

SECTION 32 90 00
PLANTING

PART 1 - GENERAL

1.01 GENERAL PROVISIONS:

- A. Work Included: Provide labor, materials, and equipment necessary to complete work of this Section, and without limiting the generality thereof furnish and install the following:
1. Planting of trees and shrubs.
 - a. the term "Plants" as used herein refers to trees, shrubs and ground cover except as otherwise indicated.
 2. Fine grading.
 3. Topsoil, including placing, spreading, furnishing of additional topsoil from off-site as required.
 4. Includes tree planting in Stormwater Box Filter and shrub planting in bio-filter as indicated on the plans and details.
- B. Planting List: A complete list of plants, including schedule of sized, and other requirements, is shown on Drawings. In the event that material omissions occur in the Plant List, the planting plans shall govern.
- C. Related Work Specified Elsewhere:
1. Subgrade Elevations: Excavation, backfilling, and grading required to establish elevations as indicated: SECTION 31 22 00 – EXCAVATION.
 - a. Fine cutting and grading are included under this SECTION 32 90 00.

1.03 QUALITY ASSURANCE; SUBMITTALS:

- A. General: Comply with requirements of SECTION 01 40 00 - QUALITY ASSURANCE; SUBMITTALS.
- B. Subcontracting: For coordination purposes subcontract planting and seeding work to a single firm specializing in both categories of work.

NOTE: Placing and spreading of topsoil, furnishing of topsoil from off site as required, is specifically made part of the landscape subcontract.

- C. Source Quality Control:
1. General: Ship planting materials with certificates of inspection required by specifications and governing authorities. Comply with regulations applicable to landscape materials.
 2. Do not make substitutions. If specified material is not obtainable, submit non-availability to Architect, together with proposal for use of equivalent material. When authorized, adjustment of contract amount will be made.

3. Analysis and Standards: Package standard products with manufacturers certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists, wherever applicable.
 4. Imported Topsoil: Before delivery of imported topsoil, furnish Architect with written statement giving location of properties from which topsoil is to be obtained, names and addresses of owners, depth to be stripped, crops grown during past 2 years.
 5. Topsoil Testing: Provide soils testing by an approved soil testing laboratory, for both existing stockpiled topsoil and any topsoil imported from other sources. Submit the following materials certification for each source of topsoil used:
 - a. pH Factor.
 - b. Mechanical Analysis.
 - c. Percentage of Organic Content.
 - d. Gradation analysis
 - e. Recommendations on type and quantity of additives required to establish satisfactory pH factor, proper drainage characteristics, and supply of nutrients to bring topsoil to satisfactory level for planting.
 6. Plants: Provide plants of quantity, size, genus, species, and variety shown and scheduled for landscape work and complying with recommendations and requirements of ANSI Z60.1 "American Standard for Nursery Stock". Provide healthy, vigorous stock, grown in recognized nursery in accordance with good horticultural practice and free of disease, insects, eggs, larvae and defects such as knots, sun-scald, injuries, abrasions, or disfigurement.
 - a. Label each tree with securely attached waterproof tag bearing legible designation of botanical and common name.
 - b. Label at least one shrub and ground cover plant of each variety with a securely attached waterproof tag bearing legible designation of botanical and common name.
 - c. Where formal arrangements or consecutive order of trees or shrubs are shown, select stock for uniform height and spread, and label with number to assure symmetry in planting.
 7. Sizes: Provide plants of sizes shown or specified. Trees of larger size may be used if acceptable to Architect, and if sizes of roots or balls are increased proportionately.
 8. Climate: Provide plants grown in similar climate and environmental conditions as Project Site.
- D. Inspection: Architect may inspect plants either at place of growth or at site before planting, for compliance with requirements for genus, species, variety, size and quality. Architect retains right to further inspect plants for size and condition of balls and root systems, insects, injuries and latent defects, and to reject unsatisfactory or defective material at any time during the progress of work. Remove rejected plants immediately from Project site.
- E. Certification: Submit certificates of inspection as required by Contract Documents and governmental authorities.
1. Provide written certification of place of growth to Architect.
- F. Materials Samples: Submit following material samples: Mulch
- G. Planting Schedule: Submit proposed planting schedule, indicating dates for each type of landscape work during normal seasons for such work in area of site. Correlate with specified maintenance periods to provide maintenance from date of substantial completion. Once accepted,

revise dates only as approved in writing, after documentation of reason for delays.

- H. Maintenance Instruction: Submit typewritten instructions recommending procedures to be established by Owner for maintenance of landscape work for one full year. Submit prior to expiration of required maintenance period(s).

1.04 DELIVERY, STORAGE AND HANDLING:

- A. Packaged Materials: Deliver packaged materials in original, unopened and undamaged containers showing weight, analysis and name manufacturer. Protect materials from deterioration during delivery, and while stored at site.
- B. Plants: Provide freshly dug or established container grown plants. Spray deciduous plants in foliage with an approved anti-desiccant immediately after digging to prevent dehydration. Do not prune prior to delivery unless otherwise approved by Architect. Do not bend or bind-tie plants in such a manner as to damage bark, break branches or destroy natural shape. Provide protective covering during delivery. Do not drop balled and burlapped stock during delivery.
1. Deliver plants after preparations for planting have been completed and plant immediately. If planting is delayed more than 6 hours after delivery, set plants in shade, protect from weather and mechanical damage, and keep roots moist by covering with mulch, burlap or other acceptable means of retaining moisture.
 2. Do not remove container grown stock from containers until planting time.
- C. Topsoil: Provide only dry, loose topsoil complying with requirements for planting mixes. Frozen or muddy topsoil will not be permitted.

1.05 JOB CONDITIONS:

- A. General: Proceed with and complete landscape work as rapidly as portions of site become available, working within seasonal limitations for each kind of landscape work required.
- B. Utilities: Determine location of underground utilities and perform work in a manner which will avoid possible damage. Hand excavate, as required. Maintain grade stakes set by others until removal is mutually agreed upon by parties concerned.
1. Do not plant within 4 feet of utility lines unless approved by Architect.
- C. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, bedrock, adverse drainage conditions, or obstructions, notify Architect before planting.
- D. Planting Season: Unless variance is requested in writing and approved by Architect, perform planting during only during following periods:
1. Planting: April 15 to July 1, August 15 to November 15.
- E. Coordination with Lawns: Commence planting after final grades are established and prior to planting lawns, unless otherwise acceptable to Architect. If planting occurs after lawn work, protect lawn areas and promptly repair damage to lawns resulting from planting operations.

1.06 SPECIAL PROJECT WARRANTY:

- A. Planting: Warranty plants for a period of one year after date of substantial completion of planting work, against defects including death and unsatisfactory growth.

- B. Warranty shall not include damage or loss of plants caused by fires, floods, freezing rains, lightning storms, or winds over 75 miles per hour, winter kill caused by extreme cold and severe winter conditions not typical of planting area; acts of vandalism or negligence on part of Owner.
- C. Replace, in accordance with Drawings and Specifications, all plants that are dead or, as determined by Architect, are in an unhealthy or unsightly condition, and have lost their natural shape due to dead branches, or other causes due to the Contractor's negligence during or at the termination of warranty period. Such replacement(s) shall be at no cost to Owner.
 - 1. Plants shall be free of dead branches and dead branch tips and shall bear foliage of a normal density, size and color.
 - 2. Make necessary repairs to grades, lawn areas and paving required because of plant replacements. Such repairs shall be done at no cost to Owner.
 - 3. Warranty of replacement plants shall extend for an additional period of one year from date of their acceptance after replacement. If replacement plants are not acceptable during, or at end of extended warranty period, Owner may elect subsequent replacement or credit for each item.

PART 2 - PRODUCTS

2.01 PRODUCTS

- A. General: Topsoil may be available on site for re-use in landscape work. If sufficient quantity of topsoil is not available, Contractor shall provide topsoil as required to complete landscape work.
- B. Topsoil Material: Fertile, friable, natural topsoil of loamy character, without admixture of subsoil material, obtained from a well-drained arable site, reasonably free from clay, lumps, coarse sands, stones, plants, roots, sticks, and other foreign materials greater than 1" in any dimension, with acidity range of between pH 5.0 and 7.0, and shall contain not less than 8% organic matter by weight as determined by loss on ignition of moisture-free samples dried at 65 degrees C.
 - 1. Use only topsoil which is representative of topsoil soil test report as specified under Paragraph QUALITY ASSURANCE; SUBMITTALS.
 - 2. Obtain topsoil only from local sources or from areas having similar soil characteristics to that found at project site. Obtain topsoil only from naturally, well-drained sites where topsoil occurs in a depth of not less than 4 inches; do not obtain from bogs or marshes.
 - a. Use only material from sources identified to and approved by Architect, and listed in the topsoil soils test report.
 - b. Topsoil, whether stripped or imported from off-site shall be a sandy loam or loam soil as defined by the USDA Soil Conservation Service, Soil Classification System, and have the following mechanical analysis:

Textural Class	% of Total Weight	Average %
Sand (0.05- 2.0 mm)	45 to 75%	60%
Silt (0.002- 0.05 mm)	15 to 35%	25%
Clay (< 0.002 mm)	5 to 25%	15%
 - c. 95% Of all topsoil shall pass a 2.0 mm sieve.
 - d. All topsoil shall be screened using a 3/8" screen.

2.02 SOIL AMENDMENTS:

- A. Fertilizer: Provide a complete fertilizer and a standard product complying with the State and United States fertilizer laws. Deliver to site in original unopened containers which shall bear the manufacturer's name and guaranteed statement of analysis. At least 40 percent by weight of the nitrogen content of fertilizer shall be derived from organic materials.
1. For plants, provide fertilizer with not less than 5% total nitrogen, 10% available phosphoric acid and 16% soluble potash, with coloring agent.
 2. Provide fertilizer material that is completely soluble in water.
 3. Slow Release Fertilizers: Provide slow release fertilizers contained in perforated polyethylene bag with microporous holes, each containing 4 ounces of water soluble fertilizer effective for eight years, containing following:
 - a. Nitrogen: 25 percent.
 - b. Phosphate: 10 percent.
 - c. Potash: 5 percent.
 - d. Product: one of the following; or approved equal:
 - (1) Agriform Planting Tablets, by Sierra Chemical Co., Milpitas, CA 95035.
 - (2) EZY-Grow Fertilizer Packet, EZY-Grow Landscape Specialties.
 - (3) Unique fertilizer, Inc. Deptford, NJ 08096
- B. Superphosphate: Finely ground phosphate rock as commonly used for agricultural purposes, containing not less than 18 percent available phosphoric acid.
- C. Sand: Clean, washed sand, free of toxic materials.
- D. Ground Limestone: Dolomitic limestone and contain not less than 85 percent of total carbonates and magnesium, ground to such fineness that 50 percent will pass a 100 mesh sieve and 90 percent will pass through a 20 mesh sieve. Coarser material will be accepted provided the specified rates of application are increased proportionately on the basis of quantities passing the 100 mesh sieve.
- E. Humus: Reed peat, sedge peat or moss peat furnished air dried, finely shredded, and suitable for horticultural use.
- F. Compost: Well rotted manure or composted organic waste materials and containing no chemicals or ingredients harmful to plants or humans. The material must pass through a 3/8" screen be friable, and free of stones, sticks, and all objectionable debris.
- G. Mulch for Plants: Organic mulch free from deleterious materials and suitable for top dressing of plants and consisting of following:
1. Shredded bark mulch not larger than 4 inches in length and 1/2 inch in width, free of wood chips and sawdust. Mulch shall be dark brown in color and aged a minimum of 12 months prior to placing.

2.03 TREES AND SHRUBS:

- A. Quality: Provide plants of size, genus, species and variety shown or scheduled for landscape work and complying with recommendations and requirements of ANSI Z60.1 "American Standard for Nursery Stock".

- B. Plants: Provide plants typical of their species or variety; normal, densely-developed branches and vigorous, fibrous root systems. Provide only sound, healthy, vigorous plants free from defects, disfiguring knots, sunscald injuries, frost cracks, abrasions of bark, plant diseases, insect eggs, borers, and all forms of infestation. All plants shall have a fully developed form without voids and open spaces. Plants held in storage will be rejected if they show signs of growth during storage.
1. Dig balled and burlapped plants with firm, natural balls of earth of sufficient diameter and depth to encompass the fibrous and feeding root system necessary for full recovery of the plant. Cracked or mushroomed balls are not acceptable.
 2. Container-grown stock: Grown in a container for sufficient length of time for root system to have developed to hold its soil together, firm and whole.
 - a. No plants loose in container.
 - b. Container stock not pot bound.
 3. Plants planted in rows shall be matched in form.
 4. Plants larger than those specified in Plant List may be used when acceptable to Architect at no additional cost to Owner.
 - a. If use of larger plants is acceptable, increase spread of roots or root ball in proportion to size of plant.
 - b. When "clump" is specified, provide a plant having a minimum of two stems originating from a common base at ground line.
 5. Measurements for Trees:
 - a. Caliper: Taken 6 inches above ground for trees up to 4 inches caliper and 12 inches above ground for larger sizes.
 - b. Height and Spread: Dimensions specified refer to main body of plant and not from branch tip-to-tip. Take measurements with branches in normal position. Height of trees, measured from crown of roots to top of top branch, shall not be less than minimum size designated in Plant List.
 6. No pruning wounds shall be present with a diameter of more than 1 inch and such wounds must show vigorous bark on all edges.
 7. Evergreen Trees: Branched to ground.
 8. Shrubs and Small Plants: Meet requirements for spread and height indicated on Plant List.
 - a. Take measurement for height from ground level to average height of top of plant, not longest branch.
 - b. Single stemmed or thin plants will not be acceptable.
 - c. Side Branches: Generous, well-twiggled, and plant as a whole well-bushed to ground.
- C. Deciduous Trees: Provide trees of height and caliper scheduled or shown and with branching configuration recommended by ANSI Z60.1 for type and species required. Provide single stem trees except where special forms are shown or listed.
1. Provide balled and burlapped (B&B) deciduous trees.
- D. Deciduous Shrubs: Provide shrubs of the height scheduled or shown and with not less than minimum number of canes required by ANSI Z60.1 for type and height of shrub required.

1. Provide balled and burlapped (B&B) deciduous shrubs, except where indicated on Plans provide container grown stock.
 2. Container grown deciduous shrubs will be acceptable in lieu of balled and burlapped deciduous shrubs subject to specified limitations for container grown stock.
- E. Coniferous and Broad-leafed Evergreens: Provide evergreens of sizes shown or listed. Dimensions indicate minimum spread for spreading a semi-spreading type evergreens and height for other types, such as globe, dwarf, cone, pyramidal, broad up-right, and columnar. Provide normal quality evergreens with well-balanced form complying with requirements for other size relationships to the primary dimension shown.
1. Provide balled and burlapped (B&B) evergreens.

2.04 MISCELLANEOUS LANDSCAPE MATERIALS:

- A. Anti-Erosion Mulch: Provide clean, seed-free salt hay or threshed straw of wheat, rye, oats or barley.
- B. Anti-Desiccant: Emulsion-type, film-forming agent designed to permit transpiration but retard excessive loss of moisture from plants. Deliver in manufacturer's fully identified containers and mix in accordance with manufacturer's instructions.
- C. Tree Wrapping Material: Bituminous impregnated tape, corrugated or crepe Kraft paper in 2 layers specifically manufactured for tree wrappings and having qualities to resist insect infection, not less than 4 inches and not more than 8 inches.
- D. Stakes and Guys: provide stakes and deadmen of sound new hardwood, treated softwood, or redwood, free of knot holes and other defects. Provide wire ties and guys of 2-strand, twisted, pliable galvanized iron wire not lighter than 12 ga. with zinc-coated turnbuckles. Provide not less than ½ inch rubber or plastic hose, cut to required lengths, material and size to protect tree trunks from damage by wires. Hose color to be black.
Size: 2 inches by 2 inches, unless otherwise indicated.

PART 3 - EXECUTION

3.01 PREPARATION

- A. General: Layout individual plant locations and areas for multiple plantings. Stake locations and outline areas and secure Architect's acceptance before start of planting work. Make minor adjustments as may be requested.
- B. Planting Soil (Topsoil) Depths: Unless indicated otherwise, provide planting soil depths not less than following:
 1. Trees: 6 inches.
 2. Shrubs: 10 inches
- C. Preparation of Planting Soil:
 1. Before mixing, clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful or toxic to plant growth.

2. Mix specified soil amendments and fertilizers with topsoil at rates specified. Delay mixing of fertilizer if planting will not follow placing of planting soil within a few days.
 - a. For planting: One part manure, 8 parts topsoil, 3 parts humus.
 - b. Refer to Paragraph SOIL AMENDMENTS.
3. For pit and trench type backfill, mix planting soil prior to backfilling, and stockpile at Site.
4. For planting beds mix planting soil either prior to planting or apply on surface of topsoil and mix thoroughly before planting.
 - a. Mix lime with dry soil prior to mixing of fertilizer.
 - b. Prevent lime from contacting roots of acid-loving plants.
 - c. Apply phosphoric acid fertilizer (other than that constituting a portion of complete fertilizers) directly to subgrade before applying planting soil and tilling.
 - d. Provide following soil ratio: One part compost, 8 parts topsoil, 3 parts humus.

D. Preparation of Planting Beds:

1. Loosen subgrade of planting bed areas to a minimum depth of 6 inches using a cultimulcher or similar equipment. Remove stones over 1-1/2 inch in any dimension, and sticks, stones, rubbish and other extraneous matter.
2. Spread planting soil mixture to minimum depth required to meet lines, grades and elevations shown, after light rolling and natural settlement. Place approximately 1/2 of total amount of planting soil required. Work into top of loosened subgrade to create a transition layer, then place remainder of the planting soil.

E. Excavation for Plants: Excavate pits, beds and trenches with vertical sides and with bottom of excavation slightly raised at center to provide proper drainage. Loosen hard subsoil in bottom of excavation.

1. For balled and burlapped (B&B) plants, make excavations at least half again as wide as the ball diameter and equal to the ball depth, plus following allowance:
 - a. Allow for 3 inch setting layer of planting soil mixture.
2. For container grown stock, excavate as specified for balled and burlapped stock, adjusted to size of container width and depth.
3. Dispose of subsoil removed from planting excavations. Do not mix with planting soil or use as backfill.
4. Fill excavations for trees and shrubs with water and allow to percolate out before planting.

3.02 FERTILIZING PLANTS:

A. Water Soluble Fertilizer:

1. Provide first feeding only during first watering during backfilling of plant, unless otherwise directed or approved by Architect.
2. Completely dissolve and mix fertilizer at rate of 6 pounds of fertilizer concentrate to 100 gallons of water.
3. Pour resulting solution in plant pit as approved or directed by Architect.
4. Apply fertilizer concentrate at following rates for each application:

- a. Plants up to 2 feet in height: 4 quarts.
 - b. Plants 2 feet and up to 6 feet in height: 6 quarts.
 - c. Plants 6 feet to 12 feet: 12 quarts.
 - d. Plants over 12 feet: 16 quarts.
- B. Slow Release Fertilizer Packets: Fertilize all woody plants except evergreen seedlings with slow release packets at time of planting, unless otherwise directed by Architect.
- 1. Place packets equidistantly within planting pit adjacent to ball or root mass, but not in direct contact with roots, in placement depth of 6 to 8 inches. Do not cut, rip or damage packets.
 - 2. If it becomes necessary to remove and replace dead or unhealthy plants, replace packets with new ones.
 - 3. Place at following application rates:

<u>Type of Plant</u>	<u>No. of Packets</u>
Evergreen Trees	
3 Feet to 6 Feet	3
Over 6 Feet	4
Deciduous Trees	
6 Feet to 12 Feet or Under four Inches Caliper	3
Over 4 Inches Caliper	4
Shrubs	
Under 3 Feet Height or Spread	2
3 Feet and Over in Height of Spread	3

3.03 PLANTING TREES AND SHRUBS:

- A. Set balled and burlapped (B&B) stock on layer of compacted planting soil mixture, plumb and in center of pit or trench with top of ball at same elevation as adjacent finished landscape grades. Remove burlap from sides of balls; retain on bottoms. When set, place additional soil mixture backfill around base and sides of ball, and work each layer to settle backfill and eliminate voids and air pockets. When excavation is approximately 2/3-full, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing final layer of planting soil mixture. Refilling around trunks or stems will not be acceptable.
 - 1. Face plants to give best appearance or relationship to each other or adjacent structure; or as directed by Architect.
- B. Set container grown stock as specified for balled and burlapped stock, except cut cans on 2 sides with an approved can cutter; remove bottoms of wooden boxes after partial backfilling so as not to damage root balls.
- C. Form ring of soil around the edge of each planting pit to retain water. After water has been absorbed, fill plant hole with planting mixture and tamp lightly to grade. Bring any settlement to grade with planting mixture.
- D. Form shallow saucers capable of holding water about each plant by placing mound of topsoil around edge of each filled in pit in accordance with Drawings.
- E. Dish top of backfill to allow for mulching.
- F. Mulch pits, trenches and planted areas immediately after planting. Provide not less than

following thickness of mulch and work into top of backfill and finish level with adjacent finish grades. Thoroughly water mulched areas. After mulching, rake mulch to uniform, finished surface.

1. Provide 2 inch to 3 inch thickness of mulch.

G. Apply anti-desiccant using power spray to provide an adequate film over trunks, branches, stems, twigs and foliage.

1. If deciduous plants are moved in full-leaf, spray with anti-desiccant at nursery before moving and again 2 weeks after planting.

H. Pruning:

1. Prune branches of deciduous stock, after planting, to balance loss of roots and preserve natural character appropriate of the particular plant requirements. In general, remove 1/4 to 1/3 of leaf bearing buds, proportion shall in all cases be made acceptable to Architect. Remove or cut back broken, damaged, and unsymmetrical growth of new wood.

2. Multiple leader plants: Preserve leader which will best promote symmetry of plant. Cut branches flush with trunk of main branch, at a point beyond a lateral shoot or bud a distance of not less than 1/2 diameter of supporting branch. Make cut on an angle.

3. Prune evergreens only to remove broken or damaged branches.

I. Remove and replace excessively pruned or malformed stock resulting from improper pruning.

J. Trunks of Trees: Wrap tree trunks of 2 inch caliper and larger. Start at ground and cover trunk to height of first branches and securely attach. Inspect tree trunks for injury, improper pruning and insect infestation and take corrective measures before wrapping.

K. Guying and Staking: Guy and stake trees immediately after planting as indicated.

3.04 MAINTENANCE:

A. Begin maintenance immediately after planting.

B. Maintain plants by pruning, cultivating and weeding as required for healthy growth. Restore planting saucers. Tighten and repair stake and guy supports and reset plants to proper grades or vertical position as required. Restore or replace damaged wrappings. Spray as required to keep trees and shrubs free of insects and disease.

1. Replacements: Replace all plants that are damaged or fail to achieve satisfactory growth or are otherwise defective.

C. Keep planting areas free of weeds, grass and other undesired vegetative growth.

D. Maintain plants until Final Acceptance of Project as a minimum but in no case less than 60 days after substantial completion of planting work.

3.05 CLEANUP AND PROTECTION:

A. During planting work, keep pavements clean and work area in an orderly condition.

- B. Protect planting work and materials from damage due to planting operations, operations by other contractors and trades and trespassers. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged planting work as directed.

3.06 INSPECTION AND ACCEPTANCE

- A. When planting work is completed, including maintenance, Architect will, upon request, make an inspection to determine acceptability.
 - 1. Landscape work may be inspected for acceptance in parts agreeable to Architect, provided work offered for inspection is complete, including maintenance.
- B. Where inspected planting work does not comply with requirements, replace rejected work and continue specified maintenance until re-inspected by Architect and found to be acceptable. Remove rejected plants and materials promptly from Project Site.
 - 1. Replacements are subject to same requirements as original plants, including maintenance and maintenance periods. Plants designated for spring planting only may be replaced only during the spring planting season unless otherwise approved or directed by Architect.

END OF SECTION 32 90 00