SECTION 02110

TREE PRESERVATION AND PRUNING

PART 1 – GENERAL

1.01 WORK INCLUDED

A. Preservation of trees, care, and pruning of trees to remain in place.

B. Trimming of tree (limbs and tree roots) as may be required to construct the improvements.

C. The work shall include the provision of all labor, materials, equipment and apparatus not specifically mentioned herein or noted on the plans, but which are incidental and necessary to complete the work specified.

1.02 JOB CONDITIONS

A. The Contractor will be held responsible for any damage to trees or other plants, which are to remain during construction, including limb or branch breakage, tearing of bark along trunk or excessive root damage. Large roots greater that 6" in diameter and 12" below ground level shall not be cut without the City's approval.

1.03 QUALIFICATION

A. All tree pruning and removal performed shall be executed by a company having, in full-time employment, an Arborist certified by the Western Chapter of the International Society of Arboriculture. Certification must be verified, and the Arborist must be directly responsible for decisions made, and should visit the work sites daily when trimming of trees and roots is to be performed.

B. Pruning shall be performed to the standards of the International Society of Arborists Pruning guidelines, and to ANSI A-300.

C. Tree pruning shall not occur without first securing a pruning permit. Permit applications shall be submitted to City.

D. Tree removal shall not occur without first securing a tree Removal Permit. For regulations on size description, application procedure and fees, the Contractor shall contact the City.

1.04 APPLICABLE PUBLICATIONS

A. Trees and Building Sites: Official Publication of the International Society of Arboriculture.

B. Arboriculture: The care of trees and shrubs by Dr. Richard Harris

PART 2 – PRODUCTS

None

PART 3 – EXECUTION

3.01 TREE PROTECTION

A. At sites where the excavation has taken place near trees to remain, and many living roots remain exposed to the air, the Contractor shall cover the exposed roots within 2 hours with sand, soil, moist burlap or other means acceptable to the City.

B. Construction materials, debris, and supplies shall not be stored within the drip line or protective fencing area under any tree.

C. Vehicles shall not be parked within the drip line or protective fencing area.

D. Woodchips or another cushioning surface material approved by the City shall be placed over areas where roots are present and construction traffic occurs.

E. Where called for on the plans, place fences or other approved protective barriers around trees to be saved.

3.02 TREE PRUNING

A. Tree pruning shall be performed to balance the crown and eliminate hazards. The main work performed shall be to reduce the sail effect through thinning. reducing end weights, shortening long heavy limbs, removing deadwood, weak limbs and sucker growth. Limbs shall be pruned back to an appropriate lateral branch.

B. All final cuts shall be made at the outer edge of the branch collar. The pruning work shall be performed in a safe and proper manner, adhering to CAL-OSHA and ANSI Standards

C. The Contractor shall be responsible for the preservation of all public and private property. Pruning includes the cutting of limbs, cleanup, removal and disposal of cuttings and debris. Elm logs must be properly disposed of per State Quarantine. Work shall be performed by a two-person crew with one climber, one ground person, a dumping chipper truck and chipper, and any other necessary saws, lines, tools and safety equipment. The work area shall have appropriate cones and signs for safe pedestrian and vehicle traffic.

3.03 ROOT PRUNING

A. Tree roots greater than 3" in diameter and less than 12" below ground level shall not be cut without approval of the City.

B. Roots shall be cut clearly, as far from the trunk of the tree as possible. Root pruning shall be to a depth of 18".

C. Root pruning shall be performed using a Vermeer Root Cutting Machine. Alternate equipment or techniques must be approved by the City.

D. Root pruning shall be completed prior to base or subgrade preparation, or to any excavation adjacent to the tree.

END SECTION 02110

SECTION 02810

IRRIGATION SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. The General and Supplementary Conditions and General Requirements apply to the work herein specified.

1.02 DESCRIPTION:

A. Contractor shall furnish all labor, tools, equipment, product, materials and transportation and perform all operations necessary to properly execute and complete all work in accordance with the Drawings and these Specifications. The intent is to accomplish the work of installing an irrigation system, which will operate in an optimum manner. This intention is to be met foregoing any deficiency in setting a complete detailed description of the work to be done.

B. Related Work Specified Elsewhere:

1. Section 02210: Earthwork and Site Grading
2. Section 02900: Landscape Planting
3. Division 15: Mechanical
4. Division 16: Electrical

1.03 QUALITY ASSURANCE:

A. Reference Standards:

1. ASTM: American Society for Testing and Materials
   a. D1785: Standard Specification for polyvinyl chloride (PVC) plastic pipe, Class 200, Class 315.
   b. D2446: Standard Specification for polyvinyl chloride (PVC) plastic pipe fittings, Schedule 40 and Schedule 80.
2. NSF: National Sanitation Foundation

B. Drawings:

1. For purposes of clarity and legibility, drawings are essentially diagrammatic to the extent that many offsets, bend, unions, special fittings, and exact locations of items are not indicated, unless specifically dimensioned.
2. Exact routing of piping, etc., shall be governed by structural conditions, obstructions. Contractor shall make use of data in Contract Documents.

3. The contractor shall not willfully install the irrigation system as shown on the drawings when it is obvious in the field that unknown obstructions, grade difference or discrepancies in area dimensions exist that might not have been considered in engineering. Such obstructions or differences shall be brought to the attention of the irrigation consultant. In the event this notification is not performed, the contractor shall assume full responsibility for any revision necessary.

1.04 VISIT TO THE SITE:

The contractor shall visit the construction site and shall take all measurements and obtain any other information as may be necessary for a complete and conclusive bid.

1.05 SUBMITTALS:

A. Substitutions:

Prior to installation, any proposed substitution from the plans or these specifications is to be forwarded, in writing, to the irrigation consultant for approval.

B. Record Drawings:

Provide record drawings as follows:

1. The contractor shall maintain in good order in the field office one complete set of prints of all sprinkler drawings, which form a part of this contract. In the event any work is not installed as indicated on the drawings, such work shall be indicated and dimensioned accurately on record drawings as changes occur. Dimension from two permanent points of reference, building corner, sidewalk, road intersections, etc., the location of the following items.

    a. Connection to existing water lines
    b. Connection of existing electrical power
    c. Routing of pressure lines (dimension max. 100 feet lone along routing)
    d. Electrical control valves
    e. Routing of control wires
    f. Quick-coupling valves
    g. Underground stub-outs
    h. Other related equipment as directed by the irrigation consultant

2. Upon completion of the work, obtain reproducible mylar from the landscape architect and neatly correct the plans (to be done by a competent draftsperson) to show the as-built conditions. After the as-builts are reviewed and approved by the irrigation consultant, obtain reduced copies of "as-built" mylar (8-1/2" x 11" sheets or to the smallest readable size), and laminate with weather proofing coating.

C. Operation and Maintenance Manuals:

1. Prior to the final inspection of the irrigation system, furnish two (2) individually bound Service Manuals to the owner. The manuals shall contain the following:

    a. Index sheet indicating the contractor's name, address, and phone number.

b. A copy of the completed guarantee-following the form in these specifications.

c. Certificate of insurance verifying coverage for completed operations.

d. List of equipment with names, addresses and telephone numbers of all local manufacturers' representatives.

e. Copies of equipment warranties and certificates.

f. Complete operating and maintenance instructions of all equipment including exploded drawings and spare parts list.

2. Provide instruction in operation of system to owner's personnel.

D. Hardware Items:

1. Two (2) sets of matching Q.C.V. keys and hose swivels.

2. Two (2) keys to each controller box.

3. Two (2) sets of any special tool required for the maintenance of each type of component used in the sprinkler system.

1.06 PROJECT COORDINATION:

A. Sequencing and Scheduling:

Coordinate irrigation installation work with the installation of other site improvements, including utility installation work and landscape installation.

B. Environmental Conditions:

Site work such as trenching and backfilling shall not be performed during wet, muddy or frozen conditions.

C. Rules and Regulations:

All work and materials shall be in full accordance with the latest rules and regulations of the National Electric Code; the Uniform Plumbing Code and other applicable state or local laws or regulations. Nothing in these drawings or specifications is to be construed to permit work not conforming to these codes.

1. The contractor shall furnish any additional material and labor required to comply with these rules and regulations, though the work is not mentioned in these particular specifications or shown on the drawings.

2. When the specifications call for materials or construction of a better quality or larger size than required by the above mentioned rules and regulations, the provision of the specifications shall take precedence over the requirements of the said rules and regulations.

D. Safety:

1. The contractor shall erect and maintain barricades, guards, warning signs, and lights as required for the protection of the public and workmen.

2. All work shall be performed in a safe manner. All regulations, all OSHA requirements and other authoritative agencies shall be followed.

3. Prior to commencement of work, locate all underground utilities so that proper precautions may be taken not to damage such improvements.

E. Maintaining Traffic:

It is the responsibility of the contractor to ensure adequate protection and controls for pedestrian and vehicular traffic in the vicinity of the project areas. The contractor shall provide all signs, barricades, flagmen, etc., necessary to meet all traffic requirements for this project at his own expense.

F. Permits and Fees:

The contractor shall obtain all permits and pay all required fees to any governmental agency having jurisdiction over the work and arrange for inspections specified by local ordinances during the course of construction as necessary.

PART 2 - PRODUCTS

2.01 PRODUCT DELIVERY, STORAGE AND HANDLING:

Handling of pipe and fittings: The contractor is cautioned to exercise care in handling, loading, unloading, and storing of pipe and fittings. Cracks can occur from sudden impact. Protect all plastic products from excessive exposure to sunlight. Any section of pipe that has been dented or damaged shall be removed from the site and, if installed, shall be replaced with new undamaged piping.

2.02 MATERIALS:

A. PVC Pressure main line piping and fittings:

1. Pressure main line piping: 1120-Schedule 40 PVC plastic pipe. Fittings shall be Schedule 40 PVC solvent weld.

2. Pipe shall be made from NSF approved, Type 1, Grade 1 PVC compound conforming ASTM D1784. All pipe shall meet requirements set forth in ASTM D2441 with an appropriate standard dimension ratio.

3. All PVC pipe shall bear the following markings:

   a. Manufacturer's name
   b. Nominal pipe size
   c. Schedule or class
   d. Pressure rating in PSI
   e. NSF

f. Date of extrusion

4. All fittings shall bear the manufacturer's name or trademark, material designation, size, applicable I.P.D. schedule and NSF seal of approval.

B. PVC non-pressure lateral line piping and fittings:

1. Non-pressure buried lateral line piping shall be PVC 1120 Class 200 with Schedule 40 PVC solvent-weld fittings.

2. Pipe shall be made from NSF approved, Type 1, Grade 1 PVC compound conforming to ASTM D1784. All pipe shall meet requirements set forth in ASTM D2441 with an appropriate standard dimension ratio.

3. Except as heretofore specified, all requirements for non-pressure lateral line pipe and fittings shall be the same as for solvent-weld pressure main line pipe and fittings as specified.

C. Sleeving and Conduit: Material shall be polyvinyl chloride (PVC) Schedule 40, type 1120/1220 with solvent weld.

D. Galvanized steel pipe shall be Schedule 40; ASTM (A120) and steel fittings shall be Schedule 40 hot dipped, double banded malleable steel.

E. PVC Schedule 80 nipples shall be used with molded threads. Machined threaded nipples will not be allowed.

F. Connections between supply line and R.C.V.'s shall be as specified or detailed on the drawings.

G. Riser assemblies shall be as specified or detailed on the drawings.

H. Controller(s), valves, backflow preventer(s) and sprinkler heads shall be specified and/or detailed on the drawings.

I. Control wires shall be UL approved copper single strand type UF direct burial 14 gauge red in color. Common wires shall be UL approved copper single strand type UF direct burial 12 gauge white in color. Spare control wires shall be UL approved copper single strand type UF direct burial 14 gauge blue in color.

J. Miscellaneous installation materials:

1. Solvent weld joints shall be of make and type approved by manufacturer (s) of pipe and fittings. Solvent cement shall be a proper consistency throughout use. Mixing thinner with solvent will not be allowed.

2. Pipe joint compound shall be non-hardening, non- toxic materials designed specifically for use on threaded connections in water carrying pipe.

3. Wire connections shall be 3M #3750 Scotch Lok Seal Packs, Spears DS-400 seal packs or approved equal.

K. Thrust Blocks: Concrete thrust blocks shall be as detailed on the plans.

L. Control or Valve Boxes:

1. Provide 14 x 19 inch plastic rectangular control valve box with bolt down plastic lid for each electrical control valve. Hot stamp or permanently engrave irrigation controller station number onto valve box lid.

2. For gate valves and quick coupling valves: Use 9-inch plastic round box. Add extensions for gate valves as required. Hot stamp or permanently engrave "GV" for gate valve and "QCV" for quick coupler valves onto valve box lid.

PART 3 - EXECUTION

3.01 GENERAL:

A. Irrigation system shall be installed in accordance with all applicable local and state codes and ordinances by a licensed landscape contractor.

B. Follow manufacturer's direction except as shown or specified.

3.02 INSPECTION OF SITE CONDITIONS:

A. All scaled dimensions are approximate. The contractor shall check and verify all size dimensions prior to proceeding with work under this Section.

B. Exercise extreme care in excavating and working near existing utilities. Contractor shall be responsible for damages to utilities, which are caused by his operations or neglect. Check existing utilities drawings for existing utility locations.

C. Coordinate installation of irrigation materials, including pipe, so there shall be no interference with utilities or other construction or difficulty in planting trees, shrubs, and groundcover.

D. Avoid trenching within drip line of trees where possible. When not possible, all damaged roots over 1-1/2" in diameter shall be cut leaving clean face, seal cuts with tree seal, then immediately install pipe, wire, etc., refill trench and soak.

E. The contractor shall carefully check all grades to satisfy himself that he may safely proceed before starting work on the irrigation installation.

F. Coordinate the work of this Section with that of other Sections for the location of pipe sleeves through walls, paving, etc.

G. The landscape contractor shall verify water pressure and available gallonage prior to construction. If deficiencies are noted that will hinder the system's performance, notify the irrigation consultant for directions to correct deficiencies.

H. The design is diagrammatic. All piping, valves, etc., shown within paved areas is design clarification only. Install piping, valves, etc., in planting areas.

3.03 PREPARATION - LAYOUT OF WORK:

Prior to installation, stake out all pressure supply lines, routing and location of sprinkler heads and notify irrigation consultant for reviewing layout when area or grade differences or obstructions are not as indicated on the plans.

3.04 INSTALLATION:

A. Trenching:

1. Dig trench straight and support pipe continuously on bottom of trench. Lay pipe to an even grade. Trenching excavation shall follow layout shown on drawings.

2. Provide for a minimum of 18 inches cover for all pressure supply lines.

3. Provide for a minimum cover of 12 inches for all non-pressure lines to spray heads.

4. Provide for a minimum cover of 18 inches for all control wiring.

5. Provide a minimum cover of 24 inches over pipe and wiring under asphalt pavement.

B. Backfilling:

1. In accordance with requirements of SECTION 02215, "EXCAVATION AND BACKFILLING".

2. Do not backfill trenches until all required tests are performed. Carefully backfill trenches with specified excavated materials for backfilling, consisting of earth, loam, sandy clay, sand, or other acceptable materials, free from large clods of earth or stones. Backfill shall be mechanically compacted in landscaped areas to a dry density equal to adjacent undisturbed soil in planting areas. Backfill shall conform to adjacent grades without dips, sunken areas, humps or other surface irregularities.

3. Surround pipe with sand in rocky terrain with a 4" bed and 4" cover.

4. Backfill in proposed asphalt paved areas shall have sand covering pipe with a 6" minimum depth.

C. Pipe and Fitting Installation and Connections:

1. Install no multiple assemblies on plastic lines. Provide each assembly with its own outlet.

2. Install all assemblies specified herein in accordance with details shown on drawings.

3. Thoroughly clean PVC pipe and fittings of dirt, dust and moisture before installation. Installation and solvent welding methods shall be as recommended by the pipe and fitting manufacturer.

4. On PVC to metal connections, the contractor shall work the metal connections first. Use Teflon tape, or equal, on all threaded PVC to PVC, and on all treaded PVC to metal joints.

5. Install piping under existing walks by boring whenever possible. Where any cutting or breaking of sidewalks and/or concrete is necessary, it shall be done and replaced at no increase in contract sum. Obtain permission to cut or break sidewalks and/or concrete from the architect before proceeding. No hydraulic driving will be permitted under concrete paving.

D. Line clearance:

All lines shall have a minimum clearance of 6 inches from each other and from lines of other trades. Parallel lines shall not be installed directly over one another.

E. Automatic Controller:

1. Locate controller in general location shown with exact placement to be determined at job site by the irrigation consultant or Owner's Representative.

2. Connect control lines to controller in sequential arrangement according to assigned identification number on plans.

3. Controller shall be properly grounded per Article 250 of the National Electric Code and conform to local regulations.

F. Remote Control Valves:

Install where shown on drawings. When grouped together, allow at least 12 inches between valves. Install each remote control valve in a separate valve box. Locate boxes in groundcover areas whenever possible, and a minimum of 12 inches from paving or curbs.

G. Control Wiring:

1. Make connections between existing automatic controls and electrical control valves with direct burial copper wire. Common wires shall be white. Install in accordance with valve manufacturer's specifications and wire charts.

2. Wiring shall occupy the same trench and shall be installed along the same route as pressure supply or lateral lines wherever possible. When not possible, house wiring in PVC conduit as described in "Sleeving and Conduit" section.

3. Where more than one wire is placed in a trench the wiring shall be taped together at intervals of 10 feet.

4. Provide 2-foot expansion coil at each wire connection and at least every 100 feet of wire length on runs more than 100 feet in length. Form expansion coils by wrapping at least five turns of wire around a 1-inch diameter pipe, then withdrawing the pipe.

5. Splicing on runs shall be placed in junction boxes. Indicate all splices on the As-Built Plan.

6. All below grade wire connections shall be made by using heat shrink tubing with interwall sealer following manufacturers recommended procedures.

7. Install separate common wire for each controller. Install extra control wires of a different color through all valve boxes to controller as indicated in irrigation notes on plans.

H. Sleeving and Conduit:

1. Control wiring passing under proposed concrete and paving shall pass through Schedule 40 PVC conduit-size as required.

2. Sleeving and conduit shall extend six (6") beyond farthest edge of pavement or curb.

3. Provide removable non-decaying plug at ends of sleeves and conduits to prevent entrance of earth.

I. Flushing of System:

1. After all new pipelines and risers are in place and connected, all necessary diversion work has been completed, and prior to installation of sprinkler heads, open control valves and use a full head of water to flush out the system.

2. Install sprinkler head only after flushing of system has been accomplished.

J. Sprinkler Heads:

1. Install sprinkler heads as shown on Drawings.

2. Spacing of heads shall not exceed maximum shown on Drawings. In no case shall spacing exceed maximum recommended by manufacturer.

3.05 FIELD QUALITY CONTROL:

A. Adjustment of the System:

1. Flush and adjust all bubblers for optimum performance and to prevent overspray onto walks, roadways and buildings.

2. If it is determined that adjustments in the irrigation equipment will provide proper and more adequate coverage, the contractor shall make such adjustments prior to planting. Adjustments may also include changes in nozzles sizes and degrees of arc as required.

3. Lowering raised sprinkler heads by the contractor shall be accomplished within ten days after notification.

B. Testing of Irrigation System:

1. Notify the irrigation consultant at least three (3) days in advance of testing.

2. Test to be done at no extra cost to the Owner.

3. Center load piping with sufficient amount of backfill to prevent arching or slipping under pressure. No fitting shall be covered.

4. Testing of pressure main lines shall occur prior to installation of electrical control valves.

5. Pressure Test for Solvent Weld Pipes:

   a. Apply test for solvent welded plastic pipe after joints have cured at least 24 hours or more it manufacturer of solvent cement requires.

   b. Test supply lines per ASTM-F690 as follows: (1) add water slowly to pipe to avoid water hammer damage, (2) bleed system to insure all air is out of pipes, (3) pressurize system to 125 psi for two (2) hours. Visually inspect for leaks while system is holding pressure constant. Note – use hydraulic pump or other safe method – do not use air compressor.

   c. Test sprinkler lines at line pressure and visually inspect for leaks.

6. When the irrigation system is completed, perform a coverage test to determine if the water coverage for planting areas is complete and adequate. Furnish all materials and perform all work required to correct any inadequacies of coverage due to deviation from drawings. This test shall be accomplished before any plant material is planted.

7. Upon completion of each phase of work, test and adjust entire system to meet site requirements.

3.06 CLEAN-UP:

Clean-up shall be made as each portion of work progresses. Refuse and excess dirt shall be removed from the site, all walks and paving shall be broomed or washed down, and any damage sustained on the work of others shall be repaired to original conditions.

3.07 FINAL REVIEW PRIOR TO ACCEPTANCE:

A. Operate each system in its entirety at time of final review. Any items deemed not acceptable shall be reworked to the satisfaction of the irrigation consultant.

B. Final review shall take place after submission of all specified lists, record drawings, and manuals.

3.08 INSPECTIONS:

The contractor shall be subject to inspections at any and all times by authorized representatives of the Owner.

3.09 MAINTENANCE:

The contractor is to make all repairs and maintain the entire sprinkler system from the time of installation through the landscape maintenance period.

GUARANTEE FOR SPRINKLER IRRIGATION SYSTEM

WE HEREBY GUARANTEE THAT THE SPRINKLER IRRIGATION SYSTEM WE HAVE FURNISHED AND INSTALLED IS FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP, AND THE WORK HAS BEEN COMPLETED IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS. WE AGREE TO REPAIR OR REPLACE ANY DEFECTS IN MATERIAL OR WORKMANSHIP, ANY SETTLING OF BACKFILLED TRENCHES, WHICH MAY DEVELOP DURING THE PERIOD OF ONE YEAR FROM DATE OF ACCEPTANCE AND ALSO TO REPAIR OR REPLACE ANY DAMAGE CAUSED BY ANY DEFECTS IN THE IRRIGATION SYSTEM OR RESULTING FROM THE REPAIRING OR REPLACING OF SUCH DEFECTS AT NO ADDITIONAL COST TO THE OWNER. ORDINARY WEAR AND TEAR, UNUSUAL ABUSE OR NEGLECT ARE EXCEPTED. WE SHALL MAKE SUCH REPAIRS OR REPLACEMENTS, INCLUDING COMPLETE RESTORATION OF ALL DAMAGED PLANTING, PAVING, OR OTHER IMPROVEMENTS OF ANY KIND, WITHIN A REASONABLE TIME, AS DETERMINED BY THE OWNER, AFTER RECEIPT OF WRITTEN NOTICE. IN THE EVENT OF OUR FAILURE TO MAKE SUCH REPAIRS OR REPLACEMENTS WITHIN A REASONABLE TIME AFTER RECEIPT OF WRITTEN NOTICE FROM THE OWNER, WE AUTHORIZE THE OWNER TO PROCEED TO HAVE SAID REPAIRS OR REPLACEMENTS MADE AT OUR EXPENSE AND WE WILL PAY THE COSTS AND CHARGES THEREFORE UPON DEMAND.

PROJECT: _____

LOCATION: _____

CONTRACTOR: _____

LICENSE NO: _____

ADDRESS: _____

TELEPHONE: _____

GUARANTEE TO: _____

_____

_____

DATE OF ACCEPTANCE: _____

AUTHORIZED REPRESENTATIVE: _____

END OF SECTION 02810

SECTION 02870

SITE FURNISHINGS AND ACCESSORIES

PART 1 – GENERAL

1.01 SUMMARY

A. The General Conditions and all other Contract Documents for this project are complementary and applicable to this Section of the Specifications.

B. Work Included: Furnish all labor, materials, equipment and services necessary to provide and construct, repair, or install the site elements, complete in place, as shown and specified, including, but not limited to:

1. Benches
2. Bike Racks
3. Trash Enclosure

C. Related Work:
Section 03340: Site Concrete Work

1.02 SUBMITTALS

A. Submit shop drawings where noted to the Owner for approval before installing any manufactured items. Plans shall include dimensions, color, finish, structural design (custom items), and connection details.

B. Submit catalog cuts, samples and manufacturers literature of all manufactured items in this section to the Owner for approval before installation.

1. Provide color samples, brushouts, or charts for all items. Final colors to be selected by Owner and a sample submitted for approval.

PART 2 – PRODUCTS

2.01 MANUFACTURED ITEMS

A. Benches: per plans, by Owner

B. Bike Racks: per plans, by Owner

C. Trash Enclosure: Final Materials to be selected by Owner and samples submitted for approval.

2.02 MISCELLANEOUS MATERIALS

A. All other materials for site elements shall be as specified on the plans and these specifications.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Examination: Verify that conditions are satisfactory for installation of each item of site elements. If unsatisfactory conditions exist, do not begin installation until such conditions have been corrected.

B. Benches and Bike Racks

1. Install directly onto concrete. Use manufacturer's recommended adhesive.

3.02 GUARANTEE

A. At completion of project, Contractor shall provide Owner with written guarantee from each manufacturer identifying the nature of warranty for each product component.

B. Contractor shall provide Owner with two (2) bound maintenance manuals identifying each piece of equipment on manufacturer's recommended maintenance program including, but not limited to, daily, weekly, and monthly check lists.

C. Contractor to provide Owner with minimum of one (1) gallon each type and color of paint used on apparatus with recommended surface preparation and application guidelines.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT AND PAYMENT:

The Site Elements shall be measured as follows:

1. Benches shall be per each
2. Bike Racks shall be per each

The contract unit price for the actual quantity of each item installed, and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals for providing and installing all site elements as shown on the plans and as specified in these specifications. Payment shall only be made for installed elements as approved by the Owner.

END OF SECTION 02800

SECTION 02900

LANDSCAPE PLANTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. The General and Supplementary Conditions and General Requirements apply to the work herein specified.

1.02 DESCRIPTION:

A. Work to be Included:

1. Furnish and place topsoil, fertilizer, organic materials, and all other materials incidental to planting work.

2. Furnish all plant materials (trees, shrubs, seed, ground covers, and plant labels).

3. Furnish all labor, equipment and materials necessary for the installation of plant materials according to these Specifications.

B. Related Work Described Elsewhere:

1. Irrigation: Irrigation system shall be installed and operative before beginning planting operation.

2. Drainlines and Utilities: Contractor shall fully acquaint himself with the existing conditions particularly in reference to underground piping. Any damage caused by the Contractor to work of other trades shall be repaired by him at no cost to the Owner.

3. Earthwork: Close coordination shall be maintained with those Contractors performing rough grading operations and installing utilities and pavement to insure proper timing of the work.

1.03 REQUIREMENTS OF REGULATORY AGENCIES:

A. Perform work in accordance with all applicable laws, codes, and regulations required by the City of Livermore and any other authorities having jurisdiction over such work. Provide for all inspections and permits required by Federal, State, and local authorities in furnishing, transporting, and installing materials.

B. Certificates of inspection required by law for transportation shall accompany invoice for each shipment of plants. File copies of certificates with Owner's Representative after acceptance of material. Inspection by Federal or State Governments at place of growth does not preclude rejection of plants at project site.

1.04 QUALITY ASSURANCE:

A. Personnel: All planting and lawn work shall be performed by personnel familiar with lawn and planting procedures under the supervision of a qualified foreman.

B. Codes and Standards: Nursery stock shall meet the standards of the current edition of the "Agricultural Code of California" and the "Regulations of the Director of Agriculture Pertaining to Nursery Stock" as to grading and quality. They shall be true to type and name in accordance with "Standardized Plant Names", Second Edition.

C. Substitutions: Substitutions of plant materials will not be permitted unless authorized in writing by Owner's Representative. If proof is submitted that any plant specified is not obtainable, a proposal will be considered for use of the nearest equivalent size or variety with corresponding adjustment of Contract price. Such proof shall be substantiated and submitted in writing to Owner's Representative at least 30 days prior to start of work under this Section. These provisions shall not relieve Contractor of the responsibility of obtaining specified materials in advance if special growing conditions or other arrangements must be made in order to supply specified materials.

   The Landscape Architect reserves the right to require the Contractor to replace at the Contractor's cost any plants which the Contractor has installed without the Landscape Architect's approval.

D. Plants shall be subject to inspection and approval of the Landscape Architect at place of growth or upon delivery for conformity to specifications. Such approval shall not impair the right of inspection and rejection during progress of the work. Wherever the terms "approve", "approval" or "approved" are used herein they mean approval of the Landscape Architect in writing.

E. Plant Certification: All plants must meet specifications of Federal, State, and County laws requiring inspection for plant disease and insect infestations. Inspection certifications required by law shall accompany each shipment, invoice and order for stock.

1.05 SUBMITTALS:

A. Furnish 6 copies of manufacturers' literature for the following items:

   1. Fertilizer
   2. Mulch
   3. Lawn seed

B. Provide analysis from an approved testing laboratory for:

   1. Topsoil
   2. Organic Amendment

C. Submit one (1) quart sample each of mulch and organic amendment.

D. All submittal data shall be forwarded in a single package to the Landscape Architect within 60 days of award of the contract.

1.06 SAMPLES AND TESTS:

A. Owner's Representative reserves the right to take and analyze samples of materials for conformity to specifications at any time. Contractor shall furnish samples upon request by Owner's Representative. Rejected materials shall be immediately removed from the site at Contractor's expense. Cost of testing of materials not meeting specifications shall be paid by Contractor.

1.07 SELECTION AND TAGGING OF PLANT MATERIAL:

A. Plants shall be subject to inspection and approval by Landscape Architect at place of growth if the Landscape Architect so chooses, and upon delivery for conformity to specifications. Such approval shall not impair the right of inspection and rejection during progress of the work. Submit written request for inspection of plant material at place of growth to Landscape Architect. Written request shall state the place of growth and quantity of plants to be inspected. Landscape Architect reserves the right to refuse inspection at this time if, in his judgment, a sufficient quantity of plants is not available for inspection.

OR

B. Plants identified as "selected specimen" shall be approved and tagged at place of growth by Landscape Architect. For distant material, submit photographs for pre-inspection review.

1.08 JOB CONDITIONS:

A. Delivery:

1. Deliver standard products to site in original unopened containers bearing manufacturer's guaranteed chemical analysis, name, trade mark and conformance to state law.

2. Deliver plants with identification labels.
   a. Labels should state correct name and size.
   b. Use durable, water-proof labels with water resistant ink that will remain legible for at least 60 days.

3. Protect plant materials during transport to prevent damage to rootball or desiccation of leaves.

4. Remove unacceptable plant materials immediately from job site.

B. Storage:

1. Contractor shall maintain the plant material properly between delivery and planting. This includes protection from animals and vandals, proper watering, and feeding if necessary.

2. Shade plants shall be stored in the shade, and sun plants shall be stored in the sun.

C. Timing: Under no circumstances shall any work be performed if the temperature exceeds 90 degrees or is below 40 degrees. No planting shall be done with the soil saturated with water.

1.09 PROTECTION OF EXISTING PLANTS TO REMAIN:

A. Do not store materials or equipment, permit burning, or operate or park equipment under the branches of any existing plant to remain except as actually required for construction in those areas.

B. Provide barricades, fences or other barriers as necessary at the drip line to protect existing plants to remain from damage during construction.

C. Notify Owner's Representative in any case where Contractor feels grading or other construction called for by Contract Documents may damage existing plants to remain.

D. If existing plants to remain are damaged during construction, Contractor shall replace such plants of the same species and size as those damaged at no cost to Owner. Determination of extent of damage and value of damaged plant shall rest solely with Owner's Representative.

PART 2 - PRODUCTS

2.01 SOIL AMENDMENTS:

A. The following organic amendments, soil amendments, and fertilizer rates and quantities are to be used for bid basis only. Contractor shall arrange and pay for testing by an accredited soils laboratory of existing site soil after rough grading operations are complete, and shall amend the soils according to said laboratory's recommendations. The soils recommendations shall be considered a part of this specification.

B. Topsoil: Provide topsoil as required to complete landscape work. Topsoil to be furnished shall be fertile and friable, possessing characteristics of representative productive soils on the site. It shall not contain toxic substances which may be harmful to plant growth. If herbicide contamination is suspected then a radish/rye grass growth trial must be performed. Consult with Landscape Architect prior to decision to test. It shall be uniformly textured and free of all objectionable foreign materials, oil, or chemicals which may be injurious to plant growth. Natural topsoil shall possess a pH factor between 5.5 and 7.5, a sodium absorption ratio (SAR) of less than 8, a boron concentration of the saturation extract of less than 1 ppm, and salinity of the saturation extract at 25 degrees C. of less than 4.0 millimhos per centimeter.
Obtain topsoil from naturally well- drained sites where topsoil occurs in a depth of not less than 4 inches; do not obtain from bogs or marshes. Topsoil from the project stockpile which meets the requirements is acceptable.

C. Imported Topsoil: Topsoil shall be tested by an approved soils laboratory for compatibility with existing on-site soils and fertility. Contractor shall submit soil laboratory's analysis and amendment recommendations. Imported topsoil shall be

subject to inspection by Landscape Architect at the project site. Remove rejected topsoil immediately at Contractor's expense.

D. Organic Amendment:

1. Nitrified fir bark having a minimum organic content of 94% and a nitrogen content of 0.8% minimum to 1.2% maximum on a dry weight basis. Fir bark shall be shredded to pass a 1/4" mesh screen. Six cubic yards per 1,000 square feet.

E. Fertilizer:

1. Lawn and groundcover areas:

a. 6N-20P-20K, 25 lbs. per 1,000 square feet.
b. Starting one month after planting, on a monthly basis, 21N-0P-0K Ammonium sulfate. 5 lbs. per 1,000 square feet.

2. Shrubs and trees:

a. 21 gram 20N-10P-5K slow release fertilizer tablets as manufactured by Agriform. Apply according to Manufacturer's instructions.
b. After planting: 21N-0P-0K Ammonium sulfate 5 lbs. per 1,000 square feet.

2.02 TOP MULCH: Fir bark chips having a maximum size of 1" diameter.

***2.03 GRASS SEED:**

A. Grass seed shall be fresh, clean, new crop seed having purity of 98.5% and a minimum germination rate of 83%. Seed mix shall be mixed in the proportions by weight shown:

Dwarf Tall Fescue
80% Bonsai
20% Pixie

Apply at a rate of 10 lbs. per 1,000 square feet.

B. Seed shall be mixed by dealer. Furnish dealer's guaranteed statement of composition, mixture and percentage of purity and germination of each variety to Landscape Architect.

OR

***2.03 SOD:** Sod shall be one year old and dense with grass, having been mowed at 1 in. height before lifting from field. All grown on fumigated soil. Sod shall be in vigorous condition, dark green in color, free of disease and harmful insects. Sod shall be grown of seed mix of the following proportions by weight:

Dwarf Tall Fescue:
80% Bonsai
20% Pixie

2.04 GROUNDCOVERS, TREES, AND SHRUBS:

A. All plant materials shall be nursery grown in accordance with the best known horticulture practices and under climatic conditions similar to those in the locality of the project. Container stock shall have grown in the containers in which delivered for at least six (6) months, but not over two years. No container plants that have cracked or broken balls of earth when taken from container shall be planted except upon special approval by Landscape Architect.

B. Plants shall be vigorous and shall have a normal habit of growth. Plants shall be free of damage by insects, pests, diseases or wind; burns from insecticides or fertilizer; and stunted growth due to lack of water, lack of food, diseases, or other causes. Plants shall be in conformity with the sizes shown on the drawings.

C. Trees: Unless otherwise specified, tree trunks shall be straight with leader intact, undamaged, and uncut. All old abrasions and cuts are acceptable only if completely callused over.

D. Quantities: Quantities necessary to complete the work as shown on the drawings shall be furnished.

E. Root Systems: All shrubs and trees shall have a normal root system. No plants with roots that have encircled themselves will be accepted. In case of any unsatisfactory root system, a total group of plants may be rejected.

* F. Balled and Burlapped Trees: Plants shall be true to species and variety and shall conform to measurements specified except that plants larger than specified may be used if approved by Landscape Architect. Use of such plants shall not increase Contract price. If larger plants are approved, the ball of earth shall be increased in proportion to the size of the plant. Plants shall be measured when branches are in their normal position. Height and spread dimensions specified refer to main body of plant and not branch tip to tip. Caliper measurement shall be taken at a point on tree trunk 6 inches above natural ground line for trees up to 4 inches in caliper and at a point 12 inches above the natural ground line for trees over 4 inches in caliper. If a range of size is given, no plant shall be less than the minimum size specified. The measurements specified are the minimum size acceptable and are the measurements after pruning, where pruning is required.

2.05 WATER SOURCE:

A. Water source shall be provided by Owner. Contractor shall provide transport as required.

2.06 ROOT GUARDS: Deep Root Model UB 36-2 shall be used on all trees 6' or closer to pavement, utilities, curbs, etc. Deep Root (415) 344-1464.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS:

A. Inspections by the Landscape Contractor:

1. Prior to all work in this section, verify grades and carefully inspect the installed work of all other trades. Verify that all such work is complete to the point where the installation may properly commence.

2. In the event of discrepancy, immediately notify the Landscape Architect. Do not proceed with this installation in areas of discrepancies until all such discrepancies have been fully resolved.

3. Inspect trees, shrubs and ground cover plants for injury, insect infestations, and proper pruning.

4. Landscape Contractor shall receive site graded to $\pm$0.10 ft. of finish grades shown on the Drawings. Allow for depth of soil amendments and mulch in determining the difference between finished subgrade in groundcover and shrub beds. Verify that subgrades are not compacted. Do not proceed until detrimental conditions are corrected.

3.02 SOIL PREPARATION:

A. The Contractor shall prepare the site for landscaping. In the areas designated for landscaping on the plans, he shall, prior to placing imported material, replacing existing topsoil, or doing any planting, clear the areas of weeds, roots, debris, rocks, and underground obstructions, and construction debris to a depth acceptable for planting. Scarify the subgrade to a 3" minimum depth prior to spreading topsoil.

B. Cultivation and Placement of Amendment:

1. In areas to be planted with shrubs cultivate to a depth of 12".

2. In lawn and groundcover areas, cultivate soil to a depth of 8". Incorporate 6 cubic yards per 1000 square feet of nitrified fir bark. Prior to planting incorporate to a depth of 6" the following fertilizers, per 1000 square feet:

   25 lbs. 6N-20P-20K

3. Areas within the driplines of existing trees shall be hand cultivated.

C. Finish Preparation in Lawn Areas:

1. Roll to compact amended soil to not more than 85% compaction. Finish grade shall be 1" below adjacent paving, curbs, or walls unless otherwise shown on drawings. Finish out to smooth, even surface conforming to established grades after settlement. Rake immediately prior to planting.

2. If rain is likely between completion of soil preparation and planting, precautions shall be taken to prevent erosion of the soil.

D. Soil Mix for Backfill of Shrubs and Trees: The following ingredients shall be tumbled to achieve a homogeneous mix:

Organic amendment	1 cubic yard
Topsoil	3 cubic yards

E. Soil Mix for Backfill of Pots: The following ingredients shall be tumbled to achieve a homogeneous mix:

Organic amendment	1 cubic yard
Topsoil	3 cubic yards

Top dress each pot with one pound of Osmacoat 17-7-12 fertilizer.

3.03 SHRUBS AND TREES:

A. Preparation:

1. Stake out location for plants and outline of planting beds on ground and obtain the approval of Landscape Architect before digging.

2. The Contractor shall protect all utilities, vegetation, and structures during work.

3. Trees shall be located a minimum of 3' from walls, overheads, walks, headers, and other trees within the project. If conflicts arise between size of areas and plans, Contractor shall contact Landscape Architect for resolution. Failure to make such conflicts known to the Landscape Architect will result in Contractor's liability to relocate the materials.

B. Excavation:

1. All plant pits shall be dug with vertical walls. The sides and bottoms of all planting pits shall be thoroughly scarified.

2. Holes for one (1) gallon size plants: Twelve (12) inches wider than the can and six (6) inches minimum deeper.

3. Holes for (5) gallon size plants: eighteen (18) inches wider than the can or root ball, and eight (8) inches deeper than can or root ball.

4. Holes for fifteen (15) gallon size plants or larger: Twenty-four (24) inches wider than the can or root ball, and twelve (12) inches deeper than the can or root ball.

C. Plants in Containers:

1. Plants shall be removed carefully from their containers after the containers have been cut on two sides minimum; fifteen-gallon containers shall be opened in three places. In the case of boxed plant specimens, the wood shall be removed at the sides and at the bottom of the box.

2. After removing plant material from its container, stimulate root growth by making four or five vertical cuts 1" deep around the circumference of the root ball.

3. Do not lift or handle plants by the top, stems, or trunk at any time. All plants shall be lifted in such a manner that the root ball is supported from the underside.

4. The Contractor shall check all plants for adequate root systems. If the root system is defective, he shall remove deficient plants from the site and replace them with new ones.

D. Balled and Burlapped Material: Dig balled and burlapped (B&B) plant with firm, natural balls of earth, of diameter not less than that recommended by USA Standard for Nursery Stock, and of sufficient depth to include the fibrous and feeding roots. Plants moved with a ball will not be acceptable if the ball is cracked or broken before or during planting operations.

E. Planting:

1. Center plant in pit or trench over tamped mound.

2. Face for best effect.

3. Set plant plumb and hold rigidly in position.

4. All plants shall be set in the ground so that the root ball will be flush with the finish grade. All plants that settle below the finish grade within 30 days of acceptance of the work shall be replanted in the proper position. In case a total section of planting area settles, the Contractor shall lift the plants, import additional soil mix, regrade, and replant, at no additional cost to the Owner.

5. Use soil mix only for backfill. Backfill pit with soil mix in 9" layers and water each layer thoroughly to settle soil. The filled pit shall be flush with surrounding grade when complete.

6. When the plant pit has been approximately one half filled, place planting tablets according to the manufacturer's schedule.

7. Apply post-planting fertilizer.

8. In shrub mass areas, mulch area between plant pits with 3" layer of fir bark for weed control.

9. Planting operation for plants in raised concrete planters is same as above except that finish grade of soil mix shall be 1 1/2" below top of planter walls. Planters may be backfilled with excess topsoil up to the depth specified for plant pits above which backfill shall be soil mix.

10. Planting operations for plants in precast planters is the same as stated in paragraph 9 above. Fill entire planter with soil mix. Place planters as shown on planting plans.

* 11. In areas noted on Drawings where acid-loving plants will be installed, use the following planting mix:

2 parts amended soil
1 part fine sand
1 part peat moss

Immediately after plants are installed, apply Iron Sequestrene at the rate and in the method recommended by the manufacturer.

3.04 GROUNDCOVER AREAS:

A. Planting:

1. Space plants equally and uniformly at spacings indicated on the Drawings, which are the maximum and in a triangular pattern.

2. Plant pits shall be sufficiently large so that the root can be freely suspended in the pit. After backfilling the pit, firm the soil so that there will be no air space around the roots.

3. Apply post-planting fertilizer.

4. Mulch all ground cover areas with 1" to 1 1/2" layer of fir bark.

3.05 LAWN SEEDING:

A. Inspection:

Upon the completion of the placing of the soil and prior to seeding, the Contractor shall call for an inspection of the lawn irrigation system. The seeding shall commence after the Landscape Architect is satisfied that the irrigation system is operating satisfactorily and finish grade is in accord with the Drawings.

B. Seeding:

1. After seed bed has been prepared, distribute the grass seed mixture evenly over the surface of the lawn area.

2. After the seed has been sown, evenly spread the fertilizer over the entire lawn area. Lightly rake the entire area to cover seed, maximum cover 1/4".

3. Top dress with minimum of 1/8" of peat moss.

4. Immediately after completion of planting, the seeded area shall be watered with a fine spray to provide a one-inch depth of penetration into the soil, and the top surface shall not be allowed to dry out at any time until after germination. Reseed areas which do not germinate.

5. Application of lawn seed by hydroseed and hydromulch method may be done at Contractor's option. All above provisions of soil preparation apply. If the hydroseed method is used materials shall be mixed and applied in the following proportions:

Wood Fiber	2000 lbs/acre
Seed Mix	See Part II Products above
Water	as needed for application

The slurry shall be applied within 60 minutes after the seed has been added to the slurry.

C. All newly seeded turf areas shall be free of broadleaf weeds. Infested areas shall be treated by the Contractor with a selective broadleaf herbicide.

D. At the time of final inspection, the lawns shall be dense, green, and weed free. It is the Contractor's responsibility to eliminate any bare spots, dead areas, and weeds.

OR

3.05 SOD LAWN:

A. Inspection:

Upon the completion of the placing of the soil and prior to placing sod, the Contractor shall call for an inspection of the lawn irrigation system. The sod shall be placed after the Landscape Architect has satisfied himself that the irrigation system is operating satisfactorily and finish grade is in accord with the Drawings.

B. Laying Sod:

1. Remove all rubble, sticks, rocks and stones 1" or larger from top 2" amended soil.

2. Lay sod without stretching. Stagger end seams and butt edges as close as possible to each other. Roll with sod roller perpendicular to direction it was laid.

3. Apply post-planting fertilizer.

4. Irrigate to an 8" soil depth immediately after planting and then irrigate lightly every day to maintain adequate moisture level through establishment period.

5. Arrange for delivery of sod in the morning to insure same-day installation.

C. At the time of final inspection the lawns shall be dense, green, and weed free. It is the Contractor's responsibility to eliminate any bare spots, dead areas and weeds.

3.06 TREE STAKING:

A. Stake trees as indicated on the Drawings.

B. Tying: Find the proper support height by holding the trunk in one hand and pulling the top to one side and releasing it. The lowest height at which the trunk will return to the upright position when the top is released, is the height at which to attach tree ties.

3.07 PRUNING:

A. Tree and Shrub: Pruning shall be performed as required to maintain a natural appearance, promote healthy and vigorous growth, and eliminate diseased or damaged growth.

B. Trees shall be pruned to thin crown and avoid wind damage, eliminate narrow V-shaped branch forks that lack strength, eliminate sucker growth, and maintain a radial branching pattern to avoid crossing branches.

C. Under no circumstances will stripping of lower branches ("raising-up") of young trees be permitted. Lower branches shall be retained in a "tipped back" or pinched condition with as much foliage as possible to promote caliper trunk growth (tapered trunk).

D. Major pruning of trees to compensate for root loss or for aesthetic reasons shall be done only with approval of the Landscape Architect.

E. Shrubs shall not be clipped into balled or boxed forms, unless such is required by the design and directed by the Landscape Architect.

F. All pruning shall be made flush to lateral branches, buds, or trunk. "Stubbing" will not be permitted.

G. Damage: All cuts over 1" resulting from pruning or wind breakage shall be inspected periodically for insect infestation or disease.

3.08 CLEAN UP:

A. Keep all areas of work clean and neat at all times. Upon completion of planting, all cans, boxes, and other debris that is a part of the planting operation shall be removed from the site.

B. All pavements shall be washed off, and site shall be left in an absolutely clean condition. All planting areas shall be cultivated and weed free before final inspection. Clean-up operations shall take place throughout the course of work so that walks and drives are clean at all times.

3.09 INSPECTIONS:

A. Notification: The Contractor shall notify the Landscape Architect a minimum of 72 hours before requiring a visit by the Landscape Architect or his duly appointed representative to the site.

B. Check Points: The following shall be considered check points and the Contractor shall only proceed with the work after the Landscape Architect has visited the site and determined that the work is proceeding satisfactorily.

1. Completion of placement of soil mix and fine grading, prior to sodding or seeding of lawn.

2. When plant material is placed in the configuration shown on the Drawings before planting.

3. A check visit shall be made to begin the maintenance period. At this time the Contractor shall have completed all phases of the Plans and Specifications. Any discrepancies shall be noted at that time and the Contractor shall make appropriate corrections before the acceptance of the work.

4. A conference including the Owner shall be held at the completion of the work, provided that all deficiencies brought out in the check visit which began the maintenance period have been corrected by this time. The Contractor shall continue to maintain the project at his own expense until all deficiencies have been corrected, at which time the Contractor shall request the Landscape Architect to visit the site and approve the project as complete. The Landscape Architect will accept the landscape project in writing. The date of the acceptance letter shall be the first day of the guarantee period.

C. Should it be determined at the Final Inspection or Final Acceptance visit that any punchlist item is incomplete, any further review of the site will be terminated until all items are guaranteed, in writing, to be complete by the Contractor. The cost of additional site visits by the Landscape Architect to verify completion of work shall be paid for by the Contractor.

3.10 MAINTENANCE:

A. Contractor shall furnish all labor, material, equipment, and services required to maintain the landscape in a healthy and attractive condition for a period of 60 days.

B. Maintenance shall include fertilization, watering, insect and disease control, weed control, weekly trash removal, mulching, restaking trees, tightening of guys, resetting plants to proper grades or upright position, and restoration of watering basins.

C. Maintenance of grass areas shall consist of fertilizing, watering, weeding, mowing, repair of all erosion, and reseeding as necessary to establish a uniform stand of the specified grasses. Areas and parts of areas which fail to show a uniform stand of grass for any reason shall be (reseeded or) resodded until all areas are covered with a satisfactory stand of grass. (Mulch reseeded areas with 1/4 in. of specified peat moss).

D. Maintenance period shall not start until all elements of construction, planting, and irrigation for the entire project are complete. Project will not be segmented into maintenance phases, unless specifically authorized in writing by the Owner's authorized representative.

E. The Contractor shall request an inspection to begin the plant maintenance period after all planting and related work has been completed in accordance with the Contract documents. A prime requirement is that all groundcover and lawn areas be planted. If such criteria is met to the satisfaction of the Architect, a field notification will be issued to the Contractor to establish the effective beginning date of the period.

F. The Contractor's maintenance period will be extended if the provisions required within the plans and specifications are not filled.

G. Watering:

1. All plants shall be kept watered as often as it is necessary to keep them in optimum, vigorous growth. The lawn shall, at no time, show a lack of fresh green color or a loss of resilience due to lack of water. Watering shall be done preferably during the early morning hours.

2. Water shall be controlled so that there will be no excessive run-off, ponding, or overwatering.

3. Root Growth: Periodically the Contractor shall check the progress of the root growth within the back fill area. As the root growth increases beyond the root ball, the frequency of watering shall be reduced so that the roots are encouraged to grow to a lower soil depth. Watering then shall be less frequent, but applications shall be very slow and the Contractor shall assure himself that water does penetrate to the depth of the former plant pit.

H. Spraying:

1. All shrubs and trees shall be inspected at least twice a month during the growing period to determine the need for spraying to control insect damage, fungus development or any other disease that might be attacking the plants. Preventative spraying shall be done only with the approval of the Landscape Architect.

2. Operators of spray equipment shall take all reasonable precautions to protect themselves, other people and buildings from spray. The Contractor shall have all permits and licenses required for such an operation. Where applicable, dormant spray shall be applied to shrubs and trees during the winter period.

3. All equipment shall be properly washed before and after use.

4. No spraying shall take place during windy or gusty days.

I. Staking and Guying: Stakes and guys shall be inspected a minimum of two times a month to assure that the wires and ties are tight and no damage has occurred to the tree trunk or branches.

J. Weed Control:

1. Weeds shall be kept under control, either by hand or by the application of herbicides designed for use on any type of weeds invading the planting areas.

2. All equipment used for herbicides shall be properly cleaned before it is used on this project. Herbicides shall be applied at temperatures recommended by the manufacturers. Herbicides shall not be used during windy or gusty days. All possible precautions shall be taken to protect vegetation which is susceptible to damage from the particular herbicides to be used.

3. The bases of all plants shall be kept completely free of weeds. Periodically, the base of the trees and shrubs shall be cultivated in order to allow better penetration of water, but such cultivation shall be carefully done in order not to destroy surface roots.

K. Fertilization: Top dress all areas at 45 day intervals from time of planting with fertilizer of same composition and at same rate as at time of planting.

L. Mowing:

1. All mowing shall be done in a neat and orderly manner. Equipment shall be moved onto and off the area to be mowed in such a manner that it will not leave

tracks or marks that detract from the finish turf. Timber shall be provided to move equipment over curbs, stairs, or similar constructions.

2. Mowing equipment shall be kept in optimum operating condition. The equipment shall be washed before initial use on the project so that there will be no chance of introducing foreign seeds or diseases onto the project.

3. Frequency of mowing shall be determined by the rate of growth of the grass. During seasons of peak growth mowing may have to be done every five days to six days; under normal conditions once a week should be adequate.

4. The average mowing height shall be 1-1/2". The grass blades must be cut sharply and cleanly. The turf must be cut evenly so that no ridges remain in the finish cut. The direction of mowing shall be alternated each time.

M. Litter: The Contractor shall remove promptly after pruning, trimming, and weeding or other work required under the contract, all debris generated by his performance of the work. Immediately after working in the areas of public walks, driveways or paved areas, they shall be vacuumed clean with suitable equipment. All areas covered by this contract shall be kept free of the following items: bottles, cans, paper cardboard or metallic items. Common debris and litter shall be disposed of in an appropriate manner.

N. Pruning: Prune as necessary to remove injured twigs and branches, dead wood, and suckers.

3.11 GUARANTEE AND REPLACEMENT:

A. Guarantee period shall be extended for a period of one year from the date of written acceptance.

B. All plants shall be guaranteed to be alive and healthy as determined by the Landscape Architect at the end of the guarantee period.

C. Plant materials supplied by Owner shall be under similar warranty against defective workmanship during the planting operations. Plant material exhibiting conditions which are determined by the Landscape Architect as being unacceptable, due to workmanship by the Contractor, shall be replaced at no additional cost to the Owner.

D. The Contractor shall replace, in accordance with the Drawings and Specifications throughout the guarantee period, any plants that die, or in opinion of the Landscape Architect, are in an unhealthy or unsightly condition, and or have lost their natural shape due to dead branches, excessive pruning, inadequate or improper maintenance, or any other causes due to the Contractor's negligence. The Contractor shall not be held responsible for acts of vandalism occurring after the beginning of the guarantee period.

END OF SECTION 02900

SECTION 02910

HYDROSEEDING

PART 1 – GENERAL

1.01 SCOPE:

A. Furnish and place hydroseeding and related work, including fertilizer, organic materials, seed fiber, stabilizing emulsion and all other materials shown on drawings and as specified herein.

1.02 QUALITY CONTROL:

A. Reviews: The Contractor shall specifically request a review by Landscape Architect of finish grade to receive hydroseeding, and site inspection of seed, fiber and fertilizer, prior to starting work Certificates shall be submitted to Landscape Architect prior to review; see following.

B. Nomenclature: Plant botanical names conform to "Standardized Plant Names", second edition.

C. Schedule: Hydroseeding schedule shall be submitted to the Owner within fourteen (14) days of the signed contract.

D. Hydroseeding limits: Shall be confirmed with the Landscape Architect prior to seeding.

1.03 SUBMITTALS:

A. Hydroseed Work Sheets:

Prior to the slurry preparation the operator shall supply the Owner a worksheet and checklist showing the amount of materials to be added to each dump of the seeder and the number of dumps needed to complete this job with the seeder size to be used.

B. Prior to hydroseeding, the Contractor shall submit a one ounce sample of the certified seed mix and bill of lading for materials.

C. Certification:

1. Seed: Contractor shall furnish the Landscape Architect with seed supplier's certificate guaranteeing statement of composition, mixture and percentage or purity or germination of each variety, weight and origin for all seed within five days after award of contract.

2. Fiber: Cellulose Fiber for hydroseeding shall be certified for laboratory and field testing of the product and that the product meets and has been tested for all requirements specified herein. Weight of fiber material specified and shipped shall refer only to air dry weight, containing not more than 10 percent (by weight) water.

PART 2 – PRODUCTS

2.01 MATERIALS:

A. Seed shall be of commercial quality and certified by the California Crop Improvement Association. Grass seed shall be fresh, clean, new crop seed having a minimum purity of 98.5% and a minimum germination rate of 83%.

1. Seed shall be pre-mixed and packaged by a commercial seed supplier, tagged and labeled in accordance with California Agricultural Code.

2. Inert matter shall not exceed 5.0% nor weed content 0.5%, with no noxious weeds.

3. Seed shall be certified composed of the mix per plans.

B. Fertilizer:

1. Deliver fertilizer to site in original unopened containers bearing manufacturer's guaranteed chemical analysis, name, trade mark and conformance to State law.

2. Fertilizer shall be a granular type mixed by a commercial fertilizer house with the following chemical analysis by weight:

C. Stabilizing Agent (soil binder): Stabilizer shall be a biodegradable tacifier, non-toxic to plant or animal life, such as sentinel or M-binder.

D. Cellulose Fiber: Fiber shall be colored with a non-toxic, water soluble green dye to provide the proper visual gauge for metering of material over ground surfaces and shall be produced from natural or recycled (pulp) fiber, such as wood chips, similar wood materials, or newsprint, chip board, corrugated cardboard, or a combination of these processed materials.

1. Fiber shall be of such a character that upon addition and agitation in slurry tanks with fertilizer, seed, water and other additives, fibers become uniformly suspended to form a homogeneous slurry.

2. When hydraulically sprayed on the ground, fiber shall form a blotter-like groundcover impregnated uniformly with seed which allows absorption of moisture and rainfall percolation into underlying soil.

3. Materials that inhibit germination or growth shall not be present in the mixture.

E. Water: Shall be potable and furnished by Owner. Contractor to transport as required.

2.02 EQUIPMENT:

A. Equipment for the application of seed fertilizer, mulch and soil binder, shall have a built-in agitation system with an operating capacity sufficient to agitate, suspend and homogeneously mix a slurry of fiber mulch, seed, fertilizer, soil binder and water. The discharge system shall provide continuous, even distribution of the slurry on the slope surface to be seeded. The slurry tank shall have a minimum capacity of 1,000 gallons when operating.

B. Equipment for irrigation shall be available if deemed necessary for establishment of hydroseed.

PART 3 – EXECUTION

3.01 SURFACE CONDITIONS:

A. Prior to all work in this section, verify grades and carefully inspect the installed work of all other trades. The Contractor shall verify that hydroseed areas are adequately graded for seed application and free of deleterious material and weeds and complete to the point where the installation may properly commence. In the event of discrepancy, immediately notify the Landscape Architect. Do not proceed with this installation in areas of discrepancies until all such discrepancies have been fully resolved.

B. Install trees, shrubs and groundcover to be planted in hydroseeded area, prior to hydroseeding.

C. The Contractor shall obtain approval of hydroseed area preparation from the Landscape Architect prior to application.

3.02 APPLICATION OF HYDROSEED:

A. The hydroseed erosion control materials shall be mixed and applied in the following proportions to all areas indicated on the Drawings:

Seed mix per plan	
Cellulose Fiber	1800 lbs./acre
Fertilizer	350 lbs./acre
R/Binder	60 lbs./acre
Stabilizing Agent Water	as needed

B. Mixing: Care shall be taken that the slurry preparation takes place on the site of the work. The slurry preparation should begin by adding water to the tank when the engine is at half throttle. When the water level has reached the height of the agitator shaft, good recirculation shall be established and seed shall be added. Fertilizer shall then be added, followed by wood pulp mulch. The wood pulp mulch shall only be added to the mixture after the seed and when the tank is at least one-third filled with water. The engine throttle shall be opened to full speed when the tank is half filled with water. All the wood pulp mulch shall be added by the time the tank is two-thirds to three-fourths full. Spraying shall commence immediately when the tank is full. The operator shall spray the area with a uniform, visible coat by using the green color of the wood pulp as a guide.

C. Application:

1. Timing:

a. Irrigated hydroseed shall be applied between February 15th and October 15th.

b. Non-irrigated hydroseed shall be applied between October 15th and December 30th.

c. Hydroseed materials shall not be applied during windy or rainy weather or when soil temperatures are below 40 degrees F.

2. Operators of hydromulching equipment shall be thoroughly experienced in this type of application. Apply specified slurry mix in a sweeping motion to form a uniform mat at specified rate.

3. Keep hydromulch within areas designated and keep from contact with other plant materials.

4. Slurry mixture which has not been applied within 4 hours of mixing shall not be used and shall be removed from the site.

5. After application, the Contractor shall not operate any equipment or allow pedestrians in the covered area.

6. Daily worksheets shall be filled out by the nozzleman, with the following information: Seed type and amount, fertilizer analysis and amount, mulch type and amount, seeding additive type and amount, number of loads and amount of water, area covered and equipment used, capacity and license number.

3.03 MAINTENANCE:

A. Any area which has not produced a healthy, established stand of grasses after a period of 30 days from the date of seeding shall be reseeded and refertilized at the original rates of application. The Contractor shall be responsible for all seeded areas until an acceptable stand of hydroseed material has been achieved.

B. Fertilization:

The Contractor shall monitor the health of the hydroseed based on grass color. When grass shows signs of yellowing, or at 45 days following application the Contractor shall fertilize hydroseeded areas with a commercial blend fertilizer of 12N-12P-12K formulation at a rate of 6 lbs./100 square feet. (The above formula and rate may be adjusted as needed to conform to actual grass condition based on an assessment by the project horticulturist).

3.04 CLEAN-UP: Immediately after application thoroughly wash off any plant material, planting areas, paved areas, or architectural features not intended to receive slurry mix. Keep all areas of work clean, neat and orderly at all times. Keep all paved and planting areas clean during planting

and maintenance operations. Clean up and remove all deleterious materials and debris from the entire work area prior to Final Acceptance or the satisfaction of the Landscape Architect.

3.05 INSPECTIONS:

A. Make written request for inspection prior to seeding and after areas have been seeded and planting operation completed.

B. Submit requests for inspections to Landscape Architect at least 72 hours prior to anticipated inspection date.

END OF SECTION 02910

SECTION 02920

LANDSCAPE SOIL PREPARATION

PART 1 – GENERAL

1.01 SCOPE

A. Furnish and install all landscape soil preparation as shown and specified including but not necessarily limited to, the following: topsoil placement, organic amendment and fertilizer placement, and finish grading.

B. Related work specified elsewhere.

1. Planting – Section 02950
2. Hydroseed – Section 02910

1.02 QUALITY CONTROL

A. Reviews: Contractor shall specifically request at least two days in advance the following reviews prior to progressing with the work:

1. Verification of amendment incorporation depths
2. Finish grade

B. Certification: Written certificates stating quantity, type, and composition, weight and origin for all amendments; chemicals shall be delivered to the Resident Engineer before the material is used on the site.

C. Test Samples: Contractor shall provide two (2) one-quart samples to Soil and Plant Laboratory of Santa Clara (408) 727-0330 for their testing for conformance to this specification. Sample one shall be the proposed import topsoil and sample two shall be from below existing paving. No material shall be delivered to the site until the Resident Engineer approves the material. Testing costs shall be paid by Contractor. Testing costs for the initial samples and costs for any additional samples due to non-compliance by the Contractor shall be paid by the Contractor.

D. Amendment Testing: Contractor shall provide a one-quart sample of each proposed amendment to Soil and Plant Laboratory of Santa Clara (408) 727-0330 for their testing for conformance to this specification. No material shall be delivered to the site until the Resident Engineer approves the material. Testing costs shall be paid by the Contractor.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Import Topsoil: Shall be a homogeneous mineral soil classified as sandy loam, or fine sand. Particle size data shall be based upon standard USDA methodology. Of the material falling in the sand category, a minimum of 80% shall fall in the fine sand range (.05 – 5mm). Gravel content (greater than 2.0mm) shall be less than 15%. Import topsoil shall not contain more silt and clay than the on-site native soil. The sum of silt plus clay shall be less than 25%, the soil shall be nonsaline as determined on the saturation extract. Alinity shall not exceed 3.0 mmhos/cm, boron shall not exceed 1.0 ppm and the sodium absorption ration (SAR) shall not exceed 6.0. Soil reaction as determined on a saturated paste shall fall between 5.5 and 7.5. The soil shall be free of organic herbicides, or other growth restricting chemicals. Contamination may be tested by greenhouse trials using rye grass and radish as test crops using the existing import soil as substrate. These trails require four to five weeks for completion.

B. Fertilizer: Shall be determined from soils analysis results. For purposes of bidding only, assume the use of 6-20-20 commercial fertilizer, 20-10-5 planting tablets by Agriform International Chemicals, Inc., and iron sulfate.

C. Organic Amendment: Nitrogen-treated organic amendment conforming to:

Physical Properties:	95%-100% passing, sieve size 6.35mm ¼", 80%-100% passing, sieve size 2.38mm No. 8, 8 mesh and 0%-30% passing, sieve size 500 micron No. 35, 32 mesh.
Chemical Properties:	Nitrogen Content dry weight basis – 0.4-0.6% iron content – minimum 0.08% dilute acid soluble Fe on dry weight basis, soluble salts – maximum 3.5 millimhos/ centimeter @ 25 degrees C. as determined by saturation extract method; ash – 0-6.0%.

PART 3 – EXECUTION

3.01 LIMITS AND GRADES

A. Prior to commencing soil preparation operations, Contractor shall request a review by the Resident Engineer to verify specified limits and grades of work completed to date and soil preparation work to commence. Contractor shall complete the rough grading as necessary to round the top and toe of all slopes, providing naturalized contouring to integrate newly graded areas with the natural topography. Finish grading under this

section shall be completed in accordance with the section shown on the landscape drawings.

3.02 TOPSOIL PLACEMENT

A. Cross rip topsoil to a depth of ten inches. Then incorporate the amendments to a homogeneously blended soil depth of six inches. Compact all soil in place to 85% compaction.

3.03 ORGANIC AMENDMENT AND FERTILIZER INCORPORATION

A. Materials determined from the soils test should be uniformly distributed throughout all irrigated planting areas and incorporated to a homogeneously blended soil depth of six inches. For bidding purposes, assume per 1000 square feet:

30 pounds Commercial Fertilizer (6-20-20)
5 cubic yards Nitrogen Stabilized Organic Amendment
10 pounds Ammonium Sulfate

3.04 TREE AND PLANT PITS

A. Tree pits shall have their sides and bottoms loosened or otherwise broken to prevent glazed or compacted surfaces. Contractor shall auger for each tree a minimum of three 18" diameter holes as appropriate for trees size and as shown on the planting notes and detail.

B. Plant pits shall have their sides and bottoms loosened or otherwise broken to prevent glazed or compacted surfaces, and shall be as shown on the planting detail.

3.05 BACKFILL

A. Backfill for plant pits shall be the prepared soil per parts 3.2 of this section, taken from adjacent prepared areas. Spread excavated material onto adjacent areas as replacement. Only unamended soil shall be used beneath the root ball; cultivate bottom of plant pit to improve porosity. Should additional backfill be necessary, a mixture of one-third organic amendment/fertilizer mix (per Soil and Plant Laboratory) and two-thirds topsoil may be used.

3.06 PLANT TABLETS

A. All container plants shall receive plant tablets as follows:

One-gallon plants	two 21-gram tablets
Five-gallon plants	five 21-gram tablets
Fifteen-gallon plants	twelve 21-gram tablets
Box trees	eighteen 21-gram tablets

Space the tablets evenly around the root ball halfway up backfill touching side of root ball. The Resident Engineer may require excavation of plants selected at random for conformance review.

3.07 FINISH GRADING

A. Contractor shall finish grade all irrigated planting areas unless otherwise noted, and shall remove all rocks and clods over one and one-half cubic inches. All areas shall be smooth and uniformly graded. All erosion damage during the construction period shall be repaired by the Contractor.

B. Unless otherwise noted, all soil finish grades shall be one inch below finish grade of walks, pavements and curbs.

END OF SECTION 02920

SECTION 03340

SITE CONCRETE WORK

PART 1 - GENERAL

1.01 SCOPE:

A. Provide concrete walks, vehicular paving, driveways, curbs, gutters, handicap ramps, flagstone paving and precast monoliths, complete and in place, as shown and specified. The work includes but is not limited to:

1. Final subgrade preparation and paving base
2. Concrete curbs, walks, paving, walls, driveways, roadway.
3. Flagstone paving, including grout joints.
4. Concrete footings for site mechanical, carpentry, and electrical items as shown.

1.02 RELATED DOCUMENTS:

A. The General Conditions of the Contract, including General and Special Provisions and General Requirements apply to the work in this section.

B. Related Work:

1. Section 02200: Earthwork
2. Section 02110: Clearing, Grubbing and Demolition
3. Section 02810: Irrigation System

1.03 QUALITY ASSURANCE:

A. Materials and methods of construction shall comply with the following standards:

1. American Society of Testing and Materials, (ASTM).
2. American Concrete Institute, (ACI).
3. Contra Costa County Standard Specification, Section 73.
4. State Standard Specifications, California Department of Transportation.
5. American National Standards Institute, (ANSI).
6. Bay Area Air Quality Management District, Sandblasting Guidelines.

B. Maintain field records of time, date of placing, curing and removal of forms of concrete in each portion of work.

C. Samples:

1. Sample panel: Before ordering material for concrete and flagstone paving work, provide sample panel, minimum 2' x 2' of each color and finish, using specified materials. Show color, texture, pattern, edging, and joint treatments.

   a. Where applicable, the approved sample panel may be a portion of the work and remain in place. Location as directed by the Landscape

Architect. Contractor will be required to provide additional panels as necessary, until approved.

1.04 SUBMITTALS

A. Submit concrete mix designs to City. Obtain approval before placing concrete.

B. Product data:

1. Submit complete materials list of items proposed for the work. Identify materials source.

2. Submit admixture, curing compound, retarder, and accessory item product data, if used.

3. Submit material certificates for aggregates, reinforcing, and joint fillers.

4. Submit samples of flagstone and grout color to be used.

C. Submit concrete delivery tickets. Show the following:

1. Batch number.
2. Mix by class or sack content with maximum size aggregate.
3. Admixtures.
4. Slump.
5. Time of loading.

D. Submit concrete test reports.

1.05 DELIVERY, STORAGE AND HANDLING:

A. Work notification: Notify City Public Works at least 24 hours prior to installation of concrete.

B. Establish and maintain required lines and grade elevations. All concrete shall slope to drain with no ponding of water.

C. Do not install concrete work over wet, saturated, muddy, or frozen subgrade.

D. Do not install concrete when air temperature is below 40 degrees F. Use of calcium chloride, salt, or any other admixture to prevent concrete from freezing is prohibited.

E. Protect adjacent work.

F. Provide temporary barricades and warning lights as required for protection of project work and public safety.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Portland Cement: ASTM C150, Type 1, natural color, unless otherwise noted.

B. Aggregate: Provide ASTM C33 normal weight aggregates, 3/4" maximum size, clean, uncoated crushed stone or gravel coarse aggregate free of materials which cause staining or rust spots; fine aggregate shall be clean natural sand.

C. Water: Clean, fresh, and potable.

D. Water-reducing admixture: ASTM C494.

E. Bouquet Canyon Flagstone: To match existing City of San Ramon soundwalls. Submit samples for review.

F. Latex Portland Cement Grout: ANSI A108.10. Color of grout to blend with flagstone. Submit sample for review.

G. Concrete Admixtures and Color Additives: Custom color by L.M. Scofield, as approved by the Landscape Architect.

2.02 MIXES:

A. Provide Class A ready-mixed concrete. Batch mixing at site not acceptable.

1. For roadway paving: Use Portland Cement Concrete containing not less than 658 pounds of Portland Cement per cubic yard to allow for 7 day cure time, with a compressive strength of not less than 4000 p.s.i.

2. For all other site concrete: Use Portland Cement Concrete containing not less than 564 pounds of Portland Cement per cubic yard, with a compressive strength of not less than 3000 p.s.i.

B. Indicate water added to mix at job site on each delivery ticket. Show quantity of water added. Site water tempered mixes exceeding specified slump range will be rejected as not complying with specification requirements.

C. Color for roadway paving shall be : "Ginger", by Q.C. Products, or approved equal, available at (800) 918-3796.

2.03 ACCESSORIES:

A. Granular base: Class II Aggregate Base.

B. Forms: Wood or metal of sufficient strength to resist concrete placement pressure and to maintain horizontal and vertical alignment during concrete placement. Provide forms straight, free of defects and distortion, and height equal to full depth of concrete work.

1. Provide 2" nominal thickness, surfaced plank wood forms for straight sections. Use flexible metal, 1" lumber or plywood forms to form radius bends.

C. Joint Filler: ASTM D1751, premolded non-extruding asphalt-impregnated fiberboard, thickness indicated.

D. Curing compound: ASTM C309, non-yellowing, non-staining liquid membrane-forming type containing a fugitive dye. Chlorinated rubber compounds not acceptable for exterior use.

E. Joint Sealants: Two-components polysulfide or polyurethane elastromeric type complying with FS TT-S-00227, self-leveling, designed for foot traffic.

F. Reinforcing steel: ASTM A615, A616, or A617, Grade 60, new domestic deformed steel bars.

G. Welded wire fabric: ASTM A185, welded plain cold-drawn steel wire fabric as indicated.

H. Form release agent: Non-staining chemical form release agent free of oils, waxes, and other materials harmful to concrete.

I. Provide all stirrups, ties, anchors, shown or required to be cast into precast members.

J. Bolts, Nuts, and Washers: ASTM A307. Provide hot-dip galvanized fasteners for exterior use. Paint to match adjacent metal work.

K. Waterproofing at walls - Sonneborn HLM-5000, Tremco TP-60, Vulken 201, or approved equal.

L. Foam Fill for (2) monoliths - EPS Foam, by Foam Products, or equal.

PART 3 - EXECUTION

3.01 INSPECTION:

A. Examine subgrades and installation conditions. Do not start concrete work until unsatisfactory conditions are corrected.

3.02 PREPARATION:

A. Proof roll the subgrade and do all necessary rolling and compacting to obtain firm, even subgrade surface. Fill and consolidate depressed areas. Remove uncompactable materials, replace with clean fill and compact to 90% of the maximum dry density in accordance with ASTM D1557-70.

B. Provide minimum 3" depth of compacted base material at walks. Compact base to 95% of the maximum dry density in accordance with ASTM D1557-70.

C. Remove loose material and debris from base surface before placing concrete.

D. Install, align, and level forms. Stake and brace forms in place. Maintain following grade and alignment tolerances:

1. Top of form: Maximum 1/8" in 10'-0".
2. Vertical face: Maximum ½" in 10'-0".

E. Coat form surfaces in contact with concrete with form release agent. Clean forms after each use and coat with form release agent as necessary to assure separation from concrete without damage.

F. Install, set, and build-in work furnished under other specification sections. Provide adequate notification for installation of necessary items.

G. Install pipe sleeves for irrigation system furnished under Section 02810. Stake location of irrigation sleeves.

3.03 PLACING REINFORCEMENT:

A. Place all reinforcement as shown on the drawings. Place accurately and securely fasten and support reinforcement to prevent displacement before or during pouring. Hang footing bars from forms. Support wire mesh with suitable metal cradles.

B. Clean, bend and place reinforcement in accordance with current requirements of the ACI Manual of Concrete Practice.

C. Reinforcement Splices:
Welded wire fabric - one mesh minimum.
Reinforcing bars - 24 bar diameter minimum, except as otherwise noted.

3.04 INSTALLATION:

A. Concrete placement:

1. Comply with ACI 304 "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete", and as specified.

2. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placing, and curing. In cold weather comply with ACI 306, "Recommended Practice for Cold Weather Concreting". In hot weather comply with ACI 305, "Recommended Practice for Hot Weather Concreting".

3. Moisten base to provide a uniform dampened condition at the time concrete is placed. Verify structures are at required finish elevation and alignment before placing concrete.

4. Place and spread concrete to the full depth of the forms. Use only square-end shovels or concrete rakes for hand-spreading and consolidating operations to prevent segregation of aggregate and dislocation of reinforcement.

5. Place concrete in a continuous operation between expansion joints. Provide construction joints where sections cannot be placed continuously.

6. Place concrete as indicated on the plans in one course, monolith construction, for the full width and depth of concrete work.

7. Strike-off and bull-float concrete after consolidating. Level ridges and fill voids. Check surface with a 10'-0" straightedge. Fill depressions and refloat repaired areas. Darby the concrete surface to provide a smooth level surface ready for finishing.

B. Joints:

1. Provide expansion joints using premolded joint filler at concrete work abutting curbs, walls, structures, walks, and other fixed objects.

   a. Locate expansion joints as indicated.

   b. Install joint fillers full-width and depth of joint. Recess top edge below finish grade for joint sealants.

   c. Provide joint fillers in single lengths for the full slab width, whenever possible. Fasten joint filler sections together when multiple lengths are required.

   d. Protect the top edge of the joint filler during concrete placement.

   e. Brooming. After the curing period, expansion joints shall be carefully cleaned and filled with approved joint sealant to just below adjacent paved surface in such a manner as to avoid spilling on paved surfaces or overflow from joint.

C. Finishes:

1. Broom Finish: Shall be obtained by drawing a stiff bristled broom across a floated finish. Direction of brooming to be perpendicular to direction of work or otherwise shown on drawings.

2. Sand Blast Finish:

   a. Perform in as continuous an operation as possible, utilizing the same work crew to maintain continuity of finish.

   b. Depth of Cut: Use an abrasive grit of the proper type and gradation to expose the aggregate and surrounding matrix surfaces to match approved sample panel.

   c. Blast corners and edge patterns carefully, using backup boards, in order to maintain a uniform corner or edge line.

   d. Use same nozzle, nozzle pressure and blasting technique as used for sample panel.

e. Maintain control of abrasive grit and concrete dust in each area of blasting. Clean up an remove all expended abrasive grit, concrete dust, and debris at the end of each day of blasting operations.

D. Curing:

1. Cure concrete with a clear, non-staining liquid membrane-forming compound. Spray apply in accordance with manufacturer's recommended coverage rate. Apply curing compound immediately after completing surface finish.

3.05 TESTING:

A. Provide slump test on first load of concrete delivered each day and whenever requested due to changes in consistency or appearance of concrete.

3.06 FLAGSTONE PAVING:

A. Install flagstones directly onto wet concrete as detailed in plans.

B. Allow flagstones to set for a minimum of 48 hours before grouting. Force a maximum amount of grout into joints. Fill all gaps and skips. Finished grout shall be uniform in color, smooth and without voids, pin holes or low spots.

C. Joints shall be concave tooled joints. All joints shall be of a uniform width or uniform thickness to maintain proper coursing. Grout shall be tooled at approximately the same degree of hardness to achieve uniform color. Expansion joints with sealant shall be constructed as shown in the plans.

D. Point and fill all holes and cracks in exposed joints with fresh mortar. Tooling shall be done at the proper time to match existing color of mortar.

3.07 PROTECTION:

A. Protect concrete work from damage due to construction and vehicular traffic until Final acceptance. Exclude construction and vehicular traffic from concrete pavements for at least 14 days.

B. Protection: Protect precast concrete items from chipping, spalling, cracking, or other damage until the Work is accepted by the Owner.

3.08 CLEANING:

A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, debris, and equipment. Repair damage resulting from concrete operations.

B. Sweep concrete sidewalks and pavement, wash free of stains, discoloration, dirt, and other foreign material immediately prior to final acceptance.

END OF SECTION 03340

SECTION 02110

TREE PRESERVATION AND PRUNING

PART 1 – GENERAL

1.01 WORK INCLUDED

A. Preservation of trees, care, and pruning of trees to remain in place.

B. Trimming of tree (limbs and tree roots) as may be required to construct the improvements.

C. The work shall include the provision of all labor, materials, equipment and apparatus not specifically mentioned herein or noted on the plans, but which are incidental and necessary to complete the work specified.

1.02 JOB CONDITIONS

A. The Contractor will be held responsible for any damage to trees or other plants, which are to remain during construction, including limb or branch breakage, tearing of bark along trunk or excessive root damage. Large roots greater that 6" in diameter and 12" below ground level shall not be cut without the City's approval.

1.03 QUALIFICATION

A. All tree pruning and removal performed shall be executed by a company having, in full-time employment, an Arborist certified by the Western Chapter of the International Society of Arboriculture. Certification must be verified, and the Arborist must be directly responsible for decisions made, and should visit the work sites daily when trimming of trees and roots is to be performed.

B. Pruning shall be performed to the standards of the International Society of Arborists Pruning guidelines, and to ANSI A-300.

C. Tree pruning shall not occur without first securing a pruning permit. Permit applications shall be submitted to City.

D. Tree removal shall not occur without first securing a tree Removal Permit. For regulations on size description, application procedure and fees, the Contractor shall contact the City.

1.04 APPLICABLE PUBLICATIONS

A. Trees and Building Sites: Official Publication of the International Society of Arboriculture.

B. Arboriculture: The care of trees and shrubs by Dr. Richard Harris

PART 2 – PRODUCTS

None

PART 3 – EXECUTION

3.01 TREE PROTECTION

A. At sites where the excavation has taken place near trees to remain, and many living roots remain exposed to the air, the Contractor shall cover the exposed roots within 2 hours with sand, soil, moist burlap or other means acceptable to the City.

B. Construction materials, debris, and supplies shall not be stored within the drip line or protective fencing area under any tree.

C. Vehicles shall not be parked within the drip line or protective fencing area.

D. Woodchips or another cushioning surface material approved by the City shall be placed over areas where roots are present and construction traffic occurs.

E. Where called for on the plans, place fences or other approved protective barriers around trees to be saved.

3.02 TREE PRUNING

A. Tree pruning shall be performed to balance the crown and eliminate hazards. The main work performed shall be to reduce the sail effect through thinning. reducing end weights, shortening long heavy limbs, removing deadwood, weak limbs and sucker growth. Limbs shall be pruned back to an appropriate lateral branch.

B. All final cuts shall be made at the outer edge of the branch collar. The pruning work shall be performed in a safe and proper manner, adhering to CAL-OSHA and ANSI Standards

C. The Contractor shall be responsible for the preservation of all public and private property. Pruning includes the cutting of limbs, cleanup, removal and disposal of cuttings and debris. Elm logs must be properly disposed of per State Quarantine. Work shall be performed by a two-person crew with one climber, one ground person, a dumping chipper truck and chipper, and any other necessary saws, lines, tools and safety equipment. The work area shall have appropriate cones and signs for safe pedestrian and vehicle traffic.

3.03 ROOT PRUNING

A. Tree roots greater than 3" in diameter and less than 12" below ground level shall not be cut without approval of the City.

B. Roots shall be cut clearly, as far from the trunk of the tree as possible. Root pruning shall be to a depth of 18".

C. Root pruning shall be performed using a Vermeer Root Cutting Machine. Alternate equipment or techniques must be approved by the City.

D. Root pruning shall be completed prior to base or subgrade preparation, or to any excavation adjacent to the tree.

END SECTION 02110

SECTION 02810

IRRIGATION SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. The General and Supplementary Conditions and General Requirements apply to the work herein specified.

1.02 DESCRIPTION:

A. Contractor shall furnish all labor, tools, equipment, product, materials and transportation and perform all operations necessary to properly execute and complete all work in accordance with the Drawings and these Specifications. The intent is to accomplish the work of installing an irrigation system, which will operate in an optimum manner. This intention is to be met foregoing any deficiency in setting a complete detailed description of the work to be done.

B. Related Work Specified Elsewhere:

1. Section 02210: Earthwork and Site Grading
2. Section 02900: Landscape Planting
3. Division 15: Mechanical
4. Division 16: Electrical

1.03 QUALITY ASSURANCE:

A. Reference Standards:

1. ASTM: American Society for Testing and Materials
   a. D1785: Standard Specification for polyvinyl chloride (PVC) plastic pipe, Class 200, Class 315.
   b. D2446: Standard Specification for polyvinyl chloride (PVC) plastic pipe fittings, Schedule 40 and Schedule 80.
2. NSF: National Sanitation Foundation

B. Drawings:

1. For purposes of clarity and legibility, drawings are essentially diagrammatic to the extent that many offsets, bend, unions, special fittings, and exact locations of items are not indicated, unless specifically dimensioned.
2. Exact routing of piping, etc., shall be governed by structural conditions, obstructions. Contractor shall make use of data in Contract Documents.

3. The contractor shall not willfully install the irrigation system as shown on the drawings when it is obvious in the field that unknown obstructions, grade difference or discrepancies in area dimensions exist that might not have been considered in engineering. Such obstructions or differences shall be brought to the attention of the irrigation consultant. In the event this notification is not performed, the contractor shall assume full responsibility for any revision necessary.

1.04 VISIT TO THE SITE:

The contractor shall visit the construction site and shall take all measurements and obtain any other information as may be necessary for a complete and conclusive bid.

1.05 SUBMITTALS:

A. Substitutions:

Prior to installation, any proposed substitution from the plans or these specifications is to be forwarded, in writing, to the irrigation consultant for approval.

B. Record Drawings:

Provide record drawings as follows:

1. The contractor shall maintain in good order in the field office one complete set of prints of all sprinkler drawings, which form a part of this contract. In the event any work is not installed as indicated on the drawings, such work shall be indicated and dimensioned accurately on record drawings as changes occur. Dimension from two permanent points of reference, building corner, sidewalk, road intersections, etc., the location of the following items.

    a. Connection to existing water lines
    b. Connection of existing electrical power
    c. Routing of pressure lines (dimension max. 100 feet lone along routing)
    d. Electrical control valves
    e. Routing of control wires
    f. Quick-coupling valves
    g. Underground stub-outs
    h. Other related equipment as directed by the irrigation consultant

2. Upon completion of the work, obtain reproducible mylar from the landscape architect and neatly correct the plans (to be done by a competent draftsperson) to show the as-built conditions. After the as-builts are reviewed and approved by the irrigation consultant, obtain reduced copies of "as-built" mylar (8-1/2" x 11" sheets or to the smallest readable size), and laminate with weather proofing coating.

C. Operation and Maintenance Manuals:

1. Prior to the final inspection of the irrigation system, furnish two (2) individually bound Service Manuals to the owner. The manuals shall contain the following:

    a. Index sheet indicating the contractor's name, address, and phone number.

b. A copy of the completed guarantee-following the form in these specifications.

c. Certificate of insurance verifying coverage for completed operations.

d. List of equipment with names, addresses and telephone numbers of all local manufacturers' representatives.

e. Copies of equipment warranties and certificates.

f. Complete operating and maintenance instructions of all equipment including exploded drawings and spare parts list.

2. Provide instruction in operation of system to owner's personnel.

D. Hardware Items:

1. Two (2) sets of matching Q.C.V. keys and hose swivels.

2. Two (2) keys to each controller box.

3. Two (2) sets of any special tool required for the maintenance of each type of component used in the sprinkler system.

1.06 PROJECT COORDINATION:

A. Sequencing and Scheduling:

Coordinate irrigation installation work with the installation of other site improvements, including utility installation work and landscape installation.

B. Environmental Conditions:

Site work such as trenching and backfilling shall not be performed during wet, muddy or frozen conditions.

C. Rules and Regulations:

All work and materials shall be in full accordance with the latest rules and regulations of the National Electric Code; the Uniform Plumbing Code and other applicable state or local laws or regulations. Nothing in these drawings or specifications is to be construed to permit work not conforming to these codes.

1. The contractor shall furnish any additional material and labor required to comply with these rules and regulations, though the work is not mentioned in these particular specifications or shown on the drawings.

2. When the specifications call for materials or construction of a better quality or larger size than required by the above mentioned rules and regulations, the provision of the specifications shall take precedence over the requirements of the said rules and regulations.

D. Safety:

1. The contractor shall erect and maintain barricades, guards, warning signs, and lights as required for the protection of the public and workmen.

2. All work shall be performed in a safe manner. All regulations, all OSHA requirements and other authoritative agencies shall be followed.

3. Prior to commencement of work, locate all underground utilities so that proper precautions may be taken not to damage such improvements.

E. Maintaining Traffic:

It is the responsibility of the contractor to ensure adequate protection and controls for pedestrian and vehicular traffic in the vicinity of the project areas. The contractor shall provide all signs, barricades, flagmen, etc., necessary to meet all traffic requirements for this project at his own expense.

F. Permits and Fees:

The contractor shall obtain all permits and pay all required fees to any governmental agency having jurisdiction over the work and arrange for inspections specified by local ordinances during the course of construction as necessary.

PART 2 - PRODUCTS

2.01 PRODUCT DELIVERY, STORAGE AND HANDLING:

Handling of pipe and fittings: The contractor is cautioned to exercise care in handling, loading, unloading, and storing of pipe and fittings. Cracks can occur from sudden impact. Protect all plastic products from excessive exposure to sunlight. Any section of pipe that has been dented or damaged shall be removed from the site and, if installed, shall be replaced with new undamaged piping.

2.02 MATERIALS:

A. PVC Pressure main line piping and fittings:

1. Pressure main line piping: 1120-Schedule 40 PVC plastic pipe. Fittings shall be Schedule 40 PVC solvent weld.

2. Pipe shall be made from NSF approved, Type 1, Grade 1 PVC compound conforming ASTM D1784. All pipe shall meet requirements set forth in ASTM D2441 with an appropriate standard dimension ratio.

3. All PVC pipe shall bear the following markings:

   a. Manufacturer's name
   b. Nominal pipe size
   c. Schedule or class
   d. Pressure rating in PSI
   e. NSF

f. Date of extrusion

4. All fittings shall bear the manufacturer's name or trademark, material designation, size, applicable I.P.D. schedule and NSF seal of approval.

B. PVC non-pressure lateral line piping and fittings:

1. Non-pressure buried lateral line piping shall be PVC 1120 Class 200 with Schedule 40 PVC solvent-weld fittings.

2. Pipe shall be made from NSF approved, Type 1, Grade 1 PVC compound conforming to ASTM D1784. All pipe shall meet requirements set forth in ASTM D2441 with an appropriate standard dimension ratio.

3. Except as heretofore specified, all requirements for non-pressure lateral line pipe and fittings shall be the same as for solvent-weld pressure main line pipe and fittings as specified.

C. Sleeving and Conduit: Material shall be polyvinyl chloride (PVC) Schedule 40, type 1120/1220 with solvent weld.

D. Galvanized steel pipe shall be Schedule 40; ASTM (A120) and steel fittings shall be Schedule 40 hot dipped, double banded malleable steel.

E. PVC Schedule 80 nipples shall be used with molded threads. Machined threaded nipples will not be allowed.

F. Connections between supply line and R.C.V.'s shall be as specified or detailed on the drawings.

G. Riser assemblies shall be as specified or detailed on the drawings.

H. Controller(s), valves, backflow preventer(s) and sprinkler heads shall be specified and/or detailed on the drawings.

I. Control wires shall be UL approved copper single strand type UF direct burial 14 gauge red in color. Common wires shall be UL approved copper single strand type UF direct burial 12 gauge white in color. Spare control wires shall be UL approved copper single strand type UF direct burial 14 gauge blue in color.

J. Miscellaneous installation materials:

1. Solvent weld joints shall be of make and type approved by manufacturer (s) of pipe and fittings. Solvent cement shall be a proper consistency throughout use. Mixing thinner with solvent will not be allowed.

2. Pipe joint compound shall be non-hardening, non- toxic materials designed specifically for use on threaded connections in water carrying pipe.

3. Wire connections shall be 3M #3750 Scotch Lok Seal Packs, Spears DS-400 seal packs or approved equal.

K. Thrust Blocks: Concrete thrust blocks shall be as detailed on the plans.

L. Control or Valve Boxes:

1. Provide 14 x 19 inch plastic rectangular control valve box with bolt down plastic lid for each electrical control valve. Hot stamp or permanently engrave irrigation controller station number onto valve box lid.

2. For gate valves and quick coupling valves: Use 9-inch plastic round box. Add extensions for gate valves as required. Hot stamp or permanently engrave "GV" for gate valve and "QCV" for quick coupler valves onto valve box lid.

PART 3 - EXECUTION

3.01 GENERAL:

A. Irrigation system shall be installed in accordance with all applicable local and state codes and ordinances by a licensed landscape contractor.

B. Follow manufacturer's direction except as shown or specified.

3.02 INSPECTION OF SITE CONDITIONS:

A. All scaled dimensions are approximate. The contractor shall check and verify all size dimensions prior to proceeding with work under this Section.

B. Exercise extreme care in excavating and working near existing utilities. Contractor shall be responsible for damages to utilities, which are caused by his operations or neglect. Check existing utilities drawings for existing utility locations.

C. Coordinate installation of irrigation materials, including pipe, so there shall be no interference with utilities or other construction or difficulty in planting trees, shrubs, and groundcover.

D. Avoid trenching within drip line of trees where possible. When not possible, all damaged roots over 1-1/2" in diameter shall be cut leaving clean face, seal cuts with tree seal, then immediately install pipe, wire, etc., refill trench and soak.

E. The contractor shall carefully check all grades to satisfy himself that he may safely proceed before starting work on the irrigation installation.

F. Coordinate the work of this Section with that of other Sections for the location of pipe sleeves through walls, paving, etc.

G. The landscape contractor shall verify water pressure and available gallonage prior to construction. If deficiencies are noted that will hinder the system's performance, notify the irrigation consultant for directions to correct deficiencies.

H. The design is diagrammatic. All piping, valves, etc., shown within paved areas is design clarification only. Install piping, valves, etc., in planting areas.

3.03 PREPARATION - LAYOUT OF WORK:

Prior to installation, stake out all pressure supply lines, routing and location of sprinkler heads and notify irrigation consultant for reviewing layout when area or grade differences or obstructions are not as indicated on the plans.

3.04 INSTALLATION:

A. Trenching:

1. Dig trench straight and support pipe continuously on bottom of trench. Lay pipe to an even grade. Trenching excavation shall follow layout shown on drawings.

2. Provide for a minimum of 18 inches cover for all pressure supply lines.

3. Provide for a minimum cover of 12 inches for all non-pressure lines to spray heads.

4. Provide for a minimum cover of 18 inches for all control wiring.

5. Provide a minimum cover of 24 inches over pipe and wiring under asphalt pavement.

B. Backfilling:

1. In accordance with requirements of SECTION 02215, "EXCAVATION AND BACKFILLING".

2. Do not backfill trenches until all required tests are performed. Carefully backfill trenches with specified excavated materials for backfilling, consisting of earth, loam, sandy clay, sand, or other acceptable materials, free from large clods of earth or stones. Backfill shall be mechanically compacted in landscaped areas to a dry density equal to adjacent undisturbed soil in planting areas. Backfill shall conform to adjacent grades without dips, sunken areas, humps or other surface irregularities.

3. Surround pipe with sand in rocky terrain with a 4" bed and 4" cover.

4. Backfill in proposed asphalt paved areas shall have sand covering pipe with a 6" minimum depth.

C. Pipe and Fitting Installation and Connections:

1. Install no multiple assemblies on plastic lines. Provide each assembly with its own outlet.

2. Install all assemblies specified herein in accordance with details shown on drawings.

3. Thoroughly clean PVC pipe and fittings of dirt, dust and moisture before installation. Installation and solvent welding methods shall be as recommended by the pipe and fitting manufacturer.

4. On PVC to metal connections, the contractor shall work the metal connections first. Use Teflon tape, or equal, on all threaded PVC to PVC, and on all treaded PVC to metal joints.

5. Install piping under existing walks by boring whenever possible. Where any cutting or breaking of sidewalks and/or concrete is necessary, it shall be done and replaced at no increase in contract sum. Obtain permission to cut or break sidewalks and/or concrete from the architect before proceeding. No hydraulic driving will be permitted under concrete paving.

D. Line clearance:

All lines shall have a minimum clearance of 6 inches from each other and from lines of other trades. Parallel lines shall not be installed directly over one another.

E. Automatic Controller:

1. Locate controller in general location shown with exact placement to be determined at job site by the irrigation consultant or Owner's Representative.

2. Connect control lines to controller in sequential arrangement according to assigned identification number on plans.

3. Controller shall be properly grounded per Article 250 of the National Electric Code and conform to local regulations.

F. Remote Control Valves:

Install where shown on drawings. When grouped together, allow at least 12 inches between valves. Install each remote control valve in a separate valve box. Locate boxes in groundcover areas whenever possible, and a minimum of 12 inches from paving or curbs.

G. Control Wiring:

1. Make connections between existing automatic controls and electrical control valves with direct burial copper wire. Common wires shall be white. Install in accordance with valve manufacturer's specifications and wire charts.

2. Wiring shall occupy the same trench and shall be installed along the same route as pressure supply or lateral lines wherever possible. When not possible, house wiring in PVC conduit as described in "Sleeving and Conduit" section.

3. Where more than one wire is placed in a trench the wiring shall be taped together at intervals of 10 feet.

4. Provide 2-foot expansion coil at each wire connection and at least every 100 feet of wire length on runs more than 100 feet in length. Form expansion coils by wrapping at least five turns of wire around a 1-inch diameter pipe, then withdrawing the pipe.

5. Splicing on runs shall be placed in junction boxes. Indicate all splices on the As-Built Plan.

6. All below grade wire connections shall be made by using heat shrink tubing with interwall sealer following manufacturers recommended procedures.

7. Install separate common wire for each controller. Install extra control wires of a different color through all valve boxes to controller as indicated in irrigation notes on plans.

H. Sleeving and Conduit:

1. Control wiring passing under proposed concrete and paving shall pass through Schedule 40 PVC conduit-size as required.

2. Sleeving and conduit shall extend six (6") beyond farthest edge of pavement or curb.

3. Provide removable non-decaying plug at ends of sleeves and conduits to prevent entrance of earth.

I. Flushing of System:

1. After all new pipelines and risers are in place and connected, all necessary diversion work has been completed, and prior to installation of sprinkler heads, open control valves and use a full head of water to flush out the system.

2. Install sprinkler head only after flushing of system has been accomplished.

J. Sprinkler Heads:

1. Install sprinkler heads as shown on Drawings.

2. Spacing of heads shall not exceed maximum shown on Drawings. In no case shall spacing exceed maximum recommended by manufacturer.

3.05 FIELD QUALITY CONTROL:

A. Adjustment of the System:

1. Flush and adjust all bubblers for optimum performance and to prevent overspray onto walks, roadways and buildings.

2. If it is determined that adjustments in the irrigation equipment will provide proper and more adequate coverage, the contractor shall make such adjustments prior to planting. Adjustments may also include changes in nozzles sizes and degrees of arc as required.

3. Lowering raised sprinkler heads by the contractor shall be accomplished within ten days after notification.

B. Testing of Irrigation System:

1. Notify the irrigation consultant at least three (3) days in advance of testing.

2. Test to be done at no extra cost to the Owner.

3. Center load piping with sufficient amount of backfill to prevent arching or slipping under pressure. No fitting shall be covered.

4. Testing of pressure main lines shall occur prior to installation of electrical control valves.

5. Pressure Test for Solvent Weld Pipes:

   a. Apply test for solvent welded plastic pipe after joints have cured at least 24 hours or more it manufacturer of solvent cement requires.

   b. Test supply lines per ASTM-F690 as follows: (1) add water slowly to pipe to avoid water hammer damage, (2) bleed system to insure all air is out of pipes, (3) pressurize system to 125 psi for two (2) hours. Visually inspect for leaks while system is holding pressure constant. Note – use hydraulic pump or other safe method – do not use air compressor.

   c. Test sprinkler lines at line pressure and visually inspect for leaks.

6. When the irrigation system is completed, perform a coverage test to determine if the water coverage for planting areas is complete and adequate. Furnish all materials and perform all work required to correct any inadequacies of coverage due to deviation from drawings. This test shall be accomplished before any plant material is planted.

7. Upon completion of each phase of work, test and adjust entire system to meet site requirements.

3.06 CLEAN-UP:

Clean-up shall be made as each portion of work progresses. Refuse and excess dirt shall be removed from the site, all walks and paving shall be broomed or washed down, and any damage sustained on the work of others shall be repaired to original conditions.

3.07 FINAL REVIEW PRIOR TO ACCEPTANCE:

A. Operate each system in its entirety at time of final review. Any items deemed not acceptable shall be reworked to the satisfaction of the irrigation consultant.

B. Final review shall take place after submission of all specified lists, record drawings, and manuals.

3.08 INSPECTIONS:

The contractor shall be subject to inspections at any and all times by authorized representatives of the Owner.

3.09 MAINTENANCE:

The contractor is to make all repairs and maintain the entire sprinkler system from the time of installation through the landscape maintenance period.

GUARANTEE FOR SPRINKLER IRRIGATION SYSTEM

WE HEREBY GUARANTEE THAT THE SPRINKLER IRRIGATION SYSTEM WE HAVE FURNISHED AND INSTALLED IS FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP, AND THE WORK HAS BEEN COMPLETED IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS. WE AGREE TO REPAIR OR REPLACE ANY DEFECTS IN MATERIAL OR WORKMANSHIP, ANY SETTLING OF BACKFILLED TRENCHES, WHICH MAY DEVELOP DURING THE PERIOD OF ONE YEAR FROM DATE OF ACCEPTANCE AND ALSO TO REPAIR OR REPLACE ANY DAMAGE CAUSED BY ANY DEFECTS IN THE IRRIGATION SYSTEM OR RESULTING FROM THE REPAIRING OR REPLACING OF SUCH DEFECTS AT NO ADDITIONAL COST TO THE OWNER. ORDINARY WEAR AND TEAR, UNUSUAL ABUSE OR NEGLECT ARE EXCEPTED. WE SHALL MAKE SUCH REPAIRS OR REPLACEMENTS, INCLUDING COMPLETE RESTORATION OF ALL DAMAGED PLANTING, PAVING, OR OTHER IMPROVEMENTS OF ANY KIND, WITHIN A REASONABLE TIME, AS DETERMINED BY THE OWNER, AFTER RECEIPT OF WRITTEN NOTICE. IN THE EVENT OF OUR FAILURE TO MAKE SUCH REPAIRS OR REPLACEMENTS WITHIN A REASONABLE TIME AFTER RECEIPT OF WRITTEN NOTICE FROM THE OWNER, WE AUTHORIZE THE OWNER TO PROCEED TO HAVE SAID REPAIRS OR REPLACEMENTS MADE AT OUR EXPENSE AND WE WILL PAY THE COSTS AND CHARGES THEREFORE UPON DEMAND.

PROJECT: _____

LOCATION: _____

CONTRACTOR: _____

LICENSE NO: _____

ADDRESS: _____

TELEPHONE: _____

GUARANTEE TO: _____

_____

_____

DATE OF ACCEPTANCE: _____

AUTHORIZED REPRESENTATIVE: _____

END OF SECTION 02810

SECTION 02870

SITE FURNISHINGS AND ACCESSORIES

PART 1 – GENERAL

1.01 SUMMARY

A. The General Conditions and all other Contract Documents for this project are complementary and applicable to this Section of the Specifications.

B. Work Included: Furnish all labor, materials, equipment and services necessary to provide and construct, repair, or install the site elements, complete in place, as shown and specified, including, but not limited to:

1. Benches
2. Bike Racks
3. Trash Enclosure

C. Related Work:
Section 03340: Site Concrete Work

1.02 SUBMITTALS

A. Submit shop drawings where noted to the Owner for approval before installing any manufactured items. Plans shall include dimensions, color, finish, structural design (custom items), and connection details.

B. Submit catalog cuts, samples and manufacturers literature of all manufactured items in this section to the Owner for approval before installation.

1. Provide color samples, brushouts, or charts for all items. Final colors to be selected by Owner and a sample submitted for approval.

PART 2 – PRODUCTS

2.01 MANUFACTURED ITEMS

A. Benches: per plans, by Owner

B. Bike Racks: per plans, by Owner

C. Trash Enclosure: Final Materials to be selected by Owner and samples submitted for approval.

2.02 MISCELLANEOUS MATERIALS

A. All other materials for site elements shall be as specified on the plans and these specifications.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Examination: Verify that conditions are satisfactory for installation of each item of site elements. If unsatisfactory conditions exist, do not begin installation until such conditions have been corrected.

B. Benches and Bike Racks

1. Install directly onto concrete. Use manufacturer's recommended adhesive.

3.02 GUARANTEE

A. At completion of project, Contractor shall provide Owner with written guarantee from each manufacturer identifying the nature of warranty for each product component.

B. Contractor shall provide Owner with two (2) bound maintenance manuals identifying each piece of equipment on manufacturer's recommended maintenance program including, but not limited to, daily, weekly, and monthly check lists.

C. Contractor to provide Owner with minimum of one (1) gallon each type and color of paint used on apparatus with recommended surface preparation and application guidelines.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT AND PAYMENT:

The Site Elements shall be measured as follows:

1. Benches shall be per each
2. Bike Racks shall be per each

The contract unit price for the actual quantity of each item installed, and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals for providing and installing all site elements as shown on the plans and as specified in these specifications. Payment shall only be made for installed elements as approved by the Owner.

END OF SECTION 02800

SECTION 02900

LANDSCAPE PLANTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. The General and Supplementary Conditions and General Requirements apply to the work herein specified.

1.02 DESCRIPTION:

A. Work to be Included:

1. Furnish and place topsoil, fertilizer, organic materials, and all other materials incidental to planting work.

2. Furnish all plant materials (trees, shrubs, seed, ground covers, and plant labels).

3. Furnish all labor, equipment and materials necessary for the installation of plant materials according to these Specifications.

B. Related Work Described Elsewhere:

1. Irrigation: Irrigation system shall be installed and operative before beginning planting operation.

2. Drainlines and Utilities: Contractor shall fully acquaint himself with the existing conditions particularly in reference to underground piping. Any damage caused by the Contractor to work of other trades shall be repaired by him at no cost to the Owner.

3. Earthwork: Close coordination shall be maintained with those Contractors performing rough grading operations and installing utilities and pavement to insure proper timing of the work.

1.03 REQUIREMENTS OF REGULATORY AGENCIES:

A. Perform work in accordance with all applicable laws, codes, and regulations required by the City of Livermore and any other authorities having jurisdiction over such work. Provide for all inspections and permits required by Federal, State, and local authorities in furnishing, transporting, and installing materials.

B. Certificates of inspection required by law for transportation shall accompany invoice for each shipment of plants. File copies of certificates with Owner's Representative after acceptance of material. Inspection by Federal or State Governments at place of growth does not preclude rejection of plants at project site.

1.04 QUALITY ASSURANCE:

A. Personnel: All planting and lawn work shall be performed by personnel familiar with lawn and planting procedures under the supervision of a qualified foreman.

B. Codes and Standards: Nursery stock shall meet the standards of the current edition of the "Agricultural Code of California" and the "Regulations of the Director of Agriculture Pertaining to Nursery Stock" as to grading and quality. They shall be true to type and name in accordance with "Standardized Plant Names", Second Edition.

C. Substitutions: Substitutions of plant materials will not be permitted unless authorized in writing by Owner's Representative. If proof is submitted that any plant specified is not obtainable, a proposal will be considered for use of the nearest equivalent size or variety with corresponding adjustment of Contract price. Such proof shall be substantiated and submitted in writing to Owner's Representative at least 30 days prior to start of work under this Section. These provisions shall not relieve Contractor of the responsibility of obtaining specified materials in advance if special growing conditions or other arrangements must be made in order to supply specified materials.

The Landscape Architect reserves the right to require the Contractor to replace at the Contractor's cost any plants which the Contractor has installed without the Landscape Architect's approval.

D. Plants shall be subject to inspection and approval of the Landscape Architect at place of growth or upon delivery for conformity to specifications. Such approval shall not impair the right of inspection and rejection during progress of the work. Wherever the terms "approve", "approval" or "approved" are used herein they mean approval of the Landscape Architect in writing.

E. Plant Certification: All plants must meet specifications of Federal, State, and County laws requiring inspection for plant disease and insect infestations. Inspection certifications required by law shall accompany each shipment, invoice and order for stock.

1.05 SUBMITTALS:

A. Furnish 6 copies of manufacturers' literature for the following items:

1. Fertilizer
2. Mulch
3. Lawn seed

B. Provide analysis from an approved testing laboratory for:

1. Topsoil
2. Organic Amendment

C. Submit one (1) quart sample each of mulch and organic amendment.

D. All submittal data shall be forwarded in a single package to the Landscape Architect within 60 days of award of the contract.

1.06 SAMPLES AND TESTS:

A. Owner's Representative reserves the right to take and analyze samples of materials for conformity to specifications at any time. Contractor shall furnish samples upon request by Owner's Representative. Rejected materials shall be immediately removed from the site at Contractor's expense. Cost of testing of materials not meeting specifications shall be paid by Contractor.

1.07 SELECTION AND TAGGING OF PLANT MATERIAL:

A. Plants shall be subject to inspection and approval by Landscape Architect at place of growth if the Landscape Architect so chooses, and upon delivery for conformity to specifications. Such approval shall not impair the right of inspection and rejection during progress of the work. Submit written request for inspection of plant material at place of growth to Landscape Architect. Written request shall state the place of growth and quantity of plants to be inspected. Landscape Architect reserves the right to refuse inspection at this time if, in his judgment, a sufficient quantity of plants is not available for inspection.

OR

B. Plants identified as "selected specimen" shall be approved and tagged at place of growth by Landscape Architect. For distant material, submit photographs for pre-inspection review.

1.08 JOB CONDITIONS:

A. Delivery:

1. Deliver standard products to site in original unopened containers bearing manufacturer's guaranteed chemical analysis, name, trade mark and conformance to state law.

2. Deliver plants with identification labels.
   a. Labels should state correct name and size.
   b. Use durable, water-proof labels with water resistant ink that will remain legible for at least 60 days.

3. Protect plant materials during transport to prevent damage to rootball or desiccation of leaves.

4. Remove unacceptable plant materials immediately from job site.

B. Storage:

1. Contractor shall maintain the plant material properly between delivery and planting. This includes protection from animals and vandals, proper watering, and feeding if necessary.

2. Shade plants shall be stored in the shade, and sun plants shall be stored in the sun.

C. Timing: Under no circumstances shall any work be performed if the temperature exceeds 90 degrees or is below 40 degrees. No planting shall be done with the soil saturated with water.

1.09 PROTECTION OF EXISTING PLANTS TO REMAIN:

A. Do not store materials or equipment, permit burning, or operate or park equipment under the branches of any existing plant to remain except as actually required for construction in those areas.

B. Provide barricades, fences or other barriers as necessary at the drip line to protect existing plants to remain from damage during construction.

C. Notify Owner's Representative in any case where Contractor feels grading or other construction called for by Contract Documents may damage existing plants to remain.

D. If existing plants to remain are damaged during construction, Contractor shall replace such plants of the same species and size as those damaged at no cost to Owner. Determination of extent of damage and value of damaged plant shall rest solely with Owner's Representative.

PART 2 - PRODUCTS

2.01 SOIL AMENDMENTS:

A. The following organic amendments, soil amendments, and fertilizer rates and quantities are to be used for bid basis only. Contractor shall arrange and pay for testing by an accredited soils laboratory of existing site soil after rough grading operations are complete, and shall amend the soils according to said laboratory's recommendations. The soils recommendations shall be considered a part of this specification.

B. Topsoil: Provide topsoil as required to complete landscape work. Topsoil to be furnished shall be fertile and friable, possessing characteristics of representative productive soils on the site. It shall not contain toxic substances which may be harmful to plant growth. If herbicide contamination is suspected then a radish/rye grass growth trial must be performed. Consult with Landscape Architect prior to decision to test. It shall be uniformly textured and free of all objectionable foreign materials, oil, or chemicals which may be injurious to plant growth. Natural topsoil shall possess a pH factor between 5.5 and 7.5, a sodium absorption ratio (SAR) of less than 8, a boron concentration of the saturation extract of less than 1 ppm, and salinity of the saturation extract at 25 degrees C. of less than 4.0 millimhos per centimeter.
Obtain topsoil from naturally well- drained sites where topsoil occurs in a depth of not less than 4 inches; do not obtain from bogs or marshes. Topsoil from the project stockpile which meets the requirements is acceptable.

C. Imported Topsoil: Topsoil shall be tested by an approved soils laboratory for compatibility with existing on-site soils and fertility. Contractor shall submit soil laboratory's analysis and amendment recommendations. Imported topsoil shall be

subject to inspection by Landscape Architect at the project site. Remove rejected topsoil immediately at Contractor's expense.

D. Organic Amendment:

1. Nitrified fir bark having a minimum organic content of 94% and a nitrogen content of 0.8% minimum to 1.2% maximum on a dry weight basis. Fir bark shall be shredded to pass a 1/4" mesh screen. Six cubic yards per 1,000 square feet.

E. Fertilizer:

1. Lawn and groundcover areas:

a. 6N-20P-20K, 25 lbs. per 1,000 square feet.
b. Starting one month after planting, on a monthly basis, 21N-0P-0K Ammonium sulfate. 5 lbs. per 1,000 square feet.

2. Shrubs and trees:

a. 21 gram 20N-10P-5K slow release fertilizer tablets as manufactured by Agriform. Apply according to Manufacturer's instructions.
b. After planting: 21N-0P-0K Ammonium sulfate 5 lbs. per 1,000 square feet.

2.02 TOP MULCH: Fir bark chips having a maximum size of 1" diameter.

***2.03 GRASS SEED:**

A. Grass seed shall be fresh, clean, new crop seed having purity of 98.5% and a minimum germination rate of 83%. Seed mix shall be mixed in the proportions by weight shown:

Dwarf Tall Fescue
80% Bonsai
20% Pixie

Apply at a rate of 10 lbs. per 1,000 square feet.

B. Seed shall be mixed by dealer. Furnish dealer's guaranteed statement of composition, mixture and percentage of purity and germination of each variety to Landscape Architect.

OR

***2.03 SOD:** Sod shall be one year old and dense with grass, having been mowed at 1 in. height before lifting from field. All grown on fumigated soil. Sod shall be in vigorous condition, dark green in color, free of disease and harmful insects. Sod shall be grown of seed mix of the following proportions by weight:

Dwarf Tall Fescue:
80% Bonsai
20% Pixie

2.04 GROUNDCOVERS, TREES, AND SHRUBS:

A. All plant materials shall be nursery grown in accordance with the best known horticulture practices and under climatic conditions similar to those in the locality of the project. Container stock shall have grown in the containers in which delivered for at least six (6) months, but not over two years. No container plants that have cracked or broken balls of earth when taken from container shall be planted except upon special approval by Landscape Architect.

B. Plants shall be vigorous and shall have a normal habit of growth. Plants shall be free of damage by insects, pests, diseases or wind; burns from insecticides or fertilizer; and stunted growth due to lack of water, lack of food, diseases, or other causes. Plants shall be in conformity with the sizes shown on the drawings.

C. Trees: Unless otherwise specified, tree trunks shall be straight with leader intact, undamaged, and uncut. All old abrasions and cuts are acceptable only if completely callused over.

D. Quantities: Quantities necessary to complete the work as shown on the drawings shall be furnished.

E. Root Systems: All shrubs and trees shall have a normal root system. No plants with roots that have encircled themselves will be accepted. In case of any unsatisfactory root system, a total group of plants may be rejected.

* F. Balled and Burlapped Trees: Plants shall be true to species and variety and shall conform to measurements specified except that plants larger than specified may be used if approved by Landscape Architect. Use of such plants shall not increase Contract price. If larger plants are approved, the ball of earth shall be increased in proportion to the size of the plant. Plants shall be measured when branches are in their normal position. Height and spread dimensions specified refer to main body of plant and not branch tip to tip. Caliper measurement shall be taken at a point on tree trunk 6 inches above natural ground line for trees up to 4 inches in caliper and at a point 12 inches above the natural ground line for trees over 4 inches in caliper. If a range of size is given, no plant shall be less than the minimum size specified. The measurements specified are the minimum size acceptable and are the measurements after pruning, where pruning is required.

2.05 WATER SOURCE:

A. Water source shall be provided by Owner. Contractor shall provide transport as required.

2.06 ROOT GUARDS: Deep Root Model UB 36-2 shall be used on all trees 6' or closer to pavement, utilities, curbs, etc. Deep Root (415) 344-1464.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS:

A. Inspections by the Landscape Contractor:

1. Prior to all work in this section, verify grades and carefully inspect the installed work of all other trades. Verify that all such work is complete to the point where the installation may properly commence.

2. In the event of discrepancy, immediately notify the Landscape Architect. Do not proceed with this installation in areas of discrepancies until all such discrepancies have been fully resolved.

3. Inspect trees, shrubs and ground cover plants for injury, insect infestations, and proper pruning.

4. Landscape Contractor shall receive site graded to $\pm$0.10 ft. of finish grades shown on the Drawings. Allow for depth of soil amendments and mulch in determining the difference between finished subgrade in groundcover and shrub beds. Verify that subgrades are not compacted. Do not proceed until detrimental conditions are corrected.

3.02 SOIL PREPARATION:

A. The Contractor shall prepare the site for landscaping. In the areas designated for landscaping on the plans, he shall, prior to placing imported material, replacing existing topsoil, or doing any planting, clear the areas of weeds, roots, debris, rocks, and underground obstructions, and construction debris to a depth acceptable for planting. Scarify the subgrade to a 3" minimum depth prior to spreading topsoil.

B. Cultivation and Placement of Amendment:

1. In areas to be planted with shrubs cultivate to a depth of 12".

2. In lawn and groundcover areas, cultivate soil to a depth of 8". Incorporate 6 cubic yards per 1000 square feet of nitrified fir bark. Prior to planting incorporate to a depth of 6" the following fertilizers, per 1000 square feet:

   25 lbs. 6N-20P-20K

3. Areas within the driplines of existing trees shall be hand cultivated.

C. Finish Preparation in Lawn Areas:

1. Roll to compact amended soil to not more than 85% compaction. Finish grade shall be 1" below adjacent paving, curbs, or walls unless otherwise shown on drawings. Finish out to smooth, even surface conforming to established grades after settlement. Rake immediately prior to planting.

2. If rain is likely between completion of soil preparation and planting, precautions shall be taken to prevent erosion of the soil.

D. Soil Mix for Backfill of Shrubs and Trees: The following ingredients shall be tumbled to achieve a homogeneous mix:

Organic amendment	1 cubic yard
Topsoil	3 cubic yards

E. Soil Mix for Backfill of Pots: The following ingredients shall be tumbled to achieve a homogeneous mix:

Organic amendment	1 cubic yard
Topsoil	3 cubic yards

Top dress each pot with one pound of Osmacoat 17-7-12 fertilizer.

3.03 SHRUBS AND TREES:

A. Preparation:

1. Stake out location for plants and outline of planting beds on ground and obtain the approval of Landscape Architect before digging.

2. The Contractor shall protect all utilities, vegetation, and structures during work.

3. Trees shall be located a minimum of 3' from walls, overheads, walks, headers, and other trees within the project. If conflicts arise between size of areas and plans, Contractor shall contact Landscape Architect for resolution. Failure to make such conflicts known to the Landscape Architect will result in Contractor's liability to relocate the materials.

B. Excavation:

1. All plant pits shall be dug with vertical walls. The sides and bottoms of all planting pits shall be thoroughly scarified.

2. Holes for one (1) gallon size plants: Twelve (12) inches wider than the can and six (6) inches minimum deeper.

3. Holes for (5) gallon size plants: eighteen (18) inches wider than the can or root ball, and eight (8) inches deeper than can or root ball.

4. Holes for fifteen (15) gallon size plants or larger: Twenty-four (24) inches wider than the can or root ball, and twelve (12) inches deeper than the can or root ball.

C. Plants in Containers:

1. Plants shall be removed carefully from their containers after the containers have been cut on two sides minimum; fifteen-gallon containers shall be opened in three places. In the case of boxed plant specimens, the wood shall be removed at the sides and at the bottom of the box.

2. After removing plant material from its container, stimulate root growth by making four or five vertical cuts 1" deep around the circumference of the root ball.

3. Do not lift or handle plants by the top, stems, or trunk at any time. All plants shall be lifted in such a manner that the root ball is supported from the underside.

4. The Contractor shall check all plants for adequate root systems. If the root system is defective, he shall remove deficient plants from the site and replace them with new ones.

D. Balled and Burlapped Material: Dig balled and burlapped (B&B) plant with firm, natural balls of earth, of diameter not less than that recommended by USA Standard for Nursery Stock, and of sufficient depth to include the fibrous and feeding roots. Plants moved with a ball will not be acceptable if the ball is cracked or broken before or during planting operations.

E. Planting:

1. Center plant in pit or trench over tamped mound.

2. Face for best effect.

3. Set plant plumb and hold rigidly in position.

4. All plants shall be set in the ground so that the root ball will be flush with the finish grade. All plants that settle below the finish grade within 30 days of acceptance of the work shall be replanted in the proper position. In case a total section of planting area settles, the Contractor shall lift the plants, import additional soil mix, regrade, and replant, at no additional cost to the Owner.

5. Use soil mix only for backfill. Backfill pit with soil mix in 9" layers and water each layer thoroughly to settle soil. The filled pit shall be flush with surrounding grade when complete.

6. When the plant pit has been approximately one half filled, place planting tablets according to the manufacturer's schedule.

7. Apply post-planting fertilizer.

8. In shrub mass areas, mulch area between plant pits with 3" layer of fir bark for weed control.

9. Planting operation for plants in raised concrete planters is same as above except that finish grade of soil mix shall be 1 1/2" below top of planter walls. Planters may be backfilled with excess topsoil up to the depth specified for plant pits above which backfill shall be soil mix.

10. Planting operations for plants in precast planters is the same as stated in paragraph 9 above. Fill entire planter with soil mix. Place planters as shown on planting plans.

* 11. In areas noted on Drawings where acid-loving plants will be installed, use the following planting mix:

2 parts amended soil
1 part fine sand
1 part peat moss

Immediately after plants are installed, apply Iron Sequestrene at the rate and in the method recommended by the manufacturer.

3.04 GROUNDCOVER AREAS:

A. Planting:

1. Space plants equally and uniformly at spacings indicated on the Drawings, which are the maximum and in a triangular pattern.

2. Plant pits shall be sufficiently large so that the root can be freely suspended in the pit. After backfilling the pit, firm the soil so that there will be no air space around the roots.

3. Apply post-planting fertilizer.

4. Mulch all ground cover areas with 1" to 1 1/2" layer of fir bark.

3.05 LAWN SEEDING:

A. Inspection:

Upon the completion of the placing of the soil and prior to seeding, the Contractor shall call for an inspection of the lawn irrigation system. The seeding shall commence after the Landscape Architect is satisfied that the irrigation system is operating satisfactorily and finish grade is in accord with the Drawings.

B. Seeding:

1. After seed bed has been prepared, distribute the grass seed mixture evenly over the surface of the lawn area.

2. After the seed has been sown, evenly spread the fertilizer over the entire lawn area. Lightly rake the entire area to cover seed, maximum cover 1/4".

3. Top dress with minimum of 1/8" of peat moss.

4. Immediately after completion of planting, the seeded area shall be watered with a fine spray to provide a one-inch depth of penetration into the soil, and the top surface shall not be allowed to dry out at any time until after germination. Reseed areas which do not germinate.

5. Application of lawn seed by hydroseed and hydromulch method may be done at Contractor's option. All above provisions of soil preparation apply. If the hydroseed method is used materials shall be mixed and applied in the following proportions:

Wood Fiber	2000 lbs/acre
Seed Mix	See Part II Products above
Water	as needed for application

The slurry shall be applied within 60 minutes after the seed has been added to the slurry.

C. All newly seeded turf areas shall be free of broadleaf weeds. Infested areas shall be treated by the Contractor with a selective broadleaf herbicide.

D. At the time of final inspection, the lawns shall be dense, green, and weed free. It is the Contractor's responsibility to eliminate any bare spots, dead areas, and weeds.

OR

3.05 SOD LAWN:

A. Inspection:

Upon the completion of the placing of the soil and prior to placing sod, the Contractor shall call for an inspection of the lawn irrigation system. The sod shall be placed after the Landscape Architect has satisfied himself that the irrigation system is operating satisfactorily and finish grade is in accord with the Drawings.

B. Laying Sod:

1. Remove all rubble, sticks, rocks and stones 1" or larger from top 2" amended soil.

2. Lay sod without stretching. Stagger end seams and butt edges as close as possible to each other. Roll with sod roller perpendicular to direction it was laid.

3. Apply post-planting fertilizer.

4. Irrigate to an 8" soil depth immediately after planting and then irrigate lightly every day to maintain adequate moisture level through establishment period.

5. Arrange for delivery of sod in the morning to insure same-day installation.

C. At the time of final inspection the lawns shall be dense, green, and weed free. It is the Contractor's responsibility to eliminate any bare spots, dead areas and weeds.

3.06 TREE STAKING:

A. Stake trees as indicated on the Drawings.

B. Tying: Find the proper support height by holding the trunk in one hand and pulling the top to one side and releasing it. The lowest height at which the trunk will return to the upright position when the top is released, is the height at which to attach tree ties.

3.07 PRUNING:

A. Tree and Shrub: Pruning shall be performed as required to maintain a natural appearance, promote healthy and vigorous growth, and eliminate diseased or damaged growth.

B. Trees shall be pruned to thin crown and avoid wind damage, eliminate narrow V-shaped branch forks that lack strength, eliminate sucker growth, and maintain a radial branching pattern to avoid crossing branches.

C. Under no circumstances will stripping of lower branches ("raising-up") of young trees be permitted. Lower branches shall be retained in a "tipped back" or pinched condition with as much foliage as possible to promote caliper trunk growth (tapered trunk).

D. Major pruning of trees to compensate for root loss or for aesthetic reasons shall be done only with approval of the Landscape Architect.

E. Shrubs shall not be clipped into balled or boxed forms, unless such is required by the design and directed by the Landscape Architect.

F. All pruning shall be made flush to lateral branches, buds, or trunk. "Stubbing" will not be permitted.

G. Damage: All cuts over 1" resulting from pruning or wind breakage shall be inspected periodically for insect infestation or disease.

3.08 CLEAN UP:

A. Keep all areas of work clean and neat at all times. Upon completion of planting, all cans, boxes, and other debris that is a part of the planting operation shall be removed from the site.

B. All pavements shall be washed off, and site shall be left in an absolutely clean condition. All planting areas shall be cultivated and weed free before final inspection. Clean-up operations shall take place throughout the course of work so that walks and drives are clean at all times.

3.09 INSPECTIONS:

A. Notification: The Contractor shall notify the Landscape Architect a minimum of 72 hours before requiring a visit by the Landscape Architect or his duly appointed representative to the site.

B. Check Points: The following shall be considered check points and the Contractor shall only proceed with the work after the Landscape Architect has visited the site and determined that the work is proceeding satisfactorily.

1. Completion of placement of soil mix and fine grading, prior to sodding or seeding of lawn.

2. When plant material is placed in the configuration shown on the Drawings before planting.

3. A check visit shall be made to begin the maintenance period. At this time the Contractor shall have completed all phases of the Plans and Specifications. Any discrepancies shall be noted at that time and the Contractor shall make appropriate corrections before the acceptance of the work.

4. A conference including the Owner shall be held at the completion of the work, provided that all deficiencies brought out in the check visit which began the maintenance period have been corrected by this time. The Contractor shall continue to maintain the project at his own expense until all deficiencies have been corrected, at which time the Contractor shall request the Landscape Architect to visit the site and approve the project as complete. The Landscape Architect will accept the landscape project in writing. The date of the acceptance letter shall be the first day of the guarantee period.

C. Should it be determined at the Final Inspection or Final Acceptance visit that any punchlist item is incomplete, any further review of the site will be terminated until all items are guaranteed, in writing, to be complete by the Contractor. The cost of additional site visits by the Landscape Architect to verify completion of work shall be paid for by the Contractor.

3.10 MAINTENANCE:

A. Contractor shall furnish all labor, material, equipment, and services required to maintain the landscape in a healthy and attractive condition for a period of 60 days.

B. Maintenance shall include fertilization, watering, insect and disease control, weed control, weekly trash removal, mulching, restaking trees, tightening of guys, resetting plants to proper grades or upright position, and restoration of watering basins.

C. Maintenance of grass areas shall consist of fertilizing, watering, weeding, mowing, repair of all erosion, and reseeding as necessary to establish a uniform stand of the specified grasses. Areas and parts of areas which fail to show a uniform stand of grass for any reason shall be (reseeded or) resodded until all areas are covered with a satisfactory stand of grass. (Mulch reseeded areas with 1/4 in. of specified peat moss).

D. Maintenance period shall not start until all elements of construction, planting, and irrigation for the entire project are complete. Project will not be segmented into maintenance phases, unless specifically authorized in writing by the Owner's authorized representative.

E. The Contractor shall request an inspection to begin the plant maintenance period after all planting and related work has been completed in accordance with the Contract documents. A prime requirement is that all groundcover and lawn areas be planted. If such criteria is met to the satisfaction of the Architect, a field notification will be issued to the Contractor to establish the effective beginning date of the period.

F. The Contractor's maintenance period will be extended if the provisions required within the plans and specifications are not filled.

G. Watering:

1. All plants shall be kept watered as often as it is necessary to keep them in optimum, vigorous growth. The lawn shall, at no time, show a lack of fresh green color or a loss of resilience due to lack of water. Watering shall be done preferably during the early morning hours.

2. Water shall be controlled so that there will be no excessive run-off, ponding, or overwatering.

3. Root Growth: Periodically the Contractor shall check the progress of the root growth within the back fill area. As the root growth increases beyond the root ball, the frequency of watering shall be reduced so that the roots are encouraged to grow to a lower soil depth. Watering then shall be less frequent, but applications shall be very slow and the Contractor shall assure himself that water does penetrate to the depth of the former plant pit.

H. Spraying:

1. All shrubs and trees shall be inspected at least twice a month during the growing period to determine the need for spraying to control insect damage, fungus development or any other disease that might be attacking the plants. Preventative spraying shall be done only with the approval of the Landscape Architect.

2. Operators of spray equipment shall take all reasonable precautions to protect themselves, other people and buildings from spray. The Contractor shall have all permits and licenses required for such an operation. Where applicable, dormant spray shall be applied to shrubs and trees during the winter period.

3. All equipment shall be properly washed before and after use.

4. No spraying shall take place during windy or gusty days.

I. Staking and Guying: Stakes and guys shall be inspected a minimum of two times a month to assure that the wires and ties are tight and no damage has occurred to the tree trunk or branches.

J. Weed Control:

1. Weeds shall be kept under control, either by hand or by the application of herbicides designed for use on any type of weeds invading the planting areas.

2. All equipment used for herbicides shall be properly cleaned before it is used on this project. Herbicides shall be applied at temperatures recommended by the manufacturers. Herbicides shall not be used during windy or gusty days. All possible precautions shall be taken to protect vegetation which is susceptible to damage from the particular herbicides to be used.

3. The bases of all plants shall be kept completely free of weeds. Periodically, the base of the trees and shrubs shall be cultivated in order to allow better penetration of water, but such cultivation shall be carefully done in order not to destroy surface roots.

K. Fertilization: Top dress all areas at 45 day intervals from time of planting with fertilizer of same composition and at same rate as at time of planting.

L. Mowing:

1. All mowing shall be done in a neat and orderly manner. Equipment shall be moved onto and off the area to be mowed in such a manner that it will not leave

tracks or marks that detract from the finish turf. Timber shall be provided to move equipment over curbs, stairs, or similar constructions.

2. Mowing equipment shall be kept in optimum operating condition. The equipment shall be washed before initial use on the project so that there will be no chance of introducing foreign seeds or diseases onto the project.

3. Frequency of mowing shall be determined by the rate of growth of the grass. During seasons of peak growth mowing may have to be done every five days to six days; under normal conditions once a week should be adequate.

4. The average mowing height shall be 1-1/2". The grass blades must be cut sharply and cleanly. The turf must be cut evenly so that no ridges remain in the finish cut. The direction of mowing shall be alternated each time.

M. Litter: The Contractor shall remove promptly after pruning, trimming, and weeding or other work required under the contract, all debris generated by his performance of the work. Immediately after working in the areas of public walks, driveways or paved areas, they shall be vacuumed clean with suitable equipment. All areas covered by this contract shall be kept free of the following items: bottles, cans, paper cardboard or metallic items. Common debris and litter shall be disposed of in an appropriate manner.

N. Pruning: Prune as necessary to remove injured twigs and branches, dead wood, and suckers.

3.11 GUARANTEE AND REPLACEMENT:

A. Guarantee period shall be extended for a period of one year from the date of written acceptance.

B. All plants shall be guaranteed to be alive and healthy as determined by the Landscape Architect at the end of the guarantee period.

C. Plant materials supplied by Owner shall be under similar warranty against defective workmanship during the planting operations. Plant material exhibiting conditions which are determined by the Landscape Architect as being unacceptable, due to workmanship by the Contractor, shall be replaced at no additional cost to the Owner.

D. The Contractor shall replace, in accordance with the Drawings and Specifications throughout the guarantee period, any plants that die, or in opinion of the Landscape Architect, are in an unhealthy or unsightly condition, and or have lost their natural shape due to dead branches, excessive pruning, inadequate or improper maintenance, or any other causes due to the Contractor's negligence. The Contractor shall not be held responsible for acts of vandalism occurring after the beginning of the guarantee period.

END OF SECTION 02900

SECTION 02910

HYDROSEEDING

PART 1 – GENERAL

1.01 SCOPE:

A. Furnish and place hydroseeding and related work, including fertilizer, organic materials, seed fiber, stabilizing emulsion and all other materials shown on drawings and as specified herein.

1.02 QUALITY CONTROL:

A. Reviews: The Contractor shall specifically request a review by Landscape Architect of finish grade to receive hydroseeding, and site inspection of seed, fiber and fertilizer, prior to starting work Certificates shall be submitted to Landscape Architect prior to review; see following.

B. Nomenclature: Plant botanical names conform to "Standardized Plant Names", second edition.

C. Schedule: Hydroseeding schedule shall be submitted to the Owner within fourteen (14) days of the signed contract.

D. Hydroseeding limits: Shall be confirmed with the Landscape Architect prior to seeding.

1.03 SUBMITTALS:

A. Hydroseed Work Sheets:

Prior to the slurry preparation the operator shall supply the Owner a worksheet and checklist showing the amount of materials to be added to each dump of the seeder and the number of dumps needed to complete this job with the seeder size to be used.

B. Prior to hydroseeding, the Contractor shall submit a one ounce sample of the certified seed mix and bill of lading for materials.

C. Certification:

1. Seed: Contractor shall furnish the Landscape Architect with seed supplier's certificate guaranteeing statement of composition, mixture and percentage or purity or germination of each variety, weight and origin for all seed within five days after award of contract.

2. Fiber: Cellulose Fiber for hydroseeding shall be certified for laboratory and field testing of the product and that the product meets and has been tested for all requirements specified herein. Weight of fiber material specified and shipped shall refer only to air dry weight, containing not more than 10 percent (by weight) water.

PART 2 – PRODUCTS

2.01 MATERIALS:

A. Seed shall be of commercial quality and certified by the California Crop Improvement Association. Grass seed shall be fresh, clean, new crop seed having a minimum purity of 98.5% and a minimum germination rate of 83%.

1. Seed shall be pre-mixed and packaged by a commercial seed supplier, tagged and labeled in accordance with California Agricultural Code.

2. Inert matter shall not exceed 5.0% nor weed content 0.5%, with no noxious weeds.

3. Seed shall be certified composed of the mix per plans.

B. Fertilizer:

1. Deliver fertilizer to site in original unopened containers bearing manufacturer's guaranteed chemical analysis, name, trade mark and conformance to State law.

2. Fertilizer shall be a granular type mixed by a commercial fertilizer house with the following chemical analysis by weight:

C. Stabilizing Agent (soil binder): Stabilizer shall be a biodegradable tacifier, non-toxic to plant or animal life, such as sentinel or M-binder.

D. Cellulose Fiber: Fiber shall be colored with a non-toxic, water soluble green dye to provide the proper visual gauge for metering of material over ground surfaces and shall be produced from natural or recycled (pulp) fiber, such as wood chips, similar wood materials, or newsprint, chip board, corrugated cardboard, or a combination of these processed materials.

1. Fiber shall be of such a character that upon addition and agitation in slurry tanks with fertilizer, seed, water and other additives, fibers become uniformly suspended to form a homogeneous slurry.

2. When hydraulically sprayed on the ground, fiber shall form a blotter-like groundcover impregnated uniformly with seed which allows absorption of moisture and rainfall percolation into underlying soil.

3. Materials that inhibit germination or growth shall not be present in the mixture.

E. Water: Shall be potable and furnished by Owner. Contractor to transport as required.

2.02 EQUIPMENT:

A. Equipment for the application of seed fertilizer, mulch and soil binder, shall have a built-in agitation system with an operating capacity sufficient to agitate, suspend and homogeneously mix a slurry of fiber mulch, seed, fertilizer, soil binder and water. The discharge system shall provide continuous, even distribution of the slurry on the slope surface to be seeded. The slurry tank shall have a minimum capacity of 1,000 gallons when operating.

B. Equipment for irrigation shall be available if deemed necessary for establishment of hydroseed.

PART 3 – EXECUTION

3.01 SURFACE CONDITIONS:

A. Prior to all work in this section, verify grades and carefully inspect the installed work of all other trades. The Contractor shall verify that hydroseed areas are adequately graded for seed application and free of deleterious material and weeds and complete to the point where the installation may properly commence. In the event of discrepancy, immediately notify the Landscape Architect. Do not proceed with this installation in areas of discrepancies until all such discrepancies have been fully resolved.

B. Install trees, shrubs and groundcover to be planted in hydroseeded area, prior to hydroseeding.

C. The Contractor shall obtain approval of hydroseed area preparation from the Landscape Architect prior to application.

3.02 APPLICATION OF HYDROSEED:

A. The hydroseed erosion control materials shall be mixed and applied in the following proportions to all areas indicated on the Drawings:

Seed mix per plan	
Cellulose Fiber	1800 lbs./acre
Fertilizer	350 lbs./acre
R/Binder	60 lbs./acre
Stabilizing Agent Water	as needed

B. Mixing: Care shall be taken that the slurry preparation takes place on the site of the work. The slurry preparation should begin by adding water to the tank when the engine is at half throttle. When the water level has reached the height of the agitator shaft, good recirculation shall be established and seed shall be added. Fertilizer shall then be added, followed by wood pulp mulch. The wood pulp mulch shall only be added to the mixture after the seed and when the tank is at least one-third filled with water. The engine throttle shall be opened to full speed when the tank is half filled with water. All the wood pulp mulch shall be added by the time the tank is two-thirds to three-fourths full. Spraying shall commence immediately when the tank is full. The operator shall spray the area with a uniform, visible coat by using the green color of the wood pulp as a guide.

C. Application:

1. Timing:

a. Irrigated hydroseed shall be applied between February 15th and October 15th.

b. Non-irrigated hydroseed shall be applied between October 15th and December 30th.

c. Hydroseed materials shall not be applied during windy or rainy weather or when soil temperatures are below 40 degrees F.

2. Operators of hydromulching equipment shall be thoroughly experienced in this type of application. Apply specified slurry mix in a sweeping motion to form a uniform mat at specified rate.

3. Keep hydromulch within areas designated and keep from contact with other plant materials.

4. Slurry mixture which has not been applied within 4 hours of mixing shall not be used and shall be removed from the site.

5. After application, the Contractor shall not operate any equipment or allow pedestrians in the covered area.

6. Daily worksheets shall be filled out by the nozzleman, with the following information: Seed type and amount, fertilizer analysis and amount, mulch type and amount, seeding additive type and amount, number of loads and amount of water, area covered and equipment used, capacity and license number.

3.03 MAINTENANCE:

A. Any area which has not produced a healthy, established stand of grasses after a period of 30 days from the date of seeding shall be reseeded and refertilized at the original rates of application. The Contractor shall be responsible for all seeded areas until an acceptable stand of hydroseed material has been achieved.

B. Fertilization:

The Contractor shall monitor the health of the hydroseed based on grass color. When grass shows signs of yellowing, or at 45 days following application the Contractor shall fertilize hydroseeded areas with a commercial blend fertilizer of 12N-12P-12K formulation at a rate of 6 lbs./100 square feet. (The above formula and rate may be adjusted as needed to conform to actual grass condition based on an assessment by the project horticulturist).

3.04 CLEAN-UP: Immediately after application thoroughly wash off any plant material, planting areas, paved areas, or architectural features not intended to receive slurry mix. Keep all areas of work clean, neat and orderly at all times. Keep all paved and planting areas clean during planting

and maintenance operations. Clean up and remove all deleterious materials and debris from the entire work area prior to Final Acceptance or the satisfaction of the Landscape Architect.

3.05 INSPECTIONS:

A. Make written request for inspection prior to seeding and after areas have been seeded and planting operation completed.

B. Submit requests for inspections to Landscape Architect at least 72 hours prior to anticipated inspection date.

END OF SECTION 02910

SECTION 02920

LANDSCAPE SOIL PREPARATION

PART 1 – GENERAL

1.01 SCOPE

A. Furnish and install all landscape soil preparation as shown and specified including but not necessarily limited to, the following: topsoil placement, organic amendment and fertilizer placement, and finish grading.

B. Related work specified elsewhere.

1. Planting – Section 02950
2. Hydroseed – Section 02910

1.02 QUALITY CONTROL

A. Reviews: Contractor shall specifically request at least two days in advance the following reviews prior to progressing with the work:

1. Verification of amendment incorporation depths
2. Finish grade

B. Certification: Written certificates stating quantity, type, and composition, weight and origin for all amendments; chemicals shall be delivered to the Resident Engineer before the material is used on the site.

C. Test Samples: Contractor shall provide two (2) one-quart samples to Soil and Plant Laboratory of Santa Clara (408) 727-0330 for their testing for conformance to this specification. Sample one shall be the proposed import topsoil and sample two shall be from below existing paving. No material shall be delivered to the site until the Resident Engineer approves the material. Testing costs shall be paid by Contractor. Testing costs for the initial samples and costs for any additional samples due to non-compliance by the Contractor shall be paid by the Contractor.

D. Amendment Testing: Contractor shall provide a one-quart sample of each proposed amendment to Soil and Plant Laboratory of Santa Clara (408) 727-0330 for their testing for conformance to this specification. No material shall be delivered to the site until the Resident Engineer approves the material. Testing costs shall be paid by the Contractor.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Import Topsoil: Shall be a homogeneous mineral soil classified as sandy loam, or fine sand. Particle size data shall be based upon standard USDA methodology. Of the material falling in the sand category, a minimum of 80% shall fall in the fine sand range (.05 – 5mm). Gravel content (greater than 2.0mm) shall be less than 15%. Import topsoil shall not contain more silt and clay than the on-site native soil. The sum of silt plus clay shall be less than 25%, the soil shall be nonsaline as determined on the saturation extract. Alinity shall not exceed 3.0 mmhos/cm, boron shall not exceed 1.0 ppm and the sodium absorption ration (SAR) shall not exceed 6.0. Soil reaction as determined on a saturated paste shall fall between 5.5 and 7.5. The soil shall be free of organic herbicides, or other growth restricting chemicals. Contamination may be tested by greenhouse trials using rye grass and radish as test crops using the existing import soil as substrate. These trails require four to five weeks for completion.

B. Fertilizer: Shall be determined from soils analysis results. For purposes of bidding only, assume the use of 6-20-20 commercial fertilizer, 20-10-5 planting tablets by Agriform International Chemicals, Inc., and iron sulfate.

C. Organic Amendment: Nitrogen-treated organic amendment conforming to:

Physical Properties:	95%-100% passing, sieve size 6.35mm ¼", 80%-100% passing, sieve size 2.38mm No. 8, 8 mesh and 0%-30% passing, sieve size 500 micron No. 35, 32 mesh.
Chemical Properties:	Nitrogen Content dry weight basis – 0.4-0.6% iron content – minimum 0.08% dilute acid soluble Fe on dry weight basis, soluble salts – maximum 3.5 millimhos/ centimeter @ 25 degrees C. as determined by saturation extract method; ash – 0-6.0%.

PART 3 – EXECUTION

3.01 LIMITS AND GRADES

A. Prior to commencing soil preparation operations, Contractor shall request a review by the Resident Engineer to verify specified limits and grades of work completed to date and soil preparation work to commence. Contractor shall complete the rough grading as necessary to round the top and toe of all slopes, providing naturalized contouring to integrate newly graded areas with the natural topography. Finish grading under this

section shall be completed in accordance with the section shown on the landscape drawings.

3.02 TOPSOIL PLACEMENT

A. Cross rip topsoil to a depth of ten inches. Then incorporate the amendments to a homogeneously blended soil depth of six inches. Compact all soil in place to 85% compaction.

3.03 ORGANIC AMENDMENT AND FERTILIZER INCORPORATION

A. Materials determined from the soils test should be uniformly distributed throughout all irrigated planting areas and incorporated to a homogeneously blended soil depth of six inches. For bidding purposes, assume per 1000 square feet:

30 pounds Commercial Fertilizer (6-20-20)
5 cubic yards Nitrogen Stabilized Organic Amendment
10 pounds Ammonium Sulfate

3.04 TREE AND PLANT PITS

A. Tree pits shall have their sides and bottoms loosened or otherwise broken to prevent glazed or compacted surfaces. Contractor shall auger for each tree a minimum of three 18" diameter holes as appropriate for trees size and as shown on the planting notes and detail.

B. Plant pits shall have their sides and bottoms loosened or otherwise broken to prevent glazed or compacted surfaces, and shall be as shown on the planting detail.

3.05 BACKFILL

A. Backfill for plant pits shall be the prepared soil per parts 3.2 of this section, taken from adjacent prepared areas. Spread excavated material onto adjacent areas as replacement. Only unamended soil shall be used beneath the root ball; cultivate bottom of plant pit to improve porosity. Should additional backfill be necessary, a mixture of one-third organic amendment/fertilizer mix (per Soil and Plant Laboratory) and two-thirds topsoil may be used.

3.06 PLANT TABLETS

A. All container plants shall receive plant tablets as follows:

One-gallon plants	two 21-gram tablets
Five-gallon plants	five 21-gram tablets
Fifteen-gallon plants	twelve 21-gram tablets
Box trees	eighteen 21-gram tablets

Space the tablets evenly around the root ball halfway up backfill touching side of root ball. The Resident Engineer may require excavation of plants selected at random for conformance review.

3.07 FINISH GRADING

A. Contractor shall finish grade all irrigated planting areas unless otherwise noted, and shall remove all rocks and clods over one and one-half cubic inches. All areas shall be smooth and uniformly graded. All erosion damage during the construction period shall be repaired by the Contractor.

B. Unless otherwise noted, all soil finish grades shall be one inch below finish grade of walks, pavements and curbs.

END OF SECTION 02920

SECTION 03340

SITE CONCRETE WORK

PART 1 - GENERAL

1.01 SCOPE:

A. Provide concrete walks, vehicular paving, driveways, curbs, gutters, handicap ramps, flagstone paving and precast monoliths, complete and in place, as shown and specified. The work includes but is not limited to:

1. Final subgrade preparation and paving base
2. Concrete curbs, walks, paving, walls, driveways, roadway.
3. Flagstone paving, including grout joints.
4. Concrete footings for site mechanical, carpentry, and electrical items as shown.

1.02 RELATED DOCUMENTS:

A. The General Conditions of the Contract, including General and Special Provisions and General Requirements apply to the work in this section.

B. Related Work:

1. Section 02200: Earthwork
2. Section 02110: Clearing, Grubbing and Demolition
3. Section 02810: Irrigation System

1.03 QUALITY ASSURANCE:

A. Materials and methods of construction shall comply with the following standards:

1. American Society of Testing and Materials, (ASTM).
2. American Concrete Institute, (ACI).
3. Contra Costa County Standard Specification, Section 73.
4. State Standard Specifications, California Department of Transportation.
5. American National Standards Institute, (ANSI).
6. Bay Area Air Quality Management District, Sandblasting Guidelines.

B. Maintain field records of time, date of placing, curing and removal of forms of concrete in each portion of work.

C. Samples:

1. Sample panel: Before ordering material for concrete and flagstone paving work, provide sample panel, minimum 2' x 2' of each color and finish, using specified materials. Show color, texture, pattern, edging, and joint treatments.

a. Where applicable, the approved sample panel may be a portion of the work and remain in place. Location as directed by the Landscape

Architect. Contractor will be required to provide additional panels as necessary, until approved.

1.04 SUBMITTALS

A. Submit concrete mix designs to City. Obtain approval before placing concrete.

B. Product data:

1. Submit complete materials list of items proposed for the work. Identify materials source.

2. Submit admixture, curing compound, retarder, and accessory item product data, if used.

3. Submit material certificates for aggregates, reinforcing, and joint fillers.

4. Submit samples of flagstone and grout color to be used.

C. Submit concrete delivery tickets. Show the following:

1. Batch number.
2. Mix by class or sack content with maximum size aggregate.
3. Admixtures.
4. Slump.
5. Time of loading.

D. Submit concrete test reports.

1.05 DELIVERY, STORAGE AND HANDLING:

A. Work notification: Notify City Public Works at least 24 hours prior to installation of concrete.

B. Establish and maintain required lines and grade elevations. All concrete shall slope to drain with no ponding of water.

C. Do not install concrete work over wet, saturated, muddy, or frozen subgrade.

D. Do not install concrete when air temperature is below 40 degrees F. Use of calcium chloride, salt, or any other admixture to prevent concrete from freezing is prohibited.

E. Protect adjacent work.

F. Provide temporary barricades and warning lights as required for protection of project work and public safety.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Portland Cement: ASTM C150, Type 1, natural color, unless otherwise noted.

B. Aggregate: Provide ASTM C33 normal weight aggregates, 3/4" maximum size, clean, uncoated crushed stone or gravel coarse aggregate free of materials which cause staining or rust spots; fine aggregate shall be clean natural sand.

C. Water: Clean, fresh, and potable.

D. Water-reducing admixture: ASTM C494.

E. Bouquet Canyon Flagstone: To match existing City of San Ramon soundwalls. Submit samples for review.

F. Latex Portland Cement Grout: ANSI A108.10. Color of grout to blend with flagstone. Submit sample for review.

G. Concrete Admixtures and Color Additives: Custom color by L.M. Scofield, as approved by the Landscape Architect.

2.02 MIXES:

A. Provide Class A ready-mixed concrete. Batch mixing at site not acceptable.

1. For roadway paving: Use Portland Cement Concrete containing not less than 658 pounds of Portland Cement per cubic yard to allow for 7 day cure time, with a compressive strength of not less than 4000 p.s.i.

2. For all other site concrete: Use Portland Cement Concrete containing not less than 564 pounds of Portland Cement per cubic yard, with a compressive strength of not less than 3000 p.s.i.

B. Indicate water added to mix at job site on each delivery ticket. Show quantity of water added. Site water tempered mixes exceeding specified slump range will be rejected as not complying with specification requirements.

C. Color for roadway paving shall be : "Ginger", by Q.C. Products, or approved equal, available at (800) 918-3796.

2.03 ACCESSORIES:

A. Granular base: Class II Aggregate Base.

B. Forms: Wood or metal of sufficient strength to resist concrete placement pressure and to maintain horizontal and vertical alignment during concrete placement. Provide forms straight, free of defects and distortion, and height equal to full depth of concrete work.

1. Provide 2" nominal thickness, surfaced plank wood forms for straight sections. Use flexible metal, 1" lumber or plywood forms to form radius bends.

C. Joint Filler: ASTM D1751, premolded non-extruding asphalt-impregnated fiberboard, thickness indicated.

D. Curing compound: ASTM C309, non-yellowing, non-staining liquid membrane-forming type containing a fugitive dye. Chlorinated rubber compounds not acceptable for exterior use.

E. Joint Sealants: Two-components polysulfide or polyurethane elastromeric type complying with FS TT-S-00227, self-leveling, designed for foot traffic.

F. Reinforcing steel: ASTM A615, A616, or A617, Grade 60, new domestic deformed steel bars.

G. Welded wire fabric: ASTM A185, welded plain cold-drawn steel wire fabric as indicated.

H. Form release agent: Non-staining chemical form release agent free of oils, waxes, and other materials harmful to concrete.

I. Provide all stirrups, ties, anchors, shown or required to be cast into precast members.

J. Bolts, Nuts, and Washers: ASTM A307. Provide hot-dip galvanized fasteners for exterior use. Paint to match adjacent metal work.

K. Waterproofing at walls - Sonneborn HLM-5000, Tremco TP-60, Vulken 201, or approved equal.

L. Foam Fill for (2) monoliths - EPS Foam, by Foam Products, or equal.

PART 3 - EXECUTION

3.01 INSPECTION:

A. Examine subgrades and installation conditions. Do not start concrete work until unsatisfactory conditions are corrected.

3.02 PREPARATION:

A. Proof roll the subgrade and do all necessary rolling and compacting to obtain firm, even subgrade surface. Fill and consolidate depressed areas. Remove uncompactable materials, replace with clean fill and compact to 90% of the maximum dry density in accordance with ASTM D1557-70.

B. Provide minimum 3" depth of compacted base material at walks. Compact base to 95% of the maximum dry density in accordance with ASTM D1557-70.

C. Remove loose material and debris from base surface before placing concrete.

D. Install, align, and level forms. Stake and brace forms in place. Maintain following grade and alignment tolerances:

1. Top of form: Maximum 1/8" in 10'-0".
2. Vertical face: Maximum ½" in 10'-0".

E. Coat form surfaces in contact with concrete with form release agent. Clean forms after each use and coat with form release agent as necessary to assure separation from concrete without damage.

F. Install, set, and build-in work furnished under other specification sections. Provide adequate notification for installation of necessary items.

G. Install pipe sleeves for irrigation system furnished under Section 02810. Stake location of irrigation sleeves.

3.03 PLACING REINFORCEMENT:

A. Place all reinforcement as shown on the drawings. Place accurately and securely fasten and support reinforcement to prevent displacement before or during pouring. Hang footing bars from forms. Support wire mesh with suitable metal cradles.

B. Clean, bend and place reinforcement in accordance with current requirements of the ACI Manual of Concrete Practice.

C. Reinforcement Splices:
Welded wire fabric - one mesh minimum.
Reinforcing bars - 24 bar diameter minimum, except as otherwise noted.

3.04 INSTALLATION:

A. Concrete placement:

1. Comply with ACI 304 "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete", and as specified.

2. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placing, and curing. In cold weather comply with ACI 306, "Recommended Practice for Cold Weather Concreting". In hot weather comply with ACI 305, "Recommended Practice for Hot Weather Concreting".

3. Moisten base to provide a uniform dampened condition at the time concrete is placed. Verify structures are at required finish elevation and alignment before placing concrete.

4. Place and spread concrete to the full depth of the forms. Use only square-end shovels or concrete rakes for hand-spreading and consolidating operations to prevent segregation of aggregate and dislocation of reinforcement.

5. Place concrete in a continuous operation between expansion joints. Provide construction joints where sections cannot be placed continuously.

6. Place concrete as indicated on the plans in one course, monolith construction, for the full width and depth of concrete work.

7. Strike-off and bull-float concrete after consolidating. Level ridges and fill voids. Check surface with a 10'-0" straightedge. Fill depressions and refloat repaired areas. Darby the concrete surface to provide a smooth level surface ready for finishing.

B. Joints:

1. Provide expansion joints using premolded joint filler at concrete work abutting curbs, walls, structures, walks, and other fixed objects.

   a. Locate expansion joints as indicated.

   b. Install joint fillers full-width and depth of joint. Recess top edge below finish grade for joint sealants.

   c. Provide joint fillers in single lengths for the full slab width, whenever possible. Fasten joint filler sections together when multiple lengths are required.

   d. Protect the top edge of the joint filler during concrete placement.

   e. Brooming. After the curing period, expansion joints shall be carefully cleaned and filled with approved joint sealant to just below adjacent paved surface in such a manner as to avoid spilling on paved surfaces or overflow from joint.

C. Finishes:

1. Broom Finish: Shall be obtained by drawing a stiff bristled broom across a floated finish. Direction of brooming to be perpendicular to direction of work or otherwise shown on drawings.

2. Sand Blast Finish:

   a. Perform in as continuous an operation as possible, utilizing the same work crew to maintain continuity of finish.

   b. Depth of Cut: Use an abrasive grit of the proper type and gradation to expose the aggregate and surrounding matrix surfaces to match approved sample panel.

   c. Blast corners and edge patterns carefully, using backup boards, in order to maintain a uniform corner or edge line.

   d. Use same nozzle, nozzle pressure and blasting technique as used for sample panel.

e. Maintain control of abrasive grit and concrete dust in each area of blasting. Clean up an remove all expended abrasive grit, concrete dust, and debris at the end of each day of blasting operations.

D. Curing:

1. Cure concrete with a clear, non-staining liquid membrane-forming compound. Spray apply in accordance with manufacturer's recommended coverage rate. Apply curing compound immediately after completing surface finish.

3.05 TESTING:

A. Provide slump test on first load of concrete delivered each day and whenever requested due to changes in consistency or appearance of concrete.

3.06 FLAGSTONE PAVING:

A. Install flagstones directly onto wet concrete as detailed in plans.

B. Allow flagstones to set for a minimum of 48 hours before grouting. Force a maximum amount of grout into joints. Fill all gaps and skips. Finished grout shall be uniform in color, smooth and without voids, pin holes or low spots.

C. Joints shall be concave tooled joints. All joints shall be of a uniform width or uniform thickness to maintain proper coursing. Grout shall be tooled at approximately the same degree of hardness to achieve uniform color. Expansion joints with sealant shall be constructed as shown in the plans.

D. Point and fill all holes and cracks in exposed joints with fresh mortar. Tooling shall be done at the proper time to match existing color of mortar.

3.07 PROTECTION:

A. Protect concrete work from damage due to construction and vehicular traffic until Final acceptance. Exclude construction and vehicular traffic from concrete pavements for at least 14 days.

B. Protection: Protect precast concrete items from chipping, spalling, cracking, or other damage until the Work is accepted by the Owner.

3.08 CLEANING:

A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, debris, and equipment. Repair damage resulting from concrete operations.

B. Sweep concrete sidewalks and pavement, wash free of stains, discoloration, dirt, and other foreign material immediately prior to final acceptance.

END OF SECTION 03340