

**BID SCHEDULE I – GENERAL  
BUTTERFIELD BOULEVARD LINEAR PARK EXTENSION PROJECT**

**This Bid Schedule must be completed in ink and included with the sealed Bid Proposal.** Pricing must be provided for each Bid Item as indicated. Items marked “(SW)” are Specialty Work that must be performed by a qualified Subcontractor. The lump sum or unit cost for each item must be inclusive of all costs, whether direct or indirect, including profit and overhead. The sum of all amounts entered in the “Extended Total Amount” column must be identical to the Base Bid price entered in Section 1 of the Bid Proposal Form. Quantities shown are required for bid purposes and may or may not be final pay quantities. Actual quantities, if different, must be substantiated during the Project by the Contractor (either by field measurement, trucking tags, or other means acceptable to the Engineer).

AL = Allowance      CF = Cubic Feet      CY = Cubic Yard      EA = Each      LB = Pounds  
 LF = Linear Foot      LS = Lump Sum      SF = Square Feet      TON = Ton (2000 lbs)

Bid Item	Description of Bid Item	Approximate Quantity/Unit of Measure	Unit Price	Extended Total
1	Mobilization	LS		
2	SWPPP	LS		
3	Construction Area Traffic Control Devices	LS		
4	Clearing and Grubbing	LS		
5	Supplemental Work	LS	\$50,000	\$50,000
6	Cut/Fill	600 CY		
7	Net Import	625 CY		

Bid Schedule I Total	
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END OF BID SCHEDULE I

**BID SCHEDULE II – CONCRETE, ASPHALT PAVING, & DRAINAGE  
BUTTERFIELD BOULEVARD LINEAR PARK EXTENSION PROJECT**

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Bid Item	Description of Bid Item	Approximate Quantity/Unit of Measure	Unit Price	Extended Total
1	Concrete Sidewalk and Flatwork	6500 SF		
2	City Standard ADA Access Ramps	3 EA		
3	Curb and Gutter (1' Pan)	80 LF		
4	Curb and Gutter (2' Pan)	3500 LF		
5	Asphalt Concrete (Trail)	650 Ton		
6	Asphalt Concrete (Maintenance Road)	245 Ton		
7	Relocate Drain Inlet	5 EA		
8	Remove Drain Inlet and Install offset Curb Inlet over existing Box Culvert	2 EA		
9	1"x4" Header Board	17,200 LF		
10	Asphalt Concrete (Sidewalk)	65 Ton		
11	Asphalt Concrete (Roadway)	15 Ton		
12	Class II Aggregate Base (Trail)	430 CY		
13	Class II Aggregate Base (Trail Shoulder)	220 CY		
14	Class II Aggregate Base (Asphalt Concrete Sidewalk)	45 CY		

Bid Schedule II Total	
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END OF BID SCHEDULE II

## **11.50 Earthwork**

Earthwork shall conform to the Provisions in Section 19, "Earthwork," of the Caltrans Standard Specifications and these Special Provisions.

Surplus excavated material shall become the property of the Contractor and shall be disposed of in conformance with the Provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Caltrans Standard Specifications.

Where a portion of the existing surfacing is to be removed, the project area to be removed shall be cut on a neat line with a power-driven saw to a minimum depth of 0.17-foot before removing the surfacing.

**\* The existing Section along Butterfield Boulevard is approximately 5.5" Asphalt Concrete over 10" Class II Aggregate Base, Contractor to confirm existing street section prior to performing any subgrade preparation. \***

Full compensation for cutting the existing surfacing shall be considered as included in the contract price under Earthwork and no additional compensation will be allowed therefore.

### **SUBGRADE PREPARATION**

All subgrade soil in areas to receive engineered fill, roadway sections and street improvements should be scarified to a minimum depth of 8 inches, moisture conditioned and compacted to the recommendations given under "Engineered Fill Placement and Compaction." Prepared soil subgrade should be non-yielding when proof-rolled by a fully loaded water truck or equipment of similar weight.

Subgrade preparation should extend a minimum of 3 feet beyond the outermost limits of the proposed construction. After the subgrade has been properly prepared, the areas may be raised to design grades by placement of engineered fill.

Soil with moisture content above optimum value should be anticipated during and shortly after rainy seasons. Where unstable, wet or soft soil is encountered, the soil will require processing before compaction can be achieved. When the construction schedule does not allow for air-drying, other means such as lime treatment of the soil or excavation and replacement with suitable material may be considered. Geotextile fabrics may also be used to help stabilize the subgrade. The method used should be based on the actual site conditions.

### **MATERIALS FOR ENGINEERED FILL**

In general, on-site soils with an organic content of less than 3 percent by weight, free of any hazardous or deleterious materials, and meeting the gradation requirements below may be used as general engineered fill to achieve project grades, except when special material (aggregate base) is required.

In general, engineered fill material should not contain rocks or lumps larger than 3 inches in greatest dimension, should not contain more than 15 percent of the material larger than 1½ inches, and should contain at least 20 percent passing the No. 200 sieve. In addition to these requirements, import fill should have a low expansion potential as indicated by a Plasticity Index of 15 or less, or an Expansion Index of less than 20. **\*\* Additionally, prior to any materials imported to the project site, Contractor shall test materials using the San Francisco Bay Regional Water Quality Control Board (SFB-RWQCB) Environmental Screening Levels (ESLs) criteria and provide the City with a certified report \*\***

## **ENGINEERED FILL PLACEMENT AND COMPACTION**

Engineered fill should be placed on properly prepared soil subgrade. Engineered fill should be placed in horizontal lifts each not exceeding 8 inches in thickness and mechanically compacted to the recommendations below at the recommended moisture content. Relative compaction or compaction is defined as the in-place dry density of the compacted soil divided by the laboratory maximum dry density as determined by ASTM Test Method D1557, latest edition, expressed as a percentage. Moisture conditioning of soils should consist of adding water to the soils if they are too dry and allowing the soils to dry if they are too wet. Below is the recommended relative compaction.

Engineered fills consisting of expansive soils, including the on-site fat clay, should be compacted to between 87 and 92 percent relative compaction at moisture content between about 3 and 5 percent above the laboratory optimum value. In pavement areas, the upper 12 inches of subgrade soil should be compacted to a minimum of 95 percent relative compaction with moisture content between 2 and 5 percent above the optimum value.

Engineered fill consisting of soils of low expansion potential, including imported and “non-expansive” fill, should be compacted to a minimum of 90 percent relative compaction at moisture content between about 1 and 3 percent above the laboratory optimum value. In pavement areas, the upper 12 inches of subgrade soil should be compacted to a minimum of 95 percent relative compaction with moisture content between 1 and 3 percent above the optimum value.

Where fill is placed in new City street areas, a minimum of 24 inches below finished grade should be compacted to the recommendations above.

Fills placed on existing slope with an inclination of 5:1 (horizontal to vertical) or steeper should be keyed and benched into the existing slope. Toe keys should extend a minimum of 2 feet into competent material and have a width of 6 feet or 1 ½ times the width of the compaction equipment, whichever provides a wider excavation. Toe keys should slope towards their backs with a slope of at least 2 percent. Benches should be created by cutting a minimum of 6 feet into the existing slopes as the new fill is being placed. Vertical spacing of benches should not more than about 6 feet. Materials excavated from the benches can be mixed with the slope fill and the fill should be compacted to the requirements in this section.

**Measurement and Payment:** Full compensation for “Earthwork” shall be considered as included in the contract prices paid for in the contract prices per cubic yard paid for “Cut/Fill” and for “Net Import” and no additional compensation will be allowed therefore.

The contract price paid per cubic yard for “Cut/Fill” in **Bid Schedule I under Bid Item 6**, shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in excavation and placement of embankment for roadway construction, including removal of pavement and base materials, complete in place, as shown on the plans, and as specified in the Caltrans Standard Specifications and these Special Provisions.

The contract price paid per cubic yard for “Net Import” in **Bid Schedule I under Bid Item 7**, shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in removing and disposing of excess dirt outside the project limits, as shown on the plans, and as specified in the Caltrans Standard Specifications and these Special Provisions.

## 14.00R Class 2 Aggregate Base

a. Description. Aggregate base shall be Class 2 and shall conform to the provisions in Section 26, "Aggregate Bases," of the CSS and these Technical Provisions. Aggregate base shall be compacted to 90% RC under sidewalk and 95% RC at all other locations.

b. Measurement and Payment. The contract unit prices paid per Cubic Yards for "Class II Aggregate Base (Trail)" shall be included in the **Bid Schedule II**, under **Bid Item 12**, and include full compensation for furnishing all labor, material, equipment, tools, and all other incidentals for doing all work involved in furnishing and placing Class II Aggregate Base, complete in place, including excavation, disposal, compaction, quality control, staged construction, temporary conforms, traffic control, flagging, k-rails, temporary striping and delineation, prime coats, tack coats, and paint binders, as specified herein and as directed by the Engineer.

The contract unit prices paid per Cubic Yards for "Class II Aggregate Base (Trail Shoulder)" shall be included in the **Bid Schedule II**, under **Bid Item 13**, and include full compensation for furnishing all labor, material, equipment, tools, and all other incidentals for doing all work involved in furnishing and placing Class II Aggregate Base, complete in place, including excavation, disposal, compaction, quality control, staged construction, temporary conforms, traffic control, flagging, k-rails, temporary striping and delineation, prime coats, tack coats, and paint binders, as specified herein and as directed by the Engineer.

The contract unit prices paid per Cubic Yards for "Class II Aggregate Base (Asphalt Concrete Sidewalk)" shall be included in the **Bid Schedule II**, under **Bid Item 14**, and include full compensation for furnishing all labor, material, equipment, tools, and all other incidentals for doing all work involved in furnishing and placing Class II Aggregate Base, complete in place, including excavation, disposal, compaction, quality control, staged construction, temporary conforms, traffic control, flagging, k-rails, temporary striping and delineation, prime coats, tack coats, and paint binders, as specified herein and as directed by the Engineer.

Full compensation for Class II Aggregate Base for all other items not listed under this section is included in the contract items of work involved and no additional compensation will be allowed therefor.

**15.00R Asphalt Concrete**

a. Description: Asphalt concrete shall be used as an asphalt pavement trail and street pavement section. New pavement shall be furnished, placed, and compacted in accordance with Section 39 "Asphalt Concrete" of the CSS and the top lift shall contain **no Reclaimed Asphalt Pavement (RAP)**. Asphalt Concrete shall be compacted to a minimum 95 percent of Maximum Theoretical Density as determined by American Society of Testing Materials (ASTM) D-2041. Finished asphalt concrete pavements, which do not conform to the specified relative compaction requirements, will be paid for using the following pay factors:

<u>In-Place Relative Compaction</u>	<u>Pay Factor</u>
95% or greater	100%
90-94.9%	20% Reduction in unit price
89.9% or less	Remove & Replace as directed

b. Materials: The asphalt concrete for overlay shall be Type A, 12.5 mm (1/2") medium maximum gradation with.

Asphalt binder shall be PG 64-10.

Asphalt shall conform to these Technical Provisions and not Section 92, "Asphalts," of the CSS.

Asphalt shall consist of refined petroleum or a mixture of refined liquid asphalt and refined solid asphalt, prepared from crude petroleum. Asphalt shall be:

- A. Free from residues caused by the artificial distillation of coal, coal tar, or paraffin.
- B. Free from water.
- C. Homogeneous.

The Contractor shall furnish asphalt in conformance with Caltrans' "Certification Program for Suppliers of Asphalt." Caltrans maintains the program requirements, procedures, and a list of approved suppliers at:

<http://www.dot.ca.gov/hq/esc/Translab/fpmcoc.htm>

The Contractor shall ensure the safe transportation, storage, use, and disposal of asphalt. The

Contractor shall prevent the formation of carbonized particles caused by overheating asphalt during manufacturing or construction.

Performance graded (PG) asphalt binder shall conform to the following:

## Performance Graded Asphalt Binder

Property	AASHTO Test Method	Specification Grade				
		PG 58-22 <sup>a</sup>	PG 64-10	PG 64-16	PG 64-28	PG 70-10
Original Binder						
Flash Point, Minimum °C	T48	230	230	230	230	230
Solubility, Minimum % <sup>b</sup>	T44	99	99	99	99	99
Viscosity at 135°C, <sup>c</sup> Maximum, Pa·s	T316	3.0	3.0	3.0	3.0	3.0
Dynamic Shear, Test Temp. at 10 rad/s, °C Minimum G*/sin(delta), kPa	T315	58 1.00	64 1.00	64 1.00	64 1.00	70 1.00
RTFO Test <sup>e</sup> , Mass Loss, Maximum, %	T240	1.00	1.00	1.00	1.00	1.00
RTFO Test Aged Binder						
Dynamic Shear, Test Temp. at 10 rad/s, °C Minimum G*/sin(delta), kPa	T315	58 2.20	64 2.20	64 2.20	64 2.20	70 2.20
Ductility at 25°C Minimum, cm	T51	75	75	75	75	75
PAV <sup>f</sup> Aging, Temperature, °C	R28	100	100	100	100	110
RTFO Test and PAV Aged Binder						
Dynamic Shear, Test Temp. at 10 rad/s, °C Minimum G*/sin(delta), kPa	T315	22 <sup>d</sup> 5000	31 <sup>d</sup> 5000	28 <sup>d</sup> 5000	22 <sup>d</sup> 5000	34 <sup>d</sup> 5000
Creep Stiffness, Test Temperature, °C Maximum S-value, MPa Minimum M-value	T313	-12 300 0.300	0 300 0.300	-6 300 0.300	-18 300 0.300	0 300 0.300

## Notes:

- a. For use as asphalt rubber base stock for high mountain and high desert area.
- b. The Engineer will waive this specification if the supplier is a Quality Supplier as defined by the Caltrans' "Certification Program for Suppliers of Asphalt."
- c. The Engineer will waive this specification if the supplier certifies the asphalt binder can be adequately pumped and mixed at temperatures meeting applicable safety standards.
- d. Test the sample at 3°C higher if it fails at the specified test temperature. G\*/sin(delta) shall remain 5000 kPa maximum.
- e. "RTFO Test" means the asphaltic residue obtained using the Rolling Thin Film Oven Test, AASHTO Test Method T240 or ASTM Designation: D 2827.
- f. "PAV" means Pressurized Aging Vessel.

Performance based asphalt (PBA) binder shall conform to the following:

## Performance Based Asphalt Binder

Property	AASHTO Test Method	Specification Grade			
		PBA 6a	PBA 6a(mod)	PBA 6b	PBA 7
Absolute Viscosity (60°C), Pa·s(x10 <sup>-1</sup> ) <sup>a</sup> Original Binder, Minimum RTFO Test Aged Residue <sup>b</sup> , Minimum	T202	2000 5000	2000 5000	2000 5000	1100 3000
Kinematic Viscosity (135°C), m <sup>2</sup> /s(x10 <sup>-6</sup> ) Original Binder, Maximum RTFO Test Aged Residue, Minimum	T201	2000 275	2000 275	2000 275	2000 275
Absolute Viscosity Ratio (60°C), Maximum RTFO Test Visc./Orig. Visc.	—	4.0	4.0	4.0	4.0
Flash Point, Cleveland Open Cup, °C Original Binder, Minimum	T48	232	232	232	232
Mass Loss After RTFO Test, %	T240	0.60	0.60	0.60	0.60
Solubility in Trichloroethylene, % <sup>c</sup> Original Binder, Minimum	T44	Report	Report	Report	Report
Ductility (25°C, 5 cm/min), cm RTFO Test Aged Residue <sup>b</sup> , Minimum	T51	60	60	60	75
On RTFO Test Aged Residue, °C 1 to 10 rad/sec: SSD <sup>e</sup> ≥ 0 and Phase Angle (at 1 rad/sec) < 72°	<sup>f</sup>	—	35	—	—
On Residue from: PAV <sup>g</sup> at temp., °C Or Residue from Tilt Oven <sup>f</sup> (@113°C), hours	R28	100 36	100 36	100 36	110 72
<sup>e</sup> SSD ≥ -115(SSV)-50.6, °C	<sup>f</sup>	—	—	—	25
Stiffness, Test Temperature, °C Maximum S-value, MPa Minimum M-value	T313	-24 300 0.300	-24 300 0.300	-30 300 0.300	-6 300 0.300

## Notes:

- Absolute viscosity (60°C) will be determined at one sec<sup>-1</sup> using ASTM Designation: D 4957 with Asphalt Institute vacuum capillary viscometers.
- "RTFO Test Aged Residue" means the asphaltic residue obtained using the Rolling Thin Film Oven Test (RTFO Test), AASHTO Test Method T240 or ASTM Designation: D 2827.
- There is no requirement; however results of the test shall be part of the copy of test results furnished with the Certificate of Compliance.
- "Residue from Tilt Oven" means the asphalt obtained using California Test 374, Method B, "Method for Determining Asphalt Durability Using the California Tilt-Oven Durability Test."
- "SSD" means Shear Susceptibility of Delta; "SSV" means Shear Susceptibility of Viscosity.
- California Test 381.
- "PAV" means Pressurized Aging Vessel.

The Contractor shall provide a sampling device in the asphalt feed line connecting the plant storage tanks to the asphalt weighing system or spray bar. The sampling device shall be accessible between 600 and 750 mm above the platform. The Contractor shall provide a receptacle for flushing the sampling device.

The sampling device shall include a valve:

- 1 With a diameter between 10 and 20 mm.

- 2 Manufactured in a manner that a one-liter sample may be taken slowly at any time during plant operations.
- 3 Maintained in good condition.

The Contractor shall replace failed valves.

**Aggregate base** must comply with Section 26, "Aggregate Bases," of the Standard Specifications and these Technical Specifications. Aggregate base must be Class 2.

In the presence of the Engineer, the Contractor shall take 2 one-liter samples per operating day.

The Contractor shall provide round friction top containers with one-liter capacity for storing samples.

Unless otherwise specified, the Contractor shall heat and apply asphalt in conformance with the provisions in Section 93, "Liquid Asphalts."

The Contractor shall apply paving asphalt at a temperature between 120° and 190°C. The Engineer will determine the exact temperature of paving asphalt.

c. **Paint Binder (Tack Coat):** Paint binder shall be applied to all horizontal and vertical surfaces to receive asphalt concrete surfacing. Paint binder shall be furnished and applied in accordance with Section 39-4.01, "Subgrade", Section 93 "Liquid Asphalts", and Section 94 "Asphaltic Emulsions".

d. **Measurement and Payment:** The contract unit prices paid per ton for "Asphalt Concrete (Trail)" shall be included in the **Bid Schedule II**, under **Bid Item 5**, and include full compensation for furnishing all labor, material, equipment, tools, and all other incidentals for doing all work involved in furnishing and placing Street Pavement Section, complete in place, including saw cutting, excavation, disposal, asphalt, compaction, quality control, staged construction, temporary conforms, traffic control, flagging, k-rails, temporary striping and delineation, prime coats, tack coats, and paint binders, as specified herein and as directed by the Engineer.

The contract unit prices paid per ton for "Asphalt Concrete (Maintenance Road)" shall be included in the **Bid Schedule II**, under **Bid Item 6**, and include full compensation for furnishing all labor, material, equipment, tools, and all other incidentals for doing all work involved in furnishing and placing Street Pavement Section, complete in place, including saw cutting, excavation, disposal, asphalt, compaction, quality control, staged construction, temporary conforms, traffic control, flagging, prime coats, tack coats, and paint binders, as specified herein and as directed by the Engineer.

The contract unit prices paid per ton for "Asphalt Concrete (Sidewalk)" shall be included in the **Bid Schedule II**, under **Bid Item 10**, and include full compensation for furnishing all labor, material, equipment, tools, and all other incidentals for doing all work involved in furnishing and placing Street Pavement Section, complete in place, including saw cutting, excavation, disposal, asphalt, compaction, quality control, staged construction, temporary conforms, traffic control, flagging, k-rails, temporary striping and delineation, prime coats, tack coats, and paint binders, as specified herein and as directed by the Engineer.

### **16.00R Street Pavement Section (6" Asphalt over existing Class II Aggregate Base)**

a. Description: Areas shown on the plans shall be excavated and reconstructed with 6 inches of asphalt concrete over existing baserock per Caltrans Section 19-Earthwork.

The AC shall be placed in two or three lifts with the uppermost lift of not less than 0.15 ft. or more than 0.20 ft.

The Contractor shall make all arrangements for disposal of excavated materials. All edges shall be saw-cut unless otherwise approved by the Engineer. Asphalt concrete in repair sections shall be placed in lifts in accordance with Section 39-6 "Spreading and Compacting". Removed materials shall be disposed of legally.

**Aggregate base** must comply with Section 26, "Aggregate Bases," of the Standard Specifications and these Technical Specifications. Aggregate base must be Class 2.

Do not store reclaimed asphalt concrete or aggregate base with reclaimed asphalt concrete within 100 feet measured horizontally of any culvert, watercourse, or bridge.

**Asphalt Concrete** must comply with Section 39 and City standard specifications.

The material remaining in place, after removing surfacing and base, to the required depth, shall be graded to a plane, watered and compacted to 95 percent relative compaction. After compaction and prior to the placing of asphalt concrete, the vertical edges of the existing pavement shall receive a tack coat. The finished surface of the remaining material shall not extend above the grade established by the Engineer.

b. Asphalt Material: The asphalt concrete for top/final lift shall be Type A, 12.5 mm (½") medium maximum gradation, in accordance with CSS. Base course shall be type A, ¾" max gradation. Asphalt binder shall be PG 64-10. **No percentage of RAP (Reclaimed Asphalt Pavement) shall be permitted in the asphalt concrete placed as the final lift/wearing course on the project.**

#### C. Measurement and Payment:

- The contract unit prices paid per ton for "Asphalt Concrete (Roadway)" shall be included in the **Bid Schedule II**, under **Bid Item 11**, and include full compensation for furnishing all labor, material, equipment, tools, and all other incidentals for doing all work involved in furnishing and placing Street Pavement Section, complete in place, including saw cutting, excavation, disposal, aggregate base, asphalt, compaction, quality control, staged construction, temporary conforms, traffic control, flagging, k-rails, temporary striping and delineation, prime coats, tack coats, and paint binders, as specified herein and as directed by the Engineer.

### **23.00R Irrigation and Planting**

#### 1.00 DESCRIPTION OF WORK

Furnish all labor, material, equipment, labor, tools, and incidentals necessary for the provision and installation of the irrigation system and street trees as shown on the Plans and as specified in this Section and per City Standard details.

#### 1.01 QUALITY ASSURANCE

- A. Quality: Minimum quality of all plant material shall conform to prevailing published specifications of the California Association of Nurserymen and the American Association of Nurserymen unless otherwise indicated. Additional specifications shall be indicated on the Plans.

#### 1.02 SUBMITTALS

- A. General: Within fourteen (14) days after Notice to Proceed submit the following:
1. Documentation certifying quantity and species of plant material ordered, the nursery supplier(s), *any* plant material not available at that time, or proposed substitutions to be reviewed.
  2. Product data on all associated planting products specified herein.
  3. 4-ounce sample of mulch.

#### 1.03 REVIEWS

- A. Contractor shall specifically request at least (5) five days in advance the following review prior to progressing with the work:
1. Intermediate Review – plant material approval and layout/locations.

### **PART II - PRODUCTS**

#### 2.01 GENERAL

- A. Reference the plans and specifications for the irrigation necessary for the trees to be planted and future trees. Note the quantities provided (to be verified by contractor).
- 2" schedule 80 main irrigation line – 4800 lineal feet
  - 1" schedule 40 lateral irrigation line – 6200 lineal feet
  - 31 – 1" quick coupling valve (Rainbird Model 44RC or approved equal)
  - 9 – 1" ball valve (Spears 2622-010 or approved equal)
  - 212 – 1" bubbler (Toro FB50PC or approved equal)
  - 15 - Control Valve (1" Hunter NODE Series Battery-Operated Remote Control Valve)
  - ~~3 – 10 lineal feet of 2" HDPE pipe for sleeving under sidewalk~~
- B. Nomenclature and Labels: Plant botanical names conform to "Standardized Plant Names," second edition, and secondly, "A Checklist of Woody Ornamental Plants of California,

“Manual 32, University of California. All plants of each clone, species, and cultivar shall be delivered to the site labeled with their full botanical name. Every plant species shall be labeled with no less than one label for every ten plants of a species.

- C. Quantities: The quantities shown on the plant list and in labels are for the Engineer's use and are not to be construed as the complete and accurate limits of the Contract. Contractor shall furnish and install all plants shown schematically on the Plans.
- D. Root Systems: All container-grown stock shall be grown in its container for at least six months prior to its planting. Contractor shall allow one percent of the quantity of plants for removal and inspection. Any plant material, within two years following the final acceptance of the project, determined by the Engineer to be defective, restricted, declining or otherwise deficient due to abnormal root growth, shall be replaced by the Contractor, to the equal condition of the adjacent plants, at the time of replacement.
- E. Health: Foliage, roots and stems of all plants shall be of vigorous health and normal habit of growth for its species. All plants/trees shall be free of all disease, insect stages, burns or disfiguring characteristics.

## 2.02 TREES

- A. All trees shall be 15 gallon unless noted otherwise, and have straight trunks of uniform taper, larger at the bottom. Trunks shall be free of damaged bark, with all minor abrasions and cuts showing healing tissue. Sucker basal growth and lateral growth shall be removed and treated to eliminate re-sprouting. Normal lower side branching shall remain. Trees unable to stand upright without support shall be rejected. **Install trees per City Standard Detail L-16.**

## 2.03 MULCH

Shall be **3 inch thick**, chipped wood product such as cedar or redwood chips greater than **3/4 inch and less than 1 inch in length**, and no more than 1/2 inch thick, and shall contain less than 1% foreign matter including soil, weeds, seeds, etc. by dry weight.

## PART III - EXECUTION

### 3.01 GENERAL

- A. Plant Material Approvals: Before planting operations commence, all plant material shall be reviewed by the Engineer. Defective plants shall be removed from the site and acceptable material substituted in its place. The review does not accept defective plants/trees which may be installed.
- B. Layout: Only those plants/trees to be planted in any single day should be laid out. Locations of all plants/trees shall be reviewed prior to planting. Plants/trees installed without this review may be transplanted/relocated as directed by the Engineer.
- C. Protection of Plants/trees: Contractor shall maintain all plant/tree material in a healthy growing condition prior to and during planting operation. Contractor shall be responsible

for vandalism, theft, and damage to plant/tree material until commencement of the maintenance period.

- D. Pruning: Contractor shall do no pruning without specific authorization of the Engineer. Plants/trees pruned without authorization shall be replaced by the Contractor if necessary.

### 3.02 SOIL PREPARATION

Verify suitability of soil to produce viable planting soil. Clean soil of roots, plants, sod, stones, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth. Mix soil with the following soil amendments and fertilizers in the following quantities to produce planting soil:

- Ratio of Loose Compost to Topsoil by Volume: 1:2 All planted areas shall be cultivated to a light and friable consistency, thereupon the following material per 1,000 square feet shall be uniformly tilled into the top 12" to 18" of soil, using a rototiller or similar machine, and then thoroughly watered down.
- Existing planting areas shall be cultivated with hand tools.
  - 6 cu. yds. - Nitrogen stabilized sawdust (soil amendment)
  - 25 lbs - Fertilizer (A)
  - 10 lbs - Iron sulfate
- Prepared soil mix for backfill in pits for trees shall consist of the following:
  - 1/3 yd - Nitrogen stabilized sawdust (soil amendment)
  - 2/3 yd.- Native Soil
  - 1 lb. Iron sulfate
  - Fertilizer (C) as follows:
    - ~~1 gal: 1 tab~~
    - ~~5 gal: 2 tabs~~
    - ~~10 gal: 4 tabs~~
    - Boxed Plants: 6-8 tabs.

- PLANTING AREA ESTABLISHMENT
  - Loosen sub grade of planting areas to a minimum depth of 6 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
    - Apply fertilizer directly to sub grade before loosening.
    - Thoroughly blend planting soil off-site before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil.
  - Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.
- EXCAVATION FOR TREES
  - Planting Pits and Trenches: Excavate circular planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are not acceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
    - Excavate approximately three times as wide as ball diameter.
    - Excavate at least 12 inches wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
    - Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
  - Subsoil and topsoil removed from excavations may be used as planting soil if amended as described.
- TREE PRUNING
  - Remove only dead, dying, or broken branches. Do not prune for shape.
  - Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.

### 3.03 TREE INSTALLATION

- A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1.

Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.

Set stock plumb and in center of planting pit or trench with root flare 2 inches (50 mm) above adjacent finish grades.

- Use planting soil for backfill.
  - Balled and Burlapped: After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
  - Carefully remove root ball from container without damaging root ball or plant.
  - Fabric Bag-Grown Stock: Carefully remove root ball from fabric bag without damaging root ball or plant. Do not use planting stock if root ball is cracked or broken before or during planting operation.
  - Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
  - Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
  - Continue backfilling process. Water again after placing and tamping final layer of soil.
- Bare-Root Stock: Set and support bare-root stock in center of planting pit or trench with root flare 2 inches adjacent finish grade.
    - Use planting soil for backfill.
    - Spread roots without tangling or turning toward surface, and carefully work backfill around roots by hand. Puddle with water until backfill layers

are completely saturated. Plumb before backfilling and maintain plumb while working backfill around roots and placing layers above roots.

- Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside soil-covered roots about 1 inch from root tips; do not place tablets in bottom of the hole or touching the roots.
- Continue backfilling process. Water again after placing and tamping final layer of soil.
- When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

#### 3.04 PLANT MAINTENANCE

- The contractor is to make all repairs and maintain the entire sprinkler system from the time of installation through the landscape maintenance period of sixty days.
- Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.
- Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.
- Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use practices to minimize the use of pesticides and reduce hazards.
- Apply pesticides and other chemical products and biological control agents in accordance with authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
- Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

#### 3.05 CLEAN UP

- A. After completion of all operations, Contractor shall remove all trash, excess soil and other debris. All walks, walls, and pavement shall be swept and washed clean. Leave the entire area in a neat, orderly condition.

### 3.06 MEASUREMENT AND PAYMENT

- a. The contract lump sum paid for irrigation system including excavation, backfill, all necessary materials, shall be included in the **Bid Schedule IV, Bid Item 3**, and include full compensation for furnishing all labor, material, equipment, tools, and incidentals, for all work involved as specified in this Section, as shown on the Drawings, and as directed by the Engineer, and no separate payment shall be made.
- b. The Contract unit price paid for each tree installation including excavation, backfill, fertilizer, staking, shall be included in the **Bid Schedule IV, Bid Item 4-8**, and include full compensation for furnishing all labor, material, equipment, tools, and incidentals, for all work involved as specified in this Section, as shown on the Drawings, and as directed by the Engineer, and no separate payment shall be made.
- c. The Contract unit paid per cubic yard for the installation of mulch shall be included in **Bid Schedule IV, Bid Item 9**, and include full compensation for furnishing all labor, material, equipment, tools, and incidentals, for all work involved as specified in this Section, as shown on the Drawings, and as directed by the Engineer, and no separate payment shall be made.