

SECTION 2740

TREES, PLANTS AND GROUND COVER

1.00 GENERAL

1.01 Scope of Work. Work to be performed under this Section shall include all furnishing of plants and related materials, labor and equipment required to complete the installation of the exterior landscape work indicated on the Drawings.

1.02 Related Work Specified Elsewhere.

Section 4200 - Underground Sprinkler System
Section 2710 - Finished Grade and Restoration

1.03 Quality Assurance.

A. Reference Standards.

Plants shall be first class representatives of the specified species or variety, in healthy conditions with normal well developed branch root systems, free of all objectionable features, and shall conform to the requirements of the *USDA Standard For Nursery Stock*, 1969 Edition, *AAN Standardized Specifications*, *The American Joint Committee on Horticulture (AJCH)* [plant names should meet the standards of AJCH], *The American National Standard Institute (ANSI)* [nursery stock should meet ANSI Standard Specifications], and *The Colorado State Nursery Act of 1965*. Where standards may conflict, use the standard which requires the highest quality of performance.

B. Inspection and Approval.

Engineer reserves the right to reject, at any time or place prior to acceptance of, any and all materials and plants which, in his opinion, fails to meet specifications. Inspection of plants are primarily for quality, size and variety, but other requirements are not waived even though visual inspection results in approval. Plants may be inspected where growing, but inspection at the place of growth shall not preclude the right of rejection at the site. Rejected plants and other materials shall be promptly removed from the site and replaced with suitable specimens. All trees and shrubs shall be from a point or origin similar in altitude and climate as the construction site.

C. Acceptable Contractor.

Landscape work shall be subcontracted to a single firm specializing in this type of work.

1.04 Source Quality Control.

A. Substitutes.

If specified landscape material is unobtainable, submit to Engineer proof of unavailability and proposals for use of equivalent material. When authorized, adjustment of contract amount will be made.

B. Trees and Shrubs.

1. Provide trees and shrubs grown in a recognized nursery in accordance with good horticulture practice.
2. Provide healthy, vigorous stock free of disease, insects, eggs, larvae and defects such as knots, sun-scald, injuries, abrasions, or disfigurement.
3. Sizes. Provide trees and shrubs of sizes shown or specified. Trees and shrubs of larger size may be used if acceptable to Engineer, and if sizes or roots or balls are increased proportionately.

C. Inspection.

Engineer reserves the right to inspect trees and shrubs at site before planting, for compliance with requirements for name, variety, size and quality.

1.05 Submittals.

- A. Certificates. All required state, federal or other inspection certificates shall accompany the invoice for plant materials, showing source of origin and shall be filed with the Engineer prior to acceptance of the material.
- B. Topsoil. Before delivery of topsoil, furnish Engineer with written statement giving locations of properties from which topsoil is to be obtained, names and addresses of owners, depth to be stripped and crops growing during past two years.
- C. Planting Schedule. Submit planting and seeding schedule to Engineer showing scheduled dates for each type of planting in each area of site.
- D. Maintenance Data. At completion of work, furnish three (3) copies of written maintenance instructions to Engineer for maintenance and care of installed individual plant types through their full grange season.
- E. Warranty. At completion of work, furnish written warranty to Engineer based upon requirements of Paragraph 1.08.

1.06 Delivery, Storage and Handling.

A. Delivery.

1. Deliver packaged landscape materials to site in original unopened containers bearing manufacturer's information (chemical analysis, name, trade name, trademark and conformance to state law).
2. Provide freshly dug trees and shrubs. Do not prune prior to delivery. Do not

bend or bind-tie trees or shrubs in such a manner as to damage bark, break branches or destroy natural shape. Provide protective covering during delivery.

3. Deliver trees and shrubs after preparations for planting have been completed and plant immediately. If planting is delayed more than six hours after delivery, set trees and shrubs in shade, protect from weather and mechanical damage, and keep roots moist.
4. Do not remove container-grown stock from container until planting time.
5. Each plant shall be identified by means of a grower's label affixed to the plant. The grower's label shall give the data necessary to indicate conformance to specifications. Use durable waterproof labels with water resistant ink which will remain legible for at least 60 days. Notify Engineer prior to delivery of plant materials to the site so that a pre-planting inspection may be made or indicate delivery schedule in advance so plant material may be inspected upon arrival at job site, whichever is more appropriate.
6. Removal unacceptable plant material immediately from job site.

B. Storage.

1. Deliver balled and burlapped stock directly from nursery and heel-in immediately if not being planted within the same day.
2. The Contractor will not be responsible for malicious destruction of plantings after installation. He shall be responsible for replacement of vandalized materials not yet installed. Report all cases of vandalism promptly to the Architect.

C. Handling.

1. Do not drop plants. Do not lift plants by the trunk, stems or foliage. The ball of the plant shall be natural, not made, and the plant shall be handled by the ball at all times. No balled or burlapped plant shall be accepted if the ball is broken or the trunk is loose in the ball.
2. All plants shall be protected at all times from drying out or other injury. Minor broken or damaged roots shall be pruned before planting. Major damage shall be cause for rejections as determined by the Engineer.

1.07 Job Conditions.

A. Existing Conditions.

1. Contractor shall determine location of 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.

2. The Contractor shall be responsible for proper repair of the sprinkler system and other underground pipe or electrical wiring damaged by operations under this section. Repairs will be made by contractors designated by the Engineer with cost being charged to this Contractor.
3. If a new tree or shrub is necessary due to interference with utility boxes or pits and underground piping or wiring, the Contractor shall notify the Engineer and receive approval of a new location. The Engineer must approve the precise location of all plants prior to pit excavation and installation.
4. When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify Engineer before planting.

B. Protection.

The Contractor shall inform the Owner in writing if special tree protection and traffic control must be installed to protect the planting from damage after the Owner assumes responsibility for maintenance.

C. Planting Schedule.

1. Sequencing/Scheduling.

Proceed with the complete landscape work as rapidly as portions of site become available, working within seasonal limitations for each kind of landscape work required.

2. Plant and install materials during normal planting seasons for each type of landscape work required. Correlate planting with specified maintenance periods to provide maintenance from date of substantial completion.
3. Prepare a proposed planting schedule and submit to Engineer. Schedule dates for each type of landscape work during normal seasons for such work in area or 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 reasons for delays.

1.08 Warranty.

A. Plant Material Guarantee.

All plants shall be guaranteed to remain alive and healthy for a full twelve (12) month period. A final inspection will be done by the Engineer at that time. Replacements shall be guaranteed an additional twelve (12) months. Inspection of the planting work, to determine its completion for beginning the guarantee period will be made by

the Engineer upon notice requesting such inspection by the Contractor. All planting must be alive and healthy in order to be considered complete.

B. Final Inspection and Replacements.

Inspection of the planting to determine its final acceptance will be made at the conclusion of the guarantee period by the Engineer representative. No plants will be accepted unless they are alive and healthy. The Contractor shall replace any plants which are dead, or in the opinion of the Engineer, are in an unhealthy or unsightly condition, and/or have lost their natural shape due to dead branches. The cost of such replacement(s) shall be borne by the Contractor and shall be included in his bid price for this section of the Work.

C. Guarantee for Seeded Areas.

Areas failing to show an adequate germination of grass shall be replanted according to the instructions in Section 3.00 of the Specifications.

2.00 MATERIALS

2.00 Topsoil.

- A. Topsoil will be stockpiled for re-use in landscape work. If quantity of stockpiled topsoil is insufficient, provide additional topsoil as required to complete landscape work.
- B. Provide new topsoil for soil mix for backfill of trees and shrubs which is fertile, friable, natural loam, surface soil, reasonably free of subsoil, clay lumps, brush, weeds and other litter, and free of roots, stumps, stones larger than 23" in any dimension, and other extraneous or toxic matter harmful to plant growth.
- C. Obtain topsoil 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 four inches; do not obtain from bogs or marshes.

2.02 Soil Amendments.

- A. Commercial Fertilizer. Complete fertilizer of neutral character, with some elements derived from organic sources and containing the following plant nutrient ratio: 20-20-5. Fertilizer shall be delivered to the site in unopened containers bearing the manufacturer's guaranteed analysis.
- B. Foliar Fertilizer. All tree and shrubs shall be foliar fertilized with "Rapidgro" or similar fertilizer. Dilute and apply fertilizer according to manufacturer's specifications. Foliar fertilization must be complete within two weeks of planting.

2.03 Soil Mixtures.

- A. Plant pits: Soil Mixture containing one part Colorado Mountain Peat to three parts

topsoil. These materials must be thoroughly mixed so there is no visible segregation of materials.

2.04 Plant Materials.

- A. Quality. Provide trees, shrubs and other plants complying with recommendations and requirements of ANSI Z60.1 "*Standard For Nursery Stock*" and as specified in Section 1.03.
- B. Plant List. A complete list of plants including names, quantities, sizes and other requirements is shown on the Drawings. The plan shall have precedence over the plant list.
- C. Deciduous Trees. Provide trees of height and caliper listed or shown and with branching configurations recommended by ANSI Z60.1 for type and species required. Provide single stem trees except where special forms are shown or listed.
- D. Deciduous Shrubs. Provide shrubs of the height shown or listed and with not less than minimum number of canes required by ANSI Z60.1 for type and height of shrub required.
- E. Ground Cover. Provide plants established and well rooted in removable containers or integral peat pots and with not less than minimum number and length of runners required by ANSI Z60.1 for the pot size required.
- F. Seed.
 - 1. Seed shall be at least 95% pure and shall have a minimum germination rate of 85%. All seed shall be furnished in bags or containers clearly labeled to show the name and address of the supplier, the seed name, lot number, net weight, the percent of week seed content and the guaranteed percentage of purity and germination. Seed and seed labels shall conform to all current state and federal regulations and will be subject to the testing provisions of the Association of Official Seed Analysis.
 - 2. All seed mixes shall be free from such noxious weeds as Canadian Thistle, Coarse Fescue, European Bindweed, Johnson Grass and Leafy Spurge. The landscape contractor shall furnish to the Engineer a signed statement certifying that the seed furnished is from a lot that has been tested by a recognized laboratory. Seed which has become wet, moldy or in any other way damaged in transit or storage, will not be accepted.
 - 3. Bluegrass Seed. Bluegrass seed shall be "Quicklawn" mix or approved equal by John Ericson, Ericson Enterprises, 481 Grand Valley Drive, Grand Junction, Colorado 81514, (303) 434-3339.
- G. Sod. Provide strongly-rooted sod, not less than two years old and free of weeds and undesirable native grasses. Provide only sod capable of growth and development when planted (viable, not dormant). Provide sod composed principally of the

following: 90% Kentucky Bluegrass (*Poa pratensis*).

2.05 Miscellaneous Landscape Materials.

- A. Mulch. Mulch all planted areas with shredded bark or approved equal.
- B. Stakes and Guys. Provide six-foot steel drive-in "T" posts. No. 125 for all tree staking. Provide wire ties and guys of two-strand, twisted, pliable galvanized iron wire not lighter than 12 gauge with zinc-coated turnbuckles. Provide not less than ½-inch hose, cut to required lengths, to protect tree trunks from damage by wires.
- C. Fiber Mulch. Mulch shall be "Conweb Hydro-Mulch" 2000 (Conweb Corporation, Fibers Division, Box 43237, St. Paul, MN 55164) or suitable approved substitute.

3.00 METHODS AND PROCEDURES

3.01 Inspection. Installer must examine subgrade, verify elevations, observe conditions under which work is to be performed, and notify contractor of unsatisfactory conditions have been corrected in a manner acceptable to installer.

3.02 Preparation.

- A. Layout. Layout individual trees and shrub locations by size 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. Prior to the excavation of planting areas or plant pits or placing tree stakes, the Contractor shall ascertain the location of all utility lines, electric cable, sprinkling system conduits so that proper precautions maybe taken not to disturb or damage any subsurface improvements.
- B. Preparation For Planting Beds.
 - 1. Loosen subgrade of planting bed areas to a minimum depth of eight inches using a cultimulcher or similar equipment. Remove stone over 1½ inches in any dimension, and stick, stones, rubbish and other extraneous matter.
 - 2. Spread planting soil mixture to a 4-inch depth required to meet lines, grades and elevations shown, after light rolling and natural settlement. Place approximately one-half of total amount of planting soil required. Work into top of loosened subgrade to crate a transition layer, then place remainder of the planting soil.
- C. Excavation For Trees and Shrubs.
 - 1. 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.
 - 2. For balled and burlapped (B&B) trees and shrubs, make excavation at least

half again as wide as the ball diameter and equal to the ball depth, plus following allowance for setting of ball on a layer of compacted backfill.

3. Allow for six-inch setting layer of planting soil mix.
4. For container grown stock, excavate as specified for balled and burlapped stock, adjusted to size of container width and depth.

D. Preparation For Planting Lawns.

1. Grade lawn areas to smooth, even surface with loose, uniformly fine texture. Roll and rake and remove ridges and fill depressions as required to meet finish grades., Limit fine grading to areas which can be planted immediately after grading.
2. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface moisture to dry before planting lawns. Do not create a muddy soil condition.
3. Restore lawn areas to specified condition if eroded or otherwise disturbed after fine grading and prior to planting.
4. Preparation of Unchanged Grades. Where lawns are to be planted in areas that have not been altered or disturbed by excavating, grading, or stripping operations, prepare soil for lawn planting as follows:

Till to a depth of not less than six inches, apply soil amendments and initial fertilizers as specified; remove high areas and fill depressions; till soils to a homogeneous mixture of fine texture free of lumps, cods, stones, roots and other extraneous matter.

3.03 Planting.

A. Planting Trees and Shrubs.

1. Set 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 backfill around base and sides of ball, and work each layer to settle backfill and eliminate voids and air pockets.
2. 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 backfill.
3. Set container grown stock as specified for balled and burlapped stock, except cut cans on two sides with an approved can cutter; remove bottoms or wooden bases after partial backfilling so as not to damage root balls.

4. Dish top of backfill to create a plant saucer with a four-inch lip.
 5. Mulch around all plants with a two-inch layer of shredded bark. The boundaries of the mulched areas shall be the rim of the planting saucer or in shrub beds, the edge of the planting bed.
 6. Staking and Guying. Stake and guy trees immediately after planting, as indicated by planting detail on Drawings.
 7. Prune, thin out and shape trees and shrubs in accordance with standard horticultural practice. Prune trees to retain required height and spread. Unless otherwise directed by the Architect, do not cut tree leaders, and remove only injured or dead branches from flowering trees, if any. Prune shrubs to retain natural character and accomplish their use in landscape design.
- B. Sodding New Lawns.
1. Lay sod within 24 hours from time of stripping. Do not plant dormant sod or if ground is frozen.
 2. Lay sod to form a solid mass with tightly-fitted joints. Butt ends and sides of sod strips; do not overlap. Stagger strips to offset joints in adjacent courses. Work from boards to avoid damage to subgrade or sod. Tamp or roll lightly to ensure contact with subgrade. Work sifted soil into minor cracks between pieces of sod; remove excess to avoid smothering or adjacent grass.
 3. Secure sod on slopes with wood pegs to prevent slippage. Water sod thoroughly with a fine spray immediately after planting.
- C. Seeding.
1. Seeding rate: Bluegrass Seed Mix, 6000 lbs/1000 sq.ft.
 2. Application. Seed shall be broadcast and uniformly raked to incorporate into the soil. Seeded areas shall be lightly mulched with clean straw.
 3. Watering of Seeded Areas. Immediately after seeding and mulching of bluegrass areas, the Contractor shall water the seeded areas lightly and sufficiently to a depth of two inches, but with care so that erosion takes place and no gullies are formed. Damage and erosion from over-watering shall be repaired by or paid for by the Contractor.
- D. Hydroseeding.
1. Seed. All seed shall be delivered to the site tagged and labeled in accordance with the Colorado Agricultural Code and shall be acceptable to the County Agricultural Commissioner.

Seed shall be of a quality which as a minimum pure live seed content of 70% (% purity x \$ germination), and weed seed shall not exceed 0.5% of the aggregate of pure live seed and other materials or a as standard for specific seed. The germination rate shall be 85%.

2. Fertilizer. A commercial fertilizer shall be ammonium phosphate and contain a minimum of 60 lbs. Actual available nitrogen, 50 lbs. actual available phosphoric acid and 25 lbs. actual available potash, uniform in composition, dry solvable, pelleted or granular.

All fertilizer shall be delivered in unbroken and unopened containers, labeled in accordance with applicable State regulations and bearing the warranty of the producer for grade finished.

3. Mulch. (Wood Cellulose) shall be manufactured from Aspen, Alder or Hemlock (no waste paper, dairy waste fiber, ground straw, rice hulls, etc., can be used - only "virgin wood fiber" , i.e. "Conweb or Silva Fiber".

The mulch shall be colored with a non-toxic water soluble green dye to provide a proper visual gauge for metering of material over ground surfaces.

It shall be manufactured in such a manner that after addition and agitation in slurry tanks with fertilizer, seed, water, and other approved additives, the fibers in the material will become uniformly suspended to form a homogeneous slurry;; and that when hydraulically sprayed on the ground, the material will form a blotter-like ground cover impregnated uniformly with seed; and which, after application, will allow the absorption of moisture and allow the rainfall to percolate to the underlying soil.

Cellulose shall be certified to indicate that laboratory and field testing of the product has been accomplished and that it meets all of the foregoing requirements based on testing. Weight specifications of this material from suppliers and for all application shall refer only to air dry weight of the fiber material.

Absolute air dry weight is based on the normal; standards of the *Technical Association of The Pulp and Paper Industry* for wood cellulose and is considered equivalent to 10% moisture.

4. Water. Water shall be clean, potable and added to the slurry mixture in sufficient amount to spread uniformly and required quantity of hydro-mulch solids (approximately 3000 - 4000 gallons per acre).
5. Organic Seeding Additive. use "Ecology Control M-Binder" as per manufacturer's recommendations (apply at rate of 120 lbs/acre).
6. Seeding Requirements.
 - a. Application of Seed: The Contractor shall obtain approval prior to application of the hydro-mulch seed.

- b. Seedbed Preparation: The area to be seeded shall have a firm seedbed which has been previously roughened by scarifying with the use of harrowing, cat tracks or other methods. Work to a depth of two inches to three inches. No implement shall be used that will create an excessive amount of down-movement of soil or clods on sloping areas.

Seedbed preparation shall be suspended when soil moisture conditions are not suitable for the preparation of a satisfactory seedbed. This will be determined by the Project Inspector.

- c. Fertilizing: The fertilizer shall be mixed and applied hydraulically in the form of a slurry. It shall be applied uniformly over the seedbed (i.e., 20-20-9 at 300 lbs.).
- d. Seeding: Seed shall be distributed uniformly over the seedbed. The seed shall be added to the slurry mixture just before it is to be applied hydraulically to the seedbed and it shall not remain in the seeder longer than one hour. Seed source: Mile High Seed Company, 520 South 9th Street, P.O. Box 1988, Grand Junction, CO 81502) unless otherwise approved.

Seed

Wester Wheat Grass (50% split or as Slender Wheat Grass available)	50%
Green Needle Grass	6¼%
Candy or Upland Bluegrass	3-1/8%
Hard Fescue	9-3/8%
Creeping Red Fescue	9-3/8%
Kentucky Bluegrass "Troy"	3-1/8%
Mt. Sage (10% purity with 70% germination)	6¼%
Lupine	
Globe Mallow	
Scarlet Gilia (wildflower mix may vary)	
Phlox	
Aspen Daisy	<u>6¼%</u>
	1/5 lbs. PLS/1000

Contractor shall commence seeding immediately upon completion of grading and seedbed preparation. Additional spot seeding may be needed if area is disturbed.

All seeding shall be completed by July 1 (spring seeding) or October 15 (fall seeding) or as otherwise approved.

- e. Mulching: The wood fiber mulch shall be applied uniformly with a hydraulic seeder at the rate of 2000 lbs/acre.
- f. Equipment: Hydroseeder - Hydraulic equipment used for the application of the fertilizer, seed and slurry of prepared wood pump shall be of the type as approved by the Owner. This equipment shall have a built-in agitation system and operating capacity sufficient to agitate, suspend and homogeneously mix a slurry containing up to 40 lbs. of fiber plus combined total of 70 lbs. fertilizer solids for each 100 gallons of water. The slurry distribution lines shall be large enough to prevent sloppage. This discharge line shall be equipped with a set of hydraulic spray nozzles which will provide a continuous non-fluctuating discharge and delivery of the slurry in the prescribed quantities uniformly without misses, waste or erosion. The slurry tank shall have a minimum capacity of 500 gallons and shall be mounted on a traveling unit which will place the slurry tank and spray nozzles within sufficient proximity to the areas to be seeded so as to provide uniform distribution. The Owner may authorize equipment with smaller uniform distribution. The Owner may authorize equipment with smaller tank capacity provided that the equipment has the necessary agitation system and sufficient pump capacity to spray the slurry in a uniform coat.

3.04 Maintenance.

- A. Begin maintenance immediately after planting. Maintain trees, shrubs and other plants until final acceptance but in no case less than 90 days after substantial completion of planting except as provided below for seeded areas. Maintain trees, shrubs and other plants by pruning, cultivating and weeding as required for healthy growth. Restore planting saucers. Tighten and repair stake and guy supports and reset trees and shrubs to proper grades or vertical position as required. Restore or replace damaged wrappings. Spray as required to keep trees and shrubs free of insect and disease.
- B. At the completion of the maintenance period, the Contractor shall:
 - a. All plants that die or are in a badly impaired condition shall be removed and replaced.
 - b. Replacement stock shall be subject to all requirements specified for the original material.

- c. Replacement stock shall be planted in accordance with the standard specifications. Maintenance requirements shall be specified below.
- d. Acceptability of the plant material furnished and planted shall be determined after all replacement plant material is planted. The Contractor shall as necessary, employ all possible means to preserve the plants in a healthy and vigorous growing condition to ensure their successful establishment.

3.05 Clean-Up and Protection. During landscape work, keep pavement clean and work areas in an orderly condition.

3.06 Inspection and Acceptance.

- A. When landscape work is completed, including maintenance, Engineer will, upon request, make an inspection to determine acceptability. Landscape work may be inspected for acceptance in parts agreeable to Engineer, provided work offered for inspection is complete, including maintenance.
- B. Where inspected landscape work does not comply with requirements, replace rejected work and continue specified maintenance until re-inspected by Engineer and found to be acceptable. Remove all rejected plants and materials promptly from project site.

End of Section