

DIVISION 1-GENERAL REQUIREMENT

SECTION 01010 - SUMMARY OF WORK

PART 1 – GENERAL

1.01 SUMMARY

- A. General work included in this section:
 - 1. Furnish all labor, materials and equipment required by the Contract Documents or required to complete the Work.
 - 2. Coordinate work of all trades.
 - 3. Furnish and install miscellaneous items incidental to or necessary for completion of the Work, whether these items are specifically indicated in the Contract Documents or not.

1.02 WORK COVERED BY CONTRACT

- A. The Work covered under this Contract will be performed at a site called Harrison Park Playground within the City of Sausalito. The project location is indicated on the Drawings.
- B. The Work includes, but is not limited to:
 - 1. Demolition of existing park improvements including but not limited to:slabs, retaining walls, fencing, header boards
 - 2. Clearing small plants, ivy, as called out by the plans and these specifications. Preserving larger trees as called out in plans.
 - 3. Mass grading.
 - 4. Traffic control.
 - 5. Construction of new retaining walls
 - 6. Construction of concrete seating, walls and stair
 - 7. Construction of pervious concrete ADA compliant walkway
 - 8. Construction of ADA compliant play area with Slide, Swing and teeter-totter apparatus
 - 9. Construction of paver patio area
 - 10. Construction of Solid Redwood fencing
 - 11. Construction of hog wire fencing
 - 12. Construction of Entry Gate
 - 13. Planting of ground cover
 - 14. Planting of small shrubs
 - 15. Planting of trees
 - 16. Installation of irrigation for plant establishment(Add Alternate)
- C. Owner-Furnished Equipment:
 - 1. None.

1.03 OTHER CONTRACTS

- A. Volunteer Group work may coincide with construction activities. Coordination with the contractors or other groups undertaking related work or un-related work within the project work areas is the responsibility of the Contractor.

1.04 SPECIFICATION LANGUAGE

- A. Specifications may be written in the imperative mood and streamlined form in accordance with practices and principals of the Construction Specifications Institute.
- B. Imperative language is directed to the Contractor unless specifically noted otherwise.
- C. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

1.05 REGULATORY REQUIREMENTS

Comply with all Federal, State, and local laws, regulations, codes, and ordinance applicable to the work.

- B. References in the Contract Documents to local codes shall mean those of **Marin County**.
- C. Other standards and codes that apply to the work are designated in the Specifications.

1.06 ACCESS BY GOVERNMENT OFFICIALS

- A. Authorized representatives of governmental agencies shall at all times have access to the work area. Provide proper facilities for access and inspection.

1.07 PROTECTION OF PUBLIC AND PRIVATE PROPERTY

- A. Site work is expected to encounter numerous existing features of various types, such as fences, drain culverts, irrigation facilities, roadside drainage facilities, mailboxes, signs, private and public driveways, curbs, asphalt pavement, buildings, utility poles, guy wires and other surface structures. Where not called out for removal or protection by the plans or as directed in writing by the Owner, the Contractor shall protect existing features of this nature and all features affected by construction operations shall be restored to their original condition.
- B. To the greatest extent possible, remove existing features without damaging the materials and re-use the material to place back in the original condition. When existing features are damaged during removal, install new materials of similar type, appearance and function, at no additional cost to the Owner.
- C. Contractor shall be responsible for all damage to streets, roads, driveways, highways, shoulders, ditches, embankments, culverts, bridges, and other public or private property, regardless of location or character, that may be caused by transporting equipment, materials, or workers to or from the work or any part or site thereof, whether by Contractor or Contractor's subcontractors or suppliers.
- D. Make satisfactory and acceptable arrangements with the Owner of, or the agency or authority having jurisdiction over, any damaged property concerning its repair, replacement, or payment of costs incurred in connection with the damage. The Engineer will not consider work on private property to be completed until the Contractor has obtained a signed copy of the **Landowner Release Form, Form 01999-8**, and has provided the Engineer with a copy of the signed document.
- E. Keep fire hydrants and water control valves free from obstruction and available for use at all times.
- F. In areas where the Contractor's operations are adjacent to or near a utility and such operations that may cause damage resulting in expense, loss and inconvenience, construction operations shall be suspended until all arrangements necessary for the protection thereof have been made by the Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

*****END OF SECTION*****

SECTION 01025 - MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 GENERAL

- A. Measurements of the completed work shall be in accordance with, and by instruments and devices calibrated to United States Standard Measures and the units of measurement for payment, and the limits thereof, shall be made as shown on the Plans, Specifications, General Conditions and Requirements, and Supplementary Conditions.
- B. Units of Measurement
 - 1. Measurements shall be in accordance with U.S. Standard Measures.
 - 2. A pound is an avoirdupois pound.
 - 3. A ton is 2,000 pounds avoirdupois.
 - 4. The unit of liquid measure is the U.S. gallon.
- C. Certified Weights
 - 1. When payment is to be made on the basis of weight, the weighing shall be done on certified platform scales, or when approved by the Construction Manager, on a completely automated weighing and recording system.
 - 2. The Contractor shall furnish the Construction Manager with duplicate licensed weighmaster's certificates showing the actual net weights.
 - 3. The City will accept the certificates as evidence of the weights delivered.
- D. Methods of Measurement
 - 1. Materials and items of work which are to be paid for on the basis of measurement shall be measured in accordance with the method stipulated in the particular sections involved.
 - 2. In determining quantities, all measurements shall be made in a horizontal plane unless otherwise specified.
 - 3. Material not used from a transporting vehicle shall be determined by the Construction Manager and deducted from the certified tag.
 - 4. When material is to be measured and paid for on a volume basis and it would be impractical to determine the volume, or when requested by the Contractor in writing and approved by the Construction Manager in writing, the material will be weighed and converted to volume measurement for payment purposes.
 - 5. Factors for conversion from weight measurement to volume measurement will be determined by the Construction Manager and shall be agreed to by the Contractor before such method of measurement of pay quantities will be adopted.
 - 6. Full compensation for all expense involved in conforming to the above requirements for measuring and weighing materials shall be considered as included in the unit prices paid for the materials being measured or weighed and no additional allowances will be made therefore.
 - 7. Quantities of material wasted or disposed of in a manner not called for under the Contract; or rejected loads of material, including material rejected after it has been placed by reason of failure of the Contractor to conform to the provisions of the Contract; or material not unloaded from the transporting vehicle; or material placed

outside the lines indicated on the Plans or given by the Construction Manager; or material remaining on hand after completion of the Contract, will not be paid for and such quantities will be deducted from the final total quantities.

8. No compensation will be allowed for hauling rejected material.

1.02 BID ITEMS

The Bid amounts for each Bid Item will be used for comparative bid analysis. The Bid amounts will also form the basis of monthly progress payments. Each Lump Sum bid amount will undergo further breakdown as described later in this Section. Unit prices for any unit price bid items will be the basis for monthly progress payment determinations and for any changes related to that Work item. Bid Item 3 will also demonstrate the Contractor's compliance with the California Labor Code relating to the price for sheeting, shoring, and bracing of excavations. Bid items are not intended to be exclusive descriptions of work categories and the Contractor shall determine and include in its pricing all materials, labor, and equipment necessary to complete each Bid Item (work phase) as shown and specified.

A. Bid Item 1 – Mobilization and Demobilization

1. This bid item shall be lump sum. Payment shall be made at fifty (50%) percent of the bid item amount on the first progress payment following completion of mobilization and the remaining amount on the final progress payment, with retention withheld as allowed by the Contract Documents.
2. This bid item shall include payment for obtaining all bonds, all Contractor acquired permits, licenses, agreements, certifications, notices of intent, and temporary easements; moving onto the Site of all equipment, materials and staff including obtaining and set up of Contractor's staging area/yard; furnishing and erecting all needed construction facilities, fencing, project signage, project security, demobilization, preconstruction photographs, video recording of surface features, progress schedules and reports, contract meetings, and record drawings. City Permits (grading and encroachment) are granted as part of project award.
3. No payment for mobilization and demobilization, or any part thereof, will be approved for payment under the Contract until all applicable mobilization and demobilization items listed above have been completed.
4. This amount shall not exceed five percent (5%) of the total bid price for the Work.

B. Bid Item 2 – Erosion Control Pollution Prevention

1. This bid item shall be lump sum. Payment for this item will be prorated over the course of the Project based on percentage complete of all items.
2. This bid item includes preparing detailed erosion control plan/stormwater pollution prevention plan subject to approval by the City of Sausalito. Plan should include reference Caltrans Construction Site BMP Manual which designates the following:
 - (a) Measures to control or prevent pollution of surface runoff from erosion, mud and sediment, material stockpiles (which shall be at or nearby the worksite) and on-site vehicle/equipment storage and maintenance. **These shall include preventing any contaminated water, such as saw-cut wash water, from entering storm drain system.**
 - (b) Provisions for maintenance and repair of control measures, personnel training, waste disposal and, if necessary, on-site sanitary facilities.

These documents together, represent the Stormwater Pollution Prevention Plan.

The City does not have a yard available for contractor use in executing work of this provision. Contractor may propose modifications in writing subject to approval by the Engineer.

Work includes installation of necessary materials and maintenance(including the need to remove and replace materials that have deteriorated and not function as installed)

Upon learning of approaching inclement weather, the contractor shall initiate the appropriate pollution prevention measures pursuant to the SWPPP and during the course of such inclement weather, shall assign personnel to regularly visit, inspect, document, report and as necessary, maintain, the enacted pollution control measures. Contractor shall submit site inspection reports to the Engineer after each storm event resulting in measurable precipitation.

Contractor shall have sole liability for failing to comply with these provisions. Item includes placing, adjusting and removing pollution prevention measures, such as, but not limited to: silt fences, straw wattles, fiber mats, hydroseed, inlet filters, check dams, plastic film to protect material from contact with rain, and all incidentals necessary for worker, pedestrian and traffic protection, including furnishing all equipment, materials and personnel associated therewith, and in accordance with these Specifications.

C. Bid Item 3 – Demolition

1. This item shall be lump sum. Payment for this item will be made proportional to amount of demolition work completed at time of payment request as determined by the Owner with retention withheld as allowed by the Contract Documents.
2. This bid item includes removal of existing facilities as shown on the plan and minor incidentals as directed in writing by the owner. All materials removed under this item shall become the property of the Contractor. Salvageable material shall be recycled as much as feasible. Waste material shall be lawfully disposed of at certified Waste Disposal Facility. Contractor shall furnish weight or volume tags of materials recycled and wasted prior to or concurrent with payment request. Item shall also include clearing of all ground cover and plant material called out for removal, including plant material growing on perimeter fencing. Item includes furnishing all equipment, materials and personnel therewith, and in accordance with these Specifications

D. Bid Item 4 – Wood retaining walls @perimeter/Fence w/ subdrain

1. This item shall be paid per linear foot. Payment of this item will be made based on quantity of item as furnished and installed as of date of payment request as determined by Owner with retention withheld as allowed by the Contract Documents.
2. This bid item includes installing Retaining wall at the site perimeter as shown on the plans and as may be further detailed in attachments to these specifications. The Easterly and Southerly boundary shall be suitably prepared to accept a 6' high solid redwood fence as detailed on the plans. Though not anticipated retaining wall placed along the Northerly boundary should be prepared to accept a 42" high "hogwire" fence as detailed on the plans. This item includes furnishing and installing 4 inch perforated pipe subdrain that shall be imbedded in a ¾" drain rock with through wall weep holes spaced at approximately 10 feet intervals. Contractor shall verify fence post connection detail with Owner prior to installing the brackets and fasteners.

Item includes furnishing all equipment, materials, and personnel therewith and in accordance with these plans.

E. Bid Item 5 – Redwood Fencing

1. This item shall be paid per linear foot. Payment of this item will be made based on quantity of item as furnished and installed as of date of payment request as determined by Owner with retention withheld as allowed by the Contract Documents.
2. This bid item includes installing Fencing at the site perimeter as shown on the plans and as may be further detailed in attachments to these specifications. The Easterly and Southerly boundary shall have a 6' high solid redwood fence as detailed on the plans. Fence installed on top of retaining wall shall be separate from but securely attached to the retaining wall. Fence post foundations receiving wood posts shall be Portland cement concrete fabricated with galvanized steel or similar corrosion protected metal bracket anchored into the foundation. Fence posts shall be securely through bolted with compatible corrosion resistant steel bolts and nuts and washers to the brackets in at least two placed or as called out in the plan details. Contractor shall verify fence post connection detail with Owner prior to installing the brackets and fasteners. Fencing board shall be secured by at least two screws along the top and bottom horizontal support members. The horizontal support member shall be screwed into wood fence posts. Item includes furnishing all equipment, materials, and personnel therewith and in accordance with these plans.

F. Bid Item 6 – Hogwire Fencing

1. This item shall be paid per linear foot. Payment of this item will be made based on quantity of item as furnished and installed as of date of payment request as determined by Owner with retention withheld as allowed by the Contract Documents.
2. This bid item includes installing Fencing at the site perimeter as shown on the plans and as may be further detailed in attachments to these specifications. The Northerly and Westerly boundary shall have a 42" high "hogwire" fence as detailed on the plans. Fence installed on top of retaining wall shall be separate from but securely attached to the retaining wall. Fence post foundations receiving wood posts shall be Portland cement concrete fabricated with galvanized steel or similar corrosion protected metal bracket anchored into the foundation. Fence posts shall be securely through bolted with compatible corrosion resistant steel bolts and nuts and washers to the brackets in at least two placed or as called out in the plan details. Contractor shall verify fence post connection detail with Owner prior to installing the brackets and fasteners. The horizontal support member shall be screwed into wood fence posts. Item includes furnishing all equipment, materials, and personnel therewith and in accordance with these plans.

G. Bid Item 7 – Rough Grading

1. This item shall be lump sum. Payment of this item will be prorated based on percentage of work completed at time of payment request as determined by Owner with retention amount withheld as allowed by the contract Documents.
2. This bid item includes all earth excavation necessary to contour the ground to approximate shape called out by the plans. Item may include import or export of soil to enable the site to conform to plan contours and spot elevations. Soil removed shall be lawfully reused or disposed of at an authorized solid waste facility. Contractor shall furnish tags evidencing the location where off hauled material was sent. Item includes furnishing all equipment, materials and personnel associated therewith, and in accordance with these Specifications.

H. Bid Item 8 - Concrete Piers

1. Concrete Piers shall be paid per each. Payment of this item will be prorated based on amount of work completed at time of payment request as determined by Owner with retention amount withheld as allowed by the contract Documents.
2. Concrete Pier shall be installed as part of retaining wall at the perimeter fence at approximate 6' spacing. Piers shall be installed so that the center of the pier is offset from the property boundary by the radius of the pier hole. The goal is to have no element of the pier crossing over the property boundary. Contractor can work with Land Surveyor Linda Carruthers to affect pier staking. Staking costs will be borne by the Contractor.

I. Bid Item 9 – Concrete, Bid Item 10 - Concrete Stairs

1. Concrete shall be paid per linear foot. Concrete Stair shall be paid per square foot. Payment of this item will be prorated based on percentage of work completed at time of payment request as determined by Owner with retention amount withheld as allowed by the contract Documents.

PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide Portland cement concrete site work complete, including the following principal items:

1. Seat curbing
2. Permeable concrete path paving
3. Path curbing
4. Paver edge bands
5. Low on-site retaining walls
6. Footings for posts and structures.

1.2 QUALITY ASSURANCE

A. Reference and Standards

1. Perform work in accordance with all applicable laws, codes and regulations required by the City of Sausalito.
2. Reference to "Standard Specifications" shall mean the current Standard Specifications of the State of California, Business and Transportation Agency, Department of Transportation, CALTRANS.
3. The American Concrete Institute (ACI): "Manual of Concrete Practice," Parts 1, 2 and 3.
4. The American Concrete Institute (ACI): "Recommended Practice for Concrete Formwork" (ACI 347R)
5. The American Concrete Institute (ACI): "Hot Weather Concreting", 305R-99
6. The American Concrete Institute (ACI): Guide for Concrete Slab construction, 302.1R-07
7. The American Concrete Institute (ACI): "Standard Specification for Cold Weather Concreting, 306.1-90 (R2002)
8. United States Voluntary Product Standard for Construction & Industrial Plywood (PS 1-95).
9. American Plywood Association's "Guide to Plywood Grades" (APA).

10. West Coast Lumber Inspection Bureau's "Standard Grading Rules No. 17" (WCLIB)
11. Concrete Reinforcing Steel Institute (CRSI): "Manual of Standard Practice" and "Recommended Practice for Placing Reinforcing Bars".
12. American Welding Society: AWS A5.1 and AWS D1.1 and D1.2.
13. Americans with Disabilities Act (ADA), Federal ADA/State of California Title 24 Standards.
14. California Code of Regulations, Title 24, 2007 Edition, also known as California Building Code (CBC).

B. Stipulations

1. Finish Surface Tolerance: 1/4-inch maximum variation in 10 feet.
3. At no point shall paving surface fail to drain.
4. Finish Concrete Surface Slip Resistance: Shall have a minimum slip resistance coefficient of 0.65 on concrete pavement with less than 5% slope and 0.8 on concrete pavement with more than 5% slope.
5. Walls retaining soil that retain 30 inches or more of soil shall include a subsurface drain behind wall per Section 68 of the Standard Specifications and as accepted by the Owner's Representative.
6. Concrete slabs shall be poured in a checkerboard fashion between expansion joints, allowing seven days curing time between pours on the other side of the expansion joints.

B. Conform to ACI 318, Section 5.13 during hot weather and to ACI 318, Section 5.12 during cold weather.

C. Requirements of ACI 318 shall govern work, materials and equipment related to this Section; specifications herein set minimum results required, and references to procedures are intended to establish minimal guides.

D. The Contractor shall be responsible for quality of concrete in place and shall bear burden of proof that concrete meets minimum requirements. Contractor shall confirm that site soils do not contain elevated levels of sulfate that would require sulfate resistant concrete as outlined in Table 4.3.1 of the ACI 318 Building Code or Table 19B-A-3 of the Uniform Building Code. If the site soils contain elevated levels of sulfate, it is the Contractor's responsibility to request mixes that meet the aforementioned requirements.

E. Placing of concrete by means of pumping will be an acceptable method of placement providing that the Contractor can demonstrate that:

1. Specified concrete strengths will be met.
2. Equipment has a record of satisfactory performance under similar conditions and using a similar mix.
3. Trial batches have been successfully made.

F. Installer Qualifications: Concrete work shall be by firm with 5 years experience with work of similar scope and quality.

I. Formwork Design Criteria: Formwork shall conform to ACI 318, Section 6.1 and CBC Section 1906A.

1. Formwork:
 - a. Shall prevent leakage or washing out of cement mortar.
 - b. Shall resist spread, shifting, and settling.
 - c. Shall reproduce accurately required lines, grades and surfaces within tolerances specified.

2. Safety: The Contractor shall be responsible for adequate strength and safety of all formwork including falsework and shoring.
3. Formwork allowable tolerances: Formwork shall produce concrete within tolerance limits recommended in ACI 318, Section 6.1, unless otherwise noted.

1.3 TESTS

- A. Per Caltrans Standard Specifications, Section 6-3.02 Testing arranged and paid by Contractor.
- B. Should tests show that concrete is below specified strength, Contractor shall remove all such concrete, as directed by the Owner. Full cost of removal of low strength concrete, its replacement with concrete of proper specified strength and testing, shall be borne by Contractor.

1.4 COORDINATION: Coordinate items of other trades. Contractor shall be responsible for the proper installation of all accessories embedded in the concrete and for the provision of holes, openings, etc., necessary to the execution of the work of the trades.

1.5 SUBMITTALS

- A. Samples of all materials under this Division shall be supplied for testing as requested by the Owner.
- B. Submit color additive manufacturer's color chart and sample chip(s), indicate color additive number and required dosage rate.
- C. Submit two full-scale mock-up (minimum 3' by 3') sample panels of all concrete finishes and color. The samples shall include curing compound if any is to be used, and include an expansion joint and a score joint, as indicated on the Drawings. Approved samples shall be kept at the job site to serve as a prerequisite for all finishes until acceptance of the Work.
- D. Submit one pint samples of aggregate for exposed aggregate finished concrete paving in color range as specified.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Supply ready mixed concrete throughout. Batch, mix and transport in accordance with ASTM C-94, "Specifications for Ready Mixed Concrete."
- B. Mix and deliver concrete in quantities that will permit immediate use only.
- C. Indiscriminate addition of water for any reason will be cause for rejection of the load.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Cement and aggregates shall have proven history of successful use with one another. Sources of cement and aggregate shall remain unchanged throughout work.

B. Mixes:

1. Ready-mixed concrete shall meet requirements of ASTM C94.
2. The Contractor shall perform tests or assemble the necessary data indicating conformance with specifications.
3. For each mix, submit data showing that proposed mix will attain the required strength in accordance with requirements of CBC Section 1905A.3.
4. Instruct Laboratory to base mix design on use of materials specified and approved by the Owner's Representative.
5. Mix design shall include compression strength test reports per CBC Section 1905A.6.3.
6. Insure mix designs will produce concrete to strengths specified and of uniform density without segregation.
7. If mix yield exceeds 1-cubic yard, modify mix design to no more than one cubic yard, without changing cement content.
8. Introduction of calcium chloride will not be permitted.
9. Mix design shall be in accordance with CBC Section 1905A.3.

2.2 FORMWORK MATERIALS

A. Panel or board forms for Exposed Finish Concrete: Minimum 5/8-inch thick exterior grade plywood with sealed edges, PS 1 grade Plyform Class I and II B-B Exterior.

B. For Exposed Smooth Form-finished Concrete: Use Medium Density (or better) Overlaid Concrete Form Exterior (MDO), to provide continuous straight, smooth, exposed surfaces without grain patterns. Furnish in largest practicable sizes to minimize number of joints and to conform to a joint system as approved by Owner's Representative.

C. Curbs may be formed with approved metal form systems.

D. Chamfer Strips: Burke Concrete Accessories, PVC type CSF ½-inch or as otherwise shown, all exposed corners.

E. Form Release Agent: Must not stain or otherwise adversely affect architectural concrete surfaces. "Nox-Crete Form Coating"; Industrial Synthetics Corp.'s "Synthex"; or equal.

F. Form Ties: Burke "Penta-Tie," or equal, cone and rod type with 1-inch break-back.

2.3 REINFORCING MATERIALS

A. Bar Reinforcement: ASTM A615.

1. #3 and smaller: Grade 40.
2. #4 and larger: Grade 60.

B. Wire Fabric Reinforcement: ASTM A185. Size (6" by 6" / W1.4 By W1.4 (#10 ga. by #10 ga.)

C. Recycled content shall be a minimum of 75% recycled post consumer steel.

2.4 CONCRETE MATERIALS

- A. Portland Cement: ASTM C150, Type II. Use one brand of cement throughout project.
- B. Fly Ash: ASTM C618,08A.
- C. Aggregates: ASTM C33, materials from established sources with proven history of successful use in producing concrete with minimum shrinkage.
- D. Per City of Sausalito standards. Submit samples for approval as specified herein.
- E. Water: Clear and potable, free from deleterious impurities.
- F. Admixtures:
 - 1. Admixtures are optional; however, a water reducer or plasticizing admixture shall be included in the concrete mix and it must be compatible with color pigments where color pigments are required. Any proposed admixture shall comply with ASTM C494.
 - 2. Where more than one admixture is proposed, include statement from admixture manufacturer indicating that admixtures proposed for use are compatible, such that desirable effects of each admixture will be realized.
 - 3. Accelerating admixtures and admixtures containing more than 0.05 percent chloride ions are not permitted. If an accelerator is used, it shall be a non-chloride accelerator.
 - 4. Liquid admixtures shall be considered part of the total water.

2.4 CONCRETE MIXES

- A. Concrete mixes shall be approved and shall be in accordance with Caltrans Standard Specifications Section 90. Unless otherwise noted, mix shall contain not less than 550 pounds of cementitious material per cubic yard (Class "2", 3,000 psi,) Type II Portland cement and 3/4-inch maximum aggregate.
- B. Cementitious Material: An intimate blend of type II Portland cement and fly ash. Cementitious material shall include 15% maximum fly ash by weight unless the strength is specified to be achieved on 7 or 14 days.
- C. Lampblack: As supplied by batch plant for plain non-colored concrete work. Concrete for non-colored pavements shall be darkened by the addition of lampblack at the mixer. The proportion of lampblack or other approved colorant shall be that required to properly darken the concrete to reduce glare, and shall be subject to the approval of the Owner's Representative. Provide ¾ pound of lampblack per cubic yard of concrete unless required otherwise.

2.5 ANCILLARY MATERIALS

- A. Aggregate Base: Class II aggregate base conforming to Section 26 of the Standard Specifications and Subgrade Specifications herein.
- B. Expansion Joint Material
 - 1. Fiber Expansion Joint: A non-extruding resilient filler, saturated with high quality bituminous materials having preserving characteristics. Conform to ASTM-D1751-04.

2.Caulked Expansion Joint: "Sonolastic Sealant Two-Part" as manufactured by Sonneborn-Contech, Building Products Division, Contech, Inc.; or approved equal. Joint caps or bond breaker tape to be as recommended by sealant manufacturer. Color shall match adjacent paving.

C. Dampproofing: Per CALTRANS Standard Specifications, Section 54.

D. Curing Materials for non-colored Concrete:

1. Waterproof Paper: ASTM C171, Type 1.1.1.1, regular. Same as Sisalkraft Division of St. Regis Paper Co.'s "Orange Label", or equivalent.

2. Impervious sheeting: 4 mil white polyethylene laminated to 10 oz. Burlap, ASTM C171, Type 1.1.3, fungus-resistant.

3. Curing Compound: ASTM C309. Product: Sealtight 1100 Clear-Series by WR Meadows, Burke Azua Resin Cure by Edocol, or equal that will not discolor concrete or affect bonding of other finishes applied thereafter, and which restricts loss of water to not more than 0.500 grams per sq. centimeter of surface when tested per ASTM C156, "Test Method for Water Retention by Concrete Curing Materials."

E. Grout: Premixed high strength non-shrink grout requiring only addition of water at the site. Burke's "Non-Ferrous, Non-Shrink Grout"; Master Builders "Masterflow 928 Grout", or equal.

F. Patching Mortar: Mix in proportions by volume of one part cement to two parts fine sand. Provide integrally colored patching mortar as required to match color and finish of colored concrete surfaces.

G. Abrasive Grains: Fused aluminum oxide granules or crushed emery containing not less than 50% aluminum oxide. Factory graded, rustproof, nonglazing and unaffected by cleaning materials. Subject to compliance with requirements provide one of the following: Sonneborn-Contech's "Frictex NS"; General Abrasive Co., Inc.'s "Fut-Sure"; The Exolon Co.'s "Exolon Anti-Slip"; or equal.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

B. Install all concrete work true to line and grade as indicated on the drawings.

C. Correct irregularities to the satisfaction of the Owner's Representative.

D. Plain non-colored, exposed concrete shall contain lampblack, approximately 3/4 pound of lampblack per cubic yard, as accepted by Owner's Representative.

E. The intent of the Grading Drawings is to provide positive drainage and to maintain slopes on walkways as required by the Americans with Disabilities act and California Title 24 throughout the project site. Notify the Owner's Representative immediately of any discrepancies between the Drawings and actual field conditions and/or conflicts between the desing and Code requirements.

3.2 PREPARATION

A. Provide subgrade preparation and the base material installation complete, including clearing, grading, excavation, and filling and dewatering. Take every precaution to obtain a subgrade of uniform bearing power compacted to a minimum of 95% relative

compaction as determined by the ASTM D1557 laboratory test procedure and in Sections 19 and 20 of the Caltrans Standard Specifications.

B. Subgrade shall be kept moist and shall not be allowed to dry out before placement of concrete. Place no material on muddy subgrade.

C. Aggregate base, where indicated, shall be placed and compacted in conformance with Caltrans Standard Specifications 26-1.04 and 26-1.05.

D. Obtain approval of subgrade from Owner's Representative prior to placing steel and concrete.

3.3 FORMS

A. Forms shall be constructed in accordance with ACI 318, Section 6.1 and shall be of sufficient strength and sufficiently tight to prevent visible distortion or leakage of mortar and fines.

B. Forms for exposed surfaces shall be constructed to protect intended finish. Deflection of facing material between studs shall not exceed 0.0025 of the span. Facing material and pattern of joints shall be as approved by the Owner's Representative.

C. For vertical surface of wall footings below grade, clean cut trench may be used in lieu of form if character of soil will permit installation without sluffing and width of concrete is increased at least 1 inch beyond indicated dimension of each face poured against earth.

D. Curb and pavement edge forms shall extend full depth of concrete and shall be coordinated with installation of planting root barriers where required. Curves shall be formed with flexible metal or wood made up of thin laminations. Curve forms shall extend one stake space straight beyond tangent point. Where curbs and pavement are adjacent to areas to receive root barriers, provide smooth uniform edges. Remove any excess concrete as required to allow installation of root barriers without gaps between curbs and/or pavement and barriers.

E. Maintain forms within the following tolerances.

1. Top of Form: Plus or minus 1/8 inch in 10 feet and no abrupt variations; at required elevation to plus 3/8 inch.

2. Face of Form: Plus or minus 1/4 inch in 10 feet longitudinal and no abrupt variations; perpendicular to surface plus or minus 1/8 inch.

F. Form Ties: Align form ties as accepted by Owner's Representative. Obtain approval of form work from Owner's Representative prior to placing concrete.

G. Forms may be reused upon cleaning and coating with parting compound to ensure separation from concrete without damage.

3.4 REINFORCEMENT

A. All concrete shall be unreinforced unless specifically noted to be "reinforced."

B. Fabricate and place reinforcement as indicated on the Drawings and in accordance with ACI "Detailing Manual" SP-66. No reinforcement shall be placed prior to distribution of the approved shop drawings.

C. Secure reinforcement in position by suitable supports and by wiring at intersections with tie wire. Supports shall be of sufficient number and strength to resist crushing or displacement under full load. Metal shall not extend to surface of concrete.

D. At time of placing concrete, reinforcing shall be free of excessive rust, mill scale, or other bond reducing matter. Immediately before placing concrete, check and adjust position, support and anchorage.

3.5 CLEANING, PATCHING AND DEFECTIVE WORK

A. Where concrete is under strength, out of line, level or plumb, or shows objectionable cracks, honeycombing, rock pockets, voids, spalling, exposed reinforcement, signs of freezing or is otherwise defective, and , in the Owner's Representative's judgment, these defects impair proper strength or appearance of the work, the Owner's Representative will require its removal and replacement at the Contractor's expense.

B. Immediately after stripping and before concrete is thoroughly dry, patch minor defects, form-tie holes, honeycombed areas, etc., with patching mortar colored and textured to match concrete. Remove ledges and bulges.

C. Compact mortar into place and neatly file defective surfaces to produce level, true planes. After initial set, dress surfaces of patches mechanically or manually to obtain same texture as surrounding surfaces.

D. Rock Pockets:

1. Cut out to full solid surface and form key.
2. Thoroughly wet before casting mortar.
3. Where the Owner's Representative deems rock pocket too large for satisfactory mortar patching as described, cut out defective section to solid surface, and replace.

E. Cleaning

1. Insure removal of bituminous materials, form release agents, bond breakers, curing compounds, if permitted and other materials employed in work of concreting that would otherwise prevent proper application of sealants, liquid waterproofing, and other delayed finishes and treatments.
2. Where cleaning is required, take care not to damage surrounding surfaces or leave residue from cleaning agents.

3.6 MIXING AND PLACING CONCRETE

A. Conform to applicable requirements set forth in Caltrans Standard Specifications Section 51-1.09 and Section 90.

B. Mixes for integrally colored concrete shall have pigment added early enough to ensure complete dispersal and uniform color, but not less than 15 minutes before placing.

3.7 JOINTS AND GROOVES

A. Plane of joints shall be perpendicular to surface. Where new pavements join existing, joints shall align.

B. Sawn Contraction Joints:

1. General: Provide where shown. Saw cut straight, true, and uniform, 1/8 –inch wide and not less than 1/4 of slab thickness in depth , unless otherwise noted. Cut with a power saw fitted with an abrasive or diamond blade.
2. Commence saw cutting operations after concrete has cured long enough to resist damage by the saw cutting operations and early enough to avoid random contraction cracks.
3. Contractor shall coordinate form removal and sequencing of adjacent concrete placement to minimize unnecessary saw cutting of adjacent surfaces.
4. Contractor shall plan for the use of varying types of saw cutting apparatus to provide acceptable finishes in areas limited in accessibility.
5. Fill saw cut over-runs and inadvertent saw cutting of adjacent surfaces with cement mortar to match color and finish of sawn pavement.
6. If joint pattern not shown, provide joints not exceeding 15 feet in either direction and located to conform to column centerlines, wall corners, etc. as accepted by Owner's Representative.

C. Tooled Joints / Score Joints

1. Form joints in fresh concrete using a jointer to cut the groove so that a smooth, uniform impression is obtained to 1/4 depth of pavement unless shown otherwise.
2. All joints shall be struck before and after brooming. Tool concrete both sides of joint.

D. Expansion Joints and Edging: Provided at the location and intervals as shown on the drawings, and at all locations where concrete paving abuts buildings, curbs or other structures, and not more than 18 feet on center. Specified and shown joint material shall be placed with top edge 1/8" below the paved surface, and shall be securely held in place to prevent movement. Joint and other edges shall be formed in the fresh concrete using an edging tool to provide a smooth uniform impression. All edges shall be struck before and after brooming.

E. Sealed Joints: 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 overflowing from joint.

3.8 FINISHING

A. Flatwork and Curbs

- a. Float Finish (typical preliminary finishing for slabs to receive other finishes): The surface of the slab shall be screeded and all surface water and laitance removed. Floating shall be started as soon as the screeded surface has stiffened sufficiently. Floating shall be performed by hand using a wood float and shall be the minimum necessary to produce a relatively smooth, level, even-textured surface.
- b. Heavy Broom Finish (typical for paving bands): After the slab has been float finished as described above, the surface shall be uniformly directional textured by coarse stable broom to match approved sample.
- c. Medium Broom Finish: Obtain by drawing a stiff bristled broom across a floated finish for a nonslip surface. Perform brooming while concrete is still wet enough to

receive broom marks to match approved sample. Direction of brooming to be perpendicular to direction of work or as otherwise shown on the drawings.

d. Brush Finish (typical for curbs): After the front form is removed, exposed surface shall be troweled smooth and then given a uniform light texture with fine brush parallel to line of curb, to match approved sample.

e. Sand Finish: Washed and finish shall be achieved by rubbing with bristle brush and flooding surface so that concrete fines are exposed slightly and resultant surface is similar to medium grit sandpaper.

f. Seeded Aggregate Finish: Evenly distribute specified aggregate over the surface with minimum surface voids. After the aggregate is thoroughly embedded, the surface shall be hand floated so that all aggregate is entirely embedded just beneath the surface. As soon as the concrete has achieved a firm set, begin simultaneously brushing and hosing with water so as to obtain a clean, uniform surface with no stone exposed more than 1/16". Care shall be taken so as to not dislodge or unevenly expose the seeded aggregate. Do not use a pressurized nozzle in washing the surface and avoid direct hosing of the surface.

g. Washed Exposed Aggregate Finish:

1) Place concrete using specified aggregate/concrete mix, screed tamp and bull float to desired elevation. A compatible water-reducing retarding admixture may be added in warm weather if desired. Apply surface retardant as soon as screeding and floating is complete.

2) If concrete is pumped into forms, lightly top seed surface of concrete with additional 3/8" size aggregate as required to match approved sample.

3) Cover slab with acceptable curing cover to prevent drying out. If fog cure is employed, start no sooner than recommended by retardant manufacturer.

4) Check retarded surface at regular intervals to determine optimum time for removing retarded surface mortar.

5) Broom and wash aggregate surface to remove mortar to its optimum (approximately 1/8" to 1/16" at surface stone depth) to match sample.

6) After aggregate is exposed, proceed with proper curing.

h. Steel Trowel Finish: After surface water disappears and floated surfaces sufficiently hardened, steel trowel and retrowel to smooth surface. After concrete has set enough to ring trowel, retrowel to a smooth uniform finish free of trowel marks or other blemishes. Avoid excessive troweling that produces burnished areas.

i. Sandblast Finish: Perform in as continuous an operation as possible, utilizing the same work crew to maintain continuity of finish.

i. Use an abrasive grit of the proper type and gradation to expose the aggregate and surrounding matrix surfaces to match sample panel, as follows:

1. Light Cut: approximately 1/16" depth
2. Medium Cut: approximately 1/8" to 3/16" depth

3. Heavy cut: approximately 1/4" to 5/16" depth
- ii. Blast corners and edge of patterns carefully, using backup boards in order to maintain a uniform corner of edge line.
- iii. Use same nozzle, nozzle pressure and blasting technique as used for sample panel.
- iv. Maintain control of abrasive grit and concrete dust in each area of blasting. Clean up and remove all expended abrasive grit, concrete dust and debris at the end of each day of blasting operations.
- j. Salt Finish: Screed, tamp and float concrete under normal installation procedures. While concrete is still in a plastic state, evenly dispense coarse grain rock salt over surface at the rate of 10 lbs. per 150 square feet to match approved sample. Carefully tamp and float in rock salt to depress it into concrete, but do not cover the salt grains. Allow concrete to set and cure thoroughly.
- k. Abrasive Finish: tamp and float concrete under normal installation procedures. While concrete is still in a plastic state, evenly dispense specified Abrasive Grains over surface at the rate of 1/4 lb. per square foot. Carefully tamp and float in Abrasive Grains to depress grains into concrete, but do not cover grains. Allow concrete to set and cure thoroughly under normal procedure.

3.10 – NOT USED

3.11 DAMPPROOFING

Mop apply one heavy coat of asphalt to a minus 2 inches below finished soil grade on soil side of retaining walls and planters.

3.12 CURING

A. Cure non-colored exposed concrete in accordance with Caltrans Standard Specifications Section 90-7.

B. When applying Curing Compound, apply after initial set of fresh concrete when bleed water has evaporated from surface using a "Hudson-type" airless sprayer in accordance with manufacturer's specifications.

C. Only water or curing compounds which impart no permanent color or gloss shall be used for curing concrete.

Compensation for conforming to these provisions shall be considered as included in the square foot unit price for Concrete Stair item, or the linear foot unit price for Concrete, or within the various items for post foundation cement. Full compensation for furnishing all the labor, materials, tools, equipment, incidentals, for doing all the work required of the various bid items for site concrete, complete in place, as shown on the Contract Documents and no additional compensation will be allowed

J. Bid Item 11. Soil Prep - Play Area/Patio Area

1. This bid item shall be paid per square foot. Payment of this item will be prorated based on amount of work completed at time of payment request as determined by Owner with retention amount withheld as allowed by the contract Documents.
2. This bid item includes fine grading of site in Play area and Patio area. The finish grade of

this item in the play area shall be at least 12" below finish grade shown on the plans. Finish grading shall include shaping land so as to drain into area drains located outside the play zone of the play apparatus. A permeable engineering fabric shall be placed on the play area prior to placement final playground surfacing. Material used to get to elevations submittals shall be Caltrans Class 2 Aggregate Base. Finish grading shall be compacted to approximately 90% of optimum density. ; The patio area shall be fine graded to a depth comparable to the thickness of the paver brick material to be used, roughly 3.5 inched below final grade as shown on the plans. Area drains shall be installed as shown on the plans and connected to retaining wall subdrains. Alternatively the drains can be routed to a manifold consisting of approximately 35 lf of 3 inch pipe running parallel to the easterly boundary retaining wall with through wall outlets spaced approximately 7 feet apart; furnishing all equipment, materials and personnel associated therewith, and in accordance with these Specifications.

K. Bid Item 12 – Engineered wood Fiber

1. This bid item shall be paid per square foot. Payment will be based on the amount of work completed as determined by the Owner subject to withheld retention amount in accordance with these specifications.
2. Furnishing and installing "Engineered Wood Fiber" Playground Surfacing. Wood Fiber shall be place on top of previously prepared subgrade with engineering fabric over the finished subgrade. Engineered Wood fiber shall be no less than 12 inches deep and shall conform to ASTM Standard F2223-10. Material shall be evenly placed to provide a uniform depth. Installation shall be per manufacturers recommendations; furnishing all equipment, materials and personnel associated therewith, and in accordance with these Specifications.

L. Bid Item 13 – Permeable Concrete Walkway

1. This bid item shall be paid per square foot. Payment will be based on the amount of work completed as at time of payment request as determined by the Owner subject to withheld retention amount in accordance with these specifications.
2. This bid item is about furnishing and installing permeable Portland cement concrete 4 inches thick for an walkway and ramp that conforms to the Standards and Guidance for Accessible Design and the Americans with Disabilities Act. Contractor shall provide owner mix design submittals for approval prior to placing material. The concrete shall have a tan color with specifics determined by creating sample squares the material. Finish shall be workmanlike and may be either broom finish or exposed aggregate final finish depending on sample results. Walkway shall have expansion joint every 50 feet and control joints placed no less than 5 feet apart. Compensation shall be for furnishing all equipment, materials and personnel associated therewith, and in accordance with these Specifications.

M. Bid Item 14 - Brick Patio Area

1. This bid item shall be paid per square foot. Payment will be based on the amount of work completed as at time of payment request as determined by the Owner subject to withheld retention amount in accordance with these specifications.
2. This bid item is about furnishing and installing brick patio area. Brick shall be McNear Red wirecut standard solid brick (8-1/8"x3-7/8"x2-7/16") or approved equivalent. Brick shall be laid out in the 45 degree herringbone pattern as shown on the plan and these specifications. Contractor shall be responsible for trimming bricks to conform to permeable concrete walkway edge and restraining curbing and string course. Brick shall

be placed a layered bed consisting of approximately 1 inch of sand, 4 to 8 inches of compacted class 2 ½ inch maximum aggregate base compacted to 95% relative density, compacted subgrade. Geotextile type and brand subject to approval by the City prior to installing shall be place between layers. The bed shall have a cross slope of not less than 1% from the walkway to the edge. The base layer shall include a 4" area drain pipe in the vicinity of the edge curbing in a 6 to 8 inch wide trench with ¾ inch drain rock.

N. Bid Item 15 - Play Apparatus

1. This bid item shall be paid lump sum. Payment can be made in two installments. The first being 60% of the bid price to secure procurement of the equipment from a manufacturer. The second being the remaining 40% upon erection and installation per manufacturers recommendation including placement of footings. Payment will be based on the amount of work completed as at time of payment request as determined by the Owner subject to withheld retention amount in accordance with these specifications.
2. This item is about furnishing and installing three pieces of play equipment. A Swing set, a see-saw (a.k.a. teeter totter), and a slide. Approved designs are Columbia Cascade Pipeline Gullwing Swing Model # 1593-2, Columbia Cascade, color CASPAX-7 powder coat finish, black sling hangers; TimberForm Spring-Rider(a.k.a. see-saw) Model # 3870-02 RW, CASPAX-7 powder coat finish, red & white seats with red spring embedment mount; a composite Play Area piece consisting of Columbia Cascade 1956-6-21-PL-AL-M as shown in drawing No. P-10027-X dated 2-15-2010 modified to add No. 1614-53-PL Storefront countertop, No. 1614-46-02-PL Abacus, Schedule 40 Aluminum posts, with attachment hardware. ~~and Columbia Cascade 1667-5-93 Spiral Stairway with Handrail,~~ or approved equal. Equipment colors shall be per the approved color palette on file in City offices. Colors shall be actively verified and approved by City prior to ordering and subject to verification upon delivery. Correct placement of the place equipment is critical to having a safe playground. The plans show the location without interference. The apparatus position shall be laid-out (a.k.a. staked) by a licensed land surveyor and verified by the City prior to constructing play equipment footings. The expense of such layout shall be included price of the equipment. Play-equipment shall be installed per manufacturers recommendations.

O. Bid Item 16 – Soil Prep – Planting Beds

1. This bid item shall be paid per square foot. Payment will be based on the amount of work completed as at time of payment request as determined by the Owner subject to withheld retention amount in accordance with these specifications.
2. The contractor shall prepare the planting areas enable proposed plants to get established within a 6 month time period. See P. Below for specific about soil prep.

P. Planting – a.k.a. Bid Items 17,18, 19, 20 – Ground Cover(bulbs to 1 gallon), Ground Cover (5 gallon), Shrubs (5 gallon), Tree (15 gallon), Tree (24" Box)

1. This bid item shall be paid as follows:
 - Ground Cover(bulbs to 1 gallon) - per square foot,
 - Ground Cover (5 gallon) – Each,
 - Shrubs (5 gallon), - Each,
 - Tree (15 gallon), - Each,

Tree (24" Box) – Each;

Payment will be based on the amount of work completed as at time of payment request as determined by the Owner subject to withheld retention amount in accordance with these specifications.

2. PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide planting work and planting maintenance complete as shown on the drawings and as specified including staking and layout of the landscaping.

B. Related work specified elsewhere includes:

1. ROUGH GRADING
2. SOIL PREP – PLANTING BEDS

1.2 QUALITY ASSURANCE

A. Reference Standards:

1. Ordinances and Regulations: All local, municipal and state laws, codes and regulations governing or relating to all portions of this work are hereby incorporated into and made a part of these Specifications. Anything contained in these Specifications shall not be construed to conflict with any of the above codes, regulations or requirements of the same. However, when these Specifications and Drawings call for or describe materials, workmanship or construction of a better quality, higher standard than is required by the above mentioned codes and regulations, the provisions of these Specifications and Drawings shall take precedence. Furnish without extra charge additional materials and labor required to comply with above rules and regulations.
2. "Sunset Western Garden Book," Lane Publishing Co., Menlo Park, California; current edition.
3. "American Standards for Nursery Stock," American Association of Nurseryman, 230 Southern Building, Washington, D.C. 20005.
4. Alameda Countywide Clean Water Program (ACCWP) or member agency having jurisdiction over the project work.
5. US Composting Council Compost analysis Program (CAP)
6. Test Methods for the Evaluation of Composting and Compost (TMECC)
7. Manufacturer's recommendations.

B. Qualifications:

1. Experience: Assign a full-time employee to the job as foreman for the duration of the Contract who is certified landscape technician, certification through CLCA or minimum of four (4) years experience in landscape installation and maintenance supervision, with experience or training in turf management, entomology, pest control, soils, fertilizers and plant identification.
2. Labor Force: Provide a landscape installation and maintenance force thoroughly familiar with, and trained in, the work to be accomplished to perform the task in a competent, efficient manner acceptable to the Owner.

C. Requirements:

1. Supervision: The foreman shall directly supervise the work force at all times and be present during the entire installation. Notify Owner's Representative of all changes in supervision.
2. Identification: Provide proper identification at all times for landscape maintenance firm's vehicles and a labor force uniformly dressed in a manner satisfactory to Owner's Representative.
3. Planting soils and organic amendments shall meet the AACWP requirement for the stormwater treatment measures used with this project work.

D. Plant Material Standards

1. Quality and Size of Plants: Conform to the State of California Grading Code of Nursery Stock, No. 1 grade. Use only nursery-grown stock which is free from insect pests and diseases.

2. Comply with federal and state laws requiring inspection for plant diseases and infestations. Submit inspection certificates required by law with each shipment of plants, and deliver certificates to the Owner. Obtain clearance from the County Agricultural Commissioner as required by law, before planting plants delivered from outside the County in which planted.

E. Testing Agency: Soil and Plant Laboratory, Inc. 352 Matthew Street (P.O. Box 153), Santa Clara, CA 95052; Tel. (408) 727-0330; or Root Zone Associates, P.O. Box 18911, San Jose, CA 95118; Tel. (408) 264-7024. Components of the test shall include all major nutrients, pH, salinity, boron, sodium, micronutrients, copper, zinc, manganese and iron, adsorption rate, organic content and texture.

F. Weed Germination: Following soil preparation and fine grading of planting areas, irrigate the planting areas to germinate any weed seeds for a minimum period of 21 days. Maintain the soil in a damp condition for a minimum depth of 4 inches. Following approval of the weed germination by the Owner's Representative, spray kill the weeds using a short lived systemic weed killer that will not affect subsequent planting. Confirm the weed kill and allow the soil to dry out to optimum degree for planting prior to planting.

1.2 SUBMITTALS,

A. Product Data: Manufacturer's current catalog cuts and specifications of the following:

1. Fertilizers
2. Herbicide
3. Tree Tie and Stake
4. Iron Sulfate
5. Tree Guy Material
6. Filter Fabric
7. Perforated Drain Pipe
8. Erosion Control Netting
9. Steel Edging
10. Header Board
11. Root Barrier

B. Samples: Submit following samples along with certificates of compliance/analytical data from approved laboratory for degree of compliance:

1. Plants: Submit typical sample of each variety or entire quantity to site for approval by Landscape Architect.
2. Organic Mulch: Submit 1-pint sample.
3. Rock Mulch: Submit 1-pint sample(s).
4. Organic (Soil) Amendment: Submit 1/2-pint sample.
5. Permeable Backfill (Filter Rock): Submit 1-pint sample.
6. Imported Planting Soil: Submit 1-pint sample

C. Delivery Receipts: Provide delivery receipts for quantities of organic soil amendments delivered to the site.

D. Topsoil Analysis: After approval of rough grading and topsoil placement, obtain three representative samples of in situ topsoil taken from accepted site locations at depth of 4" to 6" below finish grade and submit to an accredited Soils Laboratory for "agricultural suitability" analysis report, including particle size, and evaluation of physical and chemical properties of soil and recommendations for adding amendments and fertilizers to the soil.

E. Subsoil Analysis: Besides the above required soil samples, take one representative sample of any subgrade soil that is to receive a layer of imported planting soil over it. The laboratory

report shall include the subgrade soil's total combined silt and clay content for determining the total allowable combined silt and clay content of the imported planting soil specified herein.

F. Imported Planting Soil Analysis: See Imported Planting Soil Analysis requirements elsewhere in this specification for comparison to existing soil analysis.

G. Approval of Laboratory Report: Upon approval of the Laboratory's report by the Landscape Architect, the recommendations in the report shall become a part of the Specifications and the quantities of soil amendment, fertilizer and other additives shall be adjusted to conform with the report at no additional cost to the owner. Request Testing Laboratory to send one copy of test results directly to Landscape Architect and one copy to the Owner. Note that there is a minimum quantity of organic amendment specified elsewhere in this specification section.

1.3 PROJECT/SITE CONDITIONS

1. Site Visit: At beginning of work, visit and walk the site with the Owner's Representative to clarify scope of work and understand existing project/site conditions.

1.4 WARRANTY AND REPLACEMENT

A. Pre-Emergence Weed Killer: Warrant the work against weed growth for a period of four (4) months after application.

B. Warrant all plants and planting to be in a healthy, thriving condition until the end of the maintenance period, and deciduous trees beyond that time until active growth is evident.

C. Replace all dead plants and plants not in a vigorous condition immediately as directed by the Owner's Representative at Contractor's expense. Install replacement plants before the final acceptance at the size specified.

D. Warrant all plant material for a period of one year after final acceptance of the maintenance period against plant materials with defects at the time of installation.

E. Warrant plant installation and maintenance by Contractor against defects for a period of one year.

PART 2 - PRODUCTS

2.1 PLANTS

A. Plant the variety, quantity and size indicated. The total quantity tabulated on the drawings are considered approximate and furnished for convenience only. Contractor shall perform his/her own plant quantity calculations and shall provide all plants shown on the Drawings.

B. Tag plants of the type or name indicated and in accordance with the standard practice recommended by the American Association of Nurserymen.

C. Install healthy, shapely and well rooted plants with no evidence of having been root-bound, restricted or deformed.

D. Take precautions to ensure that the plants will arrive at the site in proper condition for successful growth. Protect plants in transit from windburn and sunburn. Protect and maintain plants on site by proper storage and watering.

E. Substitutions will not be permitted, except as follows:

1. If proof is submitted to the Landscape Architect that any plant specified is not obtainable, a proposal will be considered for use of nearest equivalent size or variety with an equitable adjustment of contract price.

2. Substantiate and submit proof of plant availability in writing to the Landscape Architect within 10 days after the effective date of Notice to Proceed.

F. Tree Form: Trees shall have a symmetrical form as typical for the species/cultivar and growth form.

1. Central Leader for Single Trunk Trees: Trees shall have a single, relatively straight central leader and tapered trunk, free of co dominant stems and vigorous, upright branches that compete with the central leader. Preferably, the central leader should not have been headed; however, in cases where the original leader has been remove, an upright branch at leas ½ the diameter of the original leader just below the pruning point shall be present.

2. Potential Main Branches: Braches shall be evenly distributed radially around and appropriately spaced vertically along the trunk, forming a generally symmetrical crown typical for the species.

3. Headed temporary branches should be distributed around and along the trunk as noted above and shall be no greater than 3/8" diameter, and no greater than ½ diameter of the trunk at point of attachment.

G. Tree Trunk

1. Trunk diameter and taper shall be sufficient so that the tree will remain vertical without the support of a nursery stake.

2. Trunk shall be free of wounds (except properly-made pruning cuts), sunburned areas, conks (fungal fruiting-bodies), wood cracks, bleeding areas, signs of boring insects, galls, cankers and/or lesions.

3. Tree trunk diameter at 6" above the soil surface shall be within the diameter range shown for each container size below, except where shown otherwise:

Container	Trunk Diameter in inches	Soil level from Container Top
5 gallon	0.5" to 0.75"	1.25 to 2"
15 gallon	0.75" to 1.0"	1.75 to 2.75"
24" Box	1.5" to 2. 5"	2.25 to 3"

4. Tree trunks shall be undamaged and uncut with all old abrasions and cuts completely callused over. Do not prune plants prior to delivery.

H. Tree Roots

1. Trunk root collar (root crown) and large roots shall be free of circling and/or kinked roots. Contractor may be required to remove soil near the root collar in order to verify that circling and/or kinked roots are not present.

2. The tree shall be well rooted in the container. When the trunk is lifted the trunk and root system shall move as one and the rootball shall remain intact.

3. The top-most roots or root collar shall be within 1" above or below the soil surface. The soil level in the container shall be within the limits shown in above table.

4. The rootball periphery shall be free of large circling and bottom-matted roots.

5. On grafted or budded trees, there shall be no suckers from the root stock.

I. Shrubs

1. Each shrub must stand upright without support.

2. All container shrubs shall be free of girdling roots, defined as those roots greater than 1/8" diameter circling the periphery of the rootball. The top of the rootball shall be free of "Knees" (roots) protruding above the soil, and the bottom shall be free of matted roots.

J. Measure trees and shrubs with branches in normal position. Height and spread dimensions indicated refer to the main body of the plant, and not from branch tip to tip.

2.3 FERTILIZERS

A. Commercial fertilizer, pelleted or granular form, conform to the requirements of Chapter 7, Article 2, of the Agricultural Code of the State of California for fertilizing materials as follows:

Type A: 6% Nitrogen, 20% Phosphorus Acid and 20% Potash, (6-20-20).

Type B: 21 gram planting tablets 20% Nitrogen, 10% Phosphoric Acid and 5% Potash (20-10-5) available from Agriform or 10gm BestPacks packets 20% Nitrogen, 10% Phosphoric Acid and 5% Potash (20-10-5) available from Best Fertilizer Co.

Type C: Complete fertilizer 21% Nitrogen, 7% Phosphoric
Acid and 14% Potash (21-7-14).

If commercial fertilizer having this analysis is not obtainable, other similar commercial fertilizer may be used providing it meets the approval of the Landscape Architect.

- B. Maintenance Fertilizer: Type C
- C. Sod Fertilizer: Provided by grower.

2.4 ORGANIC AMENDMENT FOR IN SITU SOILS (ON-GRADE):

- A. Ground Redwood or Ground Fir Bark with the following properties:

<u>Percent Passing</u>	<u>Sieve Designation</u>		
100	9.51 mm	3/8"	
50-60	6.35 mm	1/4"	
20-40	4.76 mm	No. 4	
0-20	2.38 mm	No. 8	8 mesh

Redwood Sawdust

- 1. Dry bulk density, lbs. per cu. yd., 260-280
- 2. Nitrogen stabilized - dry weight basis, min. 0.4%
- 3. Salinity (ECe): 4.0 maximum
- 4. Organic Content: 90% minimum
- 5. Reaction (pH): 4.0 minimum

Ground Fir and/or Pine Bark

- 1. Dry bulk density, lbs. per cu. yd., Min. 350
- 2. Nitrogen stabilized - dry weight basis, min. 0.5%
- 3. Salinity (ECe): 4.0 maximum
- 4. Organic Content: 90% minimum
- 5. Reaction (pH): 4.0 minimum

- B. Submit sample along with analytical data from an approved laboratory for degree of compliance to the Landscape Architect within two weeks after award of Contract.

2.5 COMPOSTED YARD WASTE AMENDMENT:

A. The above Ground Redwood or Ground Fir Bark or Ground Pine Bark (ORGANIC AMENDMENT FOR IN SITU SOILS) is the specified organic amendment material required. Acceptance of Composted Yard Waste Amendment in lieu of the above specified ORGANIC AMENDMENT FOR IN SITU SOILS (ON-GRADE) material will be considered if the in situ planting soil salinity and soil structure is favorable for the inclusion of recycled yard waste organic matter, as approved by the Landscape Architect. It is the Contractor's responsibility to secure test samples of both the planting soil and the proposed composted yard waste amendment (2 quart samples) and submit to Soils and Plant Laboratory for evaluation and recommendations per code A05-1 for the soil sample and A91-0 for the amendment sample. The composted yard waste amendment sample shall be a grab sample from the currently available material.

B. Based on the Soils and Plant Laboratory evaluation, the addition of composted yard waste amendment shall not be acceptable if it creates a leaching requirement. The addition of the compost shall result in a final ECe of the amended soil of less than 4.0 dS/m @ 25 degrees C. as determined in a saturation extract. Use the following table to determine the maximum allowable Ece (dS/m of saturation extract) of compost at desired use rate and allowable Ece increase.

DESIRED USE RATE	MAXIMUM ALLOWABLE Ece INCREASE FROM AMENDMENT
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Cu. Yds. Amendment Per 1000 Sq. Ft. for Incorporation to 6" depth	Volume percentage of amendment	1 dS/m	2 dS/m	3 dS/m
		Maximum ECe of Compost		
1	5	14	28	42
2	11	7	14	21
3	16	5	9.5	14
4	22	3.5	7	10.5
5	27	3	5.5	8.5
6	32	2.5	4.5	7

Example: Specification calls for 6 cu. Yds. Compost per 1000 sq. ft. for incorporation to 6" depth, and site soil has an ECe of 2.0. In order to avoid exceeding ECe of 4 in final blend, compost ECe shall be less than 4.5 dS/m.

C. Composted Yard Waste Soil Amendment properties as follows:

1. Gradation:

<u>Percent Passing by weight</u>	<u>Sieve Designation</u>		
90		1/2"	
85-100	9.51 mm	3/8"	
50-80	2.38 mm	No. 8	8 mesh
0-40	500 micron	No. 35	32 mesh

2. Organic Content: Minimum 50% based on dry weight and determined by ash method.

Minimum 250 lbs. organic matter per cubic yard of compost.

3. Carbon to nitrogen ratio: Maximum 35:1 if material is claimed to be nitrogen stabilized.

4. pH: 5.5 – 8.0 as determined in saturated paste.

5. Soluble Salts: See B. above.

6. Moisture Content: 35-60%.

7. Contaminants: The compost shall be free of contaminants such as glass, metal and visible plastic.

8. Maturity: Physical characteristics suggestive of maturity include:

a. Color: Dark brown to black.

b. Acceptable Odor: None, soil-like, musty or moldy.

c. Unacceptable Odor: Sour, ammonia or putrid.

d. Particle Characterization: Identifiable wood pieces are acceptable but the balance of the material shall be soil-like without recognizable grass or leaves.

D. Submit planting soil and composted yard waste amendment samples along with laboratory report from Soils and Plant Laboratory for degree of compliance as specified above to the Landscape Architect a minimum of 3 weeks prior to beginning soil prep. The laboratory report shall include recommendations for adjusting fertilizer and amendment quantities. Upon approval of the Laboratory's report by the Landscape Architect, the recommendations in the report shall become a part of the Specifications and the quantities of soil amendment and fertilizer shall be adjusted to conform with the report at no additional cost to the owner.

2.7 IRON SULFATE: Dry form.

2.8 PLANT BACKFILL: Except for acid loving plants (Azaleas, Rhododendrons, Ferns, Camellias, etc.), use a mixture of 2 parts soil from the hole, and 1 part amendment with iron added at the following rates:

	1 gallon can plants	-	iron,
1/4 cup			
	5 gallon can plants	-	iron,
1/3 cup			
	15 gallon can plants	-	iron,
1/2 cup			
24" box and larger	- iron, 1 cup		

Mix the iron, amendment and soil thoroughly for use in the top 8 inches of backfill around plants. For acid loving plants, mixture to be 1/2 soil from the hole and 1/2 amendment.

2.9 MULCH

- A. Organic Mulch: Fir tree or pine tree bark, dark in color; 3/4-inch to 1-inch size.
- B. Rock Mulch: Hard, durable, crushed stone, average 1/4-inch diameter, in gray color range from American Soil Products or approved equal.
- C. Submit samples of organic and rock mulches to the Landscape Architect for approval within two weeks of award of Contract. Resubmit until acceptable to Owner, at no extra cost.

2.10 TREE SUPPORT POLES (ON-GRADE): Peeled lodge pole pine logs, clean, smooth, new, and sized as follows:

- A. Two-inch (2") diameter by eight feet (8') long for trees less than 8' high and 1" caliper.
- B. Three-inch (3") diameter by eight to ten feet (8' - 10') long for trees greater than 8' high and 1" caliper.

2.11 TIES: Rubber strap, 24-inch minimum length without sharp edges adjacent to trunk, V.I.T. cinch-tie, Dublin, CA, (818)882-9530, or approved equal.

2.12 TREE GUYING:

- A. For trees up to 3" caliper, 3/16" galvanized steel cable, with rubber tree collar, 12" minimum long, and secured with cable clamp, and attached to anchor for below-grade location, Duckbill Model 40 DTS, or approved equal.
- B. For trees 3" to 6" caliper, 1/8" galvanized steel cable with rubber tree collar, 21" minimum long, and secured with cable clamp, 3" take-up eye to eye turnbuckle, and attached to anchor for below-grade location, Duckbill Model 68 DTS, or approved equal.

2.13 PLANTING SOIL (TOPSOIL):

- A. Planting soil is defined as on-site surface soil. Satisfactory planting soil shall be free of subsoil, clay, lumps, stones, and other objects over 4" in diameter, and without weeds, roots, and other objectionable material.
- B. Strip planting soil to whatever depths encountered, a maximum of 12" inches in a manner to prevent intermingling with the underlying subsoil or other objectionable material. Topsoil stripping is limited to area outside "Drip Line" of existing trees to remain and areas indicated on drawings and as approved by the Owner's Representative.
- C. Remove heavy growths of grass from areas before stripping.

D. Stockpile topsoil in storage piles in areas shown, or where designated by Owner. Construct storage piles to freely drain surface water. Cover storage piles if required to prevent windblown dust.

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

F. If sufficient on-site surface soil is not available, provide imported planting soil as specified below. Placement of dissimilar soils shall be coordinated with irrigation system valving to maintain separate valves for dissimilar soils.

2.14 IMPORTED PLANTING SOIL (TOPSOIL):

A. Imported planting soil shall be fertile, friable, natural, productive soil containing a normal amount of humus, and shall be capable of sustaining healthy plant life. Planting soil shall be free of subsoil, heavy or stiff clay, rocks, gravel, brush, roots, weeds, noxious seeds, sticks, trash, and other deleterious substances. Soil shall not be infested with nematodes or with other noxious animal life or toxic substances. Soil shall be obtained from well-drained, arable land, and shall be of an even texture. Soil shall not be taken from areas on which are growing any noxious weeds such as Morning Glory, Sorrel, or Bermuda Grass.

B. Imported planting soil shall have a pH value of between 6.0 and 7.5, a boron concentration of the saturation extract of less than 1 ppm, salinity of the saturation extract at 25 degrees C. of less than 4.0 millimoles, and a sodium absorption rate (SAR) of less than 8.

C. The silt and clay content of imported planting soil shall not exceed that of the existing soil it is to be placed over. It shall be a "Sandy Loam" as classified in accordance with USDA Standards with a combined total of between 25% to 40% Clay and Silt.

D. Make the site of the source of supply of planting soil available to the Landscape Architect for observation and approval prior to any hauling or placing of soil. In addition, submit for approval a 1-quart sample of soil, together with a standard soil analysis report by an accredited soils analyst showing chemical analysis stating source, fertility, agricultural suitability and particle size distribution of the soil. Deliver the sample to the Landscape Architect two weeks before starting the contemplated hauling of the soil. Following approval of the sample, provide a one-half cubic yard sample, which shall be stored at the site of work for comparison with subsequent loads of soil. The comparison sample shall be protected by a cover until the furnishing of all soil has been completed and accepted. Should the soil submittal lack certain requirements which can be added to the soil, the Landscape Architect will consider a request by the Contractor to amend the soil as recommended by the Soils Analyst at the Contractor's expense.

2.15 PRE-EMERGENCE WEED KILLER: Clean non-staining as recommended by a licensed pest control specialist.

2.16 FILTER FABRIC: Polyester or polypropylene non-woven filter fabric with uniform fiber distribution by "Terra Bond" #1115, "Mirafi, Inc." #140N, or approved equal.

2.17 PERFORATED DRAIN PIPE: Polyvinyl Chloride (PVC) pipe and pipe fittings shall meet extra strength minimum of SDR-35 of the requirements of ASTM Specification D3034. Perforated and non-perforated corrugated polyethylene pipe, 3- to 10-inch diameter, shall meet the requirements of ASTM D883 and ASTM F412, and shall conform to Section 68 of the Standard Specifications.

1. Corrugated polyethylene pipe fittings shall comply with all requirements of AASHTO M-252-85I for 3- to 10-inch diameter pipe. Couplings shall be split or snap-on type for perforated pipe and split couplings with gaskets for non-perforated pipe. Cutting pipe with integral couplings will not be allowed.

2. Corrugated polyethylene pipe and fittings manufactured by Advanced Drainage Systems, Inc., shall be considered the standard to determine compliance to this specification.

Inspection Tube Cap: Paint cap one coat chocolate-brown color using Flat, exterior grade latex paint as accepted by Owner's Representative.

2.18 PERMEABLE BACKFILL (FILTER ROCK): Permeable backfill used in subsurface drain installations to be Class 2 permeable material in conformance with Section 68 "Subsurface Drains" of the Standard Specifications; gradation to 3/4" maximum size. Submit Sample for approval.

2.19 EROSION CONTROL NETTING: New, with a uniform, open plain-weave, flame-retardant mesh. The mesh shall be natural brown-tan and made from unbleached single jute yarn. The yarn shall be of loosely twisted construction and shall not vary in thickness by more than one-half its normal diameter. Furnish jute mesh in rolled strips to meet the following requirements:

1. Width: 48 inches, with a tolerance of one-inch wider or narrower.
2. Not less than 78 warp ends per width.
3. Not less than 41 weft ends per yard.
4. Weight shall average 1.22 pounds per linear yard, with a tolerance of 5 percent heavier or lighter.

2.20 VINE TIES: For vines that require supports in order to climb, install anchor bolts with clear vinyl coated 3/16" galvanized steel cable, secured and taut with cable clamps, on structure in configuration approved by Landscape Architect. Train vine branches to supports with green nursery tape.

2.21 ARBOR-GUARD: AG 8-4 as manufactured by Dimex (800/334-3776), or approved equal.

2.22 STEEL EDGING: 3/16" X 4" by 8' black finish with 12" min long stakes set 1/2" below grade at each joint and maximum 4' spacing, in-line joints without offset or double thickness, by Sure-Loc, (800) 787-3562 or approved equal.

2.23 HEADER BOARD: 2 by 6 inch "Rough" Construction Heart Redwood with 2 by 4 by 15" Construction Heart Redwood stakes.

2.24 ROOT BARRIER: UB 18-2 as manufactured by Deep Root Corporation (800)458-7668, Root Solutions, Inc. (800) 554-0914, or equal.

PART 3 - EXECUTION

3.1 FINE GRADING AND SOIL PREPARATION

A. General: Soil in all planting areas shall be moist, but not so moist that it sticks to a hand shovel, and loose and friable to a minimum depth of 12 inches with a relative maximum compaction of 85%. Rip and scarify and dry any areas that do not meet this requirement.

B. Lime Treated Soil Removal: All Lime treated soils shall be removed full depth from planting areas and replaced with approved planting soil as accepted by Owner's Representative and as shown.

B. Planting Soil Placement: EARTHWORK Section

C. Planting Soil Placement:

1. Inspect planting areas and remove all base rock and other foreign material. Rip all planting areas in two directions full depth of compacted fill (to a minimum of 6 inches) into undisturbed native soil prior to backfilling. Scarification of any planting area which cannot be accomplished with a tractor shall be accomplished by an alternative method approved by the Owner's Representative to the specified depth to ensure proper drainage.
2. Prior to placing planting soil secure the Owner's Representative's acceptance of the planting areas subgrade condition. After acceptance of the planting areas subgrade condition, uniformly distribute and spread planting soil backfill over scarified subgrade as specified in planting areas and compact to a maximum of 85% relative compaction.
3. Do not work planting soil in a wet or muddy condition or dump or spread in areas where subgrade is not in proper condition.
4. Water settling, puddling, and jetting of fill and backfill materials as a compaction method is not acceptable.
5. Provide a minimum of 12" depth in planting areas, or more where shown or specified otherwise.

D. Planting Soil Placement in Planting Islands and Adjacent to Pavement Areas: Provide planting soil as a final lift in all planting areas within and adjacent to paved areas and other construction where native site soil has been covered by engineered fill and/or base rock. Remove all engineered fill, base rock and compacted subgrade full depth of compaction and replace with approved planting soil, a minimum lift of 12". Unless shown otherwise, finish grade in planting islands shall be crowned with a minimum 2 % pitch to the edges.

E. All planting areas soil shall be loose and friable prior to planting. Rip any overly compacted and re-compacted planting areas in two directions full depth of compacted soil prior to planting.

F. Before proceeding with the work: Carefully inspect all areas and verify all dimensions and quantities. Immediately inform the Landscape Architect of any discrepancy between the drawings and specifications and actual conditions and secure approval to proceed.

G. Planting operations shall be performed only during periods when beneficial results can be obtained. When excessive moisture or other unsatisfactory conditions prevail, the work shall be stopped until conditions are satisfactory.

H. Thoroughly wet down the planting areas to settle the soil and confirm irrigation coverage and operation. Allow soil to dry so as to be workable as described herein.

I. Drag to a smooth, even surface. Grade to form all swales, pitch to catch basins, streets, curb, etc., to ensure uniform surface drainage. Areas requiring grading include adjacent transition areas that shall be uniformly level or sloped between finish elevations. Refer to Erosion Control Netting below for treatment of slopes 3:1 and steeper.

J. Finish Grade: Hold finish grade and/or mulch surface in planting areas 1/2-inch below adjacent pavement surfaces, tops of curbs, manholes, etc. The subgrade of the mulch in mulched planting areas shall be a minus 2 inches for a distance of 12 to 18 inch from the edge of pavement. The remainder of the planting area shall be graded to receive the required 3 inch layer of mulch.

K. In Situ Soil Preparation:

1. Spread organic amendment, iron and Type A fertilizer evenly over installed and rough graded on-site topsoil in all planting areas including turf, ground cover and shrub areas at the following rates:
 - a. Organic Amendment: 6 cubic yards per 1,000 square feet

- b. Fertilizer: Type A (6-20-20) at 20 lbs. per 1,000 square feet.
- c. Iron Sulfate: 10 lbs. per 1,000 square feet

2. In the case of a contradiction between the quantity of organic amendment required by the Contractor-obtained soils laboratory analysis and the specified quantity shown above, the greater of the two quantities shall take precedence.

3. Rototill above additives into soil 6 to 8 inches deep. Keep iron sulfate off pavement and other surfaces to prevent rust staining. Correct all rust damage to work.

L. After the rototill work, float areas to a smooth, uniform grade as indicated on the drawings. Slope all planting areas to drain. Roll, scarify, rake and level as necessary to obtain true, even planting surfaces. Remove rocks, sticks and debris 2 inches or larger in size in turf areas and 3 inches or larger in shrub and ground cover areas. Secure approval of the grade by the Landscape Architect before any planting.

3.2 ROOT BARRIER: Install in continuous sheet parallel and adjacent to curb or pavement edge as required on drawings and in accordance with manufacturer's recommendations.

3.3 EROSION CONTROL NETTING: Verify finished grades and provide Jute Mesh and single grind Redwood bark mulch on all slopes 3:1 and steeper as accepted by the Owner's Representative. Install jute mesh loosely up and down the slope in accordance with manufacturer's specifications and as follows. Fit the soil surface contour and hold in place with 12-inch long, 11-gauge (minimum) steel wire staples driven vertically into the soil at 18- to 24-inch spacing. Jute mesh strips shall overlap along all edges at least 6 inches. Ends of side strips shall be buried into the soil at least 6 inches. Drive staples along edges to securely anchor mesh to ground.

3.4 ARBOR-GUARD: Install arbor guard on all trees in turf areas. Install according to manufacturer's specifications.

3.5 METAL EDGING: Install in continuous strips as indicated and in accordance with manufacturer's recommendations.

3.6 HEADER BOARD: Install in continuous, smooth alignment as indicated with stakes spaced 48 inches on center maximum and at all joints.

3.7 TREE AND SHRUB PLANTING

A. Mark tree and shrub locations on site using stakes, gypsum or similar approved means and secure location approval by the Landscape Architect before plant holes are dug. Review location of plants in relationship to irrigation heads and adjust location(s) that interfere with the function of the spray heads as accepted by the Landscape Architect prior to planting.

B. Test drainage of plant beds and pits by filling with water (minimum 6"). The retention of water in planting beds and plant pits for more than two (2) hours shall be brought to the attention of the Landscape Architect. If rock, underground construction work, tree roots, poor drainage, or other obstructions are encountered in the excavation of plant pits, alternate locations may be selected by Landscape Architect.

C. Excavate tree, shrub and vine pits as follows (Note square Tree Pit pattern required below):

<u>Excavation for</u>	<u>Width</u>	<u>Depth</u>
Boxed Trees	Box + 24"	Box depth
Canned Trees (15 gc)	Can + 18"	Can depth

Canned Shrubs/Vines (1 or 5 gc) Can + 12" Can depth

- D. Square Tree Pits: Tree pits shall be dug in a square pattern with pit walls scarified to promote root penetration into surrounding soil. Drilled tree pits shall be modified to a square shape.
- E. Break and loosen the sides and bottom of the pit to ensure root penetration and water test hole for drainage as required above.
- F. Backfill plant holes with mix as specified, free from rocks, clods or lumpy material. Backfill native soil free of soil amendments under rootball and foot tamp to prevent settlement. Backfill remainder of the hole with soil mix and place plant tablets or packets (Type B fertilizer) 3 inches below finish grade and 1/2-inch from roots at the following rates:
- | | | |
|---------------------|---|---------------------|
| 1 gallon can plant | - | 1 tablet or packet |
| 5 gallon can plant | - | 3 tablets or packet |
| 15 gallon can plant | - | 6 tablets or packet |
| 24-inch box plant | - | 6 tablets or packet |
| 36-inch box plant | - | 8 tablets or packet |
- G. Carefully remove and set plants without damaging the rootball. Superficially cut edge roots vertically on three sides. Remove bottom of plant boxes before planting. Remove sides of boxes after positioning the plant and partially backfilling.
- H. Set plants in backfill with top of the rootball 2 inches above finished grade. Backfill remainder of hole and soak thoroughly by jetting with a hose and pipe section. Water backfill until saturated the full depth of the hole.
- I. Build 6" high watering basin berms around trees and shrubs to drain through rootball. Basins are not required around trees in turf areas.
- J. Stake and/or guy trees as detailed. Drive stake until solid and remove excess stake protruding above top tree tie to prevent rubbing against branches.
- K. Remove any soil from top of plant rootballs and secure Landscape Architect's approval of rootball height prior to mulching.
- L. After approval of rootball height, install mulch as required below.

3.8 MULCH:

- A. Except where rock mulch is required, mulch all tree, shrub and ground cover areas with organic mulch to a 3-inch depth, except adjacent to walkways where soil grade is 2 inches below top of pavement, mulch shall be 2 inches deep, and 2-inches deep where planting ground cover plants from flats. Hold bark mulch away from base (trunk) of plant 4" or as directed by the Landscape Architect. Individual trees and/or shrubs planted in non-irrigated areas shall, at minimum, receive bark mulch over their watering basin and berm. No mulch is required around trees in turf areas.
- B. Install rock mulch to a [4-inch] depth where shown.

3.9 ROOT BARRIER: Install in linear fashion along and adjacent to the edges of the planting area as detailed or, if not shown, in accordance with manufacturer's recommendations. Set top of barrier approximately 1/2-inch above finished soil surface to allow concealment with mulch, as accepted by Owner's Representative.

3.10 GROUND COVER PLANTING: Plant in neat, straight, parallel and staggered rows as indicated on plan. Plant first row one-half required ground cover spacing behind adjacent curbs, structures, or other plant bed limits. Plant ground cover to edge of water basins of adjacent trees and shrubs.

3.11 PRE-EMERGENCE WEED KILLER: Apply pre-emergence weed killer in all areas to receive ground cover planting. Work shall be done under the supervision of a person licensed by the State of California as a pest control applicator and holding a qualified applicator license or a Qualified Applicator Certificate. Obtain approval of the finish grades prior to applying weed killer and coordinate planting and watering with the pest control specialist prior to planting. Take care to keep weed killer off areas to be seeded.

3.12 WATERING: Water all trees, shrubs and ground cover immediately after planting. Apply water to all plants as often and in sufficient amount as conditions may require to keep the plants in a healthy vigorous growing condition until completion of the Contract. Do supplemental hand watering of trees and shrubs during the first 3 weeks of plant establishment.

3.13 MAINTENANCE OF PLANTING: Maintain plants from time of delivery to site until final acceptance of landscape installation.

3.14 PRE-MAINTENANCE PERIOD REVIEW AND APPROVAL OF PLANTING

A. Receive approval of the installed planting prior to commencement of planting establishment maintenance period. Notify the Landscape Architect a minimum of seven (7) days prior to requested review. Before the review, complete the following:

1. Complete all construction work.
2. Present all planted areas neat and clean with all weeds removed and all plants installed and appearing healthy.
3. Plumb all tree stakes.
4. Seed [sod] all turf areas.
5. No partial approvals will be given.

3.22 PLANTING ESTABLISHMENT MAINTENANCE

A. General Requirements:

1. Maintenance Period: The planting establishment maintenance period required shall be 120 calendar days after all planting is complete, turf is seeded, and installation approved. A longer period may be required if the turf is not thick, vigorous and even and has been mowed a minimum of 4 times, or if the plant material is not acceptably maintained during the maintenance period. The maintenance period may be suspended at any time upon written notice to the Contractor that the landscaping is not being acceptably maintained, and the day count suspended until the landscape is brought up to acceptable standards as determined by the Landscape Architect.

2. Planting establishment maintenance immediately follows, coincides with, and is continuous with the planting operations, and continues through turf installation, and after all planting is complete and accepted; or longer where necessary to establish acceptable stands of thriving plants.

3. Protect all areas against damage, including erosion, trespass, insects, rodents, disease, etc. and provide proper safeguards. Maintain and keep all temporary barriers erected to prevent trespass.

4. Keep all walks and paved areas clean. Keep the site clear of debris resulting from landscape work or maintenance.
5. Repair all damaged planted areas, and replace plants and reseed or resod turf immediately upon discovery of damage or loss.
6. Check sprinkler systems at each watering; adjust coverage and clean heads immediately. Adjust timing of sprinkler controller to prevent flooding.
7. Maintain adequate moisture depth in soil to ensure vigorous growth. Check rootball of trees and shrubs independent of surrounding soils and hand water as required.
8. Keep Contract areas free from weeds by cultivating, hoeing or hand pulling. Use of chemical weed killers will not relieve the Contractor of the responsibility of keeping areas free of weeds over 1-inch high at all times.

B. Tree, Shrub and Ground Cover Maintenance:

1. Maintain during the entire establishment period by regular watering, cultivating, weeding, repair of stakes and ties, and spraying for insect pests. Prune when requested by the Landscape Architect.
2. Keep watering basins in good condition and weed-free at all times.
3. Replace all damaged, unhealthy or dead trees, shrubs, vines and ground covers with new stock immediately; size as indicated on the drawings.

C. Non-irrigated Erosion Control Areas: To be watered by winter rains.

D. Fertilizing:

1. Upon approval and after submitting fertilizer delivery tags, maintenance fertilization shall begin 30 days after planting is complete. Fertilize all turf and ground cover areas by broad-casting Type C (21-7-14) fertilizer at the rate of 5 lbs. per 1,000 square feet evenly throughout. Reapply every forty-five (45) days until acceptable.
2. During the winter, for quick turf greening effect, calcium nitrate (15.5-0-0) may be applied at the rate of 6 lbs. per 1,000 square feet.
3. Early spring and fall substitute a complete fertilizer such as 15-15-15 applied at the rate of 6 lbs. per 1,000 square feet, to help insure continuing adequate phosphorus and potassium.
4. Apply ammonium sulfate fertilizer as necessary to maintain vigorous, green grass between fertilizings mentioned above.
5. Observe plant's color, and if a soil pH imbalance is suspected, take soil samples and obtain laboratory analysis for confirmation. Take necessary action recommended in laboratory analysis such as top dressing with soil sulfur, leaching soil, etc.

3.23 FINAL PLANTING REVIEW AND ACCEPTANCE

- A. At the conclusion of the Maintenance Period, schedule a final review with the Owner, the Owner's maintenance person, and the Landscape Architect. On such date, all project improvements and all corrective work shall have been completed. If all project improvements and corrective work are not completed, continue the planting establishment, at no additional cost to

the Owner, until all work has been completed. This condition will be waived by the Owner under such circumstances wherein the Owner has granted an extension of time to permit the completion of a particular portion of the work beyond the time of completion set forth in the Agreement.

B. Submit written notice requesting review at least 10 days before the anticipated review.

C. Prior to review, weed and rake all planted areas, repair plant basins, mow and edge turf, plumb tree stakes, clear the site of all debris and present in a neat, orderly manner.

Full compensation for furnishing all labor, materials, tools, equipment, incidentals, and for doing all the work involved in the Planting category of work as shown on the plans these special provisions, and as directed by the Owner, and no additional payment will be allowed.

Q. Bid Item 22 – Fountain

1. This bid item shall be lump sum. Payment for this item will be prorated over the course of the Project based on percentage complete of the item.

2. This item includes removal a disposal of existing fountain and replacing with ADA compliant drinking fountain subject to the approval of the City prior to being procured, and furnished. The fountain drain shall be routed to a planting area subject to the approval of the City. Effort shall be made to set the depth of the drain to 18 inches below grade and slope at 2% or greater to a location where the drain can daylight at grade. Fountain shall include a keyed hose bib to facilitate localized irrigation and cleaning. Alternatively the hose bib can be positioned at a separated location subject to the approval of the City.

R. Bid item 23 – Entrance Treatment including Gate

1. This bid item shall be lump sum. Payment for this item will be prorated based on percentage complete of this item.

2. This item consists of installing hog-wire gate and arbor consistent with the design and details shown on the plan. Hinges and latches shall be ADA compliant robust, durable and long lasting with specific products subject to the approval by the City prior to installing. The Gate shall be redwood or cedar, generally free of large knots treated with an environmentally friendly stain and wood protectant. Contractor shall submit wood finish information to City prior to applying.

S. Bid Item 24 – Staging Plan

1. This bid item shall be lump sum. Payment for this item will be prorated over the course of the Project based on percentage complete of all items.

2. This item consists of preparing a staging plan showing location of equipment and material that will be stored prior to being fully installed. The owner has not secure a project staging area so it will be incumbent for the Contractor to furnish equipment and materials that will be used on the day the work will be performed.

T. Bid Item 25 - Traffic Control

1. This bid item shall be lump sum. Payment for this item will be prorated over the course of the Project based on percentage complete of all items.
2. This bid item includes preparing detailed traffic control plans approved by the County of Marin; placing, adjusting and removing temporary traffic control measures, such as, but not limited to, flags, cones, barricades, crash barriers, signs, and flaggers (personnel dedicated to controlling and managing traffic), lighted arrow boards, signs, detours, lighting, pedestrian and traffic ramps, temporary striping, permanent striping, K-rails, pavement markers, traffic signal loops and temporary detection devices, and all incidentals necessary for worker, pedestrian and traffic protection, including furnishing all equipment, materials and personnel associated therewith, and in accordance with these Specifications.

U. Bid Item 4 – Concrete Retaining Wall(Add Alternate)

1. This item shall be paid per linear foot. Payment of this item will be made based on quantity of item as furnished and installed as of date of payment request as determined by Owner with retention withheld as allowed by the Contract Documents.
2. This bid item includes installing Retaining wall at the site perimeter as shown on the plans and as may be further detailed in attachments to these specifications. The Easterly and Southerly boundary shall be suitably prepared to accept a 6' high solid redwood fence as detailed on the plans. Though not anticipated retaining wall placed along the Northerly boundary should be prepared to accept a 42" high "hogwire" fence as detailed on the plans. This item includes furnishing and installing 4 inch perforated pipe subdrain that shall be imbedded in a ¾" drain rock with through wall weep holes spaced at approximately 10 feet intervals. Contractor shall verify fence post connection detail with Owner prior to installing the brackets and fasteners. Item includes furnishing all equipment, materials, and personnel therewith and in accordance with these plans.

V. Bid Item 26 Irrigation with Controller

1. This item will be paid per Lump Sum. Payment made shall be comparable to percentage of work item completed at time of payment request as determined by the Owner and the remaining amount on the final progress payment, with retention withheld as allowed by the Contract Documents.
2. This item includes furnishing and installing a drip irrigation system to be operated from believed to be existing 5/8 inch water service at the site. The system shall be controlled from a battery operated Rainbird or TBOS controller (of approved equivalent), installed below grade in a concrete box with a lockable cover. The water line shall be modified to install a backflow valve in conformance with Marin Municipal Water District standards and requirements. The system will include a quick coupler connection. The quick coupler shall be brass and attached to a galvanized riser that is linked to below grade water lines through a flexible coupling system subject to the approval of the City. The system shall also furnish and install a gate valve to allow the irrigation lines to be fully closed off from the water service.

2. PART 1 - GENERAL

1.1 DESCRIPTION

- A. The work in this section consists of furnishing, layout and installing an irrigation system.
- B. Related work specified elsewhere includes:
 - 1. Section 7-17.02 EARTHWORK
 - 2. Section 7-20.01 PLANTING

1.2 QUALITY ASSURANCE

- A. Manufacturer's Specifications: Follow manufacturer's current printed specifications and drawings in all cases where the manufacturers of articles used in the Contract furnish directions covering points not specified or shown in the drawings.
- B. Ordinances and Regulations: All local, municipal and state laws, codes and regulations governing or relating to all portions of this work are hereby incorporated into and made a part of these Specifications. Anything contained in these Specifications shall not be construed to conflict with any of the above codes, regulations or requirements of the same. However, when these Specifications and Drawings call for or describe materials, workmanship or construction of a better quality, higher standard, or larger size than is required by the above codes and regulations, the provisions of these Specifications and Drawings shall take precedence. Furnish without extra charge additional materials and labor required to comply with above rules and regulations.
- C. References, Codes and Standards:
 - 1. AB 325 State of California Model Water Efficient Landscape Ordinance.
 - 2. Water Use Classification of Landscape Species (WUCOLS).
 - 3. American Society of Irrigation Consultants (ASIC) Design Guidelines.
 - 4. California Landscape Standards, California Landscape Contractors Association, (CLCA) Sacramento, California.
 - 5. CAL-OSHA, title 8, Subchapter 4-Construction Safety Orders and Subchapter 7-General Industry Safety Orders.
 - 6. California Electric Code.
 - 7. California Plumbing Code (UPC) published by the Association of Western Plumbing Officials.
 - 8. NFPA 24, Section 10.4, Depth of Cover.
 - 9. Underwriters Laboratories (UL): Electrical wiring, controls, motors and devices, UL listed and so labeled.
 - 10. American Society of Testing Materials (ASTM).
- D. Furnish without extra charge any additional material and labor when required by the compliance with all above mentioned codes and regulations, though the work be not mentioned in these specifications or shown on the drawings.
- E. Reclaimed Water: Contact water company supplying reclaimed water prior to the commencement of installing the irrigation system to coordinate inspection of the work and to verify all codes and regulations regarding use of reclaimed water. Provide all required signage and other warnings.
- F. Experience: Assign a full-time employee to the job as supervisor for the duration of the Contract with a certified landscape technician, irrigation certification through CLCA or minimum of four (4) years experience in landscape irrigation installation.
- G. Labor Force: Provide a landscape installation and maintenance force thoroughly familiar with, and trained in, the work to be accomplished to perform the task in a competent, efficient manner acceptable to the Owner's Representative.

H. Explanation of Drawings:

1. Due to the scale of the Drawings, it is not possible to indicate all offsets, fittings, sleeves, etc., which may be required. Carefully investigate the conditions affected all of the work and plan accordingly, and furnish all required fittings. Install system in such a manner to avoid conflicts with planting, utilities and architectural features.
2. Do not install the irrigation system as shown on the Drawings when it is obvious in the field that obstructions, grade differences or discrepancies in arc dimensions exist that might not have been considered in engineering. Bring such obstruction or differences to the attention of the Owner's Representative. In the event this notification is not given, the Contractor shall assume full responsibility for any revision necessary.

I. Trench Interference with Tree Root Systems:

1. Review with Owner's Representative where trenching may interfere with existing root systems and propose alternate trench locations to avoid or reduce damage to root systems.

1.3 PROTECTION OF EXISTING STRUCTURES AND UTILITIES

- A. The Drawings show, if applicable, existing above and below grade structures and utilities that are known to the Owner. Locate known existing installations before proceeding with construction operations that may cause damage to such installations. Existing installations shall be kept in service where possible and damage to them shall be repaired with no adjustment of Contract Sum. Verify with Owner if As Built drawings are available.
- B. If other structures or utilities are encountered, request Owner's Representative to provide direction on how to proceed with the Work. If a structure or utility is damaged, take appropriate action to ensure the safety of persons and property.
- C. Verify location of existing irrigation systems to be removed and replaced. Maintain any existing systems as required by the Drawings and Specifications, including temporary retention of systems necessary to maintain existing on site and adjacent planting.

1.4 SUBMITTALS

A. Materials List:

1. Submit required copies of the cut sheets and a complete list of materials proposed for installation, along with any proposed substitutions clearly identified and obtain the Owner Representative's written approval thereof before proceeding. Use only accepted materials and items of equipment.

2. List all materials by manufacturer's name and model number.

B. Substitutions:

1. If the Contractor desires to substitute a product, he shall list each item and note it as a "substitution" and provide the following information:
 - a. Descriptive information describing its similarities to the specified product.
 2. If the product is approved and, in the opinion of the Owner's Representative, the substituted product does not perform as well as the specified product, the Contractor shall replace it with the specified product at no additional cost to the Owner.

C. Manuals:

1. Prior to the final acceptance of the irrigation system, furnish three (3) individually bound Operation and Maintenance Manuals to the Owner's Representative for use by the Owner. The manuals shall contain complete enlarged drawings, diagrams and spare parts lists of all equipment installed showing manufacturer's name and address. In addition, each Service Manual shall contain the following:
 - a. Index sheet indicating the Contractor's name, address and phone number.
 - b. Copies of equipment warranties and certificates.

- c. List of equipment with names, addresses and telephone numbers of all local manufacturer representatives.
- d. Complete operating and maintenance instructions in sufficient detail to permit operating personnel to understand, operate and maintain all equipment.
- e. Parts list of all equipment such as controllers, valves, solenoids and heads.
- D. Record Drawings:
 - 1. Dimension the location of the following items from two (2) permanent points of reference such as building corners, sidewalks, road intersections, etc.:
 - a. Connection to existing water lines/meter.
 - b. Connection to electrical power.
 - c. Gate valves.
 - d. Routing of sprinkler pressure lines (a dimension at least every 100 feet and as required to identify all changes in direction and location).
 - e. Remote control valves.
 - f. Routing of control valves.
 - g. Quick coupling valves.
 - h. All sleeve locations.
 - i. Routing of all control wiring.
 - j. Include all invert elevations below 12".
 - 2. Deliver a reproducible record drawing to the Architect within seven (7) working days before the date of final review. Delivery of the record drawings shall not relieve the Contractor of the responsibility of furnishing required information in the future.
- E. Controller Plan:
 - 1. Provide one Irrigation Diagram plan in each controller housing. The plan shall show the area controlled by each valve in different colors and for orientation, any major permanent structure such as buildings and roads.
 - 2. Charts to be waterproof and hermetically sealed between two pieces of transparent 10 mil thick plastic and installed in each controller on the door as accepted by the Owner's Representative no later than the time of the coverage test of the irrigation system.
- F. Maintenance Material - supply the following tools to the Owner:
 - 1. Three (3) sets of specialized tools required for removing, disassembling and adjusting each type of sprinkler, valve or other equipment supplied on this project.
 - 2. Two (2) keys for each type of equipment enclosure.
 - 3. Two (2) keys for each type of automatic controller.
 - 4. Two (2) quick-coupler keys and matching hose swivels for each type of quick-coupling valve installed.
 - 5. All lock keys shall be keyed alike.
- G. Landscape Irrigation Audit: Upon completing the installation of the irrigation system, conduct an irrigation audit prior to beginning the maintenance period. Submit written report, recommended 12-month schedule and estimate of annual water consumption. Include a copy of this report in the Operation and Maintenance Manual.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Furnish and deliver materials in manufacturer's packaging, bearing original legible labeling.

B. The Contractor is cautioned to exercise care in handling, loading, unloading, and storing PVC pipe and fittings. All PVC pipe shall be transported in a vehicle which allows the length of the pipe to lie flat so as not to subject it to undue bending or concentrated external load at any point. Any section of pipe that has been dented, cracked, or otherwise damaged shall be discarded and, if installed, shall be replaced with new piping.

1.6 SEQUENCING AND SCHEDULING

- A. Acceptance: Do not install main line trenching prior to acceptance by Owner's Representative of rough grades completed under another Section.
- B. Coordination: Coordinate with the work of other sections to insure the following sequence of events:
 - 1. Sleeves and Conduits: Installation of all sleeves and conduits to be located under paving and through walls prior to placement of those materials.
 - 2. Bubbler Heads: Install after placement of tree, but prior to backfill with planter soil mix.
 - 3. On-Structure Equipment: Install piping and risers after waterproofing is accepted.
 - 4. Sprinkler Head in Pots: Install riser and seal the penetration of the pot prior to backfill of pot with drainage materials and planter soil mix.
 - 5. Coordinate work schedule with Owner to avoid disruption of landscape maintenance of existing landscaping.
 - 6. Install piping prior to soil preparation (planting soil amendment installation).

1.7 WARRANTY

- A. In addition to manufacturer's guarantees and warranties, work shall be warranted for one (1) year from date of final acceptance against defects in material, equipment and workmanship. Warranty shall also cover repair of damage to any part of the premises resulting from leaks or other defects in materials, equipment and workmanship to the satisfaction of the Owner.
- B. Include a copy of the warranty form in the Operation and Maintenance Manual.

1.8 OPERATION

- A. Routine: Inspect and adjust all spray heads and control valves including raising or lowering of spray head heights to accommodate plant growth and weather conditions.
- B. Controller: Inspect regularly for power interruption and reset clock as required. Adjust station timing to accommodate changes in plant growth and weather conditions.
- C. System Failure: Perform all repairs within one (1) operating period. Replacements to match removed products and materials in all respects. Report promptly all damage not resulting from Contractor's operations. Repair all damage caused by Contractor at no expense to Owner.
- D. Climate Change: Set and program automatic controllers in response to seasonal requirements and requirements of newly planted materials.

PART 2 - PRODUCTS

2.1 PIPE

- A. Pressure Main Line Pipe and Fittings: All PVC fittings shall bear the manufacturer's trademark name, material designation, size, applicable I.P.S. schedule and NSF seal of approval.
- B. All main line pipe shall be solvent welded and shall be schedule 40 unless shown otherwise on the Drawings.
 - 1. PVC Pressure Rated Pipe: ASTM D2241 NSF approved Type I, Grade I, solvent welded PVC with an appropriate standard dimension ratio (S.D.R.).
 - 2. PVC Scheduled Pipe: ASTM D1785 NSF approved, Type I,
 - 3. Grade I, solvent welded PVC.
 - 4. PVC Solvent-weld Fittings: ASTM D2466 Schedule 40, 1-2, II-I NSF approved.

5. Solvent Cement and Primer for PVC solvent-weld pipe and fittings: Type and installation methods prescribed by the manufacturer.
6. Connections between Main Lines and RCVs: Schedule 80 PVC (threaded both ends) nipples and fittings unless required otherwise by local jurisdiction.
7. Valves 2-inch and larger shall be flanged only.
8. Copper pipe shall be Type K or Red Brass where threaded joints are required and Type L otherwise.
- C. All lateral line pipe shall be solvent welded and shall be schedule 40 unless shown otherwise on the Drawings.

2.2 CONTROLLER ENCLOSURES

- A. Type: Use one of the following (unless noted otherwise on the Drawings):
 1. Stainless steel, NEMA Type 3 rated, with back panel, padlocking hasp and padlock. See Detail for pedestal construction.
 2. Le Meur, (714) 822-5100.
 3. "Strong Box" available from John Deere, (800) 347-4272.

2.3 REMOTE CONTROL VALVE: As shown on Drawings and with the following minimum requirements:

- A. Remote control valves shall be those normally manufactured for irrigation systems and shall have a slow, consistent speed of closure through entire closing operation, including last portion. To ensure this, the effective diaphragm working area/valve seating opening ratio must be a minimum 3 to 1.
- B. Shall be mechanically self-cleaning to help prevent diaphragm or solenoid port plugging. To ensure this, the flush rod should be tapered to vary the size of the port opening as the diaphragm raises and lowers, thus allowing trapped material to escape. Rod is to be finished with a serrated surface to help scrub trapped material out. Screens not acceptable.
- C. Shall have removable valve seat so valve can be repaired without removal from irrigation line.
- D. Shall have ability to operate manually without the use of wrenches or special keys.
- E. Shall have one-piece solenoid that attaches directly to valve without shunts or clips that can be lost.
- F. Shall have cross top handle to adjust maximum travel of diaphragm to allow "tuning" of valve and closure.

2.4 BOX FOR REMOTE CONTROL VALVE:

Rectangular plastic valve box with lid - Ametek, Carson, Christy or accepted equal in green color (unless noted otherwise), with non-hinged bolt down lid marked "irrigation". Box body shall have knock outs. Do not saw cut body. Minimum size box as shown on Drawings. Increase box size as required to fit. Valve box lids are to indicate the controller letter and station number of valve as accepted by Owner's Representative. Also refer herein to required polyurethane tag at valve solenoid control wire under Control Wires. Locate the identification in center of the lid. Provide separate box for each valve. Provide H/20 Loading concrete boxes with bolt-down concrete lids for all valves that occur in paved areas.

2.5 CONTROLLER GROUND

A. Provide each pedestal controller with its own ground rod. Separate the ground rods by a minimum of eight feet. The ground rod shall be an eight foot long by 5/8" diameter U.L. approved copper clad rod or as recommended by controller manufacturer. Install no more than 6" of the ground rod above finish grade. Connect #8 gauge wire with a U.L. approved ground rod clamp to rod and back to ground screw at base of controller with appropriate connector. Make this wire as short as possible, avoiding any kinks or bending. Install within pedestal housing base unless otherwise noted.

B. Provide each irrigation controller with its own independent low voltage common ground wire.

2.6 BATTERY OPERATED CONTROLLER(S): As shown on Drawings. TBOS by Rainbird or approved equal with IP-68 rated waterproof case.

2.7 CONTROL WIRES

A. Connections between automatic controllers and the solenoid-operated electric control valves shall be made with direct burial copper wire 14- AWG-UF 600 volt (minimum size). Pilot wires shall be a color other than white, and shall be a different color for each automatic controller with wires sharing a common trench. Common wires shall be white in color, with a different color stripe for each controller with wiring sharing the same common trench. No stripe is required if multiple controller wiring is not present.

B. Size of wire shall conform to the remote control valve manufacturer's specification for control wire sizes, but in no case shall the control wire be smaller than #14. Runs over 2,000 lineal feet shall be #12- AWG-UF 600 volt copper wire.

C. All wire splices are to be made within a valve box, with a copper crimp-type connector, and a "3-M" #DBY splice kit.

D. Use continuous control wiring between controllers and remote control valves (no splices).

E. Provide polyurethane tag at valve solenoid control wire that shows the controller number and station number. Also refer to valve box lid identification.

F. Provide a spare control wire in each RCV box for future.

2.8 BUBBLER HEADS

A. As shown on drawings

2.9 QUICK COUPLER VALVES:

A. Quick coupler valves shall be as listed on the Drawings with 10" diameter box and lid similar to isolation valve box described below.

2.10 ISOLATION VALVE:

A. Valves 3 inches and smaller: 125 lb. WSP bronze gate valve with screw-in bonnet, non-rising stem and solid wedge disc, NIBCO T-113 K, or approved equal. Valves shall be line size.

2.12 DRIP IRRIGATION

A. Drip Manifold:

1. Pressure Regulator: Preset at 30 psi outlet pressure, 3/4" female threaded inlet and outlet, by RainBird, Torro or equal.

2. Emitters: Xeri-Bug (XB Series) by RainBird, Toro EZ Drip Series, or equal.

3. Flexible PVC: ASTM D2287 algae-resistant flexible PVC as recommended by manufacturer of Drip Emitters.

4. Drip tubing: Conform to A. S. A. E. standards for minimum inside diameter and wall thickness, Minimum 2% carbon black, Salco ¾" AR Drip PVC flexible drip hose, or equal.
5. ¾" Y-filter, 200 mesh.
6. Toro DL 2000 Air/Vacuum Relief Valves and In-line Spring Check Valves.
7. ¾" manual PVC ball valve with extra 3' of hose coiled in valve box.
8. Drip system in accordance with "RainBird Xerigation Low-Volume Landscape Irrigation Design Manual" and as shown on the drawings as required for a complete working system.

2.13 SUBSURFACE DRIP IRRIGATION:

- A. As specified herein and as shown on the drawings and in accordance with manufacturer's recommendations. Provide all miscellaneous valves, filters fittings etc. required for a complete, operable system including the following:
 1. Emitters shall be Toro DL 2000 Techline, in-line Teflon impregnated emitter with Netafim Automatic Flush Valves, Toro DL 2000 Air/Vacuum Relief Valves in accordance with "Toro DL-2000 Low-Volume Irrigation Bidding Specifications and Design Details" and as shown on the drawings as required for a complete working system.
- B. Drip Valve Assembly: Size valve box large enough and deep enough to contain assembly and allow convenient access and easy removal of filter screen. Position filter pointed down, approximately 45 degrees.
- C. Pressure regulator: Size regulator in accordance with flow rate. Do not over size. Use factory pre-set regulator at 30 PSI.

2.14 BOX FOR ISOLATION VALVE: 10" diameter plastic, Ametek, Brooks, Christy with bolt down lid marked "irrigation," or accepted equal. Avoid locating valve in paved areas. Provide H/20 Loading concrete box with bolt-down concrete lid if valve is located in paved area. Obtain location approval by Owner's Representative.

2.15 SWING JOINTS

- A. Sprinklers and Bubblers: Use Dura, Lasco or equal pre-assembled swing joints with O-rings.
- B. Quick Coupling Valve: Dura 1-inch 1-A2-1-11-18 pre-assembled swing joint with O-rings and Dura quick lock to receive stabilizing rod.

2.16 BACKFLOW PREVENTION DEVICE

- A. As required by Code and as shown on Drawings. Verify with Owner if Anti-freeze Jacket is required and provide as required.
- B. Riser assemblies from main line burial depth to backflow preventers shall be Schedule 40 brass pipe.
- C. All metallic pipe and fittings installed below grade shall be painted with two coats of Koppers #50 Bitumastic, or approved equal. Pipes may be wrapped with an approved asphaltic tape in lieu of the liquid-applied coating.

2.17 BACKFLOW PREVENTION DEVICE ENCLOSURE

- A. "Smooth Touch" enclosure without sharp edges, by Strong Box, available from V.I.T., Escondido, CA (800) 729-1314 or equal. Coordinate size of enclosure with plumbing for minimum clearance and size. Enclosure to include hasp and staple to receive padlock. Padlock N.I.C.

2.18 CONDUIT/SLEEVES

A. Sleeving shall be Schedule 40 PVC pipe sleeves and a minimum of two times the aggregate diameter of all pipes contained within the sleeve. Provide vertical sweep for all electrical conduit on each side of hardscape and terminate ends at 12" minimum depth and 12" from hardscape surface.

2.19 Y-STRAINER

A. "Y"-Strainer upstream of remote control valves, Brass, 100 mesh.

2.20 RCV IDENTIFICATION TAGS: Plastic or brass tags with valve number, approximately 2" by 2" with number imprinted, as accepted by Owner.

2.21 MISCELLANEOUS INSTALLATION MATERIALS

A. Solvent Cement and Primers for Solvent-weld Joints: Make and type approved by manufacturer(s) of pipe and fittings. Maintain cement proper consistency throughout use.

B. Pipe and Joint Compound: Permatex: Do not use on sprinkler inlet port.

2.22 MISCELLANEOUS EQUIPMENT/ACCESSORIES

A. Concrete For Thrust Blocks and Pads: Poured-in-place Class A concrete per Section 90 of the Caltrans Standard Specifications.

B. Sleeves and Conduits: See Drawings.

C. Key(s) for Quick-Coupling Valves:

1. Type: Same manufacturer as Quick-Coupling Valve.

2.22 OTHER EQUIPMENT: As shown on Drawings and required for a fully functional irrigation system.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Sleeves and Conduits: Verify that all installed sleeving and conduits are undisturbed and are free of defects or errors introduced by the work of other sections.

B. Water Meter/Water Pressure: Test and verify that existing water pressure is the minimum pressure at maximum system g.p.m. to operate the irrigation system as indicated on the drawings.

C. Stub-outs: Verify that all stub-outs to be provided under another contract are correctly sized, located and installed as noted on Drawings.

D. Notification: Submit written notification to Owner's Representative within ten (10) working days of above inspections describing all acceptable and non-acceptable site conditions.

3.2 CONNECTIONS TO SERVICES

A. Provide and coordinate connection to water meter.

B. Provide and coordinate connection of irrigation controller to electrical power source.

3.3 INSTALLATION

A. Install irrigation system components in accordance with this Section, with the Drawings, with the manufacturer's recommendations, and with established industry standards. The Contractor shall do nothing that may jeopardize any manufacturer warranty.

B. Conduits and Sleeves:

Coordination: Provide conduits and sleeves and coordinate installation with other trades.

Extent: Install conduits and sleeves where control wires and pipes pass under paving or through walls as shown on Drawings. Extend twelve inches (12") beyond edges of paving and walls and cap ends until ready for use.

C. Excavating and Trenching:

2. Dig trenches wide enough to allow a minimum of three inches (3") between parallel pipe lines. Provide a minimum cover from finish grade as follows:

D. Pipeline Assembly:

1. Install pipe and fittings in accordance with manufacturer's current printed Specifications.

2. Clean all pipes and fittings of dirt, scale and moisture before assembly.

3. Solvent-welded Joints for PVC Pipes:

a. Solvents: Use solvents and methods specified by pipe manufacturer.

b. Curing Period: Minimum of one (1) hour before applying any external stress on the piping and at least 24 hours before placing the joint under water pressure.

4. Threaded Joints for Plastic Pipes:

a. Use Permatex on all threaded PVC fittings except sprinkler heads and quick coupler valve ACME threads.

b. Joining: Use strap-type friction wrench only. Do not use metal-jawed wrench. Assemble finger tight plus one or two turns.

5. Laying of Pipe:

a. Bedding On-grade: Remove from trench all rocks or clods. Bed pipe in at least 2 inches of soil excavated from trench. Backfill on all sides of piping to provide a uniform bearing.

b. Snaking: Snake pipe from side to side of trench bottom to allow for expansion and contraction. Minimum allowance for snaking is one (1) additional foot per 100 ft. of pipe.

c. Moisture Restrictions: Do not lay PVC pipe when there is water in the trench. Do not assemble PVC pipe unless the pipe is dry.

E. Control Valves:

1. Install in valve boxes where shown on Drawings and group together where practical. Install box flush with finish grade, not necessarily level. If valve occurs in drainage swale, relocate out of drainage swale as approved by Owner's Representative.

2. Where two or more valves are installed adjacent to each other, provide at least six inches (6") separation. Align boxes in a row, perpendicular with pavement edge.

3. Permanently mark valve box lid with 2" black valve number and controller letter or with numbered metal tag inside box as approved by Owner's Representative.

4. Refer to control wiring for required spare wire in each valve box.

F. Install "Y"-Strainer upstream of remote control valves at backflow preventer.

G. Sprinkler Head Installation:

1. Bubblers:

a. Coordinate installation with planting contractor to insure timely and proper placement of heads at new planting.

H. Subsurface Irrigation

1. Install emitters at uniform 18 inches on center and 6 inches deep except where shown otherwise. Adjust spacing on slopes to prevent over watering at base of slopes. Install system in accordance with "Toro DL-2000 Low-Volume Irrigation Bidding Specifications and Design Details" and as shown on the Drawings as required for a complete working system.

2. Provide air/vacuum relief valves at all high points on systems.

3. Provide filter as shown and as recommended by emitters manufacturer.
4. Tape pipe ends during installation and do not allow dirt or debris to enter pipe.
5. Use emitter line with the specified emitter flow rate and emitter spacing. Assemble dripper line to allow water to flow continuously and directly, with no dead ends or dead end loops between control valve and flush valve.
6. Use fittings at sharp bends and do not allow dripper line to kink.
7. Install emitter line around perimeter of planter not more than 3 inches off edge for ground cover and turf, 18 inches maximum for shrub planting.
8. Adjust alternate rows so emitters are spaced in a triangular pattern.
9. Collect water from multiple dripper lines and convey the water to automatic line flush valve.
10. Install flush valve at end(s) of collector laterals so that entire system will flush and be free of dirt and debris.
11. Flush valves shall be open when water is turned on for the first time and after a break in the main or lateral lines. Extend collector lateral as required and locate flush valve at convenient accessible location.
12. Flush the systems weekly through the first month of the maintenance period.
13. Thoroughly saturate soil prior to planting. Provide additional surface watering as required to keep plant root systems moist during planting establishment period.
- I. Drip Irrigation:
 1. Install system in accordance with "RainBird Landscape Irrigation Design and Specifications Xerigation Products and Details" or equal and as shown on the Drawings as required for a complete working system.
 2. Install Toro DL 2000 Air/Vacuum Relief Valves at high points in system.
 3. Install manual PVC ball valve with extra 3' of hose coiled in valve box at end(s) of collector laterals so that entire system will flush and be free of dirt and debris.
- J. Battery-Operated Controller:
 1. General: Install per drawings and manufacturer's instructions.
 2. Use a legible reduced copy of the Record Drawing for the irrigation diagram clearly showing all valves operated by the controller, station, number, valve size, and type of planting irrigated. Color code area operated by each valve.
- K. Control Wiring:
 1. General: Install control wires in common trenches with sprinkler mains and laterals wherever possible. Lay to the bottom side of pipe line. Provide looped slack at valves. Snake wires in trench to allow for contraction of wires. Tie wires in bundles at 10 ft. intervals.
 2. Extra Length: Provide 30 inches (30") extra control wire at each remote control valve splice to facilitate the removal of the remote control bonnet to finish grade without cutting wires.
 3. Spare: Install one unconnected spare control wire running from the controller through each intermediate control valve box.
 4. Size: Minimum size of wire is to be determined strictly by the manufacturer's current printed specifications for remote control valves, but not smaller than #14.
 5. Detection Wire: Install a bare #12 copper wire or greater on top of the PVC supply line for the purpose of possible future mine detection search. Install the control wires on the bottom of the PVC supply line with electrical tape every ten feet (10').
 6. Splicing: Crimp control wire splices at remote control valves. Seal with specified splicing materials. In-line splices will be allowed only on runs exceeding 2500 feet and only in junction boxes.
- L. Closing of Pipe and Flushing of Lines:

1. Capping: Cap or plug all openings as soon as lines have been installed to prevent entrance of materials that would obstruct the pipe. Leave in place until removal is necessary for completion of installation.

M. Rain Shutoff Switch:

1. Install switch in area not affected by irrigation or rain shadow. Provide wires in rigid conduit as accepted by Owner's Representative.

N. Detection Wire and Warning Tape:

1. Install a bare # 12 copper wire or greater on top of the PVC supply line for the purpose of possible future mine detection search.

2. Install a continuous PVC irrigation mainline warning tape 12" above the supply line.

O. RCV IDENTIFICATION TAGS: Install in remote control valve box as recommended by manufacturer and as accepted by Owner's Representative.

1.4 MISCELLANEOUS EQUIPMENT

A. Install miscellaneous equipment with concrete footings, brackets, etc., as required and as recommended by manufacturer.

3.5 FIELD QUALITY CONTROL

A. Testing of Irrigation System:

1. Make hydrostatic tests with risers capped when welded PVC joints have cured at least 24 hours. Center load piping with backfill to prevent pipe from moving under pressure. Keep all couplings and fittings exposed.

2. Install two (2) pressure gauges at opposite ends of main line system. Pump system up to a minimum of 125 psi the day preceding the scheduled test and verify that pressure is holding. Inspect system early following day and immediately notify Owner's Representative if the test confirmation must be postponed.

3. Apply continuous static water pressure of 125 psi in accordance with Caltrans Standard Specifications Section 20-5.03H, except after a drop in pressure (5 psi maximum), then the pressure must stabilize and remain stable for a one (1) hour minimum period before acceptance of the test.

4. Leaks detected during tests shall be repaired and test repeated until system passes tests at no additional cost to Owner.

B. Adjustment of the System:

1. Flush and adjust all sprinkler heads for optimum performance and to prevent overspray onto walks, roadways and buildings. Adjust the arc and radius as applicable.

2. Include as a part of the work any nozzle changes or arc adjustments necessary due to daytime windy conditions during grass establishment period. After grass has been established and watering can be performed during calm early morning or evening hours, make any required adjustments to nozzles and arcs.

3. Set all sprinkler heads perpendicular to finished grades unless otherwise noted on the drawings.

4. When the landscape sprinkler system is completed and before planting, perform a coverage test in the presence of the Owner's Representative to determine if the water coverage for planting areas is adequate.

5. Test controllers individually in the presence of the Owner's Representative and the Landscape Architect. Demonstrate that all control valves operate electronically. Provide vehicles and radio equipment as necessary to expedite this process.

6. Demonstrate to Owner's Representative that irrigation scheduling programmed into controller is adequate for plant requirements without causing runoff, and that scheduling capacities of controller are utilized.

3.6 BACKFILL AND COMPACTING

- A. General: After system is operating and required tests and reviews have been made, backfill excavations and trenches with clean soil, free of debris.
- B. Backfill for All Trenches: Regardless of the type of pipe covered, compact to minimum 95% density under pavements and 85% under planted areas.
- C. Finishing: Dress off areas to finish grades. Re-dress any areas which subsequently settle.
- D. Owner's testing agency will test backfill compaction in areas under paving.

3.7 MAINTENANCE

- A. The entire sprinkler irrigation system shall be under full automatic operation for a period of 2 days prior to any planting.
- B. The Owner's Representative reserves the right to waive or shorten the operation period.
- C. Maintain/repair system for full duration of plant maintenance period.

3.8 REVIEWS PRIOR TO ACCEPTANCE

- A. Notify the Owner's Representative in advance for the following reviews, according to the time indicated:
 - 1. Supply line pressure test and control wire installation - 72 hours.
 - 2. Coverage and controller test - 72 hours.
 - 3. Final review - 7 days.
- B. No reviews will commence without record drawings, without completing previously noted corrections, or without preparing the system for review.

3.9 FINAL REVIEW AND CLEANUP

- A. Operate each system in its entirety for the Owner's Representative at time of final review. Any items deemed not acceptable by the Owner's Representative shall be reworked to the complete satisfaction of the Owner's Representative.
- B. Provide evidence to the Owner's Representative that the Owner has received all accessories and equipment as required before final review can occur.
- C. Final acceptance and start of warranty period will occur no earlier than the end of the plant maintenance period.
- D. For time of final review, Contractor shall arrange a meeting with the Owner's maintenance personnel to demonstrate the operation of the irrigation systems automatically in order to verify acceptance and to familiarize the maintenance personnel with the system and recommended programming.

4.0 MEASUREMENT AND PAYMENT. The contract prices paid on a square foot basis for irrigation shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved installing, setting up and testing the irrigation system, as shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer.

1.03 CONTRACTOR'S COST BREAKDOWN (NOT USED)

PART 2 - PRODUCTS (NOT USED) PART 3 -

EXECUTION (NOT USED)

SECTION 8. (BLANK)

SECTION 9. (BLANK)

SECTION 10. (BLANK)

SECTION 11. (BLANK)

***** END OF SECTION *****

