mock-up may be incorporated into the finished construction. If the mock-up panels are not part of the finished work, then maintain the approved panel throughout the work as the standard.

1.4 TESTS AND INSPECTIONS

A. Per Section 01450 – Quality Control.

B. Be aware that the Owner may select Testing Laboratory as set forth in the General Conditions. Provide mock-ups of mortar for testing and access to the work for review at Project Inspector's option.

1.5 QUALIFICATIONS

A. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.6 PRE-INSTALLATION MEETINGS

A. Section 01310 – Project Management and Coordination

B. Convene minimum one week prior to commencing work of this section.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Section 01600 - Product Requirements: Product storage and handling requirements.

B. Accept brick masonry units on site. Inspect for damage.

C. Storage of Materials: Mortar materials and sand shall be stored in such a manner as to prevent deterioration or contamination by foreign materials.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Section 01600 - Product Requirements.

B. Hot and Cold Weather Requirements: TMS MSJC Specification.

1.9 COORDINATION OF WORK

A. Coordinate with work under other Sections to obtain neat, workmanlike finished result. Deliver materials furnished under this Section, and which are to be built-in by others, to site in time to avoid delays in construction progress.

B. Section 01310 – Project Management and Coordination

C. Coordinate masonry work with site concrete and installation of wall anchors.

1.10 EXTRA MATERIALS

A. Section 01770 – Execution Requirements: Spare parts and maintenance products.

B. Supply 10 units of each size, color, and type of brick units.

PART 2 MATERIALS

2.1 EXISTING BRICK

A. Existing brick paving on site.

2.2 BRICK PAVERS

A. Paver to match existing brick, size, color and finish. See Drawings. Available from Mc Near Brick, San Rafael, CA or accepted equal.

B. Donor Pavers: Provided by City, if any.

2.3 PORTLAND CEMENT

A. Standard brand conforming to ASTM C150, Type II.

2.4 SAND

A. Natural sand consisting of well-shaped, hard, durable grains containing not more than 2% of silt and clay by weight, and be free of detrimental amount of alkali, mica, weak particles, injurious organic matter, or other deleterious matter. The specific gravity shall be not less than 2.65.

B. Sand shall be well graded within limits of ASTM C144 for masonry mortar.

2.5 LIME

A. ASTM C207, Type S; hydrated for masonry purposes.

2.6 WATER

A. Free from acid, alkali, organic matter or other impurities likely to be detrimental to mortar.

2.7 MORTAR AND GROUT

A. Mortar and grout shall conform to CBC 2103A.4.2, and ASTM C476-83.

B. Mortar to conform to UBC 1985, Type M, composed of Type I or Type II Portland Cement, hydrated lime or lime putty, and clean, well-graded mortar sand. Prepare and uniformly mix to ratio of one part Portland Cement, 1/4 part hydrated lime or lime putty, and 2-1/2 to 3 parts sand; 1,500 psi.

C. Grout: ASTM C476. Composed of one (1) cubic foot Portland Cement, 2-1/4 to 3 cubic feet of sand, and 1/10 cubic foot hydrated lime or lime putty to produce a fluid consistency for pouring without segregation of material; 2,000 psi.

D. Accurately measure and mix materials in suitable devices to protect them from impurities. Mix each batch of mortar in a mechanical batch mixer and grout for 2 minutes and not longer than 5 minutes to secure a uniform mass. Use mortar and grout within 30 minutes after mixing. No re-tempering, no shovel measuring, and no split sack batches will be permitted.

2.8 ANCHORS

A. 16-gauge galvanized steel, 3-1/2 inch long, standard masonry type; held in 24-gauge galvanized steel-filled dovetail anchor slot.

2.9 REINFORCING MATERIALS

A. Per Section 02775 – Site Concrete.

2.10 COLOR

A. Chemically inert mineral oxides: Consov Permatint (Conrad Sovig Co., Inc., San Francisco); P-C/Perma Colors (P-C Western Chemicals, Inc., San Francisco); or approved equal. Color to be selected.

2.11 BOND COAT

A. Dry-set mortar in accordance with ANSI A108.5 and ANSI A118.1 Standards.

2.12 EXPANSION JOINTS

A. In accordance with Standard E-1411.

PART 3EXECUTION

3.1 EXAMINATION

A. Condition of Surfaces: Examine areas to receive work of this Section. Make certain that surfaces are even, sound, clean, dry, properly prepared and free from defects or substances that might affect application. Arrange for repairs or cleaning as required.

3.2 INSTALLATION

A. Use only whole, sound units for exposed work, without chips or other imperfections to mar finished appearance. Lay brick (pavers) plumb, true to line and with level courses. Keep bond plumb and uniform. Fill joints completely with grout without slushing. Clean surfaces of newly laid brick at end of each day's work.

A. Check that anchor slots are 24 inches on center, maximum in concrete walls. Use one anchor in each slot every their course, or wire ties at same spacing, horizontally and vertically, at metal studs. Take care at metal lathe backing to maintain integrity of membrane as much as possible.

3.3 BRICK

A. Brick pattern and mortar joints shall be as shown on drawings. Set flush to each other, uniform top surface. Brick shall be set in mortar bed on a concrete sub slab as detailed. Brick shall set on sand base as detailed.

3.4 BRICK PAVERS

A. Pattern and joints shall be as indicated on the drawings. Brick pavers shall be set in accordance with ANSI Standards. Set with uniform top surface.

B. When cutting pavers, use no less than one-half of paver length and width. Use full pavers at edges as much as practical. Do not cut donor pavers.

C. Locate donor pavers where directed.

3.5 REINFORCING MATERIALS

A. Per Section 02775 – Site Concrete.

3.6 MORTAR

A. Place mortar 3/4 inch thickness over concrete sub slab in accordance with ANSI A108.5 and F151 Standards. Mortar bed shall be placed to facilitate accurate slopes and planes in the finished work. Pre-floating will be allowed.

3.7 BOND COAT

A. Place bond coat in accordance with the manufacturer's written instructions and in accordance with ANSI Standards.

3.8 GROUT

A. Protect all brick paver surface prior to placement of grout of minimize grout stains. Place grout in accordance with ANSI Standards. Tool joints to match approved mock-ups.

3.10 FIELD QUALITY CONTROL

A. Section 01450 – Testing Laboratory Services: Testing and Inspection Services.

1. Provide masonry inspection per CBC, Volume 2, Section 2105A.7.

B. Section 01770 - Execution Requirements: Testing, adjusting, and balancing.

C. Testing of Mortar Mix: In accordance with ASTM C780 for aggregate ratio and water content, air content, consistency, and compressive strength.

D. Testing of Grout Mix: In accordance with ASTM C1019 for compressive strength, and in accordance with ASTM C143/C143M for slump.

E. Test flexural bond strength of mortar and masonry units to ASTM C1357; test in conjunction with masonry unit sections specified.

F. Test compressive strength of mortar and masonry to ASTM C1314; test in accordance with masonry unit sections specified.

3.11 PROTECTION

A. Provide protection to all paved surfaces from damage, stains and discoloration due to subsequent construction operations. Damage, stained or discolored pavers shall be removed and replaced as directed by the Project Inspector.

3.12 CLEANING

A. Section 01770 – Closeout.

B. During construction, wash off work as quickly as possible when stains or splotches are unavoidable.

C. Upon completion, clean exposed surfaces carefully, brushing and cleaning solution, If used, must be preceded and followed with a through rinsing of clear water. No sandblasting will be allowed to clean surfaces.

D. Remove from premises; equipment, debris and surplus material needed for, or resulting from, this work. Remove all masonry waste from planting areas and legally dispose of it.

E. All work shall be left in a condition satisfactory to the Project Inspector.

END OF SECTION

SECTION 02775

LANDSCAPE CONCRETE

PART 1 GENERAL

1.1 DESCRIPTION

A. Provide Portland cement concrete site work complete, including the following principal items:

1. Concrete work shown on Landscape Drawings.

B. Related requirements include:

1. Section 01450, Quality Control
2. Section 02300, Earthwork
3. Section 02335, Subgrade Preparation and Base Material
4. Section 02810, Irrigation
5. Section 02900, Planting

1.2 QUALITY ASSURANCE

A. Reference and Standards

1. Perform work in accordance with all applicable laws, codes and regulations required by City of Sausalito and County of Marin and the State of California.
2. Reference to "Standard Specifications" shall mean the current Standard Specifications of the State of California, Business and Transportation Agency, Department of Transportation, CALTRANS.
3. The American Concrete Institute (ACI): "Manual of Concrete Practice," Parts 1, 2 and 3.

B. Stipulations

1. Finish Surface Tolerance: 1/4-inch maximum variation in 10 feet.

1.3 TESTS

A. Refer to Section 01450 Quality Control. Contractor shall cooperate in making tests and shall be responsible for notifying the designated laboratory in sufficient time to allow taking of samples at time of pour.

B. Should tests show that concrete is below specified strength, Contractor shall remove all such concrete, as directed by the Project Inspector. Full cost of removal of low strength concrete, its replacement with concrete of proper specified strength and testing, shall be borne by Contractor.

1.4 COORDINATION

A. Coordinate items of other trades. Contractor shall be responsible for the proper installation of all accessories embedded in the concrete and for the provision of holes, openings, etc., necessary to the execution of the work of the trades.

1.5 SUBMITTALS

A. Submittals per Division 1 requirements

B. The Contractor's Testing Laboratory's certificate of compliance.

C. The Contractor shall submit:

1. Certified copies of mix designs for each concrete class specified including compressive strength test reports.

2. Certification that materials meet requirements specified.

3. Certification from vendor that samples originate from and are representative of each lot proposed for use.

4. Weight master Certificates for concrete delivered to the site and used for improvements.

5. Mill certifications for reinforcing steel.

6. Product literature and samples of truncated dome pavers.

7. Items required under Waiver of Batch Plant Inspection specified herein.

D. Mock-ups of all materials under this Division shall be supplied for testing as requested by the Architect.

E. Provide mock up of all concrete finishes, color and joints (with curing compound if any to be used) indicated on the drawings. Accepted mock-ups shall be kept at the job site to serve as a prerequisite for all finishes.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Supply ready mixed concrete throughout. Batch, mix and transport in accordance with ASTM C-94, "Specifications for Ready Mixed Concrete."

B. Mix and deliver concrete in quantities that will permit immediate use only.

C. Indiscriminate addition of water for any reason will be cause for rejection of the load.

PART 2 PRODUCTS

2.1 FORMWORK MATERIALS

A. Forms shall be wood.

1. Plywood: APA Plyform, Grade B-B, 5/8-inch thickness minimum.

2. Lumber: Douglas fir, "Standard" grade or better (grade marks not required).

3. Plywood: 5/8-inch thickness minimum. Use overlaid plywood complying with U.S. Product Standard PS-1 "A-C or B-B High Density Overlaid Concrete Form", Class 1. Panels to receive specified form sealer to ensure uniform finish of exposed surfaces

B. Form Coatings: Knox-Crete, or equal.

C. Form Ties: Burke "Penta-Tie," or equal, cone and rod type with 1-inch break-back. Do not use form ties on exposed concrete of seat walls.

2.2 REINFORCING MATERIALS

A. Bar Reinforcement ASTM A615.

1. #3 and smaller: Grade 40.

2 #4 and larger: Grade 60.

2.3 CONCRETE MATERIALS

A. Portland Cement: ASTM C150, Type II.

B. Aggregate: ASTM C33.

1. Coarse Aggregate: Normal weight; 3/4 inch maximum size; clean, uncoated, crushed aggregate, free of materials which cause staining or rust spots.

2. Fine Aggregate: Clean, natural sand.

C. Water: Clear and potable, free from deleterious impurities.

D. Admixtures: Admixtures are optional, must be compatible with color pigments where required. Any proposed admixture shall comply with ACI 318-08 Section 3.6. Accelerating admixtures are not permitted.

2.4 CONCRETE MIXES

A. Concrete mixes shall be accepted and shall be in accordance with CBC Section 1905A and CalTrans Standard Specifications Section 90. If there are conflicts, the provisions of CBC shall govern. Unless otherwise noted, mix shall be Class "A," 3,000 psi, Type II Portland cement and 3/4-inch maximum aggregate.

B. Concrete shall be natural color. No lamp black or other darkening agents shall be permitted in the concrete mix.

2.5 ANCILLARY MATERIALS

A. Expansion Joint Material

1. Fiber Expansion Joint: A non-extruding resilient filler, saturated with high quality bituminous materials having preserving characteristics. W. R. Meadows or accepted equal. Conform to ASTM-D1751-83. Include Joint Sealant.

B. Curing Compound: ASTM C309, Water-base type, free of permanent color, oil or wax, or accepted equal. Curing compound shall be compatible with color pigments.

C. Concrete Sealer: As manufactured by L. M. Scofield Co. or silicone-based, non-staining product such as Siloxane as manufactured by Prosoco and available from White Cap (415) 626-3750 and or equal as accepted by Architect. Concrete Sealer shall be compatible with color pigments.

D. Combination Curing Compound Concrete Sealer: W. R. Meadows Vocomp-20, (800-342-5976) or equal. Combination Curing Compound. Combination Curing Compound Concrete Sealer shall be compatible with color pigments.

E. Joint Sealant: W. R. Meadows or Sonnebourn 2-part joint sealant or Sikaflex-1a elastomeric joint sealant or equal product. Available from Sika Corporation, Hayward (510) 487-2294. Color shall be as selected by Landscape Architect.

F. Color of Concrete: Pigments for integral colored concrete as manufactured by Davis Colors, 800-356-4848, applied at manufacturer's specified rates of application, or accepted equal.

G. Color of Concrete: Pigments for dry-shake concrete color, Lithochrome dry-shake concrete color hardener as manufactured by L. M. Scofield Company, 800-800-9900, applied at manufacturer's specified rates of application, or accepted equal.

2.6 WATERPROOFING

A. Waterproofing System: MFM Subseal 60 Sheet Membrane Prime-A-Seal Primer and Mastic+Plus available from MFM Building Products, Coshocton, OH, (800) 882-7663, http://www.mfmbp.com/watermem.html, Local representative: Don Lambrecht & Associates, Inc., Rocklin, CA. 95677, 916-632-2059 or equal.

2.7 GEOCOMPOSITE MATERIAL

A. Enkadrain 3811R geocomposite drainage mat available from Colbond Inc., Enka, NC, www.colbond-usa.com, 800-365-7391or equal.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

A. Install all concrete work true to line and grade as indicated on the drawings.

B. Correct irregularities to the satisfaction of the Project Inspector.

3.2 PREPARATION

A. Take every precaution to obtain a subgrade of uniform bearing power by compaction to provide a firm base.

B. Subgrade shall be kept moist and shall not be allowed to dry out before placement of concrete. Place no material on muddy subgrade.

C. Aggregate base, where indicated, shall be placed and compacted in conformance with CalTrans Standard Specifications 26-1.04 and 26-1.05.

D. Obtain acceptance of subgrade from Project Inspector prior to placing steel and concrete.

3.3 FORMS

A. Forms shall be constructed in accordance with ACI 347 and shall be of sufficient strength and sufficiently tight to prevent visible distortion or leakage of mortar and fines.

B. Forms for exposed surfaces shall be designed to protect intended finish. Deflection of facing material between studs shall not exceed 0.0025 of the span. Facing material and pattern of joints shall be as accepted by the Architect.

C. For vertical surface of wall footings below grade, clean-cut trench may be used in lieu of form if character of soil will permit installation without sluffing and width of concrete is increased at least 1 inch beyond indicated dimension of each face poured against earth.

D. Curb and pavement edge forms shall extend full depth of concrete. Curves shall be formed with flexible metal or wood made up of thin laminations. Curve forms shall extend one stake space straight beyond tangent point.

E. Maintain forms within the following tolerances.

1. Top of Form: Plus or minus 1/8 inch in 10 feet and no abrupt variations; at required elevation to plus 3/8 inch.

2. Face of Form: Plus or minus 1/4 inch in 10 feet longitudinal and no abrupt variations; perpendicular to surface plus or minus 1/8 inch.

F. Obtain approval of formwork from Project Inspector prior to placing concrete.

Forms may be reused upon cleaning and coating with parting compound to ensure separation from concrete without damage.

After concrete is placed, the following minimum times shall elapse before removal of forms.

1. Footing sides: 24 hours.

2. Mow bands, curbs and pads: 48 hours.

3.4 REINFORCEMENT

A. All concrete shall be steel reinforced unless specifically noted to be "not reinforced." If no reinforcement is shown, reinforce in same manner as that shown in similar places.

B. Fabricate and place reinforcement as indicated on the Drawings and in accordance with ACI "Detailing Manual" SP-66. No reinforcement shall be placed prior to distribution of the accepted shop drawings.

C. Secure reinforcement in position by suitable supports and by wiring at intersections with tie wire. Supports shall be of sufficient number and strength to resist crushing or displacement under full load. Metal shall not extend to surface of concrete.

D. At time of placing concrete, reinforcing shall be free of excessive rust, mill scale, or other bond reducing matter. Immediately before placing concrete, check and adjust position, support and anchorage.

3.5 MIXING AND PLACING CONCRETE

A. Conform to applicable requirements set forth in CBC Section 1905A and CalTrans Standard Specifications Section 90. If there are conflicts, the provisions of CBC shall govern.

3.6 JOINTS AND GROOVES

A. Plane of joints shall be perpendicular to surface. Where new pavements join existing, joints shall align.

B. Install joint sealant at fiber expansion joints per manufacturer's specifications.

C. Construction Joints: Place construction joints at the end of pours and at locations where placement operations are stopped for a period of more than one half hour, except where such pours terminate at expansion joints.

1. Construction joints shall be keyed with formed tongue and groove.

2. Tool concrete edge both sides of construction joint.

D. Saw Cut Joints: Begin as soon as concrete has hardened enough to support saw and operator, and to allow cutting without raveling, or deforming the surface finish. Use a concrete cutting blade. Form a smooth uniform joint 1/8" wide, to 1" depth unless shown otherwise. Joints shall be cut within 48 hours of pour. Hold saw cuts 1/2" from edge of concrete.

E. Score Joints: Form in the fresh concrete using a jointer to cut the groove so that a smooth uniform impression is obtained to 1" depth unless shown otherwise. All joints shall be struck before and after brooming. Tool concrete both sides of joint.

F. Expansion Joints and Edging: Provided at the location and intervals as shown on the drawings, and at all locations where concrete paving abuts buildings, curbs or other structures, and not greater than 20 feet on center. Approved joint material shall be placed with top edge below the paved surface, and shall be securely held in place to prevent movement. Joint and other edges shall be formed in the fresh concrete using an edging tool to provide a smooth uniform impression. All edges shall be struck before and after brooming.

3.7 FINISHING

A. Mow bands, paving and other exposed work.

1. Surface Finishes

a. Finish at Accessible Path of Travel: Concrete paving and concrete finishes along accessible path of travel to be at least as slip-resistant as that described as a medium salted finish for slopes of less than 6%, and slip-resistant at slopes of 6% or greater.

b. Float Finish (typical preliminary finishing for slabs to receive other finishes): The surface of the slab shall be screeded and all surface water and laitance removed. Floating shall be started as soon as the screeded surface has stiffened sufficiently. Floating shall be performed by hand using a wood float and shall be the minimum necessary to produce a relatively smooth, level, even-textured surface.

c. Medium Broom Finish: After the slab has been float finished as described above, the surface shall be uniformly directional textured by coarse stable broom to match accepted mock up to be a non-slip finish and meet requirements of Finish at Accessible Path of Travel.

d. Sandblast Finish: Perform in as continuous an operation as possible, utilizing the same work crew to maintain continuity of finish to match accepted mock up. Use abrasive grit of the proper type and gradation to expose the aggregate and surrounding matrix surfaces to match mock up panel, as follows:

(1) Medium Cut: Approximately 1/8" to 3/16" depth.

(2) Heavy cut: Approximately 1/2" to 3/4" depth.

(3) Blast corners and edge of patterns carefully, using backup boards in order to maintain a uniform corner of edge line.

(4) Use same nozzle, nozzle pressure and blasting technique as used for mock up panel.

(5) Maintain control of abrasive grit and concrete dust in each area of blasting. Clean up and remove all expended abrasive grit, concrete dust and debris at the end of each day of blasting operations.

e. Sand Rubbed Finish: A fine, sandy finish shall be obtained after the concrete has set and been sacked smooth, by rubbing the surface with an appropriately sized carborundum block or other implement that will produce the desired finish.

3.8 DEFECTIVE CONCRETE

A. If any concrete work is not formed as indicated, is under strength concrete, if concrete is out of line, level or plumb, or showing objectionable cracks, honeycomb, rock pockets, voids, spalling or exposed reinforcing, it shall be removed, repaired or replaced as directed by the Landscape Architect.

3.9 CURING

A. Cure exposed concrete in accordance with CalTrans Standard Specifications Section 90.

B. Only water or curing compounds that impart no permanent color or gloss shall be used for curing concrete.

3.10 CONCRETE SEALING

A. Seal all exposed surfaces according to manufacturer’s specifications.

3.11 WATERPROOFING

A. Where soil is backfilled against seat walls install waterproofing per manufacturer’s specifications. Hold 2" below finish grade.

3.12 CLEANUP: Per Division 1 requirements.

A. During construction, wash off work as quickly as possible when stains or splotches are unavoidable.

B. Upon completion, clean exposed surfaces carefully. Brushing and cleaning solution, if used, must be preceded and followed with a through rinsing of clear water. No sandblasting will be allowed to clean surfaces.

C. Remove from premises; equipment, debris and surplus material needed for, or resulting from, this work. Remove all concrete waste from planting areas and legally dispose of it.

D. All work shall be left in a condition satisfactory to the Landscape Architect.

3.13 QUALITY ASSURANCE TESTING AND INSPECTION DURING CONSTRUCTION

A. The City will engage a qualified testing and inspection agency (The City's Testing Laboratory) and a special inspector (IOR) to perform field tests and inspections and prepare test reports.

B. Reinforcing Steel Placement - inspect 100% of reinforcement before each concrete pour to verify the following information:

1. Primary and secondary, longitudinal reinforcement has correct size and number in proper layers.

2. Longitudinal reinforcement has correct length and lap.

3. Ties and stirrups are of correct size, spacing, and number and have the proper termination-hook geometry.

4. Proper hooks are provided at bar ends as detailed.

5. Reinforcement is properly supported and braced to formwork to prevent movement during concreting operation.

6. Reinforcement has proper cover.

7. Sufficient spacing between reinforcement for concrete placement.

8. Welded wire reinforcement is composed of flat sheets, has proper wire gage and spacing, is properly supported, and is properly lapped.

9. Proper Construction/Contraction/Expansion joint spacing and reinforcement.

10. Reinforcement around embedded items is installed according to details.

C. Special Inspections: The City's Testing Laboratory or a separate agency shall serve as a Special Inspector to provide Special Inspection services for the items listed below. The scope of such services for each item shall be as defined in the 2013 CBC. These inspections are mandatory for conformance to the legal requirements of the building code and shall be in addition to the inspections and tests otherwise defined in this specification.

1. Verification of use of required design mixture

2. Concrete placement, including conveying and depositing

3. Curing procedures and maintenance of curing temperatures

4. Anchor rods, bolts and other embeds installed in concrete.

D. Qualifications of Special Inspector (IOR): The IOR shall be a qualified person who is approved by City.

E. Duties and Responsibilities of the Special Inspector:

1. The IOR shall observe the work assigned to ascertain that, to the best of his/her knowledge, it is in conformance with the approved design drawings and specifications.

2. The IOR shall furnish inspection reports to the Architect/Engineer, and the City. All discrepancies shall be brought to the immediate attention of the Architect/Engineer, Contractor, and City. A report that the corrected work has been inspected shall be sent to City, the Architect/Engineer, and the City.

3. The IOR shall submit a final signed report stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance to the approved plans and specifications and the applicable workmanship provisions of the building code.

F. THE CITY'S TESTING AND INSPECTION LABORATORY

1. The Laboratory shall perform the required inspections, sampling, and testing of materials as specified under each section and observe methods of construction for compliance with the requirements of the Contract Documents and the applicable building code.

2. Inspections Required by Government Agencies: The Testing Laboratory shall perform inspections and submit reports and certifications as required by government agencies having jurisdiction over the aspects of the project covered by this specification.

3. Notification of Deficiencies in the Work: The Laboratory shall notify the Architect, Engineer, and Contractor within 24 hours of discovery by telephone or e-mail, and then in writing of observed irregularities and deficiencies of the work and other conditions not in compliance with the requirements of the Contract Documents.

G. Concrete Mix Designs: The City's Testing Laboratory shall review the submitted mix designs for conformance to the specifications and for suitability for use in the project.

H. Concrete Batch Plant Inspection: An initial batch plant inspection shall be made by the City's Testing Laboratory prior to the start of concrete work. The scope of batch plant inspection shall include the following:

1. Inspection of Batch Plant Facilities: The Laboratory shall inspect batch plant facilities proposed for use in the work and report in writing inspection results to the Architect, Engineer, and Cityfor approval. The inspection shall confirm the batch plant conforms to the standards set forth in ASTM C94 and can show proof of certification by the National Concrete Ready Mix Association. Inspection shall include:

a. Batch Plant operations and equipment

b. Truck mixers

c. Scales

d. Stockpile placement

e. Material storage

f. Admixture dispensers

2. Multiple Batch Plants: The Contractor shall reimburse the Cityfor the costs accrued to the City's Testing Laboratory for visits to more than 1 batch plant.

3. Waiver of Batch Plant Inspection

    a. Continuous batch plant inspection may be waived in accordance with CBC Section 1704A4.4 if the plant complies with ASTM C94 and has been certified by an agency acceptable to city to comply with the requirements of the National Ready Mix Concrete Association.

    b. When batch plant inspection is waived, the following is required:

        (1) The City's Testing Agency shall check the first batching at the start of concrete work and furnish mix proportions to the licensed Weighmaster.

        (2) Licensed Weighmaster shall identify material quantities and certify each load by a ticket.

        (3) The Project Inspector shall collect truck mix tickets with load identification and maintain a daily record of placement. Truckks without a load ticket identifying the mix shall be rejected. Copies of daily placement record shall be submitted to City.

    c. At project closeout, the Weighmaster shall submit an affidavit to City certifying that all concrete supplied conforms to the proportions established by mix designs.

I. Job Site Inspection: The scope of the work to be performed by the inspector on the jobsite shall be as follows:

1. Prior to Concrete Placing

    a. Verify plan dimensions and thicknesses.

    b. Verify top of concrete elevations.

    c. Verify that forms are plumb and straight, braced against movement, and lubricated for removal.

    d. Inspect reinforcement.

    e. Verify there is no standing water or debris in pour areas.

    f. Verify that the forms used for exposed finish surfaces are of the type specified and provide a joint system as shown on the Architect's drawings.

    g. Verify that openings and sleeves are correct size and location

2. On-Site Concrete Material Testing and Inspection

    a. Verify that the Contractor is following appropriate concreting practices consistent with any extreme environmental conditions at the point of placement.

    b. Inspect concrete upon arrival to verify that the proper concrete mix number, type of concrete, concrete strength, and that it is meeting job specifications, is being placed at the proper location. Report concrete not meeting the specified requirements and immediately notify the Contractor, Batch Plant Inspector, Architect, Engineer, and City.

c. Inspect plastic concrete upon arrival at the jobsite to verify proper batching. Observe mix consistency and adding of water as required to achieve target slumps in mix designs. Record the amount of water added and note if it exceeds that allowed in the mix design. The responsibility for adding water to trucks at the job site shall rest only with the Contractor's designated representative. The Contractor is responsible that all concrete placed in the field is in conformance to the Contract Documents.

d. Obtain concrete test cylinders as specified below.

e. Perform tests to determine slump, concrete temperature, unit weight, and air entrainment as specified below. The slump tests shall be made on concrete taken from the same location from which the concrete for the test cylinders is obtained.

f. Record information for concrete test reports as specified below.

g. Verify that concrete being placed meets job Specifications. Report concrete not meeting the specified requirements and immediately notify the Contractor, Batch Plant Inspector, Architect, Engineer, IOR and City.

h. Pick up and transport to Laboratory, cylinders cast the previous day.

3. During concrete placing, provide continuous monitoring to:

a. Verify that the concrete is not over 90 minutes old at the time of placement.

b. Verify that Hot-Weather techniques are being applied as required.

c. Verify that concrete deposited is uniform and that vertical drop does not exceed six feet and is not permitted to drop freely over reinforcement causing segregation.

d. Verify that there are no cold joints.

e. Verify that the concrete is properly vibrated.

f. Verify that the finishing of the concrete surface is done according to specifications.

g. Verify that sawcut control joints on slab-on-grades are cut within 12 hours of placement.

h. Verify that the formwork has remained stable during the concreting operation.

i. Inspect anchor rods, bolts and other items embedded in concrete prior to and during concrete placement for proper grade, size and length and verification they have been properly installed to the specified embedment.

4. The job site inspector shall report any irregularities that occur in the concrete at the job site or test results to the Contractor, Architect, City, and Engineer.

J. Concrete Test Cylinders: The City’s Testing Laboratory shall cast and test concrete test cylinders as described below.

1. Cylinder Casting and Testing: Cylinders for strength tests shall be casted and Laboratory cured in accordance with ASTM C31 and tested in accordance with ASTM C39. Cylinders may be either 6” in diameter by 12” or 4” in diameter by 8”, however, the diameter of the cylinder shall be at least three times the nominal maximum size of the

coarse aggregate in the mix tested. All of the cylinders for each class of concrete shall be of the same dimension for all sets of that class.

2. Field Samples: Field samples for strength tests shall be taken in accordance with ASTM C172.

3. Frequency of Testing: Each set of test cylinders shall consist of a minimum of four standard test cylinders. A set of test cylinders shall be made according to the following minimum frequency guidelines:

    a. One set for each class of concrete taken not less than once a day.

    b. One set for each 50 cubic yards or fraction thereof.

    c. No more than one set of cylinders at a time shall be made from any single truck.

    d. If the total volume of concrete is such that the frequency of testing as specified above would provide less than five strength tests for a given class of concrete, tests shall be made from at least five randomly selected batches or from each batch if fewer than five batches are used.

    e. The above frequencies assume that one batch plant will be used for each pour. If more than one batch plant is used, the frequencies cited above shall apply for each plant used.

4. The cylinders shall be numbered, dated, and the point of concrete placement in the building recorded.

5. For concrete specified on the drawings to reach the required strength at 28 days, break one cylinder of the set at seven days, two 6” by 12” cylinders or three 4” by 8” cylinders at 28 days, and one kept in reserve for testing at the Engineers direction.

6. Cylinder Storage Box: The Contractor shall be responsible for providing a protected concrete cylinder wooden storage box at a point on the job site mutually agreeable with the Testing Laboratory for the purpose of storing concrete cylinders until they are transported to the Laboratory. The box shall be constructed and equipped to maintain the environment specified for initial curing in ASTM C31.

7. Transporting Cylinders: The City’s Testing Laboratory shall be responsible for transporting the cylinders to the Laboratory in a protected environment such that no damage or ill effect will occur to the concrete cylinders including loss of moisture, freezing temperatures or jarring.

8. Information on Concrete Test Reports: The City’s Testing Laboratory shall make and distribute concrete test reports after each job cylinder is broken. Such reports shall contain the following information:

    a. Truck number and ticket number

    b. Concrete Batch Plant

    c. Mix design number

    d. Accurate location of pour in the project

e. Strength requirement

f. Date cylinders made and broken

g. Technician making cylinders

h. Concrete temperature at placing

i. Air temperature at point of placement in the structure

j. Amount of water added to the truck at the batch plant and at the site and whether or not it exceeds the amount allowed by the mix design

k. Slump

l. Unit weight

m. Air content

n. Cylinder compressive strengths with type of failure if concrete does not meet Specification requirements. Seven day breaks are to be flagged if they are less than 60% of the required 28 day strength. 28 day breaks are to be flagged if either cylinder fails to meet Specification requirements.

9. Standards for Tests of Concrete :

   a. Slump Tests: Slump Tests (ASTM C143) shall be made at the beginning of concrete placement for each batch plant and for each set of test cylinders made. The slump test shall be made from concrete taken from the end of the concrete truck chute. The concrete shall be considered acceptable if the slump is within plus or minus 1 inch of the slump noted on the mix design submittal form for that class of concrete.

   b. Air Entrainment: Air entrainment tests (ASTM C231 or C173, C173 only for lightweight concrete) shall be made at the same time slump tests are made as cited above.

   c. Concrete Temperature: Concrete temperature at placement shall be measured (ASTM C1064) at the same time slump tests are made as cited above.

   d. Unit Weight Test: ASTM C138

10. Evaluation and Acceptance of Concrete:

    a. Strength Test: A strength test shall be defined as the average strength of two cylinder breaks from each set of cylinders tested at the time indicated above.

    b. Acceptance Criteria: The strength level of an individual class of concrete shall be considered satisfactory if both of the following requirements are met:

       (1) The average of all sets of three consecutive strength tests equal or exceed the required f'c.

       (2) No individual strength test falls below the required f'c by more than the greater of 10% of f'c or 500 PSI.

c. If either of the above requirements is not met, the Testing Laboratory shall immediately notify the Engineer by telephone. Steps shall immediately be taken to increase the average of subsequent strength tests.

K. Investigation of Low Strength Concrete Test Results:

1. Cost of Investigations for Low Strength Concrete: The Contractor shall reimburse the Cityfor the costs of investigations of low strength concrete, as defined above.

L. Causes for Rejection of Concrete: The Contractor shall reject concrete delivered to the site for any of the following reasons:

1. Wrong class of concrete (incorrect mix design number).

2. Environmental Conditions: Environmental condition limits shall be as follows unless appropriate provisions in concreting practices have been made for cold or hot weather:

a. Cold Weather: Air temperature must be 40°F and rising or the average daily temperature cannot have been lower than 40°F for 3 consecutive days unless the temperature rose above 50°F for at least one-half of any of those 24 hour periods.

b. Hot Weather: Environmental conditions must be such that cause an evaporation rate from the concrete surface of 0.2 lb./sq. ft./hr. or less as determined by Figure 2.1.5 in ACI 305R.

Concrete may be placed at other environmental condition ranges only with approval of the job inspector for the City's Testing Laboratory or other duly appointed representative.

3. Concrete with temperatures exceeding 95°F shall not be placed.

4. Air contents outside the limits specified in the mix designs.

5. Slumps outside the limits specified.

6. Excessive Age: Concrete shall be discharged within 90 minutes of plant departure or before it begins to set if sooner than 90 minutes unless approved by the Laboratory job inspector or other duly appointed representative.

M. Concrete Batch Trip Tickets: Concrete batch trip tickets shall be collected and retained by the Contractor. Compressive strength, slump, air, and temperature tests shall be identified by reference to a particular trip ticket. Tickets shall contain the information specified in ASTM C94. Each ticket shall also show the amount of water that may be added in the field for the entire batch that will not exceed the specified water cement ratio for the design mix. The Contractor and City's Testing Laboratory shall immediately notify the Architect/Engineer and each other of tickets not meeting the criteria specified.

END OF SECTION

SECTION 02790

NON-INFILL SYNTHETIC TURF SYSTEM

PART 1 GENERAL

1.1 DESCRIPTION

A. Provide Non-infill Synthetic Turf System and the base material installation complete.

1.2 QUALITY ASSURANCE

A. Reference Standards

1. Perform all work in accordance with all applicable laws, codes and regulations required by the Federal Government, State of California, City of Sausalito, and County of Marin.

2. Perform work in accordance to applicable sections of the Caltrans Standard Specifications.

3. Reference to "Caltrans Standard Specifications" shall mean the Standard Specifications of the State of California, Business and Transportation Agency, Department of Transportation, CALTRANS.

B. Related work specified elsewhere includes:

1. Section 01450, Quality Control

2. Section 02300, Earthwork

3. Section 02335, Subgrade Preparation and Base Material

4. Section 02775, Landscape Concrete

5. Section 02810, Irrigation

6. Section 02820, Chain Link Fencing

7. Section 02850, Landscape Drainage

8. Section 02870, Site Furnishings

9. Section 02875, Play Equipment

10. Section 02900, Planting

C. Stipulations

1. The finished surface of the subgrade, at any point, shall not vary more than 0.05' above or below the elevation indicated on the drawings.

2. Finish Surface Tolerance: 1/4-inch maximum variation in 10 feet.

D. ASTM Standards.

1.3 SUBMITTALS

A. Provisions: Comply with Division 1 Requirements.

B. Material list, product data and samples of all items proposed to be provided under this Section.

C. Certificates (certified analysis of certificate of compliance) signed by the material producer.

D. Certificates (certified analysis of certificate of compliance) signed by the material producer stating that the product is free of lead and in compliance with US Consumer Product Safety Commission requirements..

1.4 PROJECT CONDITIONS

A. Coordination: Coordinate this work with the work of other Sections to avoid delay and interference with other work.

B. Protect excavations by shoring, bracing, sheeting, underpinning, or other methods as required to prevent cave-ins or loose dirt from entering excavations. Barricade open excavations and post warning lights at work adjacent to public streets and walks.

C Underpin adjacent structure(s), including utility service lines, which may be damaged by excavation operations.

D. Promptly repair damage to adjacent facilities caused by operations. Cost of repair at Contractor's expense.

E. Promptly notify the Inspector of unexpected subsurface conditions.

F. If during the course of operations, an area of pumping or otherwise unstable soil is encountered, the contractor shall immediately modify his operations in such a way as to limit the frequency and weight of vehicles traveling over the area and promptly notify the Inspector who will contact the Geotechnical Engineer for an evaluation.

1.5 EXISTING CONDITIONS

A. A topographic survey of the property has been included in the drawings for reference only. Upon beginning the work, Contractor represents that he has inspected the site and satisfied himself as to actual grades and levels and the true conditions under which the work is to be performed.

1.6 PROTECTION

A. Furnish, place and maintain all supports, shoring and sheet piling which may be disturbed by earthwork operations.

B. Maintain all benchmarks, monuments, and other reference points. If disturbed or destroyed, replace as directed.

C. Adequate protection measures shall be provided to protect workmen, passers-by, and the site. Streets and adjacent property shall be fully protected throughout the operations.

D. In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for working conditions on the job site, including safety of all

persons and property during performance of the work. This requirement shall apply continuously and not be limited to normal working hours.

E. Any construction review of the Contractor's performance conducted by the Inspector is not intended to include review of the adequacy of the Contractor's safety measures in, on, or near the construction site.

F. Adjacent streets, sidewalks, and property shall be kept free of mud, dirt, or similar nuisances resulting from earthwork operations.

G. Provide for surface drainage during the period of construction in a manner to avoid creating a nuisance to adjacent areas.

H. Water as required to suppress dust nuisance.

I. Protection of Existing Improvements

1. Provide barricades, covering, or other types of protection necessary to prevent damage to existing improvements indicated to remain in place. Protect improvements on adjoining properties. Repair damaged existing improvements to original condition as approved by authority having jurisdiction.

J. Provide erosion control measures as required.

K. Protection of Other Property: Excavation and other work over, under and adjacent to existing pipelines, cables, conduit runs or structures of any kind shall be procured in such a manner as not to interfere with the safe operation and use of such installations. Should any damage be incurred to existing facilities during the Contractor's operations, the Contractor shall immediately notify the Owner's Representative and authorities, and shall arrange for the immediate repair of same at his own expense.

L. Underground Obstruction: The locations of existing underground utilities and structures, insofar as they are known from information furnished by the respective utility companies and agencies, have been shown on the drawings. The Owner assumes no responsibility for the accuracy or completeness of said data, which is offered solely for the convenience of the Contractor.

M. Control of Water: Take measures as may be required and furnish, install and operate such pumps or other devices as may be necessary to remove any seepage, storm water or sewage that may be found or may accumulate in the excavations during the progress of the work. Keep excavations entirely free from water at all times during the construction of the work, and until the Geotechnical Engineer gives permission to cease pumping.

N. Pavement Restoration: Pavement, bases and compacted subgrade disturbed by trenching operations shall be replaced in an acceptable manner with materials equal to the adjacent compacted subgrade, bases and pavement for a minimum distance of 12" on each side of the trench, and shall conform to the requirements of these Specifications or to local ordinances governing such replacement.

1.7 FIELD QUALITY CONTROL

A. Contractor shall provide adequate notice, cooperate with, provide access to the work, and assist testing agency and their representatives in execution of their function.

B. When, during the progress of work, field tests indicate that installed compacted materials do not meet specified requirements, provide additional compaction until specified density is

achieved, or remove and replace defective materials with new materials as directed by the Inspector. Cost of additional labor, materials, and testing to attain specified density at Contractor's expense.

C. The Contractor shall engage a California Registered Civil Engineer or licensed Land Surveyor to perform field engineering.

1.8 TESTING

A. Testing and Inspection: Testing shall be performed by a qualified independent testing laboratory under the supervision of a registered professional engineer, specializing in soils engineering.

B. The Owner will direct, provide and pay for initial testing and inspection during operations.

C. Provide and pay for re-testing and inspection during operations. Laboratory and inspection service shall be acceptable to the Owner.

D. Where reference is made to relative compaction, it shall be the in-place dry density of soil expressed as a percentage of the maximum dry density of the same material, determined by the ASTM D1557 laboratory test procedure. Optimum moisture is the water content that corresponds to the maximum dry density.

E. Plasticity Index: ASTM 4318.

1.9 GENERAL REQUIREMENTS

A. When rain is forecast, temporary measures to protect areas of the exposed subgrade from saturation by rainfall or runoff shall be taken. These include, but are not limited to, covering grading and sloping of subgrade surfaces to prevent ponding, sealing disturbed, uneven subgrade, surfaces with a smooth drum roller, grading and excavating diversionary swales, trenches or detention basins.

B. Failure by the Contractor to comply with the above requirements to take reasonable and adequate measures or exercise sound engineering and construction practices to protect the work from damage. All repair work shall be performed at no additional cost to the Owner.

PART 2 PRODUCTS

2.1 SYNTHETIC PLAY TURF SYSTEM

A. Synthetic Turf without Infill for play area surfacing GrassTex certified lead free by independent laboratory testing available from Ron Grosjean, Flooring Resource Group, 510-928-0053, or equal as follows:

Properties	
Style	PL 354 Big Cypress OR PL906 Mirage
Color	LA/ET Or Field Olive

Total Weight	97 ounce per square yard
Pile Height	1.75”
Fiber	Polyethylene Monofilament and Nylon Thatch
Primary backing	Polypropylene
Secondary Backing	20 ounce polyurethane
Roll Width	15’
Color Fastness to Light	9-year limited fade warranty
Holes for Drainage	¼” diameter holes on 4” on center grid.

B. Crushed Stone Base: 1/4" x Dust Crushed Rock from Clayton/Basalt #4402/SMARA #91-07-0004, available from Cemex, Clayton, CA 925-580-2792 or equal having the following properties:

U. S. Sieve		Percent Passing
3/8”	(9.5 mm)	100
#4	(4.75 mm)	88 +/- 8
#8	(2.36 mm)	60 +/- 9
#16	(1.18 mm)	41 +/- 8
#30	(600 um)	29 +/- 6
#50	(300 um)	21 +/- 4
#100	(150 um)	15 +/- 3
#200	(75 um)	12 +/- 2

Sand Equivalent = 48 +/- 11
Specific Gravity = 2.81
Absorption = 1.0%

C. Perforated Drain Pipe: Refer to Section 02850 Landscape Drainage.

D. Drain Inlets & Clean Outs: By Christy, 800-486-7070; Central Precast, 707-546-5016; Hanson Concrete Products, Pleasanton, CA, 925-426-4933 or equal.

E. Geotextile Liner: Mirafi 140N, or equal

F. Turf Bond Adhesive and Tape, Woodstock, GA 770-926-0004 or Nordot Adhesive System, Scotch Plains, NJ 908-233-6844, or equal.

2.2 CONCRETE CURBING/BORDER

A. Provide concrete border as indicated on drawings.

B. Concrete to comply with provisions of Section 02775, Landscape Concrete.

2.3 OTHER MATERIALS

A. As shown on the Drawings and provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection

1. Prior to work of this section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.

2. Provide sub grade surfaces acceptable to manufacturer: compacted base material.

3. Verify that proper drainage is provided.

4. Verify that work of this section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards, including but not limited to, U.S. Consumer Product Safety Guidelines and ASTM Standards F1487 and ASTM F1292.

5. In the event of discrepancy, immediately notify the Architect.

6. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 CONCRETE CURB INSTALLATION:

A. Preparation

1. Verify sub-grade, base material, conduit, and all other embedded items are properly located. Secure all embedded items against displacement during pour.

2. Verify all grades for pitch and fall prior to pouring pavements.

3. Verify that all cross-fall and ramp criteria comply with all accessibility regulations. including Title 24 requirements.

4. Verify existing sub grade complies with criteria specified in Section 02335, Subgrade Preparation and Base Material.

5. Notify inspector 48 hours prior to placing. Obtain inspectors approval of subgrade, forming and embedded items prior to placing.

B. Forming

1. Install forms in accordance with specified tolerances.

2. Stake rigidly in place at maximum intervals of 4 feet on center. Secure so as to prevent displacement during pouring and finishing process.

3. Install stretched wires or other device to provide form displacement indication.

4. Thoroughly clean forms, removing debris, coatings and foreign matter. Coat forms with approved bond breaker.

3.3 AGGREGATE SUB BASE INSTALLATION:

A. Install base stone and compact.

3.4 SYNTHETIC PLAY TURF SYSTEM INSTALLATION

A. Manufacturer's Instructions: Comply with the instructions and recommendations of the manufacturer.

B. Examination:

1. Site Verification of Conditions: Verify that substrate conditions are suitable for installation of the synthetic turf system.

2. Do not proceed with installation until unsuitable conditions are corrected.
Proper drainage is critical to the longevity of the surfacing system.

C. Preparation:

1. Surface Preparation: Ensure that the substrate meets the slope and drainage requirements.

D. Installation:

1. Do not proceed with synthetic turf system installation until all applicable site work, including substrate preparation, fencing, equipment installation and other relevant work, has been completed.

2. Geotextile liner:

a. Install Geotextile liner over the subgrade per manufacturer’s specifications.

3. Carpet Stretching:

a. After seams are glued and cured, stretch the carpet to eliminate slack in the carpet so that the surface is free of irregularities.

4. Borders:

a. Secure border as detailed.

5. Installer to confirm synthetic play turf Nap matches pieces to be connected, prior to final installation.

E. Field Quality Control:

1. Installations shall be completed under the supervision of a certified synthetic turf installer following manufacturer’s installation procedures and confirming conformity to the installation procedures by completing manufacturer’s documentation.

2. Tolerances

a. Smoothness: 3/16 inch plus or minus, at any point, measured along a 10 foot straight edge.

b. Adjacent surfaces: 1/8 inch maximum difference at any point between adjacent surfaces.

3.5 PROTECTION

A. Protect finished installation under provisions of the General Conditions.

B. Do not permit traffic over finished surfaces for timeframe specified by manufacturer.

C. Protect the surface from damage resulting from subsequent construction activity on the site.

3.6 MAINTENANCE

A. Provide direction and training to Owners staff by factory representative, on cleaning, repair, and resurfacing procedures.

B. Provide recommended list of maintenance products for Owner.

C. Turnover turf remnants to Owner.

END OF SECTION

SECTION 02791

RUBBERIZED SURFACING FOR PLAYGROUNDS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Poured-in-place playground surfacing system.

B. Related Sections:

1. Section 02775, Landscape Concrete
2. Section 02850, Landscape Drainage.
3. Section 02870, Site Furnishings.
4. Section 02875, Play Equipment.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM D412 Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.
2. ASTM D624 Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
3. ASTM E108 – Fire Test. Product shall exhibit a minimum result of a Class A Rating.
4. ASTM E303 – Skid Resistant Test Data.
5. ASTM F1487 – Standard Consumer Safety Performance Specification for Playground Equipment for Public Use.
6. ASTM F1292 Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment.
7. ASTM F1951 Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment.

B. CAS/CAR – California Accessibility Statues and California Accessibility Regulations.

C. ADAAG – Americans with Disabilities Act.

D. CPSC – Consumer Products Safety Commission, Handbook for Public Playground Safety #325, Current Edition.

1.3 SYSTEM DESCRIPTION

A. Performance Requirements: Provide a 2 layer rubber-polyurethane playground surfacing system which has been designed, manufactured and installed to meet the following criteria:

1. Shock Attenuation (ASTM F1292):
    a. Gmax: Less than 200.
    b. Head Injury Criteria: Less than 1,000.
2. Flammability (ASTM D2859): Pass.
3. Tensile Strength (ASTM D412): 25 psi (413 kPa).
4. Tear Resistance (ASTM D624): 12 pounds per inch.
5. Water Permeability: 0.4 gal/yd2/second.
6. Accessibility: Comply with requirements of ASTM F1951.

1.4 SUBMITTALS

A. General: Submit listed submittals in accordance with Section 01330, Submittals.

B. Product Data: Submit manufacturer's product data and installation instructions and depth of basemat

C. Manufacturer's details showing depths of wear surface and sub-base materials, anchoring systems and edge details.

D. A list of materials and components to be installed, including Manufacturer's name, storage requirements, and precautions, and shall state chemical composition and test results to which material has been subjected in compliance with these specifications.

E. Test results to substantiate that the product meets or exceeds all ASTM & ADA requirements for each standard listed in Quality Assurance. Test must be performed and certified by an independent laboratory.

F. Certificate of Insurance

G. Warranty

H. Copy of IPEMA Certification

I. A listing of at least twenty five (25) installations where products similar to those proposed for use have been installed and have been in successful service for a minimum period of three (3) years. This list shall include Owner or purchaser, address of installation, date of installation, contact person, and phone number

J. Statement signed by the Manufacturer of the synthetic safety surfacing attesting that all materials under this section shall be installed by the Manufacturer or its Certified Installers

K. Material Safety Data sheets (MSDS) and Product Data Sheets on all materials

L. Verification Samples: Submit manufacturer's standard verification samples of 9"x9" (229 x 229 mm) minimum.

M. Quality Assurance/Control Submittals submit the following: Certificate of Qualifications of the playground surfacing installer.

N. Closeout Submittals submit the following: Warranty documents specified herein.

O. Color: Submit manufacturer's color chart. Choice by City to be determined prior to installation.

1.5 QUALITY ASSURANCE

A. Qualifications: Utilize an installer approved and trained by the manufacturer of the playground surfacing system, having experience with other projects of the scope and scale of the work described in this section.

B. Certifications: Certification by manufacturer that installer is an approved applicator of the playground surfacing system.

C. International Play Equipment Manufacturers Association (IPEMA) certified.

D. ASTM F-1292 – Impact Attenuation Test Certification for the poured-in-place system to be installed in compliance with the Critical Fall height as determined by the Playground Equipment to be installed in conjunction with the poured-in-place surfacing system.

E. Insurance Requirements - All bidders must carry minimum insurance of:

1. $1,000,000 General Liability Per Occurrence

2. $2,000,000 General Aggregate

3. $2,000,000 Products Completed Operations

4. $5,000,000 Excess Liability

5. $1,000,000 Workers Comp. & Employers Liability

6. $1,000,000 Automobile Liability (any Auto)

1.6 DELIVERY, STORAGE AND HANDLING

A. General: Comply with Section 01600.

B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at a minimum temperature of 40 degrees F (4 degrees C) and a maximum temperature of 90 degrees F (32 degrees C).

1.7 PROJECT/SITE CONDITIONS

A. Environmental Requirements: Install surfacing system when minimum ambient temperature is 40 degrees F (1 degree C) and maximum ambient temperature is 90 degrees F (32 degrees C). Do not install in steady or heavy rain.

1.8 WARRANTY

A. Manufacturer's Warranty: Submit for City acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights City may have under Contract Documents.

1. Surfacing shall maintain required impact attenuation characteristics and be guaranteed against defects in workmanship and material for a period of no less than five (5) years from date of completion of work.

PART 2 PRODUCTS

2.1 POURED-IN-PLACE PLAYGROUND SURFACING SYSTEM

A. Manufacturers:

1. Surface America, Inc., P.O. Box 157, Williamsville, NY 14231; Telephone: (800) 999-0555, (716) 632-8413; Fax: (716) 632-8324; E-Mail: info@surfaceamerica.com; website: www.surfaceamerica.com.

2. Tot Turf by Robertson Industries Inc, available from Tot Turf (510) 433.0655

3. SpectraPour® Safety Surfacing Contact Chris Wolf at SpectraTurf, (800) 875-5788 or fax (951) 734-3630 www.spectraturf.com.

4. No Fault Safety Surface as manufactured and sold by No Fault Sport Group, LLC. No Fault Safety Surface shall consist of synthetic poured-in-place safety surfacing meeting the requirements of this specification and comprised of SBR, EPDM or TPV, and polyurethane binder. It shall be manufactured and installed by No Fault Sport Group, LLC (866-637-7678 www.nofault.com) and its certified installation crews.

5. Or equal in accordance with Section 01600.

B. Products/Systems: Poured-in-Place playground surfacing system, including the following:

1. Poured-In-Place Primer:

a. Material: Polyurethane.

b. Binder for safety surfacing shall be specifically designed for use with rubber granule material for outdoor installations.

c. Binder is a single component polyurethane pre-polymer formulated using a polymeric foam of Diphenylmethane 4, 4' Diisocyanate (MDI), Amber Viscosity – 4500cps, NCO content – 9.0, Density – 20dc-68, PCF Flash Point - >390dF, Elongation – 550%, Tensile – 3900 lb./sq. in.

d. No toluene diphenel isocyanate (TDI) shall be used.

e. No filler materials shall be used in urethane such as plasticizers and the catalyzing agent shall contain no heavy metals.

f. Weight of polyurethane shall be no less than 8.5 lbs/gal (1.02 Kg/1) and no more than 9.5 lbs/gal (1.14 Kg/1).

g. Color tinted binder will not be allowed.

2. Poured-In-Place Basemat:

a. Material: Blend of 100% recycled shredded SBR (Styrene butadiene rubber) and polyurethane.

b. Strands of SBR may vary from 0.5 mm – 2.0 mm in thickness by 3.0 mm – 20 mm in length.

c. Thickness: As required for 6-foot fall height, 3" (76 mm) minimum thickness. Confirm during submittal process.

d. Formulation Components: Blend of strand and granular material.

3. Poured-In-Place Top Surface:

a. Material: Blend of recycled EPDM (ethylene propylene diene monomer) and polyurethane. URETHANE BINDER TO USE ALIPHATIC FORM

b. EPDM particles shall meet requirements of ASTM D 412 and CSA Z614-98 for tensile strength and elongation; and ASTM D 2240 (Shore A) hardness of 55-65, not less than 26 percent rubber hydrocarbons

c. EPDM shall be peroxide cured with an EPDM content of 26% and shall include a processing aid to prevent hardness with 26% poly content to maintain dynamic testing characteristics, weatherization and UV stability.

d. Size of rubber particles shall be not less than 1.00 mm, or greater than 3.0 mm across. with a minimum EPDM content of 25% by weight and certified letter from Manufacturer stating this content. All rubber shall remain consistent in gradation and size.

e. Strand, shaved, chipped or shredded rubber is not acceptable in the poured cap.

f. Thickness: Nominal 1/2" (12.7 mm), minimum 3/8" (9.5 mm), maximum 5/8" (15.9 mm).

g. Color: As shown on Drawings and subject to revision by City through the submittal process:

(1) Dry Static Coefficient of Friction (ASTM D2047): 0.9 to 1.0.

(2) Wet Static Coefficient of Friction (ASTM D2047): 0.7to 0.9.

(3) Dry Skid Resistance (ASTM E303): meet or exceed 86 to 90

(4) Wet Skid Resistance (ASTM E303): meet or exceed 57 to 64

2.2 MIXES

A. Required mix proportions by weight:

1. Basemat: 14% polyurethane, 86% rubber.

2. Top Surface: 18% polyurethane, 82% rubber.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

A. Comply with the printed instructions and recommendations of the playground surfacing manufacturer.

3.2 EXAMINATION

A. Site Verification of Conditions: Verify that substrate conditions are suitable for installation of the playground surfacing system.

B. Do not proceed with installation until unsuitable conditions are corrected.

C. The base shall have the specific minimum slope and shall vary no more than 1/8" when measured in any direction with a 10' foot straight edge. Verify that sub-surfacing drainage, if required, has been installed to provide positive drainage.

D. Tolerance of concrete or bitumininous subsurface shall be within 1/8 inch (3.0 mm) in 10 feet (3050 mm). Tolerance of aggregate subsurface shall be within 3/8 inch (10mm) in 10 ft (3050 mm). Verify that aggregate subsurface has been fully compacted in 2” lifts to 95 percent or greater.

E. Asphalt base shall be allowed to cure a minimum of fourteen (14) days and new concrete shall be allowed to cure a minimum of seven (7) days prior to commencement of surfacing.

F. Do not proceed with installation until unsuitable conditions are corrected.

3.3 PREPARATION

A. Cleaning - The entire subsurface shall be clean, dry and free from any foreign and loose material.

B. Surface Preparation: Using a brush or short nap roller, apply primer to the substrate perimeter and any adjacent vertical barriers such as playground equipment support legs, curbs or slabs that will contact the surfacing system at the rate of 300 ft 2/ga (7.5 m1/L).

3.4 INSTALLATION

A. Do not proceed with playground surfacing installation until all applicable site work, including substrate preparation, playground equipment installation and other relevant work has been completed. Make required adjustments to accommodate playground equipment.

B. Basemat Installation:

1. Using screeds and hand trowels, install the basemat at a consistent density of 29 pounds, 1 ounce per cubic foot (466 kg/m3) to the specified thickness.

2. Allow basemat to cure for sufficient time so that indentations are not left in the basemat from applicator foot traffic or equipment.

3. Do not allow foot traffic or use of the basemat surface until it is sufficiently cured.

4. Edges - Surface edges shall be flush with edge of adjacent area or tapered to provide safe transition. When connecting to a concrete curb or border the hardened edge shall be primed with adhesive

5. The SBR cushion layer surface shall be porous

C. Primer Application: Using a brush or short nap roller, apply primer to the basemat perimeter

and any adjacent vertical barriers such as playground equipment support legs, curbs or slabs that will contact the surfacing system at the rate of 300 ft2/gal (7.5 m2/L).

D. Top Surface Installation:

1. Using a hand trowel, install top surface at a consistent density of 58 pounds, 9 ounces per cubic foot (938 kg/m3) to a nominal thickness of 1/2" (12.7 mm).

2. Install to finish grades required on the Drawings.

3. Large Areas - All areas in excess of 2,000 sq. ft. or that require adjacent color pours will have a cold joint or seam due to the nature of the installation process. Although seldom visible, large areas or adjacent colors require the No Fault Safety Surface material to be installed on separate days

4. Edges - Surface edges shall be flush with edge of adjacent area or tapered to provide safe transition

5. Allow top surface to cure for a minimum of 72 hours.

6. At the end of the minimum curing period, verify that the top surface is sufficiently dry and firm to allow foot traffic and use without damage to the surface.

7. Do not allow foot traffic or use of the surface until it is sufficiently cured.

3.5 PROTECTION

A. Protect the installed playground surface from damage resulting from subsequent construction activity on the site.

3.6 FINAL REVIEW AND CLEANUP:

A. Remove adhesive from adjacent surface or play equipment. Spills of excess adhesive shall be promptly cleaned.

B. Properly dispose of all material and packing waste before leaving the job site.

C. Include copies of the material submittals and manufactured material suppliers and installers name and telephone number in the Operations and Maintenance manuals as part of the closeout documents.

D. Include manufacturer’s warranty information of specified items with warranties.

E. In accordance with Section 01770, Closeout.

END OF SECTION

SECTION 02810

IRRIGATION

PART 1 GENERAL

1.1 DESCRIPTION

A. Install irrigation system, sleeves, and conduits and pull boxes complete as shown and as specified.

1.2 RELATED SECTIONS

A. Section 02870, Site Furnishings

B. Section 02775, Landscape Concrete

C. Section 02850, Landscape Drainage

D. Section 02900, Planting

1.3 QUALITY ASSURANCE

A. Qualifications:

1. The contractor shall use an installer that complies with and submits written evidence of the following:

2. All irrigation sub-contractors bidding on this project must have a California license and be experienced in the installation, in Northern California, of irrigation systems for at least 5 years and have completed five (5) projects in Northern California of comparable size, type and complexity, in the past three (3) years.

3. Experience: Assign a full-time employee to the job as foreman for the duration of the Contract with a certified landscape technician, certification through CLCA or minimum of four (4) years experience in landscape installation and maintenance supervision, with experience or training in turf management, entomology, pest control, soils, fertilizers and plant identification.

4. Labor Force: Provide a landscape installation and maintenance force thoroughly familiar with, and trained in, the work to be accomplished to perform the task in a competent, efficient manner acceptable to the Owner.

5. Coordinate shutoff of irrigation systems with the Owner and be responsible for any damage caused to adjacent landscaping by Contract work.

B. Requirements:

1. Supervision: The foreman shall directly supervise the work force at all times and be present during the entire installation. Notify Owner's Representative of all changes in supervision.

2. Identification: Provide proper identification at all times for landscape maintenance firm's vehicles and a labor force uniformly dressed in a manner satisfactory to Owner's Representative.

C. Manufacturer's Specifications: Follow manufacturer's current printed specifications and Drawings in all cases where the manufacturers of articles used in the Contract furnish directions covering points not specified or shown in the drawings.

D. Ordinances and Regulations: All local, municipal and state laws, codes and regulations governing or relating to all portions of this work are hereby incorporated into and made a part of these Specifications. Anything contained in these Specifications shall not be construed to conflict with any of the above codes, regulations or requirements of the same. However, when these Specifications and Drawings call for or describe materials, workmanship or construction of a better quality, higher standard, or larger size than is required by the above codes and regulations, the provisions of these Specifications and Drawings shall take precedence.

E. Marin Municipal Water District Requirements: Conform to all requirements of the Marin Municipal Water District (MMWD) and Water Conservation Ordinance 421.

F. Explanation of Drawings:

1. Due to the scale of the Drawings, it is not possible to indicate all offsets, fittings, sleeves, etc., which may be required. Carefully investigate the conditions affecting all of the work and plan accordingly, and furnish all required fittings. Install system in such a manner to avoid conflicts with planting, utilities, site improvements and architectural features.

2. Do not install the irrigation system as shown on the Drawings when it is obvious in the field that obstructions, grade differences or discrepancies in arc dimensions exist that might not have been considered in engineering. Bring such obstruction or differences to the attention of the Landscape Architect. In the event this notification is not given, the Contractor shall assume full responsibility for any revision necessary.

G. References, Codes and Standards

1. Marin Municipal Water District, Water Conservation Ordinance 421.

2. Water Use Classification of Landscape Species (WUCOLS).

3. American Society of Irrigation Consultants (ASIC) Design Guidelines.

4. California Landscape Standards, California Landscape Contractors Association, Sacramento, California.

5. CAL-OSHA.

6. National Electric Code.

7. Uniform Plumbing Code (UPC) published by the Association of Western Plumbing Officials.

8. Underwriters Laboratories (UL): Electrical wiring, controls, motors and devices, UL listed and so labeled.

9. American Society of Testing Materials (ASTM).

10. California Building Code (CBC).

1.4 SUBMITTALS

A. Materials List and Notifications:

1. Within thirty (30) days after the Notice to Proceed, submit manufacturer's cut sheets and complete lists of materials proposed for installation, and obtain the Landscape Architect's written approval thereof before proceeding. Use only accepted materials and items of equipment.

2. List all materials by manufacturer's name and model number.

3. Notification: Submit written notification describing all acceptable and non-acceptable site conditions.

4. Water Pressure: Submit written notification of findings of existing water pressure.

B. Manuals:

1. Prior to the final acceptance of the irrigation system, furnish two (2) individually bound Owner's Manuals to the Landscape Architect for use by the Owner. The manual shall contain complete enlarged drawings, diagrams and spare parts lists of all equipment installed, showing manufacturer's name and address. In addition, each Owner's Manual shall contain the following:

a. Index sheet indicating the Contractor's name, address and phone number.

b. Copies of equipment warranties and certificates. Include certificate for irrigation controller and warranty for controller.

c. List of equipment with names, addresses and telephone numbers of all local manufacturers' representatives.

d. Complete operating and maintenance instructions in sufficient detail to permit operating personnel to understand, operate and maintain all equipment.

e. Parts list of all equipment such as controllers, valves, solenoids and heads.

f. Landscape Irrigation Audit.

C. Record Drawings:

1. Dimension the location of the following items from two (2) permanent points of reference such as building corners, sidewalks, road intersections, etc.:

a. Connection to existing water lines.

b. Connection to electrical power.

c. Ball valves.

d. Routing of sprinkler pressure lines.

e. Remote control valves.

f. Routing of control valves.

g. Quick coupling valves.

h. All sleeve locations.

i. Routing of all control wiring.

j. Include all invert elevations below 12".

2. Deliver one reproducible set of Record Drawings to the Landscape Architect within seven (7) working days before the date of Final Review. Delivery of the Record Drawings shall not relieve the Contractor of the responsibility of furnishing required information in the future.

D. Controller Plan:

1. Permanently install one "bubble diagram" controller plan adjacent to controller housing. The plan shall show the area controlled by each valve and any major permanent structure, such as buildings and roads.

2. Charts to be waterproof and installed as accepted by the Landscape Architect.

E. Maintenance Material - supply the following tools to the Owner:

1. Three (3) sets of specialized tools required for removing, disassembling and adjusting each type of sprinkler, valve or other equipment supplied on this project.

2. Two (2) keys for each type of equipment enclosure.

3. Two (2) keys for each type of automatic controller.

4. Two (2) quick-coupler keys and matching hose swivels for each type of quick-coupling valve installed.

5. All lock keys shall be keyed alike.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Furnish and deliver materials in manufacturer's packaging, bearing original legible labeling.

B. Handle and store all equipment in accordance with manufacturer's current printed specifications.

1.6 SEQUENCING AND SCHEDULING

A. Acceptance: Do not install main line and lateral trenching prior to acceptance by Inspector of rough grades completed under another Section.

B. Coordination: Coordinate with the work of other sections to insure the following sequence of events:

1. Sleeves and Conduits: Installation of all sleeves and conduits to be located under paving and through walls prior to placement of those materials.

1.7 WARRANTY

A. In addition to manufacturer's guarantees or warranties, work shall be warranted for two (2) years from date of final acceptance against defects in material, equipment and workmanship. Warranty shall also cover repair of damage to any part of the premises resulting from leaks or other defects in materials, equipment and workmanship to the satisfaction of the Owner.

B. Include a copy of the warranty forms in the Owner's Manual.

1.8 OPERATION

A. Routine: Inspect and adjust all spray head, bubbler heads and control valves, including raising or lowering of spray head heights to accommodate plant growth and weather conditions.

B. Controller: Inspect regularly for power interruption and reset clock as required. Adjust station timing to accommodate changes in plant growth and weather conditions.

C. System Failure: Perform all repairs within one (1) operating period. Replacements to match removed products and materials in all respects. Report promptly all damage not resulting from Contractor's operations. Repair all damage caused by Contractor at no expense to Owner.

D. Climate Change: Set and program automatic controllers in response to seasonal requirements and requirements of newly planted materials.

E. Program automatic controller for climatologically controlling operation for at least 10 months of growing conditions before the end of the 12-month maintenance period. Obtain letter of certification from manufacturer's representative certifying the controller is properly programmed.

PART 2 PRODUCTS

2.1 PIPE

A. All piping shall be continuously and permanently marked with the manufacturer's name or trademark, nominal size, and schedule or class indicating the pressure rating.

B. Polyvinyl chloride (PVC) 1120-1220, Class 200 and Class 315 shall conform to ASTM D2241. Schedule 40 and 80 shall conform to ASTM D1785.

C. Piping on pressure side of irrigation control valves:

1. Pipe to be polyvinyl chloride (PVC) 1120-1220, Schedule 40, Class 200 and Class 315 as noted on below.

2. Sizes ¾", 1", 1-1/4", 1-1/2" and 2": Use polyvinyl chloride (PVC) 1120-1220, Schedule 40 and with solvent weld Schedule 40 fittings.

3. Sizes 2-1/2" and 3": Use polyvinyl chloride (PVC) 1120-1220, Class 315 with solvent weld Schedule 40 fittings.

4. Sizes 4" and greater use Class 200 rubber gasketed (ring-tite) pipe with rubber gasketed deep bell Series 200 PVC injection molded IPS fittings. Fittings are to conform to ASTM D3139, carry a maximum pressure rating of 200 psi. Fittings are available from Multi

Fittings Corp, Port Huron, MI, 800-523-3539 or Harco. Use lubricant approved by the pipe manufacturer.

D. Piping on non-pressure side of irrigation control valves:

1. Polyvinyl chloride (PVC) 1120-1220 Class 200 and Schedule 40 as noted on the drawings.

E. Piping for potable water lines as shown on drawings.

2.2 FITTINGS

A. Fittings for Solvent Welded Pipe: Schedule 40 and Schedule 80, polyvinyl chloride, standard weight, as manufactured by Sloane, Lasco, or accepted equal, to meet ASTM D2466-73 and D2467-73.

2.3 NIPPLES

A. Plastic: Schedule 80, Type I, Grade 1 polyvinyl chloride (PVC); threaded both ends; ASTM D1784 and D1785; uniformly gray in color.

2.4 IRRIGATION CONTROLLER

A. As shown on Drawings.

2.5 CONTROL WIRES

A. Type: Copper with UL accepted for direct burial, size 14-1. Common ground wire with white insulating jacket; individual control wires with insulating jacket of color other than white. Use red wires for control valve wires and black wires for extra wires.

B. Splices: 'DBR', or 'DBY' by 3M.

2.6 REMOTE CONTROL VALVE

A. As shown on Drawings.

2.7 ISOLATION VALVE

A. For isolation valves 3” and larger: Specification: Nibco, Resilient Wedge Iron Body Gate Valve, model F-619-RW-SON, Flanged, non-rising stem or accepted equal. Match the line size.

B. For ball valve at remote control valve: Specification: KBI, Lo-Torque Schedule 80 Plastic Ball Valve or accepted equal. Match the line size or size of remote control valve.

C. For isolation valves 2-1/2” and smaller: Specification: Nibco T-113 Bronze Ball Valve or accepted equal. Match the line size.

2.8 VALVE BOXES

A. As shown on Drawings or accepted equal. Christy Concrete, unless otherwise noted, marked with valve number or valve type inscribed on lid.

2.9 PULL BOXES

A. As shown on the Drawings, Christy N-9.

2.10 DETECTION WIRE

A. Sheathed #12 copper wire.

2.11 SLEEVE AND CONDUIT MATERIALS

A. For Water Lines: PVC 1120-1220, Class 315 pipe.

B. For Control Wires and Conduits: PVC 1120-1220, Schedule-40 electrical conduit. Install pull ropes in empty conduits.

C. For Control Wires and Water Lines: Twice the diameter of the largest pipe going through the sleeve.

2.12 MISCELLANEOUS INSTALLATION MATERIALS

A. Solvent Cement and Primers for Solvent-weld Joints: Conforming to ASTM D2564 #P-70 primer and Weld-on #711 glue or make and type accepted by manufacturer(s) of pipe and fittings. Maintain cement proper consistency throughout use.

B. Teflon Tape: Use only Teflon tape on all threaded PVC fittings.

2.13 MISCELLANEOUS EQUIPMENT/ACCESSORIES

A. Concrete Pads: Poured-in-place concrete boxes and vaults.

B. Thrust Blocks: Concrete and the size shall be based on an average safe soil bearing load of 700 lbs. per square foot. See Concrete Section of Specifications.

C. Sleeves and Conduits: See Drawings.

2.14 REMOTE CONTROL VALVE TAGS

A. Christy remote control valve tags or accepted equal.

2.15 OTHER EQUIPMENT

A. As shown on the Drawings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Sleeves and Conduits: Verify that all installed sleeving and conduits are undisturbed and are free of defects or errors introduced by the work of other sections.

B. Water Pressure: Test and verify that existing water pressure is the minimum pressure to operate the irrigation system as specified on the Drawings.

C. Stub-outs: Verify that all stub-outs to be provided under another contract are correctly sized, located and installed as noted on Drawings. Mark all below grade stub-outs, spare sleeves, and boxes.

D. Notification: Submit written notification to Inspector within ten (10) working days of above inspections describing all acceptable and non-acceptable site conditions.

3.2 CONNECTIONS TO SERVICES

A. Coordinate connection to points of connection where applicable.

B. Temporarily connect to potable water source with backflow prevention device if required so that work may proceed and be tested before irrigation water connection is installed.

C. Field verify with Owner the locations of connections to water sources, stub outs, backflow prevention devices, irrigation controller, isolation valves, and remote control valves.

D. Refer to Planting Plan of location of valve boxes.

E. Coordinate connection of irrigation controllers to electrical power source. Contractor to connect to the power

3.3 INSTALLATION

A. Conduits and Sleeves:

1. Coordination

a. Provide conduit and sleeve materials and coordinate installation with other trades.

b. Do not install other trades conduit, pipes or materials in irrigation trenches.

c. Coordinate with track layout for location of electrical and signal conduits and boxes at track finish line.

2. Extent: Install conduits and sleeves where control wires and pipes pass under paving or through walls as shown on Drawings. Extend twelve inches (12") beyond edges of paving and walls and cap ends until ready for use.

B. Excavating and Trenching:

1. Dig trenches wide enough to allow a minimum of three inches (3") between parallel pipelines. Provide a minimum cover from finish grade as shown on drawings.

C. Pipe Line Assembly:

1. General:

a. Install pipe and fittings in accordance with manufacturer's current printed Specifications.

b. Clean all pipes and fittings of dirt, scales and moisture before assembly.

c. Thrust blocks:

2. For irrigation mainlines which are 2 ½" diameter and greater, install thrust blocks at changes of direction and size changes greater than ½". Refer to Drawings.

3. The size of the thrust blocks shall be per pipe manufacturer's instructions and based on the maximum thrust force expected during test pressures as well as peak operating pressures and the load-bearing capacity of the soil.

4. Install thrust blocks at shutoff valves.

    a. Install thrust blocks at the termination points of the mainline.

    b. Do not install Concrete or thrust blocks over valve wires.

    c. Do not conduct a pressure test within 48 hours of the thrust block pours.

5. Solvent-welded Joints for PVC Pipes:

    a. Solvents: Use solvents and methods specified by pipe manufacturer.

    b. Curing Period: Minimum of one (1) hour before applying any external stress on the piping and at least 24 hours before placing the joint under water pressure.

6. Threaded Joints for Plastic Pipes:

    a. Quick Coupler Valve Swing Joint Assembly: Use non-hardening pipe joint compound.

    b. Use Permatex on all other threaded PVC fittings.

    c. Joining: Use strap-type friction wrench only. Do not use metal-jawed wrench. Assemble finger tight plus one or two turns.

7. Laying of Pipe:

    a. Bedding On-grade: Remove from trench all rocks or clods. Bed pipe in at least 2 inches of soil excavated from trench. Backfill on all sides of piping to provide a uniform bearing.

    b. Snaking: Snake pipe from side to side of trench bottom to allow for expansion and contraction. Minimum allowance for snaking is one (1) additional foot per 100 ft. of pipe.

    c. Moisture Restrictions: Do not lay PVC pipe when there is water in the trench. Do not assemble PVC pipe unless the pipe is dry.

D. Isolation Valves: Group valves together, aligned in a row where grouped, and locate where shown on drawings. Install box flush with finish grade, not necessarily level. Locate boxes outside of track surfacing.

F. Control Valves:

1. Install in valve boxes where shown on Drawings and group together where practical.

2. Manifold valves where connecting to the mainline.

3. Where two or more valves are installed adjacent to each other, provide at least twelve inches (12") separation. Align boxes in a row.

4. Permanently mark valve box lid with 2" black valve number and controller letter. Install remote control valve tags at each valve.

G. Automatic Controller:

1. General: Install per local code and manufacturer's current printed Specifications.

2. Connection to Valves: Connect remote control valves to controller in clockwise sequence to correspond with station setting beginning with Stations 1, 2, 3, etc. Match valve numbers as shown on Irrigation Plan.

3. Connect all controllers to lightning rod as required for lightning protection.

4. Labeling: Affix controller letter (i.e., "A") on inside of controller cabinet door with minimum of one-inch (1") high permanent letter.

5. Irrigation Diagram: Affix a non-fading, waterproof copy of irrigation diagram to cabinet door below controller name. Irrigation diagram to be sealed between two plastic sheets, 20 mil. minimum thickness. Use a reduced copy of the Record Drawing for the irrigation diagram clearly showing all valves operated by the controller, station, number, valve size, and type of planting irrigated. Color code area operated by each valve.

6. Connect controller to existing electrical power as required. Install per code and manufacturer's current printed Specifications.

H. Closing of Pipe and Flushing of Lines:

1. Capping: Cap or plug all openings as soon as lines have been installed to prevent entrance of materials that would obstruct the pipe. Leave in place until removal is necessary for completion of installation.

3.4 SLEEVING

A. Install sleeves where control wires and pipes pass through or under walls.

B. Install sleeves for control wiring and pipe under walks and paving as shown on the drawing and as required to facilitate a smooth construction sequence.

C. Sleeves to be of adequate size to accommodate retrieval for repair of wiring or piping and shall extend a minimum of 12" beyond edges of walls, walks and paving.

D. Coordinate sleeve installation with other trades as required.

E. Install one spare 3" diameter sleeve adjacent to sleeves shown on Drawings and required to complete work. Cap both ends and mark location on pavement as accepted by Inspector.

3.5 PIPELINE ASSEMBLY

A. Install pipe in accordance with manufacturer's instructions.

B. Solvent weld PVC pipe and fittings using primers, solvents and methods recommended by manufacturer, except where screw connections are required. Clean pipe and fitting of dirt and moisture before assembly. PVC pipe may be assembled on ground surface beside trench. Snake pipe from side to side of trench bottom to allow for expansion and contraction. Make

all connections between PVC pipe and metal valves or pipe with threaded fittings using PVC male adapters.

C. Use Permatex pipe joint compound (#51D) on threaded PVC fittings, except for sprinkler heads. Assemble threaded PVC fittings finger tight plus one or two turns.

3.6 CONTROL WIRING

A. Install control wires with sprinkler mains and laterals in common trenches wherever possible. Lay to the side of pipeline. Tie wires in bundles at 10' intervals and allow slack for contraction between ties.

B. Provide a minimum of 30” of looped extra ground and control wire at each valve and at 200' intervals on long wire runs. Snake wires in trench to allow for contraction of wires.

C. Control wire splices at remote control valves to be crimped and sealed with specified splicing materials.

D. Line splices will be allowed only on runs of more than 2500'. Place splices inside of a valve box below grade and mark with a marker.

E. Install two additional wires in wire bundles for potential connection to controller. Run from farthest valve to controller without splices. More than two wires may be required due to branching of mainline. Install different color wire than active valve wire.

F. Crimp control wire splices at control valves. Seal with specified splicing materials. In-line splices will be allowed only on runs exceeding 2500 feet and only in junction boxes.

3.7 DETECTION WIRE

A. Install wire on top of the irrigation main supply line. Install wire on top of the potable water line when the potable line is in a separate trench. Connect detection to each quick coupling valve stake to serve as a ground.

3.8 FIELD QUALITY CONTROL

A. Testing of Irrigation System:

1. Make hydrostatic tests with quick coupler valves installed and capped, remote control valves installed, flow valve open, ball valve open and laterals disconnected when welded PVC joints have cured at least 24 hours. Center load piping with backfill to prevent pipe from moving under pressure. Keep all couplings and fittings exposed.

2. Install two (2) pressure gauges at opposite ends of mainline system. Pump system up to a minimum of 125 psi the day preceding the scheduled test and verify that pressure is holding. Inspect system early following day and immediately notify Inspector if the test confirmation must be postponed.

3. Apply continuous static water pressure of 125 psi in accordance with CalTrans Standard Specifications Section 20-5.03H, except after a drop in pressure (5 psi maximum), then the pressure must stabilize and remain stable for a one (1) hour minimum period before acceptance of the test.

4. Leaks resulting from tests shall be repaired and test repeated until system passes tests.

B. Adjustment of the System:

1. Flush and adjust all sprinkler heads for optimum performance and to prevent over spray onto walks, roadways and buildings.

C. Set all sprinkler heads perpendicular to finished grades unless otherwise noted on the Drawings.

D. When the landscape sprinkler system is completed, perform a coverage test in the presence of the Inspector to determine if the water coverage for planting and turf areas is adequate.

E. Test controllers individually in the presence of the Inspector and the Landscape Architect. Demonstrate that all control valves operate electronically.

1. Demonstrate to Landscape Architect that irrigation scheduling programmed into controller is adequate for plant requirements without causing runoff, and that scheduling capacities of controller are utilized.

3.9 BACKFILL AND COMPACTING

A. General: After system is operating and required tests and reviews have been made, backfill excavations and trenches with clean soil, free of debris.

B. Backfill for All Trenches: Regardless of the type of pipe covered, compact to minimum 95% density under pavements and 85% under planted areas.

C. Compacting: Compact trenches only in areas to be planted by thoroughly flooding the backfill. Jetting process may be used in those areas.

D. Finishing: Dress off areas to finish grades.

E. Owner's testing agency will test backfill compaction in areas under paving.

3.10 FLOW SENSOR AND MASTER VALVE

A. Install as required on the Drawings and in conformance with the manufacturer's General and Technical Specifications.

3.11 MAINTENANCE

A. The entire sprinkler irrigation system shall be under full automatic operation for a period of 2 days prior to any planting.

B. The Owner’s Representative reserves the right to waive or shorten the operation period.

C. Maintain/repair system for full duration of plant maintenance period.

D. Maintain the landscape to ensure water use efficiency.

E. Submit a regular maintenance schedule with the Certificate of Completion. The regular maintenance schedule shall include, but not be limited to, routine inspection; adjustment and repair of the irrigation system and its components; aerating and dethatching turf areas; replenishing mulch; fertilizing; pruning; weeding in all landscape areas, and removing and obstruction to emission devices. Operation of the irrigation system outside the normal watering window is allowed for auditing and system maintenance.

F. Repair of irrigation equipment shall be done with the originally installed components or their equivalents.

G. Implement sustainable or environmentally-friendly practices for landscape maintenance.

3.12 IRRIGATION SCHEDULE

A. Program the controller for the plant establishment period and the one 12-month irrigation schedule.
Program and adjust controller to apply water as required for healthy plant growth, maintenance and water conservation.

B. For the efficient use of water, prepare manage, and evaluate irrigation schedule to utilize the minimum amount of water required to establish and maintain plant health and meet the following criteria:

1. Irrigation scheduling shall be regulated by automatic irrigation controllers.

2. Overhead irrigation shall be scheduled between 10:00 p.m. and 6:00 a.m. unless weather conditions prevent it. Operation of the irrigation system outside the normal watering window is allowed for auditing and system maintenance.

3. For implementation of the irrigation schedule, particular attention must be paid to irrigation run times, emission device, flow rate, and current reference evapotranspiration, so that applied water meets the Estimated Total Water Use. Total annual applied water shall be less than or equal to Maximum Applied Water Allowance (MAWA). Actual irrigation schedules shall be regulated by automatic irrigation controllers using current reference evapotranspiration data (e.g., CIMIS) or soil moisture sensor data.

4. Program the controller to operate automatically based on Evapotranspiration (ET) data ET.

5. Parameters used to set the automatic controller shall be developed and submitted for each of the following

a. The plant establishment period;

b. The established landscape; and

c. Temporarily irrigated areas.

6. Each irrigation schedule shall consider for each station all of the following that apply:

a. Irrigation interval (days between irrigation);

b. Irrigation run times (hours or minutes per irrigation event to avoid runoff);

c. Number of cycle starts required for each irrigation event to avoid runoff;

d. Amount of applied water scheduled to be applied on a monthly basis;

e. Application rate setting;

f. Root depth setting;

g. Plant type setting;

h. Soil type;

i. Slope factor setting;

j. Shade factor setting; and

k. Irrigation uniformity or efficiency setting.

3.13 REVIEWS PRIOR TO ACCEPTANCE

A. Notify the Owner's Representative in advance for the following reviews, according to the time indicated:

1. Pre-construction conference - 7 days.

2. Supply line pressure test and control wire installation - 72 hours.

3. Coverage and controller test - 72 hours.

4. Final inspection - 7 days.

5. Landscape Irrigation Audit: An irrigation audit includes, but is not limited to: inspection, system tune-up, system test with distribution uniformity or emission uniformity, reporting overspray or runoff that causes overland flow, and preparation of an irrigation schedule.

4. Before sodding of the grass areas, and upon completing the installation of the overhead irrigation system for the grass areas, conduct an irrigation audit by a certified landscape irrigation auditor. Include a copy of this report in the Operation and Maintenance Manual. Submit written report by each valve station that contains the following:

a. Operating pressure of the irrigation system.

b. Distribution uniformity of overhead irrigation.

c. Precipitation rate of overhead irrigation.

d. Report of any overspray or broken irrigation equipment.

e. Report of any runoff or overspray that causes overland flow.

f. Irrigation schedule including:

(i) Plant establishment irrigation schedule

(ii). Regular irrigation schedule by month including: plant type, root depth, soil type, slope factor, shade factor, irrigation interval (days per week), irrigation runtimes, number of start times per irrigation day, gallons per minute for each valve, precipitation rate, distribution uniformity and monthly estimated water use calculations.

(iii). An irrigation maintenance schedule timeline shall be attached to the certificate of completion that includes: Routine inspections, adjustment and repairs to the

irrigation system, aerating and dethatching turf areas, replenishing mulch, fertilizing, pruning and weeding.

6. Make correction and adjustments as required to provide the following minimum Distribution Uniformity:

    a. Rotary head irrigation: 70%

    b. Spray head irrigation: 62.5%

B. No reviews will commence without record drawings, without completing previously noted corrections, or without preparing the system for review.

C. Submit the signed Certificate of Completion and the following as part of the Maintenance and Operations Manual specified:

1. Submit the signed Certificate of Completion

2. Record drawings

3. Irrigation scheduling parameters used to set the controller

4. Irrigation controller schedule

5. Landscape maintenance schedule

6. Soil analysis report and documentation verifying implementation of soil preparation

7. Letter of certification from controller manufacturer’s representative certifying the controller is properly programmed for ET operation.

8. Written verification of static and dynamic water pressure.

Certificate of Completion
This certificate is filled out by the project applicant, landscape architect and landscape contractor upon completion of the landscape project.

Part 1. Project Information Sheet

Date	MMWD Project Number
Project Name	Project Address
Name of Project Applicant	Telephone Number
	Fax Number
Title	Email Address
Company	

"I/we certify that I/we have received copies of all the documents within Landscape Documentation Package and that it is our responsibility to see that the project is maintained in accordance with the Landscape and Irrigation Maintenance Schedule."

Property Owner Signature Date

Part 2. Landscape Architect and/or Landscape Contractor/Installer

Landscape Architect Name Vincent P. Lattanzio	Telephone Number 415-447-5215
Title Principal	Fax Number 415-674-0999
License Number California Licensed Landscape Architect 2554	vince@carducciassociates.com
Carducci & Associates	555 Beach Street, 4th Floor San Francisco, CA 94133

Landscape Contractor Name	Telephone Number
Title	Fax Number
License Number	Email Address
Company	Street Address

"I/we certify that the work has been completed in accordance with the ordinance and that the landscape planting and irrigation installation conform to the criteria and specifications of the approved Landscape Documentation Package. Additionally, a landscape audit and irrigation maintenance schedule have been

completed and are attached to this certificate showing that the system meets the efficiency requirements used in the Maximum Applied Water Allowance calculation".

Landscape Architect Signature	Date
Landscape Contractor Signature	Date

3.14 FINAL REVIEW AND CLEANUP:

A. Operate each system in its entirety for the Owner's Representative at time of final review. Any items deemed not acceptable by the Owner's Representative shall be reworked to the complete satisfaction of the Owner Representative.

B. Provide evidence to the Owner's Representative that the Owner has received all accessories and equipment as required before final review can occur.

C. Final acceptance and start of warranty period will occur no later than the end of the plant maintenance period.

D. For time of final review, Contractor shall arrange a meeting with the Owner's maintenance personnel to demonstrate the operation of the irrigation systems automatically in order to verify acceptance and to familiarize the maintenance personnel with the system and recommended programming.

E. All work shall be left in a condition satisfactory to the Owner Representative.

3.15 CLOSEOUT

A. Operate each system in its entirety for the Inspector at time of final review. Any items deemed not acceptable by the Inspector shall be reworked to the complete satisfaction of the Inspector.

B. Provide evidence to the Inspector that the Owner has received all accessories and equipment as required before final review can occur.

C. Final acceptance and start of warranty period will occur no later than the end of the plant maintenance period.

D. Include copies of the material submittals and manufactured material suppliers and installers name and telephone number and the items required as part of the Certificate of Completion in the Operations and Maintenance manuals as part of the closeout documents.

E. Include warranty and manufacturer's warranty information of specified items with warranties.

END OF SECTION

SECTION 02820

CHAIN LINK FENCING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Scope: Provide labor, materials and equipment for the installation of the chain link fences and gates as shown on the drawings and as specified. The contractor shall supply a total color coated chain link fencing system of the design, style and strength defined herein. The system shall include all components (i.e., framework, chain link fabric and fittings) required.

B. Related work specified elsewhere includes:

1. Division 1, General Requirements
2. Section 02300, Earthwork
3. Section 02335, Subgrade Preparation and Base Material
4. Section 02350, Drilled Piers
5. Section 02775, Landscape Concrete
6. Section 02800, Irrigation
7. Section 02850, Landscape Drainage
8. Section 02870, Site Furnishings

1.2 ACCESSIBILITY COMPLIANCE

A. Openings: Openings in path of travel must comply with California Building Code exit door requirements.

1.3 SUBMITTALS

A. Per Division 1, General Requirements. Submit for approval six (6) copies of manufacturer's information and shop drawings for fencing, posts, fence post footing, rails, tension wire, fabric and hardware.

B. Submit two (2) samples showing finish of fence framing system, hardware and fence fabric.

1.4 PROJECT CONDITIONS

A. Coordination: Coordinate this work with the work of other Sections to avoid delay and interference with other work.

B. Protect excavations by shoring, bracing, sheeting, underpinning, or other methods as required to prevent cave-ins or loose dirt from entering excavations. Barricade open excavations and post warning lights at work adjacent to public streets and walks.

C. Promptly repair damage to adjacent facilities caused by operations. Cost of repair at Contractor's expense.

D. Promptly notify the Inspector of unexpected subsurface conditions.

E. Excavations and Sidewall Support: Excavations to depths greater than 4.5 feet will require shields or shoring per OSHA regulations and OSHA recommendations and procedures.

F. Excavations Stabilization and Dewatering Considerations: In instances where excessive caving or unstable wall conditions are encountered, the Geotechnical Engineer may recommend that trench shields be used both for worker safety and to maintain integrity of the trench. Minimizing the length of excavation open at one time will also minimize excavation instability. Also, for this condition, the Geotechnical Engineer recommends the need to keep excavations open as short a time as possible before backfilling. The risk of excavation wall squeezing and bottom heave increases with time.

1.5 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.

1.6 REFERENCES

A53 / A53M	Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
A 90/A90M	Test Method for Weight (Mass) of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings
A 569/A569M-977	Specification for Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip Commercial Quality
B 6-97	Specification for Zinc
B 117	Practice for Operating Salt Spray (Fog) Apparatus
D 1499	Practice for Operating Light- and Water-Exposure Apparatus (Carbon-Arc Type) for Exposure of Plastics
D 3359	Test Methods for Measuring Adhesion by Tape Test
E 8-98	Test Methods for Tension Testing of Metallic Materials
E 8M	Test Methods for Tension Testing of Metallic Materials (Metric)
E 376	Practice for Measuring Coating Thickness by Magnetic-Field or Eddy-Current (Electromagnetic) Test Methods
F 567	Practice for Installation of Chain-Link Fence
F 626	Specification for Fence Fittings
F 668	Specification for Poly (Vinyl Chloride) (PVC)-Coated Steel Chain-Link Fence Fabric
F 900	Specification for Industrial and Commercial Swing Gates
F 934	Specification for Standard Colors for Polymer-Coated Chain Link Fence Materials
F 969	Practice for Construction of Chain-Link Tennis Court Fence
F 1043	Specification for Strength and Protective Coatings on Metal Industrial Chain Link Fence Framework
ANSI/AWS D1.1	Structural Welding Code - Steel

1.7 PRODUCT HANDLING AND STORAGE:

A. Upon receipt at the job site, all materials shall be checked to ensure that no damages 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

2.1 GENERAL

A. Manufacturer: framework and fabric for color chain link fence systems shall conform to Polyolefin Coated Chain Link Fencing, Permafused II™, Master Halco, Inc., 4000 W. Metropolitan Drive, Suite 400, Orange, CA 92868, Phone (800) 229-5615 Fax (714) 385-0107, http://www.fenceonline.com, Ameristar or equal.

2.2 STEEL FRAMEWORK

A. Steel pipe - Type I: ASTM F 1083 and ASTM A 53 Gr B, standard weight schedule 40 or 80 per plan; minimum yield strength of 35,000 psi outside diameter sizes as indicated. Hot-dipped galvanized with minimum average 1.8 oz/ft² (550 g/m²) of coated surface area.

B. Polyolefin Coated finish: in accordance with ASTM F1043, apply supplemental color coating of minimum 10 mils (0.254mm) of thermally fused polyolefin in black color to match fabric.

C. The color of all framework shall be black.

D. Bottom of fence shall be provided with a bottom rail.

2.3 FABRIC

A. Polyolefin elastomeric coating, 6 mil (0.15mm) to 10 mil (0.25mm) thickness, thermally fused to zinc-coated steel core wire: Per ASTM F668 Class 2b. Minimum Core wire tensile strength of 75,000 psi (517 MPa).

B. Size: Helically wound and woven to heights as indicated on Drawings, diamond mesh of 2.0" size at, 9-gauge wire. (Steel core wire size is 11 gauge and the coated wire size is 9 gauge).

C. Selvage: Top edge knuckled. Bottom edge knuckled.

2.4 POLYOLEFIN COATED ACCESSORIES

A. Chain link fence accessories: [ASTM F 626] Provide items required to complete fence system. Galvanize each ferrous metal item and finish to match framing. Fittings should match Master Halco specifications.

B. Post caps: Formed steel, cast malleable iron, or weather tight closure cap for tubular posts. Provide one cap for each post. Where top rail is used, provide tops to permit passage of top rail.

C. Top rail and rail ends: Pressed steel per ASTM F626, for connection of rail and brace to terminal posts.

D. Top rail sleeves: 7" (178 mm) expansion sleeve with a minimum .137" wire diameter and 1.80" length spring, allowing for expansion and contraction of top rail.

E. Wire ties: 9 gauge [0.148" (3.76 mm)] galvanized steel wire for attachment of fabric to line posts. Double wrap 13 gauge [0.092" (2.324 mm)] for rails and braces. Hog ring ties of 12-1/2 gauge [0.0985" (2.502 mm)] for attachment of fabric to tension wire.

F. Brace and tension (stretcher bar) bands: Pressed steel, minimum 300 degree profile curvature for secure fence post attachment. At square post provide tension bar clips.

G. Tension (stretcher) bars: One piece lengths equal to 2 inches (50 mm) less than full height of

fabric with a minimum cross-section of 3/16” x 3/4” (4.76 mm x 19 mm). Provide tension (stretcher) bars where chain link fabric meets terminal posts.

H. Tension wire: thermally fused polyolefin applied to zinc coated steel wire: Per ASTM F 1664 Class 2 b, 6 gauge, [0.192” (4.88 mm)] diameter core wire with tensile strength of 75,000 psi (517 MPa).

I. Truss rods & tightener: Steel rods with minimum diameter of 5/16” (7.9 mm). Capable of withstanding a tension of minimum 2,000 lbs.

J. Nuts and bolts are galvanized. Use touch up paint to color coat nuts and bolts.

2.5 SETTING MATERIALS

A. Concrete: Minimum 28 day compressive strength of 3,000 psi (20 MPa). Refer to Section 02775.

PART 3 EXECUTION

3.1 PREPARATION

A. All new installation shall be laid out by the contractor in accordance with the Drawings.

3.2 INSTALLATION

A. Install chain link fence in accordance with ASTM F567. Fence posts shall be set at spacings of a maximum of 8’ o.c. Gate posts shall be spaced according to the gate openings specified in the construction plans. The “Site Concrete” section of this specification shall govern post base placement and material requirements. Install fabric on the side towards the court and attach with wire ties or clip to line posts at 14 inches o.c. and to rails, braces and tension wire at 24 inches o.c.

3.3 POST

A. Locate terminal post at each fence termination and change in horizontal or vertical direction of 30° or more.

B. Set posts evenly spaced, plumb and true to lines with top line uniform in concrete to depths herein specified. Brace end, corner, pull and gateposts with same material as top rail and truss to line posts with 3/8" rods and tighteners. Line posts shall be evenly spaced 8' or less apart. Top rail shall pass through line post tops and form a continuous brace within each stretch and be securely fastened to terminal posts. Splices in top rail shall be made with couplings at approximately 20' spacing. Each post to be set in a concrete footing sized in accordance with the drawings. Set top of footing as shown on drawings, hold below concrete mowband and concrete border. Extend post to 6" from bottom of concrete footing. Gate post footings to be per manufacturer's recommendations.

3.4 FABRIC

A. Fabric Attachment: Fabric shall be attached to line posts with fabric bands or clips spaced approximately 14" apart, and to top rails and tension wires with wire ties spaced 24" apart. At all corners and vertical ends of fabric, install stretcher bars banded to posts and gate frames at 24" maximum.

B. Attach all fence fabric to the playing side of the fence.

C. Set booth of fence fabric 1” above finish grade. Fabric to not touch the ground.

3.5 RAILS

A. Splices at top rails shall be made with couplings at approximately every 20'. Coupling shall produce a continuous brace of railing from end to end of each stretch of fence. Every fifth coupling in a stretch shall be fitted with a heavy spring to allow for expansion and contraction of rail. Rails shall be rigidly clamped to end and corner post with appropriate fittings. Bottom rail shall be clamped at each post. Stretch all fabric tight, free from sags and bulges.

3.6 FASTENINGS

A. Provide 1/4” maximum exposure on bolts. Provide smooth bolt ends.

3.7 CLEANUP: Per Division 1, General Requirements

A. At completion, leave project clean and ready for use.

1. Legally dispose of waste materials, debris, and rubbish off the site.

2. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from exposed and semi-exposed surfaces.

3. Repair, patch, and touch up marred surfaces to specified finish, to match adjacent surfaces.

4. Broom clean paved surfaces, rake clean planting areas and other surfaces of grounds.

3.8 CLOSEOUT: Per Division 1, General Requirements

A. Include copies of the material submittals and manufactured material suppliers and installers name and telephone number in the Operations and Maintenance manuals as part of the closeout documents.

END OF SECTION

SECTION 02825

SITE CARPENTRY

PART 1 GENERAL

1.1 DESCRIPTION

A. Provide all labor, equipment and materials for the installation of the site carpentry as shown on the drawings and specified.

B. Related work specified elsewhere includes:

1. Section 02775, Landscape Concrete
2. Section 02870, Site Furnishings

1.2 QUALITY ASSURANCE

A. Lumber: Grade stamp to contain symbol of grading agency, mill number of name, grade of lumber, species of species grouping or combination designation, rules under which grades, where applicable, and condition of seasoning at time of manufacture.

B. Abbreviations: RWD - redwood. DF - Douglas Fir. PT - pressure-treated. All wood surfaced, four sides, unless otherwise designated "rough" or "resawn."

1.3 PROTECTION

A. Lumber shall be stored in neat stacks at the site unless it is to be used immediately. All lumber shall be piled so that it may be readily inspected and shall be handled in a manner that will avoid injury or breakage.

1.4 SUBMITTALS

A. Samples: Submit samples of wood which will be exposed in finished work, to show face texture and color of material.

PART 2 MATERIALS

2.1 LUMBER

A. Except where otherwise noted, all lumber shall conform to the allowable characteristics permitted within the applicable grading rule. No splits, checks, holes, decay or other irregularities will be permitted except those characteristics of that grade.

B. Lumber shall be as follows:

1. As shown on drawings.

2.2 HARDWARE

A. Hardware shall be hot-dipped galvanized unless otherwise noted.

PART 3 EXECUTION

3.1 WORKMANSHIP

A. Workmanship shall be first class throughout. All lumber (and timber) shall be accurately cut and framed to a close fit and shall have even bearing over the entire contact surface. All joints shall be square and tight unless otherwise shown. No shimming will be permitted in making joints. Work shall be free of hammer marks, dents or other disfiguration. Nails and other hardware to be sized per U.C.B. Nailing Schedule and to be seated flush unless otherwise shown. Counter-sink finishing nails 1/16 inch. Holes for bolts shall be bored with a bit 1/16 inch larger than the bolt. Holes for lag screws shall be bored with a bit not larger than the base of the thread.

B. Where bolts project beyond nut, cut off 1/8" from nut and paint within 24 hours with heavy coat of Zinc Chromate primer paint and one coat of Aluminum finish paint (to match the galvanized bolt finish, unless otherwise noted).

C. Exposed fasteners in exterior work shall be hot-dipped galvanized.

D. Sand all exposed surfaces smooth to touch and ease all exposed edges.

3.2 CLEAN UP

A. Contractor shall provide the labor, supplies and equipment as necessary for final cleaning of surfaces and installed items.

B. The Contractor shall keep the area clean throughout the project and clear of debris.

END OF SECTION

SECTION 02832

ORNAMENTAL FENCING AND GATES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Ornamental Fence and accessories.

1.2 RELATED SECTIONS

A. Section 02275, Landscape Concrete

B. Section 02900, Planting

1.3 SUBMITTALS

A. Procedures: In accordance with Section 01330, Submittals.

B. Shop Drawings: Layout of fences and gates with dimensions, details, and finishes of components, accessories, connections and post foundations.

C. Product Data: Manufacturer's catalog cuts indicating material compliance and specified options.

D. Samples: Color selection for polymer finishes and samples of materials (e.g., finals, caps, and accessories).

1.4 ACCESSIBILITY COMPLIANCE

A. Gates: Gates in path of travel must comply with exit door requirements of California Building Code (CBC). (CBC Sections 1005.2, 1008, 1015, & 1020.2). Provide hardware that does not require pinching, grasping, or twisting motion to operate and provide solid kick plates 10 inches high minimum, 3 inches maximum from paving on both sides of gate.

B. Walk-Through Gates: Comply with CBC Section 1008.1.10 (Panic Hardware), or show in compliance with CBC Section 1008.2 (Gates).

1.5 PROJECT CONDITIONS

A. Coordination: Coordinate this work with the work of other Sections to avoid delay and interference with other work.

B. Protect excavations by shoring, bracing, sheeting, underpinning, or other methods as required to prevent cave-ins or loose dirt from entering excavations. Barricade open excavations and post warning lights at work adjacent to public streets and walks.

C. Promptly repair damage to adjacent facilities caused by operations. Cost of repair at Contractor's expense.

D. Promptly notify the Inspector of unexpected subsurface conditions.

E. Excavations and Sidewall Support: Excavations to depths greater than 4.5 feet will require shields or shoring per OSHA regulations and OSHA recommendations and procedures.

F. Excavations Stabilization and Dewatering Considerations: In instances where excessive caving or unstable wall conditions are encountered, the Geotechnical Engineer may recommend that trench shields be used both for worker safety and to maintain integrity of the trench. Minimizing the length of excavation open at one time will also minimize excavation instability. Also, for this condition, the Geotechnical Engineer recommends the need to keep excavations open as short a time as possible before backfilling. The risk of excavation wall squeezing and bottom heave increases with time.

1.6 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.

1.7 REFERENCES

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.

B. ASTM B117 - Practice for Operating Salt-Spray (Fog) Apparatus.

C. ASTM B221 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.

D. ASTM D1654 - Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.

E. ASTM D2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.

F. ASTM D2794 - Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).

G. ASTM D3359 - Test Method for Measuring Adhesion by Tape Test.

H. ASTM D523 - Test Method for Specular Gloss.

I. ASTM D714 - Test Method for Evaluating Degree of Blistering in Paint.

J. ASTM D822 - Practice for Conducting Tests on Paint and Related Coatings and Materials using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus.

K. ASTM F1184 – Industrial & Commercial Horizontal Slide Gates

L. ASTM F2408 – Ornamental Fences Employing Galvanized Steel Tubular Pickets.

1.8 PRODUCT HANDLING AND STORAGE

A. Upon receipt at the job site, all materials shall be checked to ensure that no damages 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.

1.11 PRE-INSTALLATION MEETINGS

A. Section 01310 – Administrative Requirements: Pre-installation meeting.

B. Convene minimum one week prior to commencing work of this section.

1.12 WARRANTY

A. The powder-coated surface on all framework (i.e., pickets, rails and posts) by AMERISTAR® is warranted under normal and proper usage, against cracking, peeling, chipping, blistering or corroding for a period of ten (10) years from the original purchase date. Normal and proper usage does not include physical damage, abrasion or exposure to salty environments to the protective coating.

B. Aegis II™ Industrial Ornamental Metal Fencing System framework is also warranted for the same period of time against defects in workmanship or materials.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Products from qualified manufacturers having a minimum of 5 years experience manufacturing ornamental picket fencing will be acceptable by the Architect as equal if they meet the following specifications for design, size, gauge of metal parts and fabrication.

B. Ornamental Picket Fence: As shown on Drawings.

C. Approved Manufacturer: Ameristar Fencing, Tulsa, OK, Phone 888-333-3422, (918) 835-0898 or accepted equal.

D. Local Ameristar regional distribution centers, Stockton, CA 95210.

2.2 MATERIALS

A. The fence system shall conform to Ameristar Aegis II, Majestic, design, 3-Rail style manufactured by Ameristar Fence Products, Inc. in Tulsa, Oklahoma.

B. Steel material for fence framework (i.e. tubular pickets, rails and posts), shall be galvanized prior to forming in accordance with the requirements of ASTM A653/A653M, with minimum yield strength of 45,000 psi (310 MPa). The steel shall be hot-dip galvanized to meet the requirements of ASTM A653/A653M with a minimum zinc coating weight of 0.90 oz/ft2 (276 g/m2), Coating Designation G-90.

C. Material for pickets shall be 1” square x 14 Ga. tubing. The cross-sectional shape of the rails shall conform to the manufacturer’s ForeRunner double wall design with outside cross-section dimensions of 1.75” square and a minimum thickness of 14 Ga. Picket holes in the ForeRunner rail shall be spaced 4.715” o.c., except for Invincible style 6’ long, which shall be, spaced 4.98” o.c. Picket retaining rods shall be 0.125” diameter galvanized steel. High quality PVC grommets shall be supplied to seal all picket-to-rail intersections. Fence posts and gate posts shall meet the minimum size requirements of Table 1.

2.3 FABRICATION

A. Pickets, rails and posts shall be precut to specified lengths. ForeRunner rails shall be prepunched to accept pickets. Pickets shall be predrilled to accept retaining rods.

B. Grommets shall be inserted into the prepunched holes in the rails and pickets shall be inserted through the grommets so that predrilled picket holes align with the internal upper raceway of the ForeRunner rails (Note: This can best be accomplished by making an

alignment jig). Retaining rods shall be inserted into each ForeRunner rail so that they pass through the predrilled holes in each picket.

C. The manufactured galvanized framework shall be subjected to the PermaCoat® thermal stratification coating process (high-temperature, in-line, multi-stage, multi-layer) including, as a minimum, a six-stage pretreatment/wash (with zinc phosphate), an electrostatic spray application of an epoxy base, and a separate electrostatic spray application of a polyester finish. The base coat shall be a thermosetting epoxy powder coating (gray in color) with a minimum thickness of 2 mils (0.0508mm). The topcoat shall be a "no-mar" TGIC polyester powder coat finish with a minimum thickness of 2 mils (0.0508mm). The color shall be Black. The stratification-coated framework shall be capable of meeting the performance requirements for each quality characteristic shown in Table 2.

D. Completed sections (i.e., panels) shall be capable of supporting a 600 lb. load applied at midspan without permanent deformation. Panels shall be biasable to a 25% change in grade.

E. Swing gates shall be fabricated using 1.75" x 14ga Forerunner double channel rail, 1.75" sq. x 14ga. gate ends, and 1" sq. x 14ga. pickets. Gates that exceed 6' in width will have a 1.75" sq. x 14ga. intermediate upright. All rail and upright intersections shall be joined by welding. All picket and rail intersections shall also be joined by welding.

2.4 GATES

A. Ornamental picket swing gates as shown on Drawings. Comply with requirements for accessibility and fire existing.

B. Coordinate requirements for illuminated exit signs.

C. Accessible Gate Latch: As required to meet California Building Code requirements for accessible access. Submit manufacturers cut sheet and sample.

D. All lock keys shall be keyed alike with Schlage locks. Provide locks keyed alike to what the owner uses.

2.5 SETTING MATERIAL

A. Concrete: Minimum 28-day compressive strength of 3,000 psi (20 MPa).

2.6 TABLES

Table 1 – Minimum Sizes for Aegis II Posts

Fence Posts	Panel Height
2-1/2" x 12 Ga.	Up to & Including 6' Height
3" x 12 Ga.	Over 6' Up to & Including 10' Height
4" x 11 Ga.	Over 10' Height

Gate Leaf	Gate Height			
	Up to & Including 6'	Over 6' Up to & Including 8'	Over 8' Up to & Including 10'	Over 12'
Up to 4'	3" x 12Ga.	3" x 12 Ga.	4" x 11 Ga.	4" x 11 Ga.
4'1" to 6'	3" x 12Ga.	3" x 12 Ga.	4" x 11 Ga.	4" x 11 Ga.
6'1" to 8'	4" x 11 Ga.	6" x 3/16"	6" x 3/16"	6" x 3/16"

8’1” to 10’	4” x 11 Ga.	6” x 3/16”	6” x 3/16”	6” x 3/16”
10’1” to 12’	6” x 3/16”	6” x 3/16”	6” x 3/16”	8” x 1/4"
12’1” to 16’	6” x 3/16”	6” x 3/16”	8” x 1/4”	8” x 1/4"

Table 2 – Coating Performance Requirements		
Quality Characteristics	ASTM Test Method	Performance Requirements
Adhesion	D3359 – Method B	Adhesion (Retention of Coating) over 90% of test area (Tape and knife test).
Corrosion Resistance	B117, D714 & D1654	Corrosion Resistance over 3,500 hours (Scribed per D1654; failure mode is accumulation of 1/8” coating loss from scribe or medium #8 blisters).
Impact Resistance	D2794	Impact Resistance over 60 inch lb. (Forward impact using 0.625” ball).
Weathering Resistance	D822 D2244, D523 (60˚ Method)	Weathering Resistance over 1,000 hours (Failure mode is 60% loss of gloss or color variance of more than 3 delta-E color units).

Table 3 – Aegis II – Post Spacing By Bracket Type						
Span	For CLASSIC, GENESIS, & MAJESTIC 8’ Nominal (92.625” Rail)					
Post Size	2-1/2”	3”	2-1/2”	3”	2-1/2”	3”
Bracket Type	Industrial Universal (BB302)	Industrial Universal (BB303)	Industrial Flat Mount (BB301)		Industrial Swivel (BB304)*	
Post Settings ± ½” O.C.	96”	96.5”	96”	96-1/2”	*96”	*96-1/2”
Span	For CLASSIC, GENESIS, & MAJESTIC 6’ Nominal (71.375” Rail)					
Post Size	2-1/2”	3”	2-1/2”	3”	2-1/2”	3”
Bracket Type	Industrial Universal (BB302)	Industrial Universal (BB303)	Industrial Flat Mount (BB301)		Industrial Swivel (BB304)*	
Post Settings ± ½” O.C.	71.5”	72”	71.5””	72”	*73”	*73.5”
*Note: When using BB304 swivel brackets on either or both ends of a panel installation, care must be taken to ensure the spacing between post and adjoining pickets meets applicable codes. This will require trimming one or both ends of the panel.						

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify areas to receive fencing are completed to final grades and elevations.

B. Ensure property lines and legal boundaries of work are clearly established.

3.2 PREPARATION

All new installation shall be laid out by the contractor in accordance with the construction plans.

3.3 FENCE INSTALLATION

A. Fence post shall be spaced according to Table 3, plus or minus ½". For installations that must be raked to follow sloping grades, the post spacing dimension must be measured along the grade. Fence panels shall be attached to posts with brackets supplied by the manufacturer. Posts shall be set in concrete footers having a minimum depth of as shown on drawings. The "Earthwork" and "Concrete" sections of this specification shall govern material requirements for the concrete footer. Posts setting by other methods such as plated posts or grouted core-drilled footers are permissible only if shown by engineering analysis to be sufficient in strength for the intended application.

3.4 FENCE INSTALLATION MAINTENANCE

A. When cutting/drilling rails or posts adhere to the following steps to seal the exposed steel surfaces; 1) Remove all metal shavings from cut area. 2) Apply zinc-rich primer to thoroughly cover cut edge and/or drilled hole; let dry. 3) Apply 2 coats of custom finish paint matching fence color. Failure to seal exposed surfaces per steps 1-3 above will negate warranty. Ameristar spray cans or paint pens shall be used to prime and finish exposed surfaces; it is recommended that paint pens be used to prevent overspray. Use of non-Ameristar parts or components will negate the manufactures' warranty.

3.5 GATE INSTALLATION

A. Gate posts shall be spaced according to the manufacturers' gate drawings, dependent on standard out-to-out gate leaf dimensions and gate hardware selected. Type and quantity of gate hinges shall be based on the application; weight, height, and number of gate cycles. The manufacturers' gate drawings shall identify the necessary gate hardware required for the application. Gate hardware shall be provided by the manufacture of the gate and shall be installed per manufacturer's recommendations.

B. Install gates plumb, level and secure for full opening without interference.

C. Attach hardware by means, which will prevent unauthorized removal.

D. Adjust hardware for smooth operation.

E. Accessible Gate Hardware: Install as required to meet California Building Code requirements for accessible access and as shown on drawings.

3.6 FINAL REVIEW AND CLEANUP:

A. Clean up debris and unused material, and remove from site.

B. Include copies of the material submittals and manufactured material suppliers and installers name and telephone number in the Operations and Maintenance manuals as part of the closeout documents.

C. Include manufacturer's warranty information of specified items with warranties.

D. In accordance with Section 01770, Closeout.

END OF SECTION

SECTION 02850

LANDSCAPE DRAINAGE

PART 1 GENERAL

1.1 DESCRIPTION

A. Provide all labor, materials and equipment for installation of all storm drainage systems as indicated on the drawings.

B. Related work specified elsewhere includes:

1. Section 02300, Earthwork

2. Section 02335, Subgrade Preparation and Base Material

3. Section 02810, Irrigation

4. Section 02900, Planting

5. Section 16010, General Electrical Requirements

1.2 REFERENCE AND STANDARDS

A. Perform work in accordance with all applicable laws, codes and regulations required by the State Water Resources Control Board, and the local City government.

B. Reference to "Standard Specifications" shall mean the Standard Specifications of the State of California, Business and Transportation Agency, Department of Transportation, CALTRANS.

C. When the Specifications call for materials and construction of a better quality or larger sizes than required by the ordinances, the provisions of the Specifications shall take precedence over the requirements of said ordinances.

D. Relative compaction refers to the in-place dry density of soil expressed as a percentage of the maximum dry density of the same material, as determined by the ASTM D1557 laboratory compaction procedure.

1.3 PROJECT CONDITIONS

A. Protect excavations by shoring, bracing, sheeting, underpinning, or other methods as required to prevent cave-ins or loose dirt from entering excavations. Barricade open excavations and post warning lights at work adjacent to public streets and walks.

B. Underpin adjacent structure(s), including utility service lines, which may be damaged by excavation operations.

C. Promptly repair damage to adjacent facilities caused by earthwork operations. Cost of repair at Contractor's expense.

D. Groundwater in trenches may be strongly influenced by the tides and should be kept open as little as possible.

E. Promptly notify the Inspector of unexpected subsurface conditions.

F. Trench Excavations and Sidewall Support: Trenching, both in fill soils and residual soil and weathered rock, can be performed using standard rubber-tire or track-mounted backhoes or excavators. Trenching to depths greater than 4.5 feet will require trench shields or shoring per OSHA regulations. Trenches or excavations around manholes or in areas that cannot be easily shored may require laying slopes back per OSHA recommendations and procedures. In areas beneath paved parking lots, trenches with saw-cut pavement on flat ground would provide the most stable conditions with respect to possible trench wall caving or sloughing. Trenches dug parallel to slopes will be the least stable.

G. Trench Stabilization and Dewatering Considerations: In instances where excessive caving or unstable wall conditions are encountered, the Geotechnical Engineer may recommend that trench shields be used both for worker safety and to maintain integrity of the trench. Minimizing the length of trench open at one time will also minimize trench instability. If unsuitable soil is exposed at the bottom of the trench excavation (or is close to the bottom of trench excavation), there is a significant risk of side wall sloughing and bottom heaving. For this condition, the Geotechnical Engineer may recommend that a crushed rock-working surface be placed. This working surface should be built by overexcavating the unsuitable at least 12-inches, shoring established, then replacing with at least 12-inches of 1-1/2-inch maximum, crush rock (3/4-inch by ¼-inch would be ideal). The crushed rock should be underlain with filter fabric (MIRAFI 140N or equal). Also, for this condition, the Geotechnical Engineer recommends the need to keep trenches open as short a time as if possible before backfilling. The risk of trench wall squeezing and bottom heave increases with time.

H. Locally perched water may be encountered where granular, porous fill overlies less permeable clay fill or unsuitable soil. Standard sump pumps placed at strategic locations should be feasible to dewater trenches.

1.4 GENERAL REQUIREMENTS

A. Sheeting and Shoring: Furnish, place and maintain such sheeting, bracing and shoring as may be required to support the sides of the excavations for the proper protection of workmen, to facilitate the work, and to prevent damage to the pipes and structures or facilities. Upon completion of the work, all bracing and shoring shall be removed, unless otherwise directed by the Inspector.

B. Protection of Other Property: Excavation and other work over, under and adjacent to existing pipelines, cables, conduit runs or structures of any kind shall be procured in such a manner as not to interfere with the safe operation and use of such installations. Should any damage be incurred to existing facilities during the Contractor's operations, the Contractor shall immediately notify the Owner's Representative and authorities, and shall arrange for the immediate repair of same at his own expense.

C. Underground Obstruction: The locations of existing underground utilities and structures, insofar as they are known from information furnished by the respective utility companies and agencies, have been shown on the drawings. The Owner assumes no responsibility for the accuracy or completeness of said data, which is offered solely for the convenience of the Contractor.

D. Control of Water: Take measures as may be required and furnish, install and operate such pumps or other devices as may be necessary to remove any seepage, storm water or sewage that may be found or may accumulate in the excavations during the progress of the work. Keep excavations entirely free from water at all times during the construction of the work, and until the Geotechnical Engineer gives permission to cease pumping.

E. Pavement Restoration: Pavement, bases and compacted subgrade disturbed by trenching operations shall be replaced in an acceptable manner with materials equal to the adjacent compacted subgrade, bases and pavement for a minimum distance of 12" on each side of the trench, and shall conform to the requirements of these Specifications or to local ordinances governing such replacement.

1.5 COORDINATION

A. Examine the site and familiarize all conditions.

B. Coordinate this work with the work of other Sections to avoid delay and interference with other work.

C. Layout of equipment, accessories and piping system is generally diagrammatic, unless specifically dimensioned. Drawings and details shall be checked for interferences before installing the work. The right is reserved to make any reasonable change in location of piping shown on the drawings without increase in Contract price.

D. Keep an accurate dimensioned record of as-built location and depth, as referred to accepted based datum, on all lines, drop inlets, etc. Keep record drawings up-to-date as the job progresses and available for inspection. Prior to final acceptance and approval of the work, deliver a copy of this record to the Inspector in neat and legible form.

1.6 SUBMITTALS

A. Per Division 1 requirements.

B. Product Literature:

1. Pipe & fittings.

2. Cleanouts.

3. Filter fabric.

4. Drain inlets.

5. Manhole.

C. Certificate of Letter of Compliance:

1. Sand backfill with sieve analysis.

2. Permeable backfill.

3. Angular washed sand: Submit, ASTM F1632 soils analysis and analytical packages A06-2, A06-3, A05-1 from Soil & Plant Laboratory.

D. Samples:

1. Filter fabric.

2. Sand backfill.

3. Permeable backfill.

4. Angular washed sand.

1.7 FIELD QUALITY CONTROL

A. Contractor shall provide adequate notice, cooperate with, provide access to the work, and assist testing agency and their representatives in execution of their function.

B. When, during the progress of work, field tests indicate that installed compacted materials do not meet specified requirements, provide additional compaction until specified density is achieved, or remove and replace defective materials with new materials as directed by the Inspector. Cost of additional labor, materials, and testing to attain specified density at Contractor's expense.

C. The Contractor shall engage a California Registered Civil Engineer or licensed Land Surveyor to perform field engineering.

PART 2 MATERIALS

2.1 STORM DRAINAGE PIPE

A. Corrugated High Density Polyethylene (CHDPE) may be substituted for Polyvinyl Chloride (PVC) Pipe where PVC pipe is noted on the drawings.

B. Polyvinyl Chloride (PVC) Pipe: PVC pipe and fittings shall meet the extra strength minimum of SDR-35 of the requirements of ASTM Specification D3034. Joints shall be rubber ring for Storm Drainage Pipe. Manufactured by J-M Manufacturing, Stockton, CA, (1-800-621-4404), or equal.

1. PVC Smooth Wall Perforated Drain Pipe: Size as noted on the drawings, and manufactured to meet CALTRANS Standard Specification Section 68 and AASHTO M278, or accepted equal. Color, White.

2. Storm Drain Pipe: SDR-35. Size as noted on the drawings and manufactured to meet Caltrans standard specifications. Color, White.

C. Corrugated High Density Polyethylene (CHDPE) Storm Drain Pipe: CHDPE solid wall pipe and fittings shall be N-12 drainage pipe with N-12 IB WT pipe joint assembly as manufactured by Advanced Drainage Systems, 800-821-6710. Inc., or equal. Local sales representative: Jim Winslow, 510-913-2211.

D. Corrugated High Density Polyethylene (CHDPE) Perforated Drain Pipe: Perforated CHDPE pipe and fittings shall be N-12 Series 65 WT Corrugated HDPE Pipe and fittings as manufactured by Advanced Drainage Systems, 800-821-6710. Inc., or equal. Local sales representative: Jim Winslow, 510-913-2211.

2.2 DRAIN INLETS, CLEAN OUTS, STRUCTURES & EQUIPMENT

A. By Christy, Model No. as noted. Christy, 800-486-7070; Central Precast, 707-546-5016; Hanson Concrete Products, Pleasanton, CA, 925-426-4933 or equal.

B. Clean Outs: As shown on drawings.

C. Planting Area Drain Inlet: As shown on drawings.

D. Rubber Drain: As shown on drawings.

E. Sump Pump Manhole: Central Precast, or equal, 48" diameter eccentric manhole with removable 24" diameter concrete lid to receive pored in place rubber surfacing.

F. 24" Diameter Drain Inlet: Central Precast RGR 24, or equal.

G. Buried Clean Outs: As shown on drawings, or equal.

2.3 PERMEABLE BACKFILL

A. Permeable backfill used in subsurface drain installations to be Class II permeable material in conformance to Section 68 "Subsurface Drains" of the CalTrans Standard Specifications.

2.4 IMPORTED BACKFILL

A. Import backfill, where required, shall meet the requirements of the CalTrans Standard Specifications as approved by Architect.

2.5 FILTER FABRIC (GEOTEXTILE FABRIC)

A. Polypropylene non-woven filter fabric with uniform fiber distribution by "Mirafi, Inc." #140N, or equal.

2.6 PIPE BEDDING (SAND BEDDING)

A. Pipe bedding material shall consist of sand or granular materials naturally produced by the disintegration of rock and shall be sufficiently free of organic material, mica, loam, clay and other deleterious substances (95% passing ¾-inch sieve and a maximum of 15% passing the No. 200 sieve). The bedding shall be at least 4 inches below the pipe and 12 inches above the pipe. The pipe bedding shall meet or exceed the following values for particle distribution:

Sieve Size	Standard Specification % Passing
#4	75-100
#8	70-100
#16	65-100
#30	60-100
#50	40-70
#100	0-30
#200	0-15

B. In most cases the excavated spoil from the trenches up to about 5 feet in depth may be suitable for intermediate backfill (above the bedding material and below any pavement section), provided the material has no organic material, no rocks larger than 3 inches, have a liquid limit equal to or less than 40, and a plasticity index equal to or less than 15.

2.7 ANGULAR WASHED SAND (TOPDRESSING SAND)

A. For use above perforated drains, for infiltration topsoil, for import topsoil and sand growing medium for athletic field and as topdressing sand.

B. A total silt and clay of no more than 4%.

C. Shall be naturally angled sand, free of mica. No rounded silica sand.

D. Chemistry Suitability Considerations:

1. Salinity: Saturation Extract Conductivity (Ece) Less than 3.0 dS/m @ 25 degrees C.

2. Sodium: Sodium Adsorption Ration (SAR) Less than 6.0

3. Boron: Saturation Extract Concentration Less than 1.0 ppm

4. Reaction: pH of Saturated Paste: 5.5 – 7.8 without high lime content.

E. To ensure conformance, submit ½ gallon sample to Soil & Plant Laboratory for analytical packages: A06-2, A06-3, A05-1.

F. Angular washed sand shall meet or exceed the following values of USGA sand particle distribution:

Sieve Size	USGA Spec Individual Percent Retained
#4	0
#10	0-3%
#18	0-7%
#35	Minimum 60% Combined
#60	
#100	20% Maximum
#270	5% Maximum

G. Angular washed sand shall be from one source and one of the following sources or accepted equal:

1. Top Dressing Sand available from Brown Sand Inc. 209-234-1200.

2. G8 Sand available from TMT Enterprises 408-432-9040-Matt.

3. or equal.

2.8 GEOCOMPOSITE MATERIAL

A. Enkadrain 3811R geocomposite drainage mat available from Colbond Inc., Enka, NC, www.colbond-usa.com, 800-365-7391, or equal.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

A. Lay storm drains true to line and grade by accurate and accepted methods, beginning at the outlet and proceeding upgrade. Storm lines shall slope uniformly between elevations given.

B. Pipe, fittings, precast sections, drain inlets, equipment, structures, clean outs, frames and covers shall be carefully handled at all times.

C. No pipe shall be laid which is cracked, checked, spalled or damaged. All damaged, cracked, checked or spalled sections shall be removed from the site.

D. Chain slings are not permitted. Support pipe loaded on trucks or stacked one upon another with wooden blocking. Pipe handled or skidways shall not be skidded or rolled against pipe already on the ground.

E. Install all pipes in the approximate locations shown and of size indicated on the drawings.

F. All pipeline and fittings shall be kept clean and closed during construction.

3.2 TRENCH EXCAVATION

A. All utility trench shall be excavated in accordance with current OSHA excavation and trench safety trench safety standards. The contractor shall be solely responsible for the design and construction of all excavation and trench safety.

B. Storm drain line bedding material shall consist of sand with less than 15 percent fines. The bedding shall extend from the bottom of the trench to 1-foot above the top of the pipe. Sand bedding shall be placed in a trench free of standing water, and mechanically compacted to a dense condition (as verified by the Geotechnical Engineer).

C. Trench backfill above the pipe bedding shall meet the criteria for fill in Section 02300, Earthwork. The Engineer shall evaluate any proposed imported soil sample prior to it use as trench backfill. Trench backfill shall be placed in uniform layers not exceeding 8-inches in loose thickness, moisture-conditioned to near-optimum moisture content, and compacted. Backfill shall be compacted to at least 90 percent relative compaction and the upper 8” of subgrade compacted to 95 percent relative compaction. Jetting shall not be permitted for any backfill compaction.

D. Any groundwater infiltrating into utility trenches shall be pumped out prior to backfilling.

E. Unless otherwise shown on the drawings, the width of trenches at any point below the top of the pipe shall not be greater than the outside diameter of the pipe plus 16" for pipe diameters 33" or less. Sheeting and bracing, where required, shall be placed within the trench width.

F. Do not over-excavate. Remove stones necessary to avoid point bearing. Pipes shall be bedded in accordance with backfill herein, and additionally where rock, hardpan or other unyielding foundation material is encountered in trenches at the grade or the bottom of the pipe. The hard unyielding material shall be excavated to a minimum depth of 6" below the

bottom of the pipe bell or coupling, and such overdepths shall be backfilled with materials specified, for backfill and for backfilling the lower portion of trenches, compacted to a relative compaction of not less than 90%.

G. Unsatisfactory material such as mud, quicksand or other unsuitable materials encountered below the grades shown or specified which are directed or specified to be removed shall be replaced with selected materials, compacted to a relative compaction of not less than 90%.

H. In the event of excavation exceeding the trench width specified, furnish higher strength pipe or other construction methods (i.e., improved bedding), as accepted by the Inspector, to provide for the resultant increased loading. The Geotechnical Engineer shall have the right to limit the amount of trench that is opened or partially opened at any one time, and to limit the amount of trench left without backfill at any one time.

I. All materials, regardless of character and subsurface condition, shall be excavated to the depths indicated or specified. During excavation, material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins, or shall be separately stockpiled as required. Dispose of excess excavated material or unsalvageable material off of the property.

3.3 EXCAVATION FOR STRUCTURES AND APPURTENANCES

A. Excavation for inlets and similar structures shall be sufficient to provide at least 12" in the clear between the outer surfaces and the adjacent earth or timber that may be used to hold and protect the banks. Any overdepth excavation below such appurtenances that has not been directed will be considered unauthorized and shall be refilled with sand, selected materials, gravel or concrete, as directed and at the expense of the Contractor. Unsatisfactory material such as mud, quicksand or other unsuitable materials encountered below the grades shown or specified for structure foundations, when directed shall be removed and replaced as specified in Trench Excavation above.

3.4 DRAIN INLETS

A. Install plumb, level and square to adjacent structure or paving or as otherwise directed by Inspector.

B. Connect Drain Inlet directly to PVC pipe and make a complete watertight connection.

3.5 SAND BACKFILL (PIPE BEDDING)

A. All pipe shall have sand bedding in accordance with the requirements specified herein.

B. Compacted Granular Bedding with Tamped Backfill: The pipe shall be bedded in compacted granular material placed on a flat trench bottom. The granular bedding shall have a minimum thickness of 1/4 the outside pipe diameter and shall extend to the springline of the pipe. The bedding shall be at least 4 inches below the pipe and 12 inches above the pipe. Selected material backfill shall be placed at the remainder of the sides of the pipe and to a minimum depth of 12" over the top of the pipe.

C. In most cases the excavated spoil from the trenches up to about 5 feet in depth may be suitable for intermediate backfill (above the bedding material and below any pavement section), provided the material has no organic material, no rocks larger than 3 inches, have a liquid limit equal to or less than 40, and a plasticity index equal to or less than 15.

D. Both bedding and intermediate backfill shall be placed and compacted in thin lifts (8-inch maximum loose thickness) and compacted in-place. Backfill shall achieve an in-place density of 95% relative compaction and be within 2% of wet or dry of optimum moisture content.

3.6 SUBSURFACE DRAINS

A. Install subsurface drains where indicated on the drawings and backfill with permeable material as specified. Provide not less than 3" of permeable material under pipe. Bell and spigot, and tongue and groove concrete pipe shall be laid without mortar in the joints, and lengths shall be pressed firmly together to prevent infiltration of fine material. Lay all pipe perforations down. Where subsurface drains connect to site drainage or plumbing systems, verify inverts of connections and lay pipe accordingly to drain.

3.7 DITCHES AND SWALES

A. Construct ditches and swales in the areas designated to convey storm water to the storm drainage facilities.

3.8 ANGULAR WASHED SAND

A. Install angular washed sand to dept shown on drawings, fine grade and compact to maximum of 85 relative compaction.

3.9 BACKFILLING

A. Do not backfill trenches until all required tests are performed and inspections made. Remove sheeting, bracing and shoring. Backfill trench with selected material suitable for the specified compaction. Trenches improperly backfilled shall be reopened to the depth required for proper compaction, then refilled and compacted as specified.

B. Compact granular material bedding by mechanical tampers to the specified relative compaction. Bedding and backfill materials as applicable shall be carefully compacted below the springline of the pipe, and shall be brought up simultaneously on both sides to the full-specified depth so as to obviate any displacement of the pipe from its true alignment. Sand bedding and backfill shall be compacted by careful jetting to saturation only. No ponding of water above the surface of the sand will be permitted. Special care shall be taken not to damage the coating or wrapping of pipes.

C. Backfilling for Structures: Backfill material, placement and compaction for manholes and similar structures shall conform to the requirements stipulated above for the trench using 6” - 8" uniform layers.

3.10 RELATIVE COMPACTION

A. Each layer of bedding material and backfill over and around pipes, and each layer of backfill around and adjacent to structures, shall be compacted at the proper moisture content to 90% relative compaction and the upper 8” of subgrade compacted to 95 percent relative compaction.

B. Allow sufficient time to perform the necessary testing to assure that the backfill is being properly compacted. Backfill operations shall be scheduled in such manner as to permit making necessary control tests for each backfill lift prior to the placing of subsequent lifts.

Field density tests will be performed in sufficient number to ensure that the specified density is being obtained.

3.11 DAMAGE BY LEAKS

A. The Contractor shall be responsible for all damage to any part of the premises caused by leaks or breaks in pipes, connections or appurtenances furnished and installed under this Specification for a period of one (1) year after date of acceptance of the project by the Owner.

3.12 CLOSING OF UNINSPECTED WORK

A. Do not allow any of the work installed to be covered up or enclosed before it has been inspected and accepted by the Inspector. Any work enclosed or covered before it has been accepted or directed to be covered shall be uncovered by the Contractor, at his expense, and replaced as directed.

3.13 FIELD QUALITY CONTROL

A. Division 1 requirements - Quality Control: Field inspection and testing.

B. Request inspection prior to and immediately after placing cover over pipe.

C. Compaction testing will be performed in accordance with the Standard Specifications.

D. Exfiltration Test, Deflection Test, and Pressure Test: Test in accordance with Standard Specifications.

E. If tests indicate Work does not meet specified requirements, remove Work, replace and retest.

3.14 CARE AND CLEANING: Per Division 1 requirements.

A. During construction, protect work from damage by accident, staining or otherwise. Upon completion, repair or replace broken, damaged or defective parts. All work shall be left in a condition satisfactory to the Owner. Remove all surplus materials and debris from the premises.

B. At completion, flush and clean out installed piping systems.

3.15 CLOSEOUT

A. Include copies of the storm drain material submittals in the Operations and Maintenance manuals as part of the closeout documents.

B. Include manufacturer’s warranty information of specified items with warranties

END OF SECTION

SECTION 02870

SITE FURNISHINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Furnish and install all manufactured items shown on drawings and specified.

B. Scope of work: The general extent of work contained in this section is shown on the Drawings

C. Related sections can include, but may not be limited to the following:

1. Section 02300, Earthwork
2. Section 02335, Subgrade Preparation and Base Material
3. Section 02775, Landscape Concrete
4. Section 02850, Landscape Drainage

1.2 REFERENCES AND REGULATORY REQUIREMENTS

A. State of California Department of Transportation Standard Specifications, current edition.

B. Perform all work in accordance with all applicable laws, codes, and regulations required by State of California and the local City government.

1.3 SUBMITTALS

A. Conform to Division One requirements.

B. Product Data: Submit catalog “cut sheets” and installation instructions of all materials and equipment proposed to be furnished and/or installed under this portion of the work. Include the manufacturers and distributors name, sub-contractor as applicable. Insure that the “cut sheets” clearly describe the specific product by catalog number and that additional non-specified products that may appear on the same “cut sheet” are cross out where applicable.

C. Samples: Submit samples of colors and finishes for all applicable products and furnishings for selection by City.

D. Shop Drawings: Submit complete shop drawings for all materials or furnishings requiring field or shop fabrication.

1.4 QUALITY ASSURANCE

A. Review: All equipment shall be reviewed for conformance with the intent of the Contract Documents and accepted by the contractor prior to installation. All site furnishings shall be in a new, “first-class” condition, per the discretion of the City Representative, prior to Final Acceptance.

1.5 DELIVERY, STORAGE AND HANDLING

A. The contractor is responsible for coordination of the delivery, acceptance, handling and storage of all site furnishings.

B. Store and handle site furnishings as acceptable to the Construction Manager and so that work or access of others is not impeded.

C. The contractor shall protect all site furnishings from theft or damage at all times until the City's Representative has accepted such items.

PART 2 MATERIALS

2.1 MATERIALS

A. As shown on the drawings.

2.2 CONCRETE FOR FOOTINGS

A. Concrete for footings, per Section 02775, Landscape Concrete.

2.3 PLAY AREA SAND

A. The attractive white color of this sand is accented with reflective particles throughout. This material exhibits very good drainage, slight crusting and a moderate set-up. TMT Enterprises, Inc., 1996 Oakland Road, San Jose, CA 95131, (408) 432-9040, or accepted equal and yielding the following results:

Sieve Size	**TMT White Bunker Sand**
#4	0
#10	0.1
#18	7.5
#35	26.4
#60	39.7
#100	17.1
#140	3.2
#270	2.4
Silt & Clay	3.6

All gradations given are examples of a typical sample and will not always be exactly the same.

B. Submit 1-gallon sample and certificate of compliance from sand supplier for review and acceptance.

C. Salvage existing sand and sieve clean of debris a and reuse for the sand paly area. Submit sample for review and acceptance.

D. Refer to Section 02850, Landscape Drainage for geocomposite (drainage composite) material.

PART 3 EXECUTION

3.1 SEQUENCING AND SCHEDULING

A. Coordinate construction timing of installation of site furnishings in conformance with all other work.

3.2 INSTALLATION

A. Concrete footings: Install as shown in Drawings unless noted otherwise. Slope top of footings to drain.

B. Equipment:

1. Conform to layout shown on Drawings.

2. Install site furnishings in strict conformance with details, accepted Shop Drawings, and manufacturer's instructions.

3. If specified equipment and/or materials are revised, plan and Drawings are subject to revisions based on manufacturers' recommendations.

C. Set all work true and square, plumb and level.

D. Size bolts to fit flush with nuts. Countersink nuts and bolts as detailed. Vandal proof bolts as directed by Project Inspector.

E. Securely fasten and/or anchor all equipment with bolts, angles, plates, flanges, concrete footings and/or other items required for proper and complete installation and/or erection of the units.

F. Supply all miscellaneous metal units and install as specified herein.

G. Set all equipment, etc., level as recommended by manufacturer.

H. Transport, store and handle precast units and manufactured items in a manner to avoid hairline cracks, staining or other damage. Store units free of the ground and protected from mud or rain splashes. Cover units, secure covers firmly, and protect the units from dust, dirt or other staining material.

I. Heights of tables and benches shall be as follows, unless otherwise required by ADA; California Title 24 or other code requirements.

Description	**Height Above Finish Grade**
Table Surface Height	34" Maximum
Knee Space Height	27" Minimum Clear Space
Knee Space Depth	19" Minimum from edge of table to nearest obstruction under table top
Width of Knee Space	30" Minimum clear width beneath table

Bench Surface Height	16” Minimum, 18” Maximum

3.3 FIELD QUALITY CONTROL

A. All site furnishings shall be inspected and accepted upon delivery by the Contractor. Final acceptance of site furnishings and locations of site furnishings shall be per the discretion of the City.

3.4 CLEANUP: Per Division One requirements.

A. During construction, protect work from damage by accident, staining or otherwise.

B. Upon completion, repair or replace broken, damaged or defective parts.

C. Remove all surplus materials and debris from the premises.

D. All work shall be left in a condition satisfactory to the Project Inspector.

3.5 CLOSEOUT

A. Include manufacturer’s cut sheets and maintenance instructions of specified items in Operations and Maintenance Manual.

B. Include manufacturer’s warranty information of specified items with warranties.

END OF SECTION

SECTION 02875

PLAY EQUIPMENT

PART 1 GENERAL

1.1 SCOPE

A. Furnish labor, material and equipment necessary for the installation of the playground equipment, structure or modular unit as shown on the drawings and specified herein.

B. Provide the play equipment as shown on the drawings:

C. Work shall include but not limited to the following: excavation, layout, and installation of playground equipment, structure or modular unit in accordance with the installation instructions, including all appurtenances and accessories as required for a full and complete installation.

D. Coordinate with work shown in other sections so the work is installed in a timely and qualitative process.

1.2 SUBMITTALS

A. Product Data: The Contractor shall submit, as required by Specification Section 01330, Submittals, six complete sets of the material and equipment submittals, including:

Play equipment manufacturer and manufacturer's representative's name(s) and address(es).

1. Plan view drawings with model numbers, descriptive labels (including component names,) deck heights, and notations of compliance with CPSC, ASTM F1487 and ADA.

2. Detailed component list with model numbers and catalog descriptions.

3 Color chart.

4. Written material specifications for all components.

5. IPEMA certification certificate from the IPEMA website.

6. Copy of manufacturer's warranty in certificate format.

7. Copy of manufacturer's ISO 9001 Certification.

B. For playground equipment greater than 8-ft in height provide engineered calculations, stamped and wet-signed by a licensed California Structural Engineer, for the attachment design and foundations as a deferred submittal for review and approval by the City of Sausalito. The engineered calculations are to be based on the 2013 California Building Code, American Society of Civil Engineers Standard 7-10, etc. (current codes).

C. Approval of the submittals shall be the Contractor's authorization to order the required material and equipment. There will be no deviation from the approved submittals without the written authorization of the Owner's representative.

1.3 PRODUCTS

A. PRODUCTS: The layout shown in the plan view is based upon equipment and measurements from the equipment manufacturer.

B. Design and Fabrication: Playground equipment, structure or modular unit submitted for consideration shall be equivalent in design, layout, deck size, post size, clamping/fastening system, deck/slide/climber height, ADA accessibility, appearance, color and construction detail to playground equipment specified in the drawings. Reasonable variations in size/height (no more than +/- 10%) and manufacturer's standard colors may be allowed at the Owner's discretion. Color schemes are to match as closely as possible to the originally specified colors. Play value and safety features of components must be equal or superior to specified design as judged by the Owner or Owner's representative

C. Modification: Any expense of modification, adjustment or revision required to ensure compliance of furnished equipment to specified equipment and playground design shall be the sole expense and responsibility of the Contractor.

1.4 REFERENCES AND STANDARDS

A. ASTM C 67 – Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.

B. ASTM C 501 – Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser.

C. ASTM D 412 – Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension.

D. ASTM D 573 – Standard Test Method for Rubber-Deterioration in an Air Oven.

E. ASTM D 624 – Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.

F. ASTM D 2047 – Standard Test Method for Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine.

G. ASTM D 2859 – Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials.

H. ASTM D 3676 – Standard Specification for Rubber Cellular Cushion Used for Carpet or Rug Underlay.

I. ASTM E 303 – Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester.

J. ASTM F 1292 – Standard Specification for Impact Attenuation of Surfacing Materials Within the Use Zone Playground Equipment.

K. ASTM F 1487 - Standard Consumer Safety Performance Specification for Playground Equipment for Public Use.

L. ASTM F 1951 – Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment.

M. ASTM F 2223 - Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment.

N. US Consumer Product Safety Commission (CPSC) Handbook for Playground Safety.

O. International Play Equipment Manufacturer's Association (IPEMA) IPEMA Checklist for Access.pdf. http://voiceofplay.org/public/uploads/IPEMA_Checklist.pdf.

P. WWW.VOICEOFPLAY.ORG.

Q. WWW. ADA.GOV.

R. WWW.ACCESS-BOARD.GOV.

S. Chapter 4, Accessible Routes, DOJ ADA 2010.

T. Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities.

U. Abbreviations:

ASTM: American Society for Testing and Materials

CPSC: Consumer Product Safety Commission

IPEMA: International Playground Equipment Manufacturers Association

ADA: Americans with Disabilities Act

ISO: International Organization for Standardization

CPSI: Certified Playground Safety Inspector

1.5 WARRANTY

A. The Contractor shall guarantee installation workmanship for a period of one year from the date of Notice of Completion of the Project.

B. Provide copy of Contractor's installation warranty on company letterhead.

PART 2 MATERIALS

2.1 MATERIALS

A. EQUIPMENT: See drawings for type, style, configuration, size and height of playground equipment, structure or modular unit to be provided.

B. COLOR SCHEDULES: See drawings for the color schedules of the various elements of playground equipment, structure or modular unit to be provided.

C. SPECIFICATIONS/COMPONENTS

1. Designs and specifications are based upon equipment from the playground equipment manufacturer. Equals will be considered against this standard of quality and design.

2. COMPONENT LIST: REFER TO DRAWINGS

D. CONCRETE FOOTINGS: Concrete for footings conforming to the requirements of Section 02775 – Landscape Concrete.

E. AGE APPROPRIATE SIGNS: See drawings for age appropriate signs.

F. PLAY AREA SAND

1. Refer to Section 02870, Site Furnishings.

PART 3 INSTALLATION

3.1 INSTALLATION

A. INSTALLATION

1. Instructions: Explicit, printed installation instructions, written in English, shall be provided by the manufacturer, which shall include detailed, scaled plan views, elevations, and footing drawings and details when applicable, as well as sequential assembly instructions to assure proper installation of the playground equipment, structure or modular unit.

2. Equipment must be installed by a manufacturer-certified installer and must be installed in accordance with the manufacturer's installation instructions. Installation crew leader must be CPSI-certified. If not installed by a manufacturer-certified installer, the equipment shall be inspected after installation by a CPSI not employed by the installer and signed off by said CPSI before the playground is opened for first use.

3. Engineered wood fiber shall be blown in place to avoid damage to adjacent improvements unless specifically approved by Architect.

4. Close Out: Contractor shall provide the Owner with one copy of complete manufacturer's installation instructions and maintenance kit. Most manufacturers send at least two sets of installation manuals with each order. Additional sets of installation instructions should be purchased from the manufacturer if originals are lost or damaged. It is the Contractor's responsibility to secure the installation instructions from the installer. Manufacturer mails one complete set of installation instructions directly to the Owner, and the Contractor shall not be required to supply additional sets to the Owner.

5. Clean-up: The site shall be kept clean and free of tools, trash, debris and installation materials on a daily basis. Material may be stored on site during installation with appropriate protective measures and approval by the Owner's representative.

3.2 CLOSE OUT

A. Provide the Owner with one copy of complete manufacturer's installation instructions, installation drawings and shop drawings.

B. Provide the Owner with one copy of complete manufacturer's care and maintenance instructions.

C. Provide the Owner with copy of Contractor's warranty on company letterhead.

D. Provide the Owner with one copy of complete Record Drawings.

END OF SECTION

SECTION 02890

SITE SIGNS

PART 1 GENERAL

1.1 SCOPE

A. Provide all labor, material and equipment for installation of signs as shown on the drawings.

B. Related work specified elsewhere includes:

1. Section 02820, Chain Link Fencing

2. Section 02900, Planting

1.2 REQUIREMENTS AND STANDARDS

A. The Contractor shall furnish and install signs to comply with the drawings.

B. All accessories shall be installed as recommended by Manufacturer.

PART 2 MATERIALS

2.1 SIGNS

A. Provide and install vandal-resistant attachments. Refer to drawings and coordinate with Owner's Representative.

B. Signs: As shown on drawings. Refer to drawings and coordinate with Owner's Representative. Submit Manufacturer's data. Final text as approved by owner.

2.2 GRAFFITI-RESISTANT COATINGS

A. Graffiti-Resistant Coatings: GCP 1000/Clear by Genesis Coatings, 800-533-4273 or approved equal.

PART 3 EXECUTION

3.1 INSTALLATION OF SIGNS

A. Confirm location with Owner's Representative before installing. Install per drawings and manufacturer's data. Use vandal-resistant attachments. Set level.

B. Install Graffiti-resistance coatings on signs per manufacturer’s specifications.

3.2 CLOSEOUT

A. Clean up per General Conditions.

B. Include copies of the material submittals and manufactured material suppliers and installers name and telephone number in the Operations and Maintenance manuals as part of the closeout documents.

C. Include manufacturer's warranty information of specified items with warranties.

END OF SECTION

SECTION 02900

PLANTING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Furnish labor, material and equipment for the installation of the planting work and the maintenance as shown on the drawings and as specified.

1.2 RELATED SECTIONS

A. Section 02335, Subgrade Preparation and Base Material

B. Section 02775, Landscape Concrete

C. Section 02800, Irrigation

D. Section 02850, Landscape Drainage

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Experience: Assign a full-time employee to the job as foreman for the duration of the Contract with a minimum of four (4) years experience in landscape installation and maintenance supervision, with experience or training in turf management, entomology, pest control, soils, fertilizers and plant identification.

2. Labor Force: Provide a landscape installation and maintenance force thoroughly familiar with, and trained in, the work to be accomplished to perform the task in a competent, efficient manner acceptable to the Project Inspector.

B. Requirements:

1. Supervision: The foreman shall directly supervise the work force at all times and be present during the entire installation. Notify Project Inspector of all changes in supervision.

2. Identification: Provide proper identification at all times for landscape maintenance firm's vehicles and a labor force uniformly dressed in a manner satisfactory to Project Inspector.

C. Reference Standards:

1. Manufacturer's recommendations.

2. "Sunset Western Garden Book," Lane Publishing Co., Menlo Park, California; current edition.

3. "American Standards for Nursery Stock," American Association of Nurseryman, 230 Southern Building, Washington, D.C. 20005.

4. "Staking Landscape Trees," University of California Extension, Publication #2576 or current publication.

5. "Tree Pruning Guidelines," International Society of Arboriculture, Savoy, IL, 1995 or current edition, conforming to ANSI-A300-1995 tree pruning specifications and guidelines.

6. California Department of Transportation (CalTrans), Standard Specifications, 1992 Edition or current edition.

7. Weed Control Methods Handbook, The Nature Conservancy, Tu, M., Hurd, C. & J.M. Randall. 2001. http://tncweeds.ucdavis.edu.

D. Plant Material Standards

1. Quality and Size of Plants: Conform to the State of California Grading Code of Nursery Stock, No. 1 grade. Use only nursery-grown stock that is free from insect pests and diseases.

2. Comply with federal and state laws requiring inspection for plant diseases and infestations. Submit inspection certificates required by law with each shipment of plants, and deliver certificates to the Project Inspector. Obtain clearance from the County Agricultural Commissioner as required by law, before planting plants delivered from outside the County in which planted.

3. Within 35 days of Notice to Proceed, provide a letter from the contactor certifying that all plant materials and sod are available. Some material may require contract growing with a nursery. If plant material is not available at time of planting, Contractor shall pay the owner per the following schedule so the owner can obtain the plants for planting by the Contractor:

Type	**Cost**
One Gallon and smaller	$10.00
Five Gallon	$30.00
Fifteen Gallon	$100.00
24” Box	$300.00

4. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container with well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for kind, type, and size of plant required. Plants shall be grown in containers an adequate amount of time to be fully rooted and not root bound. Foliage shall be robust without evidence of dieback. Minimum container sizes as follows:

Type	**Code**	**Dimensions**	**Volume Cubic Inches**
Plug	PL	1 1/4" sq. × 3" long	2
Super Stubby	L6	1 1/2" dia. × 6" long	7
Super Cell	L8	1 1/2" dia. × 8" long	10
Liner	LN	2 1/4" sq. × 3" long	12

Type	Code	Dimensions	Volume Cubic Inches
Tree Band	TB	2 1/4" sq. × 5" long	20
Deepot 16	D6	2" dia. × 7" long	16
Deepot 40	DP	2 1/2" dia. × 10" long	40
4” Pot	4” Pot	4" sq. × 4" long.	64
TreePot 4	T4	4" sq. × 14" long	180
One Gallon	1 Gal	6" dia. × 7" long	180
TreePot 6	T6	6" sq. × 16" long	400
TreePot 8	T8	8" sq. × 18" long	550
Five Gallon	5 Gal	10 1/4" dia. × 12" long	950
Fifteen Gallon	15 Gal	15" dia. × 18" long	3180
24” Box	24” Box	24" sq. × 23" long	13248
36” Box	36” Box	36" sq. × 35" long	45360
48” Box	48” Box	48" sq. × 42" long	96768
60” Box	60” Box	60" sq. × 44" long	158400
72” Box	72” Box	72" sq. × 40 to 46" long	228096

5. Without a commercial endorsement, plant material may be available from the following sources:

   a. Jeff Anhorn Nursery, Telephone: 925-447-0858, or equal grower.

   b. Central Coast Wilds, Telephone: 831-750-2365, or equal grower.

   c. Hedgerow Farms, Telephone: 530-662-6847or equal

   d. Larner Seeds, Telephone: 415-868-9407or equal.

   e. Greenlee Nursery, Telephone: 909-342-6201 or equal grower.

   f. Norman’s Nursery, Telephone: 209-887-2025 or equal grower.

   g. Valley Crest Tree Nursery, Telephone: 925-862-2485 or equal grower.

   h. Devil Mountain Nursery, Telephone: 925-829-6006 or equal grower.

   i. Cornflower Farms, Telephone: 916-689-1015 or equal grower.

   j. Suncrest Nurseries, Telephone: 831-728-2595 or equal grower.

   k. Western Star Nursery, Telephone: 925-862-9008 or equal grower.

   l. Pacific Nurseries, Telephone: 650-755-2330 or equal grower.

m. Bamboo Pipeline, Telephone: 888-288-1619 or equal.

E. Testing Agency: Waypoint Analytical, 1101 S. Winchester Blvd. Suite G-173, San Jose, CA 95128; Tel. (408) 727-0330.

F. Weed Control: No conventional pesticides or herbicides are permissible on any City property. Organic non-toxic weed control may be applied, pending City approval. Corn gluten (available from Happy Gardener), or approved alternative, may be applied to control weeds. Follow the manufacturer's recommendations for use.

G. Limited Use of Chemicals: Planting areas may not be treated with pesticides, insecticides, herbicides or any other toxic materials that have proven to be harmful to human health at any time during maintenance or installation. Only organic treatments may be used and all treatments must be approved by the City.

1.4 SUBMITTALS

A. Product Data: Manufacturer's current catalog cuts and specifications of the following.

1. Fertilizers

2. Soil Amendment

3. Mulch

4. Sod

5. Gypsum

6. Topdressing Sand: Certificate of compliance, total quantity of material to be used.

B. Samples:

1. Organic Mulch: Submit 1-quart sample.

2. Plants: Submit typical sample of each variety or entire quantity to site for approval by Landscape Architect.

3. Soil amendment.

4. Sod. Submit two samples.

5. Import soil: Submit two 1-pint samples.

C. Certificates of Compliance for the following:

1. Sod.

2. Soil Amendment, chemical and physical properties.

3. Quantity of soil amendment delivered to site and incorporated into soil preparation.

4. Import soil soil chemical and physical properties.

5. Within 30 days of Notice to Proceed, provide a letter from the contactor certifying that all plant materials, seed and sod are available.

D. Topsoil Analysis: After acceptance of rough grading and topsoil placement, obtain three representative samples of topsoil taken from accepted site locations and submit to an accredited Soils Laboratory for "agricultural suitability" analysis report. Include analysis and recommendations to counteract possible lime treatment. Upon approval of the Laboratory's report by the Landscape Architect, the recommendations in the report shall become a part of the Specifications and the quantities of soil amendment; fertilizer and other additives shall be adjusted to conform to the report.

1.5 PROJECT/SITE CONDITIONS

A. Site Visit: At beginning of work, visit and walk the site with the Project Inspector to clarify scope of work and understand existing project/site conditions.

1.6 WARRANTY AND REPLACEMENT

A. Warrant the work against weed growth for a period of four (4) months after application.

B. Warrant all plants and planting to be in a healthy, thriving condition until the end of the maintenance period, and deciduous trees beyond that time until active growth is evident.

C. Replace all dead plants and plants not in a vigorous condition immediately as directed by the Project Inspector at Contractor's expense. Install replacement plants before the final acceptance at the size specified.

D. Warrant all plant material for a period of one year after final acceptance of the maintenance work against defects in the plant prior to installation.

E. Warrant plant installation and maintenance by Contractor against defects for a period of one year.

PART 2 PRODUCTS

2.1 PLANTS

A. Plant the variety, quantity and size indicated. The total quantity tabulated are considered approximate and furnished for convenience only.

B. Tag plants of the type or name indicated and in accordance with the standard practice recommended by the American Association of Nurserymen.

C. Install healthy, shapely and well rooted plants with no evidence of having been rootbound, restricted or deformed.

D. Take precautions to ensure that the plants will arrive at the site in proper condition for successful growth. Protect plants in transit from windburn and sunburn. Protect and maintain plants on site by proper storage and watering.

E. Substitutions will not be permitted, except as follows:

1. If proof is submitted to the Landscape Architect that any plant specified is not obtainable, a proposal will be considered for use of nearest equivalent size or variety with an equitable adjustment of contract price.

2. Substantiate and submit proof in writing to the Landscape Architect within 30 days after the effective date of Notice to Proceed.

F. Trees: Select straight trunks with the leader intact, undamaged and uncut with all old abrasions and cuts completely callused over. Do not prune plants prior to delivery.

G. Measure trees and shrubs with branches in normal position. Height and spread dimensions indicated refer to the main body of the plant, and not from branch tip to tip.

2.2 GRASSES

A. Sod: Machine cut sod to a uniform thickness of 3/8-inch excluding top growth and thatch. Each individual sod piece shall be strong enough to support its own weight when lifted by the ends, in vigorous condition, dark green in color, free of disease, weeds and harmful insects. Broken pads, irregularly shaped pieces, and torn and uneven ends will be rejected.

B. Sod: Native Bentgrass Sod (100 percent Agrostis Pallens) available from Delta Bluegrass Company, 800-637-TURF (8873), no-known equal or accepted equal.

C. Sod Signage: Provide and install two sod educational signs, one in English, one in Spanish. Available from Delta Bluegrass Company, 800-637-TURF (8873), no-know equal. Mount on fence at location determined in the field by Owner's representative.

D. Sodded Lawn Turf: As shown on the Drawings.

A.

2.3 FERTILIZERS

A. Commercial fertilizer, pelleted or granular form, conform to the requirements of Chapter 7, Article 2, of the Agricultural Code of the State of California for fertilizing materials as follows:

Type A: 6% Nitrogen, 20% Phosphorus Acid and 20% Potash, (6-20-20) or approved equal.

Type B: AgSafe 20-10-5, 21-gram Planting Tablets complete fertilizer 20% Nitrogen, 10% Phosphate and 5% Potash (20-10-5) slow-release plant food with minors, 10% humus, Mycorrhizae, plant extracts, and fish extracts for two year root zone feeding. Product P101 Grower & Landscaper Bulk Case (21g), 500 tablets (21g) per case, available from Agritab Corporation, Clearfield, UT, www.agritab.com, 800-398-3803, or equal.

Type C: AgSafe 20-10-5,10-gram Planting Tablets complete fertilizer 20% Nitrogen, 10% Phosphate and 5% Potash (20-10-5) slow-release plant food with minors, 10% humus, Mycorrhizae, plant extracts, and fish extracts for two year root zone feeding. Product P102 Grower & Landscaper Bulk Case (10g), 1,000 tablets (10g) per case, available from Agritab Corporation, Clearfield, UT, www.agritab.com 800-398-3803, or equal.

If commercial fertilizer having this analysis is not obtainable, other similar commercial fertilizer may be used providing it meets the acceptance of the Landscape Architect.

B. Maintenance Fertilizer: Turf Supreme or equal (no herbicide included) 16% Nitrogen, 6% Phosphoric Acid and 8% Potash (16-6-8), or approved substitute as recommended by the turf seed or sod supplier. Apply at quarterly intervals according to manufacturer's specifications until the turf is accepted by the City.

2.4 SOIL AMENDMENT

A. Approved Products: Super-Humus Compost. Available at BFI Organics, 1601 Dixon Landing Road, Milpitas, CA, 408-945-2836, “Wonder Grow” available from TMT Enterprises, 408-432-9040 or Lopez Ag Service Organic Compost ½”-916-682-5450, Al., or equal with the following properties:

B. Reaction (pH): 5.5 to 8.0.

C. Screened to ½” minus and having the following graduation:

Percent Passing	Sieve Designation
85- 100	9.51mm (3/8")
50-80	2.38mm (No. 8)
0-40	500 micron (No. 35)

D. Soluble salts as determined by Saturation Extract Solution less than 10 mmhos/cm or ds/M.

E. Carbon to nitrogen ratio less than 35:1.

F. Organic content: Minimum of 50%. Minimum of 250 lbs organic matter per cubic yard of compost.

G. Moisture Content: 35-60%.

H. Shall be free of glass, metal and visible plastics.

I. Odor shall be soil-like (musty or moldy) not sour, ammonia-like or putrid.

J. Characterization: identifiable wood pieces are acceptable but the balance of material should be soil-like without recognizable grass or leaves.

K. Color: Dark brown to black.

L. Submit sample to the Landscape Architect two weeks before accepted delivery of amendment to the project with laboratory organic amendment analysis report to include above information and iron content. Laboratory organic amendment analysis report is to be from a sample that is no older than one month old.

2.5 MULCH

A. Bark Mulch: Pro-chip decorative mulch, small redwood color, 1” maximum size, or equivalent as accepted by the Landscape Architect. Available at BFI Organics, 1601 Dixon Landing Road, Milpitas, CA 408-945-2836, or equal.

B. Submit two (2) samples of mulch to the Landscape Architect for acceptance within two weeks of award of Contract. Resubmit until acceptable to Owner, at no extra cost.

2.6 AGRICULTURAL GYPSUM: Agricultural Gypsum.

2.7 PLANT BACKFILL: Except for acid loving plants (Azaleas, Rhododendrons, Ferns, Camellias, etc.), use a mixture of 2 parts soil from the hole, and 1 part amendment with iron added at the following rates:

1 gallon can plants	-	iron, 1/4 cup
5 gallon can plants	-	iron, 1/3 cup
15 gallon can plants	-	iron, 1/2 cup

24" box and larger - iron, 1 cup

Mix the iron, amendment and soil thoroughly for use in the top 8 inches of backfill around plants. For acid loving plants, mixture to be 1/2 soil from the hole and 1/2 amendment.

2.8 SOIL SULFUR: Tiger Organic Sulfur 0-0-0-90.

2.9 IRON SULFATE: Iron Sulfate, 31% Fe.

2.10 SOIL

A. On-site topsoil as follows:

1. Planting soil is defined as on-site surface soil. Satisfactory planting soil shall be free of subsoil, clay, lumps, stones, and other objects over 1" in diameter, and without weeds, roots, and other objectionable material.

2. Strip planting soil to whatever depths encountered, a minimum of six inches in a manner to prevent intermingling with the underlying subsoil or other objectionable material. Topsoil stripping is limited to area indicated on drawings.

3. Remove heavy growths of grass from areas before stripping.
4. Stockpile topsoil in storage piles in areas shown, or where designated by Owner. Construct storage piles to freely drain surface water. Cover storage piles if required to prevent windblown dust.

5 If herbicide contamination is suspected then a radish/ryegrass growth trial must be performed. Consult with Landscape Architect prior to decision to test or not.

B. Imported topsoil shall be free of subsoil, clay, lumps, stones, and other objects over 1-inch in diameter, and without objectionable material and be imported soil as follows:

1. Imported topsoil shall be fertile, friable, natural, productive soil containing a normal amount of humus, and shall be capable of sustaining healthy plant life. Topsoil shall be free of subsoil, heavy or stiff clay, rocks, gravel, brush, roots, weeds, noxious seeds, sticks, trash, and other deleterious substances. Soil shall not be infested with nematodes or with other noxious animal life or toxic substances. Soil shall be obtained from well-drained, arable land, and shall be of an even texture. Soil shall not be taken from areas on which are growing any noxious weeds such as Morning Glory, Sorrel, or Bermuda Grass.

2. Imported topsoil shall have a pH value of between 6.0 and 7.5, a boron concentration of the saturation extract of less than 1 ppm, salinity of the saturation extract at 25-degrees C, of less than 4.0 millimoles, and a sodium absorption rate (SAR) of less than 8.

3. The silt and clay content of imported topsoil shall not exceed that of the existing soil it is to be placed over. It shall be a "Sandy Loam" as classified in accordance with USDA Standards.

4. Make the site of the source of supply of topsoil available to the Landscape Architect for observation and review prior to any hauling or placing of soil. In addition, submit for review a 1-quart sample of soil, together with a standard soil analysis report by Soil and Plant Laboratory similar Lab Report 59864, showing chemical analysis stating source, fertility, agricultural suitability and particle size distribution of the soil, recommendations for soil amendments and compatibility with the on site soil. Deliver the sample to the

Landscape Architect two weeks before starting the contemplated hauling of the soil. Following approval of the sample, provide a one-half cubic yard sample, which shall be stored at the site of work for comparison with subsequent loads of soil. The comparison sample shall be protected by a cover until the furnishing of all soil has been completed and accepted. Should the soil submittal lack certain requirements, which can be added to the soil, the Landscape Architect will consider a request by the Contractor to amend the soil as recommended by the Soils Analyst at the Contractor's expense.

5. To ensure conformance, submit ½ gallon sample to Soil & Plant Laboratory for analytical packages: A06-2, A06-3, A05-1.

C. Imported Angular Washed Sand (topdressing sand):

1. Refer to Section 02850 Landscape Drainage.

2.11 MYCORRHIZA

A. MycoApply® All Purpose Granular available from Mycorrhizal Applications, Inc www.mycorrhizae.com, PO Box 1181 Grants Pass, OR 97528, Telephone 866-476-7800, or 541.476.3985 fax, 541.476.1581, or equal.

PART 3 EXECUTION

3.1 INSPECTION

A. Before proceeding with the work: Carefully inspect all areas and verify all dimensions and quantities. Immediately inform the Landscape Architect of any discrepancy between the drawings and specifications and actual conditions and secure approval to proceed.

B Carefully inspect all areas and verify that the areas to be planted have not been impacted by lime treatment. Remove lime treated soil from planting areas.

C. Protect tree root systems from damage caused by equipment, runoff, and spillage of noxious materials and storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

3.2 SOIL PLACEMENT

A. Soil Placement:

1. Provide soil as noted on the drawings.

2. Protect improvements from damage due to landscape work.

3. Existing Soil Excavation: where import soil is required, excavate existing soil, as required, to clear existing vegetation and roots, meet finish grades and allow for soil preparation.

4. Inspect planting areas and remove all base rock and other foreign materials. Rip all planting areas in two directions full depth of compacted fill, to a minimum of 12-inches, into undisturbed native soil prior to backfilling. Scarification of any planting area, which cannot be accomplished with a tractor, shall be accomplished by an alternative method approved by the Landscape Architect to the specified depth to ensure proper drainage.

5. Uniformly distribute and spread soil backfill in planting areas in layers not to exceed 24" and compact to a maximum of 85% relative compaction.

6. When the planting soil differs in clay and silt content from the subsoil it is to be placed upon, install a 4-inch thick lift of planting soil on the subgrade and rototill into the subgrade 6-inches deep before installing the remaining required planting soil.

7. Do not work planting soil in a wet or muddy condition or dump or spread in areas where subgrade is not in proper condition.

8. Water settling, puddling, and jetting of fill and backfill materials, as a compaction method, is not acceptable.

9. Maintain moisture content of materials during compaction operations within required moisture range to obtain indicated compaction density.

10. Provide a minimum depth of import soil as noted on the drawings.

11. Protect tree root systems from damage caused by equipment, runoff, and spillage of noxious materials and storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

3.3 FINE GRADING AND SOIL PREPARATION

A. Protect tree root systems from damage caused by equipment, runoff, and spillage of noxious materials and storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

B. Planting operations shall be performed only during periods when beneficial results can be obtained. When excessive moisture or other unsatisfactory conditions prevail, the work shall be stopped until conditions are satisfactory.

B. Thoroughly wet down the planting areas to settle the soil and confirm irrigation coverage and operation. Allow soil to dry so as to be workable.

C. Topsoil shall be in a loose, friable condition prior to planting. Rip and cross rip all planting areas 12” deep and compact to a maximum of 85% relative compaction. Backfill planters with topsoil as detailed and specified.

D. Drag to a smooth, even surface. Grade to form all swales, pitch to catch basins, streets, curb, etc., to ensure uniform surface drainage. Areas requiring grading include adjacent transition areas which shall be uniformly level or sloped between finish elevations.

E. Hold finish grade surface in planting areas below adjacent pavement surfaces, tops of curbs, manholes, etc as shown on the drawings.

F. Spread soil amendment, Soil Sulfur, Gypsum and Type A fertilizer evenly over installed and rough graded topsoil in all turf and panted areas at the following rates:

Soil Amendment: 6 cubic yards per 1,000 square feet
Fertilizer: Type A at 15 lbs. per 1,000 square feet.
Soil Sulfur: 15 lbs. per 1,000 square feet
Gypsum: 60 pounds per 1,000 square feet

G. Rototill above additives into soil 6 to 8 inches deep. Keep iron sulfate off pavement and other surfaces to prevent rust staining. Correct all rust damage to work.

H. After the rototill work, float areas to a smooth, uniform grade as indicated on the drawings. Slope all planting areas to drain. Roll, scarify, rake and level as necessary to obtain true, even planting surfaces. Remove rocks, sticks and debris, 1 inch or larger in size, from all planting areas. Secure approval of the grade by the Landscape Architect before any planting.

I. Scarify all planting areas that become compacted prior to planting.

3.4 SOD INSTALLATION

A. Coordinate the work with other trades and the City so the sod is installed a minimum of 30 days before the park is scheduled to be open to the public.

B. Protect tree root systems from damage.

C. To the extent practical, grub weedy plants (Kikuyu grass, Bermuda grass, broadleaf plants) from the existing soil without use of herbicides.

D. Excavate the existing soil at the edges of the existing planting areas a minimum of 3” deep to allow space for imported compost and sod so that new materials can be set flush with the existing finish grade.

E. Without disturbing existing roots, scarify the existing soil so it is friable to a depth of 6 inches.

F. Lightly roll surface and re-shape to level humps and hollows. Install irrigation drip tubing. Install a 2” thick layer of compost. Firm soil. Smooth to uniform surface and verify that finish grade is the specified dimension below pavement, mow edge or curb as shown on the drawings Secure Architect's approval prior to sodding. Do not lay sod on dry soil. Keep sod moist and shaded prior to installation.

G. When the irrigation system is completed, perform a coverage test in the presence of the Project Inspector to determine if the water coverage for planting areas is adequate.

H. When the overhead irrigation system is completed, and before installation of sod, perform a landscape irrigation audit and correct deficiencies as required.

I. After completing soil preparation, fine grading, and irrigation coverage test and just before sod installation,

1. Apply Type A fertilizer to surface prior to installing sod at a rate of 15 pounds per 1,000 square feet

J. Water area lightly immediately prior to installing sod.

K. Lay first strip of sod along a straight line (use a string in irregular areas). Butt joints tightly, do not overlap edges. On second strip, stagger joints. Use a sharp knife to cut sod to fit curves, edges and sprinkler heads.

L. When a conveniently large area has been sodded, water lightly to prevent drying. Continue to sod and to water until installation is complete.

M. After laying sod, roll lightly to eliminate irregularities and to form good contact between sod and soil. Avoid a heavy roller and excessive initial watering.

N. Thoroughly water the completed sod surface to at least 8 inches deep. Repeat sprinkling at regular intervals to keep sod moist at all times until rooted. After sod is established, decrease frequency and increase amount of water per application.

O. Eliminate low spots and divots by pulling sod back and filling with amended sand growing medium.

P. Fill gaps that form with prepared top dress material (1/2 sand, 1/2 organic material). Hand weed and re-sod areas that do not take every 14 days.

Q. Protect sod from trespass until acceptance. Protect turf areas by erecting fences, barriers and signs necessary to prevent trespass. Keep barriers neat and well maintained.

3.5 TREE AND SHRUB, PLANTING

A. Mark tree and shrub locations on site using stakes, gypsum or similar approved means and secure location approval by the Landscape Architect before plant holes are dug. Adjust as necessary prior to planting.

B. Test drainage of plant beds and pits by filling with water (minimum 12"). The retention of water in planting beds and plant pits for more than eight (8) hours shall be brought to the attention of the Landscape Architect. If rock, underground construction work, tree roots, poor drainage, or other obstructions are encountered in the excavation of plant pits, alternate locations may be selected by Landscape Architect.

C. Excavate tree, shrub and vine pits as follows:

Excavation for	Width	Depth
Boxed Trees	Box + 24"	Box
Canned Trees (15 gc)	Can + 18"	Can
Canned Shrubs/Vines (1 or 5 gc)	Can + 12"	Can
Canned Shrubs/Vines (4” pot and smaller)	Can + 12"	Can
Trees with Root Guards	4' wide min.	Box or Can

D. Break and loosen the sides and bottom of the pit to ensure root penetration and water test hole for drainage as required above.

E. Carefully remove and set plants without damaging the rootball. Superficially cut edge roots vertically on three sides using a knife. Remove bottom of plant boxes before planting. Remove sides of boxes after positioning the plant and partially backfilling.

F. Set plants in backfill with top of the rootball 2 inches above finished grade. Backfill remainder of hole and soak thoroughly by jetting with a hose and pipe section. Water backfill until saturated the full depth of the hole.

G. Backfill plant holes free from rocks, clods or lumpy material. Soil immediately below the trees should be left undisturbed to provide support but the bottom and sides should be cultivated to improve porosity. Backfill remainder of the hole with soil as follows:

1. Greater than 12-inches below grade: native and un-amended soil.

2. Less than 12-inches below grade: two parts native soil and one part soil amendment.

3. 1-gallon and smaller, 4” pots and plugs: two parts native soil and one part soil amendment.

4. Mix Mycorrhiza planting backfill with the planting backfill in the top 1” of the planting hole as close to the root ball and evenly distributed as possible at the following rates

4” pot or plug plant	- 1 teaspoon
1 gallon can plant	- 1 tablespoon
3 gallon can plant	- 3 tablespoons
5 gallon can plant	- 3 tablespoons
15 gallon can plant	- 6 tablespoons.
24-inch box plant	- 8 tablespoons
Larger plants	- 4 tablespoons per inch of trunk caliper at 6” above finish grade

H. Set trees in backfill with top of the rootball 2-inches above finished grade. Backfill remainder of hole and soak thoroughly by jetting with a hose and pipe section. Water backfill until saturated the full depth of the hole.

I. Install fertilizer Type ‘B’ for 1-gallon plants and larger adjacent to the rootball per the manufacturer’s specifications. Install fertilizer Type ‘C’ for 4” pot or plug plant adjacent to the rootball per the manufacturer’s specifications.

J. Remove any soil from top of plant rootballs and secure Landscape Architect's approval of rootball height prior to mulching. Build 6" high watering basin berms around trees and shrubs to drain through rootball.

K. Stake and/or guy trees as detailed. Drive stake until solid and remove excess stake protruding above top tree tie to prevent rubbing against branches.

L. After approval of rootball height, mulch watering basins with organic mulch to 3-inch depth and thoroughly water. No mulch is required around trees in turf areas.

3.6 GROUND COVER PLANTING: Plant in neat, straight, parallel and staggered rows as indicated on plan. Plant first row one-half required ground cover spacing behind adjacent curbs, structures, or other plant bed limits. Plant ground cover to edge of water basins of adjacent trees and shrubs.

3.7 MULCH

A. Mulch all shrub and ground cover areas that are disturbed by irrigation improvements with organic mulch to a 3-inch depth. Hold bark mulch away from base (trunk) of plant 2” to 4” or as directed by the Landscape Architect.

3.8 WATERING

A. Water all turf immediately after planting. Apply water to all plants as often and in sufficient amount as conditions may require to keep the plants in a healthy vigorous growing condition until completion of the Contract. Do supplemental watering during the plant establishment period. Provide supplemental water as required to establish plants and sod.

3.9 MAINTENANCE OF PLANTING

A. Maintain plants from time of delivery to site until final acceptance of landscape installation.

3.10 PRE-MAINTENANCE PERIOD REVIEW AND APPROVAL OF PLANTING

A. Receive approval of the installed planting prior to commencement of planting establishment maintenance period. Notify the Project Inspector a minimum of ten (10) days prior to requested review. Before the review, complete the following:

1. Complete all construction work.

2. Present all areas neat and clean with all weeds removed.

3. Sod all turf areas.

4. No partial approvals will be given.

3.11 PLANTING ESTABLISHMENT MAINTENANCE

A. General Requirements:

1. The planting establishment maintenance period required shall be 120 calendar days after all planting is complete, grass is seeded and sodded, and installation approved. A longer period may be required if the turf is not thick, vigorous and even, or if the plant material is not acceptably maintained during the maintenance period. The maintenance period may be suspended at any time upon written notice to the Contractor that the landscaping is not being acceptably maintained, and the day count suspended until the landscape is brought up to acceptable standards as determined by the Landscape Architect.

2. Planting establishment maintenance immediately follows, coincides with, and is continuous with the planting operations, and continues through turf installation, and after all planting is complete and accepted; or longer where necessary to establish acceptable stands of thriving plants.

3. Protect all areas against damage, including erosion and trespass, and provide proper safeguards. Maintain and keep all temporary barriers erected to prevent trespass.

4. Keep all walks and paved areas clean. Keep the site clear of debris resulting from landscape work or maintenance.

5. Repair all damaged planted areas, and replace plants and sod immediately upon discovery of damage or loss.

6. Check sprinkler systems at each watering; adjust coverage and clean heads immediately. Adjust timing of sprinkler controller to prevent flooding.

7. Maintain adequate moisture depth in soil to ensure vigorous growth. Check rootball of trees and shrubs independent of surrounding soils and hand water as required.

8. Keep Contract areas free from weeds by cultivating, hoeing or hand pulling. Keep areas free of weeds over 1-inch high at all times.

B. Tree, Shrub and Ground Cover Maintenance:

1. Maintain during the entire establishment period by regular watering, cultivating, weeding, repair of stakes and ties, and spraying for insect pests. Prune when requested by the Landscape Architect.

2. Keep watering basins in good condition and weed-free at all times.

3. Replace all damaged, unhealthy or dead trees, shrubs, vines and ground covers with new stock immediately; size as indicated on the drawings.

C. Native Bent Grass, Mow Free Maintenance:

1. Maintain during the entire establishment period.

2. Turf shall be well established, free of bare spots and weeds, and of a “sod-like” quality to the satisfaction of the Landscape Architect prior to Final Acceptance.

3. Maintain constant moisture to a depth of eight inches (8").

4. Keep sod areas free of undesirable weeds and grasses by the application of suitable selective weed killers or hand pulling. Use Integrated Pest Management practices that use the least toxic practices.

5. Re-sod all damaged areas as soon as evident.

6. Re-seed areas as by broadcast method as required to establish a an acceptable; stand of grass that is free of weeds.

7. Repair any hollow, settled or eroded areas by filling, rolling and reseeding or re-sodding.

8. Fertilize native sod if needed for green color and vigorous growth.

D. Turf (Lawn) Maintenance:

1. Standards: This specification and ASTM F2069 Standard Guide for Maintaining Warm Season Turfgrasses on Athletic Fields shall be used as a minimum standard for cultural practices required for maintaining the athletic fields. This guide covers the minimum requirements for maintaining cool season turfgrasses used for natural surface athletic fields. Practices covered include mowing, fertilization, irrigation, core cultivation, overseeding, and pest management.

2. Protection: The contractor shall maintain protection of the turf areas. Damaged areas shall be repaired or replaced at the contractor's expense.

3. Mowing and Edging:

a. Contractor is required to mow the grass for the first time when it has grown to 1.5” and shall be cut to 1.” At this point the grass shall be mowed from 1.5” to 1,” throughout the maintenance period. From November 1 through June 28 the grass shall be mowed at least dependent on grass growth and the soil moisture conditions. If the soil is too moist than mowing can be less frequent.

b. Turf shall not be allowed to exceed 1.5“ in height and shall not be mown shorter than one-third (1/3) of grass leaf height. Turf shall be well established, free of bare spots and weeds, and of a “sod-like” qualify to the satisfaction of the owner prior to Final Acceptance.

c. Turf shall be cut with a dedicated mower. Cutting height will be determined on environmental conditions, condition of sod, and time of year or activities.

d. Excess grass clippings shall be picked up and removed from the site and premises.

e. Let turf areas dry out enough so that mower wheels do not skid, tear or mark the turf.

f. Edges shall be trimmed at least twice monthly or as needed for neat appearance. Clippings shall be completely removed and disposed of.

4. Watering: Turf shall be watered at such frequency as weather conditions require to replenish soil moisture below root zone and to establish healthy turf areas.

E. Fertilizing:

1. Observe plant's color, and if a soil pH imbalance is suspected, take soil samples and obtain laboratory analysis for confirmation. Take necessary action recommended in laboratory analysis such as top dressing with soil sulfur, leaching soil, etc.

2. Upon approval and after submitting fertilizer delivery tags, fertilize all turf and ground cover areas by broad-casting Maintenance fertilizer

3. Apply Best Turf Supreme (16-6-8) without added herbicide, or approved alternative, in quarterly intervals.

4. Calculate actual nitrogen based on the N-P-K ratio listed on the fertilizer product label. The nitrogen amount expressed on this label is the percentage of actual nitrogen available in the package.

5. Phosphorus should be applied at a rate of 2 lbs/1,000 sq. ft. per year. Spring or early fall are the best times for phosphorus.

F. Irrigation System:

1. System Observation: The Contractor shall visually check all systems for proper operation on a weekly basis and make all necessary repairs. All equipment shall be adjusted as necessary for proper coverage and function.

2. Controllers: Program automatic controller for appropriate seasonal water requirements. Perform a full instruction session in the presence of the City’s designated maintenance personnel demonstrating programming, system testing, trouble-shooting, etc. Include instructions on how to turn off system in case of emergency.

3. Program automatic controller for a 12-month maintenance period. Obtain letter of certification from manufacturer’s representative certifying the controller is properly programmed.

4. Repairs: All repairs made to the irrigation system shall be at the Contractor's expense. All repairs shall be made within twenty-four (24) hours.

3.12 FINAL PLANTING REVIEW AND ACCEPTANCE, PER Division 1 requirements.

A. At the conclusion of the planting establishment period, schedule a final review. On such date, all project improvements and all corrective work shall have been completed. If all project improvements and corrective work are not completed, continue the planting establishment, at no additional cost to the Owner, until all work has been completed. This condition will be waived by the Owner under such circumstances wherein the Owner has

granted an extension of time to permit the completion of a particular portion of the work beyond the time of completion set forth in the Agreement.

B. Submit written notice-requesting review at least 10 days before the anticipated review.

C. Prior to review, weed and rake all planted areas, repair plant basins, mow and edge turf, clear the site of all debris and present in a neat, orderly manner.

D. Acceptance of Grass: Final acceptance will follow City's final approval of the punch list and the following criteria:

1. Satisfactory Sod and sodded Lawn: At end of Maintenance Period, a healthy, well-rooted, even-green colored, viable sod has been established, free of weeds, open joints, bare areas, and surface irregularities.

2. The final grades shall not vary from the specified grades more than one-quarter of one inch (1/4") in ten feet (10') when measured in any one direction. This tolerance is required over the entire field. Final elevations shall be verified using a "string line" method: lengths of 100' pulled taught with high/low spots marked and hand-dressed and resodded.

3. Sod has rooted into the rootzone mix to a depth of 6 inches and has formed a mature sod mat.

4. Sod and seed is free of dead or bare spots in excess of 3" by 3."

5. Soil and plant tissue fertility test results indicate all constituents are within target values.

6. Maintenance log is complete and all equipment manuals and documentation delivered to the owner.

3.13 CLOSEOUT

A. Include copies of the material submittals and manufactured material suppliers and installers name and telephone number in the Operations and Maintenance manuals as part of the closeout documents.

B. Include warranty per Article 1.5 and manufacturer's warranty information of specified items with warranties.

END OF SECTION

SECTION 02960

GRAFFITI - RESISTANT COATINGS

PART 1 GENERAL

1.1 DESCRIPTION

A. Includes all services, labor, materials and equipment necessary to complete application of graffiti-resistant coatings on all exposed exterior vertical concrete surfaces and as follows:

1. Concrete walls
2. Site signs

1.2 REALTED SECTIONS

A. Section 02775, Landscape Concrete

B. Section 02820, Site Signs

C. Section 02870, Site Furnishings

1.3 QUALITY ASSURANCE

A. Contractor shall contact the manufacturer prior to bidding work so as to familiarize themselves with current warranty requirements, costs, application procedures, and notification requirements.

B. The manufacturer's representative shall inspect and approve all surfaces prior to application and verify correct material for each application.

1.4 SUBMITTALS: Per Division 1 requirements.

PART 2 PRODUCTS

2.1 PRODUCTS: GCP 1000, Matte/Clear by Genesis Coatings, 1-800-533-4273 or equal.

PART 3 EXECUTION

3.1 SURFACE PREPARATION

A. All surfaces shall be dry and free from excess dirt, dust, loose paint, greasy stains and efflorescence. Porous concrete should be sealed first with a minimum of 48 hours before application. All cracks, voids, bee holes, or mortar shrinkage shall be properly repaired and primed if necessary to make the surface uniform. If using GCP 1000 over a previously coated surface, apply a small amount in an inconspicuous place to check for lifting.

3.2 APPLICATION

A. Apply per manufacturer’s specifications.

B. Temperature and humidity shall be 50-90 degrees and humidity less than 80 percent.

C. Test on materials before applying and request approval from Landscape Architect before applying completely on materials.

3.3 PROTECTION AND CLEANUP: Per Division 1 requirements.

A. Applicator shall be responsible for protection of this and all adjacent work from damage during application with drop cloth or other suitable materials. Completely remove over spray and spills as soon as possible fore curing, and remove excess material from job site.

END OF SECTION

SECTION 05520

HANDRAILS AND RAILINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Steel tubing handrails.

B. Steel tubing guardrails and posts.

C. Brackets and fittings.

1.2 REFERENCES

A. CAS/CAR – California Accessibility Statues/California Accessibility Regulations, Books 1 and 2, May, 1994.

B. ASTM - American Society for Testing and Materials

C. California Building Code.

D. "Standard Code for Welding in Building Construction", American Welding Society (AWS).

E. ASTM A53 – Type E or S, Grade B Pipe.

F. ASTM A153 – Zinc coating (Hot-Dip) on iron and steel hardware.

G. ASTM A500 – Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

H. ASTM A123 – Zinc (Hot-Dip Galvanized) Coating on Iron and Steel Products.

I. Related Work Specified Elsewhere

1. Section 01450: Quality Control

1.3 SUBMITTALS FOR REVIEW

A. Submit under provisions of Section 01330, Submittals.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners and accessories.

C. Sample: Submit three samples of handrail and each component.

D. Welder Certifications.

1.4 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

PART 2 PRODUCTS

2.1 STEEL RAILING SYSTEM

A. Fasteners, Plates, Brackets, Flanges and Bases: Manufactured by Craneveyor Corp., South El Monte, CA, or equal.

B. Handrails, Guardrails, Posts, Pickets, Rails: size as shown on Drawings. Round steel pipe ASTM A53. Welded joints, galvanized, ASTM A123.

1. Pipe yield strength: 35 ksi.

2. Flat Bar for Guide Rail: ASTM A36 ¼" thick by 2" wide steel plate as shown on drawings with welded joints, galvanized, ASTM A123.

C. Fittings: Elbows, T-shapes, wall brackets, escutcheons: Cast steel. Brackets: Round top to accept tube rail, size to allow minimum 1-1/2 inch clearance from rail to wall.

D. Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing.

E. Galvanizing: Thickness of coating on tubing in accordance with ASTM A123. Fittings shall be galvanized in accordance with ASTM A153.

F. Finish: Clean galvanized finish, no paint.

G. Non-Shrink Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 5,000 psi in 24 hours and 8,000 psi in 7 days; SUPER POR-ROK ANCHORING CEMENT manufactured by Minwax Construction Products Division, Montvale, NJ, or an equal meeting the same standard of performance.

H. Touch-Up Primer for Galvanized Surfaces: Ready mixed Zinc rich galvanizing compound, DEVCON 2, by Devcon Corp., Danvers, MA, GALVICON by Southern Coatings, Sumter, SC, or equal.

I. Epoxy Adhesive: Two component material suitable for anchoring into dry or damp concrete. Same as Burke's "Burk Epoxy MV", Covert's "CIA-Gel 7000", Hilti's "HIT C-100" or equal product.

2.2 FABRICATION

A. Fabricate handrails of specified tubing only in conformance with CSAS requirements.

B. Fit and stop assemble components in largest practical sizes for delivery to site.

C. Fabricate components with joints tightly fitted and secured.

D. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

F. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

G. Accurately form components to each other and to building structure.

H. Hot-dip galvanize all fabricated assemblies in accordance with ASTM A123.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Beginning of installation means erector accepts existing conditions.

3.2 PREPARATION

A. Clean and strip steel items to bare metal where site welding is required.

3.3 INSTALLATION

A. Set vertical supports in core-drilled holes with the specified non-shrink grout or epoxy adhesive.

B. Install components plumb and level, accurately fitted, free from distortion or defects.

C. Provide anchors, plates or angles required for connecting railings to structure. Anchor railing to structure.

D. Field weld anchors as indicated on shop drawings. Grind welds smooth.

E. Conceal bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

F. Touch up welds and chipped surfaces with specified galvanizing compound prior to completion.

3.4 ERECTION TOLERANCES

A. Maximum Variation from Plumb: ¼ Inch in 10 feet.

3.5 DEFECTIVE WORK AND MATERIALS

A. Work found to be defective, missing or damaged shall be immediately replaced with proper work. Such replaced work and the inspection for same shall be at the expense of the Contractor. All proposals for the repair or replacement of damaged, defective, or missing work to be reviewed by the Architect.

B. Straightening of any materials, if necessary, shall be done by a process and in a manner that will not injure the materials.

C. If defects or damage work cannot be corrected in the field, the material shall be returned to the shop or new parts furnished. The Contractor shall replace all work at his own expense.

3.6 CLEANING

A. After erection, all surfaces shall be cleaned and left free of all grime and dirt. Remove unused materials, tools, equipment and debris from the premises and leave broom clean.

B. For Galvanized Surfaces: Clean welds, bolted connections and abraded areas and apply galvanizing repair. Paint to comply with ASTM A780.

END OF SECTION

SECTION 16010

GENERAL ELECTRICAL

PART 1 – GENERAL

1.1 DESCRIPTION

A. General: Furnish all labor, materials, apparatus, tools, equipment, transportation, temporary construction and special or occasional services as required to make a complete working electrical installation, as shown on the drawings or described in these specifications.

B. Work Included:

1. Branch circuit wiring.

2. Underground raceways, grounding and site pullboxes/handholes. Minimum underground conduits for lighting shall be 1”.

3. Site work, trenching, backfill and compaction.

4. Pathway lights and maintenance weatherproof GFCI receptacles.

C. Related Work:

1. Perform the following work, in accordance with appropriate sections of the specifications cited, where and as necessary to furnish a complete, working electrical installation.

1.2 REFERENCES

A. Specific:

1. The following publications or editions of the documents current at the time a project is on-going shall apply:

a. National Electrical Code.

b. Uniform Building Code.

c. California Code of Regulations, Titles 24.

2. Equipment and materials specified under this Division shall conform to the following standards where applicable.

a. UL, Underwriters' Laboratories.

b. ASTM, American Society for Testing Materials.

c. CBM, Certified Ballast Manufacturers.

d. ANSI, American National Standards Institute.

1.3 DRAWINGS

A. Layout: General layout shown on the drawings shall be followed except where other work may conflict with the Drawings.

B. Accuracy:

1. Drawings for the work under this Section are diagrammatic.

2. Contractor shall verify lines, levels and dimensions shown on the Drawings and shall be responsible for the accuracy of the setting out of work and for its strict conformance with existing conditions at the site.

1.4 SUBSTITUTIONS

A. General: Refer to Division - 1 for substitution requirements.

1.5 SUBMITTALS

A. General: Refer to Division - 1 for submittal requirements.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Equipment and materials shall be properly stored and adequately protected and carefully handled to prevent damage before and during installation. Equipment and materials shall be handled, stored, and protected in accordance with the manufacturer's recommendations and as approved by the City. Electrical conduit shall be stored to provide protection from the weather and accidental damage. Plastic conduit shall be stored on even supports and in locations not subject to direct sun’s rays or excessive heat. Cables shall be sealed, stored and handled carefully to avoid damage to the outer covering or insulation and damage from moisture and weather. Damaged or defective items, in the opinion of the City, shall be replaced with new items at no cost to the City.

1.7 PERMITS AND FEES

A. City to pay for all permits. The contractor shall pay and provided for licenses and fees required to carry on and complete the work.

PART 2 – PRODUCTS (Not applicable)

PART 3 – EXECUTION

3.1 TESTS

A. Tests shall be conducted during the construction period and at completion to determine conformity with applicable Codes and with these Specifications. Tests shall be performed in the presence of the City, and shall include, but are not limited to, the following:

1. Insulation Resistance: Perform 500-volt D.C. tests for one minute on all feeder conductors, including the neutral, and make a typed record of all readings to be included in the maintenance instructions. Repair or replace circuits showing less than 40 megohms resistance to ground. Make tests using Biddle Insulation Resistance Megger, or equal.

2. Ground Resistance: Test ground resistance per IEEE Standard No. 81.

3. Circuits Continuity: Test all feeder and branch for continuity. Test all neutrals for improper grounds.

4. Equipment Operations: Test power circuits for correct operation through their control devices.

5. Product Failure: Any product which fails during the tests or are ruled unsatisfactory by the City shall be replaced, repaired, or corrected as prescribed by the City at the expense of the Contractor. Tests shall be performed after repairs, replacements or corrections until satisfactory performance is demonstrated.

6. Physical Inspection of Electrical Equipment and Cables: Inspection shall be made of all equipment to insure proper assembly and construction.

3.2 INSTRUCTIONS AND MANUALS

A. Contractor shall at the time of completion, allot an adequate period for instruction of City's operations and maintenance personnel in the use of the lighting systems. All personnel shall be instructed at one time.

B. Contractor making all necessary arrangements with manufacturer's representatives.

C. The equipment manufacturer shall provide product literature and application guides for the City's reference.

3.3 PROJECT RECORD DOCUMENTS (AS-BUILT)

A. Provide Project Record Drawings and Specifications as required by other Sections of the Specifications and as required herein. Such drawings shall fully represent installed conditions including actual location of outlets, correct conduit and wire sizing as well as routing, revised fixture scheduling listing the manufacturer and products actually installed.

B. All changes to drawings shall be clearly marked on plans and submitted to City for review prior to submittal of final record drawing submittal in ACAD format.

3.4 WORKMANSHIP

A. Preparation, handling and installation shall be in accordance with Manufacturer's written instructions and technical data particular to the product specified and/or approved except as otherwise specified. Coordinate work and cooperate with others in furnishing and placing this work. Work to approved shop drawings for work by others and to field measurements as necessary to properly fit the work.

B. Conform to the National Electrical Contractor's Association Standard of Installation for general installation practice.

3.5 PROTECTION

A. Keep conduits, junction boxes, outlet boxes, and other openings closed to prevent entry of foreign matter. Cover fixtures, equipment and apparatus and protect against contamination or damage from dirt, paint, water, chemical or mechanical means, before and during construction period. Restore to original condition any fixture, apparatus, or

equipment damaged prior to final acceptance, including restoration of damaged shop coats of paints, before final acceptance. Protect bright finished surfaces and similar items until in service. No rust or damage will be permitted.

3.6 SPECIAL TOOLS

A. All special tools for proper operation and maintenance of the equipment provided under this section shall be delivered to the City.

3.7 CUTTING AND PATCHING

A. Install all required sleeves, forms and insets before walls or partitions are built. Cutting and patching of walls, partitions, ceilings and floor necessary for reception of work, cause by failure to provide or properly located sleeves, forms and inserts, incorrect location of work or failure to cooperate with other trades, shall be done at expense of trade responsible.

B. No cutting of finished or structural work may be done without acceptance. When necessary to have finished material or structural work cut, finish necessary drawings to trade whose materials are out to be cut.

3.8 CLEARANCES

A. Provide working clearances in front of, in back of, and to sides for all electrical equipment as required by National Electrical Code Article 110.

END OF SECTION

SECTION 16100

BASIC MATERIALS AND METHODS

PART 1 GENERAL

1.01 DESCRIPTION

A. Work specified in this section encompasses products, assemblies and basic installation methods required for electrical project systems specified under this Division.

B. Work Included:
1. Conduits and fittings
2. Wire and cables
3. Wire connections and devices
4. Outlet boxes
5. Pull and junction boxes
6. Handholes and spliceboxes
7. Ground rods
8. Receptacles

B. Related Work:
1. Section 16010 - General Electrical.
2. Section 16510 - Lighting Fixtures.
3. Section 16600 – Electrical Site Work.

1.03 SUBMITTALS

A. Submit in conformance with the requirements of Section 16010 the following items:
1. Conductors and cables
2. Raceways
3. Handholes and spliceboxes
4. Ground rods and fittings
5. Receptacles
6. Outlet boxes

PART 2 PRODUCTS

2.01 CONDUIT AND FITTING

A. Rigid Steel Conduit
1. Conduit, rigid steel: full weight, threaded, hot-dip galvanized, inside enameled, conforming to ANSI C80.1
2. Three-piece couplings: electroplated, cast malleable iron. Efcor 165 series, O.Z./Gedney 4-50 series, or equal
3. Threadless couplings: electroplated, cast malleable iron, with integral conduit stop, Efcor 1760, or equal.
4. Threadless connectors: electroplated, cast malleable iron, on threaded male hub plastic insulated throat rated 90 degrees C minimum. Efcor 1750B series, O.Z./Gedney 31-050 1T series, or equal.
5. Insulated bushings: threaded polypropylene or thermosetting phenolic rated 150 degrees C minimum.
6. Insulated grounding bushings: threaded cast malleable iron body with insulated

throat and steel, "lay-in" ground lug with compression screw. O.Z./Gedney BLG series, Thomas & Betts 3870 series, or equal.

7. Insulated metallic bushings: threaded cast malleable iron body with plastic insulated throat rated 105 degrees C., O.Z./Gedney Type B, Thomas & Betts 1222 series, or equal.

B. Electrical Metallic Tubing (EMT)

1. Conduit: Shall be formed of cold rolled strip steel, electrical resistance welded continuously along the longitudinal seam and hot-dip galvanized after fabrication. Conduit shall conform to ANSI C80.3 specifications and shall meet U.L. requirements.
2. Couplings: Electroplated, cast malleable iron, gland compression type, U.L. listed rain and concrete tight through 1-1/4 inch trade size: O.Z./Gedney 6050W series, Efcor 760 series, or equal. Set-screw type couplings may be used in dry locations, O.Z./Gedney 5050 series, or equal.
3. Connectors: Gland compression type with cast malleable iron body with male hub and insulated plastic throat 150 degrees C temperature rated. O.Z./Gedney 4050 series, or equal.

C. Flexible Metallic Conduit

1. Conduit: Shall be fabricated in continuous lengths from galvanized steel strip, spirally wound and formed to provide an interlocking design.
2. Fittings: Connectors shall be made of the screw clamp with cast malleable iron bodies and threaded male hubs with insulated throats.

D. Liquid Tight Flexible Metallic Conduit

1. Conduit: Anaconda Type U.A., Coleman Type Uxt1, or equal.
2. Fittings: Connector body and gland nut shall be of cadmium plated cast malleable iron, with insulated throat, T & B 5331 series, O.Z./Gedney 4Q-38-1T series, or equal.

E. Rigid Non-Metallic Polyvinylchloride Conduit

1. Schedule 40 and 80 PVC.
2. All fittings solvent welded.
3. As manufactured by Carlon, or equal.

F. Non-Metallic Polyethylene Plastic Conduit

1. Schedule 40 and 80 Polyethylene, per ASTM D 2447, conforming to NEMA TC 3.
2. All fittings solvent welded.
3. As manufactured by Wesflex Pipe Manufacturing, or equal.

F. Minimum acceptable conduit size: 3/4 inch.

2.02 WIRE AND CABLE

A. General

1. Acceptable manufacturers: Southwire, Triangle, PWC Inc., or equal.
2. Conductor material: All wire and cable shall be insulated copper for all wire sizes.
3. Insulation: Insulation shall be THWN-THHN for wire sizes through size 1/0 AWG. For larger wire sizes insulation shall may be THWN, XHHW, THW or as required to suit application.
4. Fixture wire: Type AF.
5. Minimum conductor size:

Power and lighting branch circuits: #12 AWG

6. Color coding: System conductors shall be identified as to phase connections by means of color impregnated insulation or approved colored marking tapes as follows:

VOLTAGE	A PH.	B PH.	C PH.	NEUTRAL	GRD.
208V/120	Black	Red	Blue	White	Green
480V/277	Orange	Purple	Brown	White	Green

2.03 PROTECTIVE DEVICES

A. Circuit Breakers: Molded case, bolt-on, thermal magnetic type, 40 degrees C. ambient temperature compensated, fixed mounting, with quick-make, quick-break switch mechanism mechanically trip-free from the operating handle, conforming to applicable UL requirements.

B. Ratings: Refer to drawings and panel schedules for trip frame and poles required. Minimum short circuit rating for 120/208 volts breakers is 10,000 AIC if not indicated otherwise.

2.04 OUTLET BOXES AND COVERS

A. Standard Outlet Boxes: Galvanized, one-piece, drawn steel, knock-out type of size and configuration best suited to the application indicated on the plans. Minimum box size, 4 inch square by 1-1/2 inch deep.

B. Cast Outlet Boxes: Malleable iron, for use with threaded conduit, of size and configuration best suited to the application. As manufactured by Appleton, Killark, or Crouse Hinds.

C. Cast Floor Boxes: Adjustable metallic floor boxes, sized as required to accommodate devices, with threaded plug openings, brass covers: As manufactured by Steel City, Walker or equal.

2.05 SWITCHES AND RECEPTACLES

A. General

1. All general purpose 20 ampere, 125-250 volt receptacles and 120-277 volt switches shall conform to NEMA WD-1 and applicable U.L. tests. Color of devices shall be as selected by City.

B. Receptacles

1. Ground fault circuit interrupter receptacle: NEMA type 5-20R, Leviton #6399 or equal.

2. Duplex receptacles shall be NEMA type 5-20R, heavy duty, specification grade, Leviton #5362, or equal.

C. Switches: Twenty amperes, 120-277 volts, fast make- slow break, quiet type switch with silver cadmium alloy contacts, binding head terminal screws, back and side wired. All switches shall be ivory in color.

1. Single pole, single throw: Leviton 1221, or equal.

2. Three-way: Leviton #1223, or equal.

3. Double pole, single throw: Leviton #1222, or equal.

4. Dimmer Switches: Lutron Nova Series to suit application.

2.06 DEVICE PLATES

A. Flush Device Plates: Device plates shall be of one-piece type of suitable shape for the devices to be covered. Where the device plate does not cover the outlet opening, special large plates shall be used. Sectional Device Plates will not be permitted. Plates shall be brushed stainless steel type 302, 0.04 inches thick.

B. Surface Mounted Devices, indoor: Galvanized metal to fit box.

C. Outdoor, Weatherproof: Cast aluminum with hinged in use cover flap.

2.07 ELECTRICAL SUPPORTING DEVICES

A. Concrete Fasteners: Remington, Ramset, or equal. Powder-driven concrete pin fasteners, low velocity type.

B. Conduit Straps: Hot-dip galvanized, cast malleable iron, one hole type strap with cast clamp-backs and spacers as required. O.Z./Gedney #14-50G strap and #141G spacer; Efcor #231 strap and #131 spacer, or equal.

C. Construction Channel: 1-1/2 inch by 1-1/2 inch 12 gauge galvanized steel channel with 17/32 inch diameter bolt holes, 1-1/2 inches on center, in the base of the channel. As manufactured by Kindorf 905 series, Unistrut P-1000-HS, or equal.

D. Fasteners (General): Wood screws for fastening to wood. Machine screws for fastening to steel. Toggle bolts for fastening to hollow concrete board, gypsum board or plaster walls. Expansion anchors for attachments to pre-poured concrete.

2.08 IDENTIFYING DEVICES

A. Panelboard Directories: Shall be typewritten, arranged in numerical order and show the number of the circuit its description.

B. Wire & Terminal Markers: Self-adhering, pre-printed vinyl with self-laminating wraparound strip. Brady B191 series; Thomas & Betts WSI series, or equal.

2.09 GROUNDING

A. Enclosures of equipment, raceways, and fixtures shall be permanently and effectively grounded. Provide code-sized, unless otherwise indicated, copper insulated green equipment ground with all conduit runs. Equipment ground shall originate at switchboard and/or panelboard ground bus and shall be bonded to all switch and receptacle boxes and electrical equipment enclosures, lighting poles ground lugs, and to driven ground rods in handholes.

B. Driven ground rods shall be copper-clad steel, minimum size ¾" diameter x 10 feet long at main service, and 5/8" diameter x 8 feet long where installed in handholes, or as noted on Plans. Ground rods shall be provided with suitable rod clamps of phosphor bronze (do not use clamps intended for water pipe connections).

2.10 HANDHOLES & SPLICE BOXES

A. Shall be as manufactured by Christy, Forni, Utility Vault or approved equal.

B. Handholes and splice boxes shall be constructed of reinforced concrete, complete with basic bodies, risers and covers. Provide driven-ground rods in all handholes and splice boxes used for power. Covers shall be reinforced concrete where located in non-traffic areas. In traffic areas, boxes shall be full-traffic rated H-20, with steel covers.

B. All covers shall be marked "electric" for lighting/power circuits.

PART 3 EXECUTION

3.01 CONDUIT AND RACEWAY APPLICATIONS

A. Rigid Steel Conduit: For all exposed conduit exposed to mechanical damage, and Underground, with corrosion resisting tape wrapping.

B. Electrical Metallic Tubing (EMT): Interior branch circuits where run concealed above suspended ceiling, in stud walls, furred spaces, and where not exposed to mechanical damage, or above 6' from floor.

C. Flexible Metallic Conduit: In dry locations for connection from adjacent boxes to transformers, and vibrating equipment.

D. Liquid-Tight Flexible Metallic Conduit: For connections in damp and wet locations to pump motors, solenoid valves, HVAC equipment and similar devices, shall be made using liquid-tight flexible metallic conduit. Provide separate ground wire independent of conduit, run inside conduit and bonded at both ends to enclosures.

E. Rigid PVC Conduits: Schedule 40 & 80 PVC may be used underground only, with 3" sand under and 6" sand over when serving lighting circuits and power secondary circuits.

3.02 CONDUIT INSTALLATION

A. General
1. Conduit system shall be concealed unless exposed work is clearly indicated on the Drawings.
2. Conduits shall be tightly covered and well protected during construction using metallic bushings and bushing "pennies" to seal open ends.
3. In all empty conduits or ducts, install a 200-pound tensile strength polyethylene pulling rope.
4. Conduit systems shall be electrically continuous throughout. Install code size, insulated, copper, green grounding conductor in all conduit runs indicated, or required by code, or as indicated on Drawings.
5. Minimum underground conduit for lighting shall be 2 (two) inch.

B. Layout
1. Locations of conduit runs shall be planned in advance of the installation and coordinated with the paving, drainage and site work in the same areas.
2. Conduits shall not be placed closer than 12 inches from a parallel water line, or 6 inches from such lines crossing perpendicular to the runs.

C. Supports
1. All raceway systems shall be secured to structures using specified fasteners, clamps and hangers spaced according to code requirements.
2. Support single runs of conduit using one-hole pipe straps. Where run horizontally on walls in damp or wet location, install "clamp backs" to space conduit off the surface.

D. Termination and Joints
1. Raceways shall be joined using specified coupling or transition couplings where dissimilar raceway systems are joined.
2. Conduits shall be securely fastened to cabinets, boxes and gutters using two-locknuts and an insulating bushing or specified insulated connectors. Install grounding bushings or bonding jumpers on all conduits terminating at concentric knockouts.
3. Conduit terminations exposed at weatherproof enclosures and cast outlet boxes, shall be made watertight using specified connectors and hubs.

3.03 CABLE AND WIRE INSTALLATION

A. General
1. Conductors shall not be installed in conduit until all work of any nature that may cause injury is completed. Care shall be taken in pulling conductors that insulation is not damaged. UL approved non-petroleum base and insulating type pulling compound shall be used as needed.
2. All cables shall be installed and tested in accordance with Manufacturer's requirements and warranty.

B. Splicing and Terminating
1. All aspects of splicing and terminating shall be in accordance with cable manufacturers published procedures.
2. Make up all splices in outlet boxes with connectors as specified herein with separate tails of correct color to be made up to splice. Provide at least six (6) inches of tails packed in box after splice is made up.
3. All wire and cable in panels, terminal cabinets and equipment enclosures shall be bundled and clamped.

END OF SECTION

SECTION 16510

LIGHTING FIXTURES

PART 1 GENERAL

1.01 DESCRIPTION

A. Furnishing, installation and connection of all fixtures, lamps, ballasts, lighting control devices, related components and accessory wiring as shown on the plans, Fixture Schedule or as specified herein.

B. Related Sections:
   1. Section 16010 - General Electrical
   2. Section 16100 – Basic Materials and Methods

1.02 REFERENCES

A. ANSI C82.2
B. ASTM C635 AND E580
C. NFPA 70
D. UL 57, 924, 935
E. CCR TL24
F. CBM

1.03 SUBMITTALS

A. Submit in conformance with the requirements of Section 16010 the following items:
   1. Catalog, and photometric data, for all lighting fixtures.
   2. Shop drawings for all special fixtures.
   3. Control devices, contactors, time switches and cabinets.

1.04 COORDINATION

A. Refer to Landscape Architectural Plans for exact location of lighting fixtures installed on site or exterior of building.

PART 2 PRODUCTS

2.01 LAMPS

A. Lamps shall be as manufactured by G.E., Sylvania Osram, Philips and Venture or approved equal.

B. Fluorescent Lamps
   1. 24, 36 and 48 inch long lamps, and 24 inch U-lamps shall be energy saving T-8 Octron tri-phosphor 3500 degrees K, 82 CRI.
   2. Compact twin-tube and double twin-tube, 9, 13, 18, 26and 32 watts nominal, tri-phosphor 2700 degrees K, 82 CRI

C. Metal Halide Lamps: Clear bulb, medium or mogul base as required, 4000 degrees K, 65 CRI, pulse-start, position oriented type, as manufactured by Venture Lighting *Uniform* pulse start systems. Minimum average lamp life for 250 watt lamps shall be 15,000 hours.

D. Metal Halide Lamps for Soccer and Softball: See Section 16520 – Sports Lighting.

E. LED shall be min 50,000 hours life with CRI greater than 85. Color temperature shall be 4000 degree K. All LED drivers shall be match per the manufacturer's recommendation and replaced due to any flicker issues during dimming or normal operations. **LED units shall be provided with min. ten year warranties.**

2.02 REFRACTORS, REFLECTORS AND LOUVERS

A. All glassware, plastic and metal shall be uniform, free from defects, and photo-metrically tested for distribution by an independent testing laboratory.

B. Plastic diffusers shall be of virgin acrylic plastic.

2.03 LIGHTING CONTROL PANELS, AND PHOTOELECTRIC CONTROL

A. Lighting control panel shall meet the requirements of the latest Title 24 Lighting Compliance standards. The lighting control panel shall have an internal astronomical time clock to control its outputs.

B. Suitable multipole relays shall be provided as shown on the drawings and connected to lighting control circuits for all branch circuits to be controlled by astronomical time clock.

C. Suitable manufacturers are Wattstopper, Leviton, or approved equal.

2.04 PHOTOELECTRIC CONTROL

A. Photoelectric control shall be either:

1. Flush mounted on weatherproof cover plate on North exterior building wall for centralize control.
2. Incorporated into the fixture housing for local control of fixture.

2.05 OCCUPANCY SENSORS

A. Occupancy sensors shall be incorporated into the fixture where required by Title 24 for control.

B. Acceptable manufacturers shall be The Watt-Stopper, Hubbell, Leviton, Mytech, or equal.

C. Sensors shall be in full compliance with requirements of CCR Title 24 covering energy emitting devices.

PART 3 EXECUTION

3.01 INSTALLATION

A. Contractor shall be responsible for handling, and fixtures shall be plumb, level, in straight lines without distortion and clean.

B. Install each fixture in a manner recommended by the fixture manufacturer and approved by the City. Under this Section of the work, furnish and install all additional ceiling

bracing, hanger supports and other structural reinforcements to the building required to properly and safely suspend fixtures, all as approved by the City.

C. Drivers: Drivers judged by the Architect to be noisy and failed or malfunctioning drivers shall be replaced at no expense to the owner within 12 months after installation is completed.

END OF SECTION

SECTION 16600

ELECTRICAL SITE WORK

PART 1 GENERAL

1.01 DESCRIPTION

A. Work Included
   1. Furnishing, installing and connecting of conduits, conductors, fittings and accessories.
   2. Trenching, directional boring, excavation, and backfilling for all underground conduits and ducts, spliceboxes, pull boxes and hand holes.
   3. Pavement, surfacing, and landscaping repairs.

1.02 RELATED SECTIONS

A. Section 16010 - General Electrical
B. Technical Requirements

1.03 SEPARATION FROM OTHER SERVICES

A. Separate conduit runs not less than one foot horizontally and one six inches vertically from gas, water sewer and drainage lines.

1.04 STANDARD PRACTICES

A. Installation of ducts and conduits shall be in accordance with latest edition of the NEC. Pull boxes to be provided per code.

PART 2 - PRODUCTS (Refer to SECTION 16100)

PART 3 EXECUTION

3.01 EXCAVATION

A. Excavations shall be open vertical construction of sufficient width to provide free working space around the work and to provide sufficient space for backfill and tamping.

B. Provide safety shoring, bracing or bulkheading to support excavations and maintain warning signs and barricades. Provide suitable temporary steel covers over excavations crossing roadways or walks.

C. Excavate all trenches so that minimum coverage above conduit or duct to finish grade is not less than 24", unless otherwise specified or shown on Drawings, or included in the technical requirement’s section

D. For non-metallic conduits or ducts not encased in concrete, excavate trench 3" below the required grade. Place 3" bed of sand properly compacted and graded to provide uniform bearing surface for conduits or ducts, unless otherwise specified or shown on Drawings, or included in the technical requirement’s section.

E. Excavate adjacent to existing trees by hand to avoid injury to trees and tree roots. Protect all roots 2" and larger in diameter with heavy burlap. Hand trim roots smaller than

2" diameter. Seal all cuts through roots 2" and larger with tree trimmer's asphaltic emulsion. If trenches remain open more than 24 hours, shade side of trench adjacent to tree with burlap and keep damp. Stockpiling of any materials within drip line of trees is prohibited.

F. Keep excavations free of water.

3.02 BACKFILLING

A. Cover non-metallic conduits and ducts not encased in concrete with a minimum 3" layer of sand. Compact sand backfill per specifications.

B. Except where sand or select fill is required as specified above and except under paved areas, walks or roads, use backfill of suitable excavated material with 2" maximum rocks or clods. If excavated material is unsuitable or inadequate for the backfill as specified, furnish and import additional suitable materials to complete the work.

C. Compact the fill by adding backfill material in 8" maximum layers and tamping by hand or machine. Do not machine-tamp first backfill layer over non-metallic conduits or ducts not concrete encased.

D. Remove shoring as backfill is placed. Remove from property surplus material remaining after backfilling, or place as directed by Owner's Representative.

E. Place " WARNING-ELECTRIC" marker strip the continuous length of trench, down 12" from finish grade. Strips shall be installed over all conduits

F. Replace existing road, walkway, pavement, or similar surfaces, to match existing work, and as indicated on Drawings.

G. Bring to grade any subsidence occurring during the Guarantee Period by adding surfacing materials of the like kind.

3.03 SPLICEBOXES, PULLBOXES AND HANDHOLES

A. In spliceboxes, place duct and conduit entries using knockout panels provided. Pour concrete around conduits to anchor them in place.

B. Provide End Bells at all PVC conduit or duct entrances where indicated on drawings.

C. Install boxes and handholes flush with grade or pavement. In pavement use boxes with covers that are traffic-rated. In landscape areas use reinforced concrete covers. All covers shall be marked "Electric", or as required to suit.

D. Handholes shall have as a minimum one base section and one 12" riser, set on a minimum 6" bedding of pea-gravel.

3.04 RACEWAYS

A. Install duct and conduit runs straight and true between vaults and spliceboxes. Do not use bends except where shown on plans. For alignment curves, use not more than 5 - degrees segments for each standard straight length.

B. Begin to fan out ducts from standard separation to splicebox, handhole or vault entrance at least 30' from entrance, using gradual alignment changes at coupling of each straight

section.

C. Slope duct runs 6" minimum per 100 feet to avoid possibility of pockets that could accumulate water. Double-slope grading of ducts from midpoint of run is permitted.

D. Stagger duct joints 6" vertically and horizontally. Anchor ducts to prevent floating during pouring of concrete.

E. Make bend radius to centerline of all conduits not less than 10 times nominal diameter of conduit.

F. Rod all underground raceways with approved flexible mandrels and brushes to remove all obstructions and to prove that raceways are clear and usable.

G. Furnish and install pull lines in all empty raceways. Pull line shall be continuous from splicebox to splicebox, handhole or vault, with 24" of slack left at each termination.

3.05 HORIZONTAL DIRECTIONAL DRILLING

A. Contractor shall have the option of using either open-cut trenching or horizontal directional drilling for the installation of underground conduits.

B. Horizontal directional drilling shall include the use of mechanical and hydraulic deviation equipment to allow for changing the direction of the boring course at any point during the operation. The equipment shall include instruments capable of monitoring the exact location of the drilling head assembly. The equipment shall be capable of creating and directing the bore-hole along a predetermined path to the specified target location.

C. Horizontal directional drilling shall be done with fluid-assisted mechanical cutting. Drilling fluids shall be as recommended by the equipment manufacturer. Contractor shall be responsible for regulating pressure and flow rates so that compaction of the surround subgrade materials around the bore is not altered.

D. Uncontrolled jetting (using fluid force to erode the soil) is prohibited. Any area where subgrade and/or aggregate base compaction has been damaged by boring shall be repaired at the Contractor’s expense, and to the satisfaction of Owner. Repair work shall include removal and replacement of surface paving at the Contractor's expense, if required for proper subgrade and/or aggregate base compaction.

E. Mobile horizontal directional drilling system shall be capable of being started at the existing finish grade at an inclined angle to achieve required depth. The equipment shall be capable of drilling a 2" to 3" diameter pilot hole to a distance of 200'. The drill head assembly shall utilize small diameter fluid jets to fracture along with mechanical cutters to bore and excavate soil as the head advances. The pilot hole is to be enlarged with reamers as required and the line pulled into the hole with fluid mixtures in accordance with the equipment manufacturers’ directions.

END OF SECTION