

## SECTION 32 94 23

### PLANTING

This section replaces section 32 92 00, 32 93 13, 32 93 43 and 32 98 00 in the 2017 edition of the Utah Chapter of American Public Works Association Manual of Standard Specifications (APWA).

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes:
  - 1. Trees, shrubs, perennials, vines, and groundcover requirements.
  - 2. Bedding, topsoil, and temporary support.
- B. The work to be performed under this section shall consist of furnishing all materials, labor, and plants necessary for the proper planting of all trees, shrubs, perennials, vines, and groundcovers of the kind and sizes specified at the prescribed locations, and otherwise in accordance with the drawings and specifications or as directed by the Landscape Architect or Owner's Representative or Owner's Representative.
- C. Related sections:
  - 1. Section 32 84 23 Underground Irrigation Systems

##### 1.02 REFERENCES

- A. AAN: American Associations of Nurserymen, Inc.
- B. ANSI Z60.1-2004: American Standard for Nursery Stock.
- C. FS O-F-241: Fertilizers, Mixed Commercial.
- D. ICN: International Code of Nomenclature for algae, fungi, and plants.
- E. City Standards/Ordinances relating to irrigation and planting.

##### 1.03 QUALITY ASSURANCE

- A. Perform work in conformity with applicable requirements of AAN.
- B. Upon receiving Notice to Proceed, the Contractor shall provide written proof that the specified plant material is available and has been secured or reserved specifically for this project. Obtain nursery stock and other plant materials from reliable and stable sources prior to order and delivery.
- C. Provide plants that are declared free of disease and insect pests.

##### 1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Exercise care in digging, transporting, handling, and packing of all plants.
- B. Handle plants so roots are protected at all times. If delivery is in open vehicles, cover entire load without causing over heating.
- C. Deliver plant material immediately prior to placement. Keep plant material moist.
- D. Protect root balls from sun and wind by covering with soil or other suitable material if not planted immediately on delivery.
- E. Store fertilizer in a weatherproof location such that its effectiveness will not be impaired.

### 1.05 ACCEPTANCE

- A. Plants shall not be accepted if the ball of earth surrounding roots (rootball) has been cracked or broken.
- B. Plants shall be accepted if burlap, staves, and ropes required in connection with transplanting are installed and still intact upon delivery.
- C. Heeled in stock from cold storage shall not be accepted.

### 1.06 SAMPLES

- A. Samples of the topsoil, bark mulch, fertilizer, and tree ties listed below shall be submitted to the Landscape Architect or Owner's Representative for inspection and approval prior to the beginning of work under this contract.
- B. Delivery of materials may begin only after samples have been approved. All materials furnished for the work shall conform in every respect to the approved samples. Any non-conforming materials will be rejected.

## PART 2 PRODUCTS

### 2.01 GENERAL

- A. The planting plan is diagrammatic, and all plant locations are approximate. Plant symbols take precedence over plant quantities shown on the plans and in the plant material schedule. The Contractor shall verify all plant quantities and notify the Landscape Architect or Owner's Representative of any discrepancies between the quantities and the symbols shown.
- B. Provide plants of normal growth and uniform height, according to species, with straight canes and well developed leaders, roots, and tops.
- C. Provide plants of sizes indicated. The size stated in each case shall be interpreted to mean dimensions of plant as it stands in its mature position in the nursery without straightening of any branches or leaders.
- D. Provide legible labels attached to all plants, specimens, bundles, boxes, bales, or other containers indicating botanical genus, species, and size of each.
- E. Plants cut back from larger sizes to meet specifications shall be rejected.
- F. Balled and burlapped deciduous shrubs may be acceptable in lieu of container growth deciduous shrubs only if there is a demonstrated significant shortage of container grown stock.

### 2.02 PLANTS

- A. All plants shall comply with federal and state laws requiring inspection for plant disease and infestations.
- B. Any inspection certificates required by law shall accompany each delivery of plants and such certificate shall be given to the Landscape Architect or Owner's Representative. All plants shall be subject to inspection and approval at the place of growth or upon delivery to the site for their quality, size, species, and variety. Such approval shall not impair the right of inspection and rejection at the site or during progress of work for size and condition of the plants, latent defects, or injuries. Any and all rejected plants shall be removed immediately from the premises by the Contractor. The Contractor shall make all replacements at his expense should he fail to comply in full with any of the specifications. Necessary replacements will be

made as soon as weather conditions permit, and all such plants replaced shall conform to all specifications herein.

- C. Names and Grades:
  - 1. Plant names shall conform to the nomenclature of “Standardized Plant Names,” “International Code of Nomenclature for algae, fungi, and plants (ICN),” or “International Code of Nomenclature for Cultivated Plants (ICNCP), 9<sup>th</sup> edition.” When a name is not found in any of these references, consult the accepted name used in the nursery trade. All plants shall be tagged by the nursery with the proper identification labels to insure the correct varieties of plants.
  - 2. Size and grading standards shall conform to those of the American Association of Nurserymen, Inc., as published in “American Standard for Nursery Stock”, 2014 Edition, with all current revisions unless otherwise specified.
  - 3. The caliper of trees shall be measured six (6) inches above the surface of the ground.
  - 4. Measurements on all trees and shrubs shall be taken with the branches in a normal position. Height and spread dimensions specified refer to the main body of the plant and not from branch or root tip to tip. No trees which have had their leaders cut, or are so damaged that cutting is necessary, will be accepted.
- D. No substitution of size, grade, variety or any species shall be permitted except by written permission of the Landscape Architect or Owner’s Representative.
- E. Plant Size:
  - 1. All plants shall conform to the size, age, and condition as specified in the plant list shown on the drawings. Undersized plant material shall not be approved.
  - 2. No additional compensation shall be due the Contractor if larger than specified plant material is provided.
  - 3. Only balled and burlapped or container stock shall be accepted. No bare root stock shall be accepted.
  - 4. Plants cut back from larger sizes to meet specifications shall be rejected.
- F. Plant List:
  - 1. Plants lists indicate minimum size requirements only. Plant materials shall be equal to or greater in size than those specified.
  - 2. Any discrepancies between plant lists and plans shall be immediately brought to the attention of the Landscape Architect or Owner’s Representative.
  - 3. In all cases the Contractor shall be held responsible for all plant materials indicated on the plans unless otherwise directed in writing by the Landscape Architect or Owner’s Representative.
  - 4. Each bidder shall investigate sources of supply and satisfy himself that he can supply all of the plants mentioned in the planting lists in size, variety, and quantity noted and specified before submitted his bid. Failure to take this precaution will not relieve the successful bidder from his responsibility as Contractor to furnish and install all plant material in strict accordance with the contract requirements without additional expense to the owner.
  - 5. If a shortage of the specified plant material truly exists and can be verified by the Contractor, the Contractor shall notify the Landscape Architect immediately and discuss what varieties and sizes are available as a suitable substitution. Last minute substitutions are not acceptable.

- G. All plants shall be fresh and vigorous, of normal habit and growth, and free of disease, insects and insect eggs and insect larvae, weeds and weed seed. No heeled-in plants from cold storage shall be accepted except on approval by the Landscape Architect or Owner's Representative prior to installation.

2.03 **SEED**

- A. All seed shall be accurately labeled and tested for purity and germination, using the procedure sanctioned by the Association of Official Seed Analysts.
- B. The seed tag shall indicate the date of testing, along with the testing results showing purity (percentage of the labeled species by weight), the percentages of other crop, weed, inert material, dormant or hard seed, and also the percentage of seed that will germinate.
- C. Seed labels or tags shall list the following:
  1. Manufacturer's name and address.
  2. Date and location of packaging.
  3. Name of the species of seed or seeds being sold.
  4. Variety of seed or seeds being sold.
  5. Percent purity of the seed. (Purity is defined as the percent weight of the entire sample of each seed species or variety that is present in excess of 5% of the total.)
  6. Percent other seed crop. (Other seed crop is defined as the percent weight of the entire sample of seed found in the sample that are less than 5% of the total seed weight and are generally recognized by the Association of Official Seed Analysts as seeds or plants grown as crops. If more than one crop species or cultivar is found in the sample, their weights are combined and reported.)
  7. Percent weed seed. (Weed seeds are all other seed species that the Association of Official Seed Analysts does not classify as crop seeds.)
  8. Percent inert matter. (Inert matter is defined as the percent weight of the sample that is not viable seed. It can include plant parts, broken seeds or other materials that are not viable seeds.)
  9. Percent germination.
  10. Percent hard and/or dormant seed. (Hard seed is the percent of the number of seeds that remain hard at the end of the testing period because they have not absorbed water because of an impermeable seed coat. Dormant seed is defined as the percent of the number of seeds, other than hard seed, that fail to germinate, but are determined to be viable by subjecting them to other seed testing techniques. Both of these seed types are generally considered to be seed that will germinate at a later date than seed reported in the percent germination calculation.)
  11. Percent Total Viability.
  12. Noxious weed seeds of the continental USA found in the seed mix.
  13. Last date the seed was tested for germination.
  14. Bulk pound quantity of seed contained in the bag.
  15. Pure Live Seed (PLS) pound quantity contained in the bag.

2.04 **SOD**

- A. Sod shall be obtained only from approved sources. The sod shall have been mowed regularly and carefully maintained from planting to harvest.
- B. The sod shall be free of grassy and broad-leaf weeds, contain no bare or burned spots, and be clean and strongly rooted. It shall be of the varieties noted on the plans and notes.
- C. The sod shall be cut using approved methods and equipment. It shall be cut in pieces not exceeding one (1) square yard, with a minimum of three quarter (3/4) inch and maximum one and one half (1 1/2) inch thickness. All sod for a particular contiguous area must have the same thickness.
- D. For very large turf areas and all athletic fields, large roles of sod shall be used. All sod roles shall be of uniform and consistent thickness within the range described above.

2.05 **TREE STAKES & TIES**

- A. Tree stakes shall be two by two (2x2) inch square or two (2) inch diameter round wood stakes ten (10) feet in length as indicated on the plans. Steel stakes may not be used.
- B. Tree stake ties shall be manufactured of virgin flexible vinyl meeting ASTM-D-412 standards for tensile and elongation strength. The material shall be black in color for ultraviolet resistance. Hose and wire shall not be used.

2.06 **TOPSOIL**

- A. All planting areas shall receive either a minimum of four (4) inches of stockpiled or imported topsoil in turf areas and twelve (12) inches in planting beds.
- B. All topsoil used on this project (stockpiled or import) shall meet the following criteria:
  - 1. pH:.....5.5 - 8.0
  - 2. EC (electrical conductivity):.....<2.0 mmhos per centimeter
  - 3. SAR (sodium absorption ratio):.....<3.0
  - 4. % OM (percent organic matter):.....≥2%
  - 5. Nitrogen (NO<sub>3</sub>N).....48 ppm min.
  - 6. Phosphorous (P).....11 ppm min.
  - 7. Potash (K) .....130 ppm min.
  - 8. Iron (Fe) .....5.0 ppm min.
  - 9. Texture (particle size per USDA classification):
    - a. Sand: .....<70%
    - b. Clay:.....<30%
    - c. Silt:.....Balance
  - 10. Stone Fragments (gravels or any soil particle greater than two (2) mm in size):.....<5% (by volume)
  - 11. Rocks Present > 1.5” .....None
- C. In addition, the topsoil shall be fertile, friable, natural loam and shall be capable of sustaining vigorous plant growth. It shall be free of stones, lumps, clods of hard earth, plants or their roots, sticks, and other extraneous matter. The topsoil shall contain neither noxious weeds nor their seeds. It shall not be used for planting operations while in a frozen or muddy condition.

**2.07 WEED BARRIER FABRIC**

- A. If specified, a weed barrier fabric shall be placed in all planting beds to prevent the growth and spread of unwanted vegetation. The fabric shall be Typar #3301B or approved equal.

**2.08 MULCH**

- A. Mulch shall be used as a top dressing for all planting beds unless specified otherwise. See plant material schedule for mulch types to be used.
- B. Shredded bark mulch shall conform to the following criteria:
  - 1. Bark pieces shall not exceed two (2) inches when passed through a screen of that size.
  - 2. Large chunks of bark or wood shall not be mixed in with the mulch.
  - 3. The bark mulch shall be primarily from coniferous trees.
- C. Where used, mulch shall be placed to a depth of three (3) inches on top of the topsoil.
- D. Other mulches may be used only as specified on the drawings or in the planting notes and details.

**2.09 FERTILIZER**

- A. Commercial fertilizer shall be uniform in composition, dry, and free flowing. Deliver fertilizer mixed as specified in bulk or bag, showing weight analysis, formula, and manufacturer's name.
- B. A 16-16-16 balanced fertilizer shall be used. Any exceptions to this formula shall be based on horticultural recommendations resulting from a site-specific soils test and must be approved prior to application by the Landscape Architect or Owner's Representative.

**2.10 MOWSTRIP**

- A. Where turf areas are separated from planting beds, a concrete mowstrip shall be used. No other edging materials may be used unless specifically noted on the plans and approved by the Landscape Architect or Owner's Representative.
- B. The mowstrip shall be constructed using concrete having a compressive strength rating of two thousand five hundred pounds per square inch (2,500 psi) or greater, and a maximum slump of four (4) inches.
- C. A three eighth (3/8) inch diameter rebar (#3) shall be placed continuously in the center of the mowstrip to provide support and help prevent differential settling of the mowstrip after cracking. Overlap joints a minimum of twelve (12) inches.
- D. Include a concrete mowstrip at the base of all fences. Said mowstrip shall be six (6) inches deep and eighteen (18) inches wide, with the fence posts located in the center of the mowstrip.

**PART 3 EXECUTION**

**3.01 GENERAL**

- A. Site Visit: The Contractor shall visit and inspect the site. He shall take into consideration known and reasonably inferable conditions affecting work. Failure to visit the site will not relieve the Contractor of furnishing materials and performing the work required.

- B. Prior to any planting operations, the irrigation system shall be fully operational and all planting areas shall be thoroughly moistened.
- C. Where weeds or other undesirable vegetation are present in planting areas, the Contractor shall apply a contact herbicide a minimum of ten (10) days prior to commencement of any planting or irrigation work. Apply herbicide per manufacturer's recommendations. The poisoned vegetation shall be allowed to completely die back, including the roots, before proceeding with the work. Dead vegetation shall then be removed from the site and disposed of in a legal manner.
- D. The Contractor shall conform to the following requirements with regard to existing vegetation:
  - 1. The Contractor shall be fully responsible for any damage to existing trees or shrubs. He shall use all reasonable means to protect and preserve plants on the project not designated for demolition.
  - 2. No pruning, thinning, or cutting of existing vegetation shall be allowed unless written permission is given by the Landscape Architect or Owner's Representative.
  - 3. The Contractor shall replace any trees or existing shrubs damaged by him or his sub-contractors with like kind and size.

### 3.02 **PLANTING SEASONS**

- A. All new plant installation shall be completed between April 15 and October 15. If planting must be done after October 15 or before April 15, the Contractor shall obtain specific approval to do so from the Landscape Architect or Owner's Representative prior to beginning any planting operations.
- B. No planting shall be done in frozen soil or during unfavorable weather conditions, subject to the approval of the Landscape Architect or Owner's Representative.

### 3.03 **TOPSOIL**

- A. The Contractor shall obtain a soil analysis from any authorized soil testing agency of any existing stockpiled or imported topsoil to be used on the project to verify that it conforms to the topsoil specifications. Test results shall include horticultural recommendations. The soil samples shall be obtained per the testing agency directions. Allow ten (10) working days to obtain test results. The costs for such testing shall be the responsibility of the Contractor.
- B. Prior to delivery of the imported topsoil to the site, the Contractor shall provide to the Landscape Architect or Owner's Representative the name and location of the topsoil source, along with the certified soil analysis of the topsoil to be used. The analysis shall verify that the proposed topsoil meets the topsoil specifications and is capable of supporting healthy plant growth.
- C. After imported topsoil has been delivered to the site, a second soil test may be required to verify that it is indeed the same soil as previously tested and designated for use in this project. No substitution of topsoil shall be allowed without prior written authorization from the Landscape Architect.
- D. The following procedure shall be followed in placing all topsoil:
  - 1. All cut areas to receive topsoil which have a slope of less than ten (10) percent shall be cross-rippled to a depth of two (2) to four (4) inches.

2. The subgrade material shall be rough graded to plus or minus one tenth ( $\pm 0.1$ ) foot of the final rough grade, which will allow the Contractor to achieve final finished grade through the placement of the topsoil.
  3. The surface of the subgrade shall be scarified to a depth of two (2) inches to provide a transition zone between the subgrade and the topsoil. Place the topsoil on the subgrade and fine grade to the final finished grade and topsoil depths as indicated on the drawings and in these specifications.
  4. Any required soil amendments (i.e. mulch, organic matter, etc.) shall be placed directly on the topsoil at the required rates and spread evenly over the planting area. The amendments shall then be thoroughly blended into the topsoil to a depth of four (4) inches. Where only a dry, granular fertilizer is to be added, it may be applied to the surface and raked in during the fine grading procedures.
- D. The Contractor shall maintain a minimum of two (2) percent drainage away from all buildings, structures, and walls. Finished grades shall be smoothed to eliminate puddling or standing water.
  - E. All finished grades shall be approved in writing by the Owner prior to installation of any plant materials.
  - F. See Sport Field Grading specifications for instructions regarding sports field surfaces.

### 3.04 **PLANT CONDITION**

- A. All precautions customary in commercial landscape installation practice shall be taken in preparing plants for planting. Workmanship that fails to meet these minimum standards shall be rejected. All balled and burlapped plants shall have firm and natural balls of earth around their roots. No plant shall be planted if the rootball is cracked or broken, either before or during the process of planting. Loose, broken or manufactured root balls shall be rejected.
- B. All plants materials in five (5) gallon containers or larger shall have been established in that container for a period of not less than six (6) months and not more than two (2) years. Plant material shall not be root bound. They shall exhibit sound, healthy, and vigorous growth and be free from diseases and pests.
- C. The Contractor shall have the Landscape Architect or Owner's Representative approve plant material size and quality prior to installation. Any plants which are not true to form, appear stressed or unhealthy, are infested with pests, infected with disease, or are undersized for their containers shall be rejected.
- D. All plant material shall be planted as soon upon arrival on the premises as possible. If planting cannot be done immediately, the roots shall be protected from the sun and kept in a moist condition until the time of planting. Such protection may be provided by laying the plants on the north side of the building and covering the roots with wet straw.
- E. If it is anticipated that planting will not be done for more than twenty-four (24) hours after the arrival of plants upon the premises, the balled and burlapped stock shall be heeled-in on the north side of a building and all roots completely covered with dirt which shall be wetted down frequently. Care will be taken in the handling of all ball and burlap materials so that the earth around the roots is disturbed as little as possible.



### 3.05 PLACEMENT OF PLANTS

- A. Plants shall be generally located as indicated by the drawing. The Contractor shall stake out the location of all plants and planting areas with identified plant stakes, and no excavation shall commence until such locations have been approved by the Landscape Architect or Owner's Representative or Owner's Representative.
- B. In the event that underground construction work or obstructions are encountered during excavation of the plant holes, alternate locations will be assigned and approved by the Landscape Architect or Owner's Representative or Owner's Representative.
- C. Except for turf and groundcovers, plants shall not be placed within twenty-four (24) inches of sprinkler heads.
- D. The Contractor must locate and stake any sprinkling head or valve box within the dripline of a proposed or existing tree location and must establish the direction of the lateral or main irrigation line that serves the staked sprinkler head or valve box. This procedure will help eliminate damage to existing or future tree roots.

### 3.06 PLANT INSTALLATION

- A. All concrete work, sprinkling systems, and finished grading shall be completed and approved by the Landscape Architect or Owner's Representative before any planting of the specified plant materials is begun.
- B. No tree planting shall be initiated until sprinkling system is complete and tested. However, tree planting shall precede lawn planting.
- C. Each plant will be placed in an individual plant pit. The sharing of pits shall not be allowed.
- D. All trees and shrubs shall be planted in pits as detailed in the planting details contained herein or as noted on the drawings. Tree and shrub pits shall be circular in outline, with a diameter at least two (2) times the diameter of the rootball of each plant to be installed. They shall be one to two and one half (1 - 2 ½) inches shallower than the rootball depth. When the plant is properly placed in the plant pit, the root collar shall be approximately one (1) inch above finished grade of the topsoil. For perennial plants (which have no root collar), the top of the rootball shall be even with the finished grade or the topsoil. The sides of the plant pit shall be roughened, and not smooth or sculpted.
- E. Plant backfill mix shall be one hundred (100) percent native site soil.
- F. For container grown plants, remove the container and place the plant vertically in the plant pit, directly on undisturbed soil. The root crown or collar shall be at or just above the finished grade. Perennial and ornamental grass plants shall be planted with the root collar at finished grade.
- G. For balled and burlapped plants, place the plant vertically in the center of the pit, with the rootball resting on undisturbed soil. Cut and remove the wire basket and burlap or other wrapping material from the rootball. This may be done with the rootball in the pit. Any burlap or wire pieces underneath the rootball may be left in place if they cannot be removed. Do not fold the burlap over but cut away as much as possible without disturbing the rootball. No burlap shall be pulled from under the rootball. Backfill the bottom one third (1/3) of the pit as the wire and burlap are removed. In all cases, maintain the integrity of the rootball.
- H. Specified backfill material shall be carefully and firmly worked and tamped under and around the rootball to fill all voids. When backfilled and compacted to two

thirds (2/3) the depth of the pit, thoroughly water with a hose to completely soak the roots and remove any air pockets.

- I. The plant pit shall then be completely backfilled with the specified backfill mix and tamped well. A shallow watering basin or rain cup shall be formed around each plant. This basin will be equal in diameter to that of the original planting pit.
- J. Monitor all plants to ensure that no settling occurs. Pits which settle shall be immediately filled with additional soil mixture at no additional expense to the Owner.
- K. After planting, the following operations shall be performed:
  - 1. Stake and mulch all trees per installation details.
  - 2. Remove all nursery stakes ties, and tags from all plants. Prune and remove any dead, damaged, or broken branches. Maintain side growth on all trees.

### 3.07 **STAKING**

- A. All trees, including evergreen trees, shall be staked.
- B. Staking shall be performed as follows:
  - 1. Two (2) 2" x 2" square or 2" diameter round wood stakes, ten (10) feet in length, shall be used to support each tree planted under this contract unless otherwise indicated.
  - 2. Tree ties shall conform to the staking detail shown on the planting detail sheet.
  - 3. Each stake will be located adjacent to the rootball, on opposing sides, to provide maximum support to the trunk. Do not penetrate the rootball with the stake.
  - 4. The stakes will be driven into the pit bottom after the tree has been placed in the pit, but before backfilling begins so as to avoid damage to the roots.
- C. Stakes and ties shall be removed after one (1) full growing season from the time the tree was installed.

### 3.08 **WATERING**

- A. All plants shall be thoroughly watered immediately after planting. This shall mean full and thorough saturation of all backfill in the pits and beds during the same day of planting. Water shall be applied only by open end hose at very low pressure to avoid creating air pockets, causing injury to the plant, or washing away of backfill. When installed, watered, and fully settled, the plants shall be vertical with the root collar at the appropriate level.
- B. Subsequent watering shall be provided by the site's irrigation system. The Contractor shall insure that all plants, especially trees, receive sufficient water to maintain healthy growth and vigor. Overwatering shall be avoided, and prolonged saturation of the soil around the trees shall be eliminated by appropriately controlling the irrigation circuit which provides water to that area.

### 3.09 **WEED BARRIER FABRIC (if specified)**

- A. Prepare final grade prior to placing fabric. Placement of fabric shall comply with the following:
  - 1. Place pre-emergent herbicide prior to installing fabric.
  - 2. Install fabric directly on topsoil. With drip tubing, install tubing on top of fabric.
  - 3. Overlap and secure per manufacturer's recommendations.

4. Cut an "X" where plant will be located. Peel back corners to allow plant installation. Fold corners back in to place after plant is installed.

### 3.10 **MULCHING**

- A. Shredded bark mulch shall be placed to a depth of three (3) inches on top of the topsoil in all planting beds and over tree planting pits.
- B. The finished grade of the bark mulch shall be as follows:
  1. Two (2) inches below the surface or finished grade of any paving, mowstrips, or walks adjacent to the planting area.
  2. At adjacent finished grade of the turf surrounding tree planting pits.
- C. In tree pits, the bark shall be kept six (6) inches away from the base of the tree.
- D. Just prior to placement of the mulch, the Contractor shall treat the mulched areas with a pre-emergent herbicide according to the manufacturer's recommendations.

### 3.11 **SOD INSTALLATION**

- A. The Contractor shall notify the Landscape Architect or Owner's Representative of the source of the sod prior to placement.
- B. The sod shall be free of grassy and broad-leaf weeds, contain no bare or burned spots, and be clean and strongly rooted. It shall be of the varieties noted on the plans and plant materials schedule.
- C. The sod shall be cut using approved methods and equipment. It shall be cut in pieces not exceeding one (1) square yard, with a uniform thickness on all pieces. Sod thickness may vary between a minimum of one (1) inch and maximum one and one half (1 ½) inches but must be consistent throughout this project. For very large turf areas and all athletic fields, large rolls of sod shall be used. Sod shall be placed using equipment specifically designed to lay large sod rolls.
- D. The Contractor shall notify the Landscape Architect of the source of the sod prior to placement. The sod shall be stripped and delivered to the site not more than twenty-four (24) hours prior to laying. The sod shall be maintained in a moist and healthy condition to encourage immediate growth.
- E. The following procedure shall be followed when installing the sod:
  1. Lay the sod on smooth, moist topsoil, working off planks if required.
  2. Rake the topsoil to loosen and level prior to placing each course of sod.
  3. Lay strips perpendicular to the direction of the slope. Strips shall be parallel to each other, with their end seams staggered. The sod shall be neither stretched nor overlapped, and all joints shall be butted tightly together.
  4. Roll the sod immediately after placing and thoroughly water with a fine spray to a depth sufficient that the underside of the new sod and the soil immediately below the sod are thoroughly wet.
  5. On slopes two (2) horizontal to one (1) vertical or steeper, lay the sod perpendicular to the slope and secure every row with wooden pegs at two (2) feet maximum on center. Drive the pegs flush with the soil portion of the sod.
  6. Sod pieces shall be laid tightly together. Sod areas with gaps caused by pieces not being laid tightly enough together or with ridges from overlapping pieces shall not be accepted and the Contractor will be required to re-lay the sod.

3.12 **HYDROSEEDING (if used)**

A. General:

1. Wood fiber mulch shall be virgin wood fiber, free of growth- or germination-inhibiting substances. The mulch shall be air dried with not more than fifteen (15) percent moisture by weight. The total organic weight shall be a minimum of ninety-eight (98) percent. Inorganic ash content shall be 0.7±0.2 percent. Water holding capacity shall be 1000G/100G (oven dried weight). The pH range shall be 4.0 - 6.0. The fiber length shall meet the following:
  - a. Fifty (50) percent shall be at least 0.15 inches in length or longer.
  - b. Fifty (50) percent shall be retained on the twenty-eight (28) mesh screen. It shall be Echofiber or Conwed or approved equal.
2. The seed mix shall be as specified on the plans. Provide written certification that the seed conforms to Utah seed law and is in compliance with Utah State Department of Agriculture regulations.
3. The tackifier shall be M-Binder or Plantego or equal.
4. The fertilizer shall be a chemically prepared, dry, homogenous pellet product with a balanced formula of 16-16-16.
5. Application rates shall be as follows:
  - a. Wood fiber mulch .....50 pounds (min.)/1,000 SF
  - b. Seed mix.....See plans (7 pounds/1,000 SF typ.)
  - c. Tackifier.....100 pounds/Acre
  - d. Fertilizer.....1 pound or actual nitrogen/1,000 SF
  - d. Water.....92 gallons/1,000 SF

B. One-step preparation and application of hydroseed mulch shall be as follows:

1. The wood fiber mulch, seed, tackifier, fertilizer, and water shall be mixed together in a hydroseeding machine having a capacity of at least two thousand (2,000) gallons to allow for a homogeneous slurry which is thoroughly mixed and can be applied easily without clogging. The machine shall be mounted on a traveling unit which is either self-propelled or drawn by a separate unit. Equipment used in the hydroseeding process shall be thoroughly cleaned of all seed and other materials used in any previous hydroseeding process, prior to hydroseeding on this project.
2. The equipment shall have a built in agitation system and operating capacity sufficient to agitate, suspend, and homogeneously mix a slurry containing not less than fifty (50) pounds of organic mulching amendment plus chemical additives and solids for each one hundred (100) gallons of water.
3. The slurry shall be prepared at the site and its components shall be mixed to supply the rates of application as specified. The slurry preparation shall begin by adding water to the tank when the engine is at one half (½) throttle. The engine throttle shall be open to full speed when the tank is one half (½) filled with water. All organic amendments, fiber, and chemicals shall then be added by the time the tank is two thirds (2/3) to three fourths (¾) full. At this time and not before, the seed mix shall also be added. Spraying shall commence immediately when the tank is full, and the slurry is mixed.

4. Apply the hydroseed to form even appearing cover over the required areas. The slurry shall be applied in a downward drilling motion via a fan stream nozzle. It is important to ensure that all of the components enter and mix with the soil. Use only qualified and trained personnel to insure uniformity of the hydroseed applications.
  5. The hydroseeding slurry components shall not be left in the hydroseed machine for more than two (2) hours in order to avoid seed deterioration.
- C. A two-step hydroseeding procedure may be used in lieu of the one-step method. The two-step procedure shall consist of first sowing the seed mix by broadcasting, and second, applying the hydromulch. Specifically, this procedure shall conform to the following:
1. The seed shall be broadcast over the planting bed at the rates noted in the plant schedule. The seed shall be sown in two (2) perpendicular directions with a cyclone seeder or other similar mechanical seeder. Lightly rake the seed into the soil.
  2. Apply a fine spray watering immediately after each area has been sown.
  3. Prepare and apply hydromulch slurry (minus the seed mix) according to the procedure outlined in 3.12 B, steps 1 through 5 above.

### 3.13 **DRILL SEEDING**

If seeding operations are to be done using a drill seeding method, the following requirements shall apply:

- A. All topsoil shall be placed, and the fine grading completed prior to any seeding operations.
- B. The seed bed shall be prepared by loosening the surface of the soil and mixing the specified fertilizer into the top two (2) inches of the topsoil. The finished surface shall be smooth and even, with no high or low spots, no rocks, nor other deleterious materials. The use of a Rotodairon or similar piece of equipment to prepare the seed bed is encouraged.
- C. The seed shall be drilled using a Brillion type seeder, specifically designed for drilling grass seed. An agricultural grain drill is not acceptable. A cultipacker, harrow, or similar apparatus shall be a part of the seeder or dragged behind to help ensure that the seed is covered by the soil and the surface is left smooth and even.

### 3.14 **CLEAN UP**

- A. Throughout the course of planting, excess and waste materials as well as excavated subsoil shall be continuously and promptly removed. All areas shall be kept clear and all reasonable precautions taken to avoid damage to existing structures, plants, and grass.
- B. When planting has been completed in an area, it shall be thoroughly cleaned of all debris, rubbish, subsoil, and waste materials. These shall be removed from the property and disposed of legally. All planting tools shall also be put away.
- C. The ground surface shall be left in a condition satisfactory to the Landscape Architect or Owner's Representative.

**3.15 AS-BUILT DOCUMENTS**

- A. The Contractor shall keep a record of all departures from the working drawings that occur during construction. These changes shall be shown on a clean set of prints, and the prints kept on the job site at all times for review.
- B. As a part of his observation work, the Landscape Architect or Owner's Representative shall review the as-built drawings regularly to verify that changes are being recorded. At the conclusion of the work, the Contractor shall present to the Owner fresh, clean drawings of all the changes made and recorded previously and they shall become part of the permanent record of the project.

**3.16 MAINTENANCE**

- A. Substantial Completion:
  - 1. At Substantial Completion of all planting work outlined in these plans, the Contractor shall contact the City to arrange for a walk through to verify that all aspects of the work have been completed. Work must be fully completed (except for final clean-up) according to all plans, notes, and specifications and exhibit professional workmanship. Substantial completion shall be defined as the complete installation of all plant materials, staking, mulching, and other work on the project in its entirety. Substantial completion shall not be given on designated portions of the project.
  - 2. Notice by the Contractor shall be given, in writing, at least three (3) days in advance to the Landscape Architect or Owner's Representative so that proper scheduling can be made for those who are to attend.
  - 3. At the appointed time, an inspection of all plant materials, including staking and mulching, shall be made.
  - 4. A list of uncompleted items (punch list) shall be generated by the Landscape Architect or Owner's Representative and distributed to the Contractor and other involved parties within three (3) days of the substantial completion inspection. Each item on the punch list shall be corrected before the project will be approved and accepted by the Landscape Architect or Owner's Representative. The Contractor will be back charged for time spent by the Owner and any consultants who have been brought to the site for a final inspection when the project is not ready for said inspection.
- B. Maintenance/Establishment Period:
  - 1. The maintenance/establishment period shall begin one (1) day after the substantial completion inspection. The Contractor shall complete all punch list items during this period, as well as maintain and operate the entire irrigation system.
  - 2. In cases where the maintenance/establishment period runs beyond October 15 of any given year, the balance of the maintenance/establishment period days shall be extended into the spring of the following year. Counting of the balance of days shall begin no sooner than April 15, unless mutually agreed upon by both the Contractor and the City prior to that date. Early counting shall be based on weather conditions at the time.
  - 3. The Contractor shall maintain all plantings until the turf is fully established. The turf shall be considered fully established when grass stands come in uniform and thick, with no bare or thin spots, and roots have begun to spread and knit together. No weeds shall be allowed in the grass. If the turf grass is

hydroseeded, the Contractor must complete the hydroseeding by September 1. The maintenance/establishment period shall be a minimum period of sixty (60) days.

4. The maintenance work required shall include but not be limited to the following:
    - a. Appropriate watering of all plant materials.
    - b. Weeding and removal of all weeds from groundcover and planting areas.
    - c. Replacement of any dead, dying, or damaged trees, shrubs, perennials, or groundcover.
    - d. Filling and replanting of any low areas which may cause standing water.
    - e. Adjusting or sprinkler head heights and watering patterns.
    - f. Filling and recompaction of eroded areas, along with any required reseeding and/or replanting.
    - g. The grass shall be mowed when the blades reach three (3) inches tall and maintained to a minimum height of two (2) inches. No more than one third (1/3) of the blade shall be removed per cutting. The cutting frequency shall be once every five (5) to seven (7) days depending upon grass height and growth rate.
    - h. Weekly removal of all trash, litter, clippings, and all foreign debris.
    - i. At thirty (30) days after planting, a balanced fertilizer (16-16-16) shall be applied to the grass areas at a rate of one half (1/2) pound of nitrogen per one thousand (1,000) square feet.
    - j. At intervals of thirty (30) days after the first application of fertilizer to the grass, apply a balanced fertilizer (16-16-16) at a rate of one half (1/2) pound of nitrogen per one thousand (1,000) square feet until the grass is established.
  5. The maintenance period shall not end until Final Acceptance of the project.
- C. Final Acceptance:
1. A final inspection shall be held prior to the end of the maintenance period to ensure that all punch list items have been completed and the entire project is ready for acceptance by the Owner.
  2. Upon satisfaction that the Contractor has completed all punch list items, the irrigation system is fully and completely functional, and the required As-Built drawings, mylars and maintenance manuals have been submitted, the Owner shall accept the project.
  3. An official letter of final acceptance shall be prepared and issued by the Owner to the Contractor, designer, and the Landscape Architect. Upon final acceptance of the project by the Landscape Architect or Owner's Representative, the Owner shall assume full responsibility for the project, and the guarantee period shall begin.

### 3.16 GUARANTEE

- A. Upon final acceptance of the project as being properly installed, the Contractor shall guarantee the plant materials as follows:

1. All shrubs and groundcovers shall be guaranteed by the Contractor as to growth and health for a period of sixty (60) days after completion of the maintenance period and final acceptance.
  2. All trees shall be guaranteed by the contractor to thrive and grow in an acceptable upright position for a period of one (1) year after completion of the maintenance period and final acceptance.
- B. The Contractor shall, within fifteen (15) days after receiving written notification by the Landscape Architect or Owner's Representative, remove and replace all guaranteed plant materials which die or become unhealthy or appear to be in a badly impaired condition at any time during the guarantee period. Any plants that settle below or rise above the desired finished grade shall also be reset to the proper grade.
- C. All replacements shall be plants of the same kind, size, and quality as originally specified in the "plant list" and they shall be furnished, planted, staked, and maintained as specified herein at no additional cost.
- D. The Contractor will not be responsible for plants destroyed or lost due to occupancy of the project, vandalism on the part of others, or improper maintenance or lack thereof.
- E. At the conclusion of the guarantee period and prior to final inspection of the plant materials by the Landscape Architect or Owner's Representative, the Contractor shall remove all tree stakes. This period of time shall be approximately 1 year after initial planting.
1. Stakes shall be removed by first cutting the ties securing the tree to stakes and secondly pulling stakes or guys out of the ground.
  2. Stakes shall not be broken off above, at, or below ground levels but removed completely.
- F. At the conclusion of the guarantee period a final inspection of all planting included in this contract shall be made by the Landscape Architect or Owner's Representative. At that time any plant found to be unhealthy, broken, damaged, or otherwise in an impaired condition shall be noted. Plants so noted shall be removed immediately from the site by the Contractor and replaced by him, as specified under this section, with plants of like kind and size in the manner previously specified for the original planting without extra compensation.

## **END OF SECTION**