CHAPTER 11 – APPENDICES

APPENDIX 1 – LANDSCAPE PLANTING
CHAPTER 11—APPENDICES

Appendix 1 Landscape Planting

1.1 General

1.2 Scope of Work
   1.2.1 Work Covered

1.3 Materials
   1.3.1 Topsoil
      1.3.1.1 Topsoil
      1.3.1.2 Soil pH
   1.3.2 Soil Amendments
      1.3.2.1 Peat Moss
      1.3.2.2 Iron Sulfate
      1.3.2.3 Elemental Sulfur
   1.3.3 Mulch
      1.3.3.1 Mulch
      1.3.3.2 Turf Swales
      1.3.3.3 Blown Mulch
      1.3.3.4 Jute Mesh
      1.3.3.5 Erosion Control Fabric
   1.3.4 Fertilizer
      1.3.4.1 Grass Starter Fertilizer
      1.3.4.2 Other Fertilizers
      1.3.4.3 Company Name
      1.3.4.4 Additional Fertilizers
      1.3.4.5 Submittal of Sample Labels
      1.3.4.6 Notification
   1.3.5 Plant Materials
      1.3.5.1 General
      1.3.5.2 Container Size
      1.3.5.3 Diameter
      1.3.5.4 Nursery-Grown Plants
      1.3.5.5 Pruning
      1.3.5.6 Transplanting
      1.3.5.7 Earth Balls
      1.3.5.8 Wrapping
      1.3.5.9 Container-Grown Plants
      1.3.5.10 Requirements
      1.3.5.11 Plant Symmetry
      1.3.5.12 B & B Plants
      1.3.5.13 Planting Delay
      1.3.5.14 Bare Roots
      1.3.5.15 Bare Root Ground Cover
      1.3.5.16 Potted Ground Cover
      1.3.5.17 Grafted Root Stock
   1.3.6 Turf Materials
      1.3.6.1 Bluegrass Mixture
      1.3.6.2 Turf-Type Tall Fescue Mixture
      1.3.6.3 Tall Fescue Mixture
      1.3.6.4 Sod - General
         1.3.6.4.1 Requirements
1.3.6.4.2 Disease-Free Sod
1.3.6.4.3 Thatch-Free
1.3.6.4.4 Prior Approval
1.3.6.4.5 Thickness
1.3.6.4.6 Root Development
1.3.6.4.7 Mowing Height
1.3.6.4.8 Moisture Content
1.3.6.4.9 Delivery Time Period
1.3.6.5 Bluegrass Sod
1.3.6.6 Fescue Sod
1.3.7 Herbicide
1.3.7.1 Brands
1.3.7.2 Application
1.3.7.3 Sample Labels
1.3.7.4 Notification
1.3.8 Miscellaneous Landscape Materials
1.3.8.1 Timber Landscape Edging
1.3.8.2 Herbicide
1.3.8.3 Antidessicant
1.3.8.4 Weed Barrier Fabric
1.3.8.5 Tree Wrap
1.3.8.6 Tree Wrap Specifications
1.3.9 Guying and Staking Material
1.3.9.1 Tree Anchors
1.3.9.2 Cable
1.3.9.3 Tree Collars
1.3.9.4 Cable Clamps
1.3.9.5 Anchor
1.3.9.6 Tree Anchor Kit
1.3.9.7 Stakes
1.3.10 Tree Guards

1.4 Quality of Plant Materials
1.4.1 Nursery Growing Conditions
1.4.2 Nursery Stock Freshness
1.4.3 Delay Before Planting
1.4.4 Pruning
1.4.5 Condition of Nursery Stock
1.4.6 Specimen Quality Plants
1.4.7 Nursery Stock Measurement
1.4.8 Nursery Stock Inspection
1.4.9 Nursery Stock Delivery
1.4.10 Nursery Stock Storage

1.5 Execution
1.5.1 Preparation
1.5.1.1 Layout
1.5.1.2 Spraying with Herbicide – Planting Beds
1.5.1.3 Plowing and Smoothing
1.5.2 Planting of Trees, Shrubs, Perennials, Bulbs & Groundcover
1.5.2.1 Preparation of Planting Areas
1.5.2.1.1 Disposal of Debris
1.5.2.1.2 Tilling
1.5.2.1.3 Fertilizer
1.5.2.1.4 Level
1.5.2.1.5 Pits

APP 1-4
January 2013
1.5.2.1.6 Frozen Material
1.5.2.2 Protection of Plants
1.5.2.3 Labeling Plants
1.5.2.4 Binding Plants
1.5.2.5 Damaged Limbs
1.5.2.6 Backfill
1.5.2.7 Pre-emergent Herbicides
1.5.2.8 Mulch
1.5.2.9 Stakes and Guy Wires
1.5.2.10 Maintenance
1.5.2.11 Stabilizing
1.5.2.12 Soil pH

1.5.3 Planting of New Turf Areas-Seeding
1.5.3.1 Disturbed Lawn Areas
1.5.3.2 Site Conditions
1.5.3.3 Site Requirements
1.5.3.4 Seed Bed Preparation
1.5.3.5 Turf Grass Seeding Rate
   1.5.3.5.1 Improved Bluegrass
   1.5.3.5.2 Improved Turf-Type Tall Fescue
   1.5.3.5.3 Kentucky 31 Tall Fescue
1.5.3.6 Turf Mixture Broadcasting
1.5.3.7 Straw Mulch Broadcasting
1.5.3.8 Erosion Control Fabric

1.5.4 Planting of Turf Areas-Sodding
1.5.4.1 Drawings
1.5.4.2 Satisfactory Site Conditions
1.5.4.3 Site Requirements
1.5.4.4 Preparing the Sod Bed
1.5.4.5 Sod Installation
1.5.4.6 Sloping Surfaces
1.5.4.7 Watering the Sod
1.5.4.8 Maintenance

1.5.5 Maintenance of Turf
1.5.5.1 Seeded Turf Areas
1.5.5.2 Sodded Turf Areas

1.5.6 Relocation of Existing Trees & Shrubs
1.5.6.1 Relocation
1.5.6.2 Replanting

1.5.7 Installation of Landscape Bed Edging (Wood Timbers)
1.5.7.1 Drawings
1.5.7.2 Height
1.5.7.3 Anchoring

1.5.8 Clean-Up and Protection
1.5.8.1 Site Cleaning
   1.5.8.1.1 Litter
   1.5.8.1.2 Weeds
   1.5.8.1.3 Planking
   1.5.8.1.4 Concrete Trucks
   1.5.8.1.5 Washing
   1.5.8.1.6 Stains
1.5.8.2 Site Access
   1.5.8.2.1 Sidewalks
   1.5.8.2.2 Boring Methods – Utility Lines
   1.5.8.2.3 Sharing
   1.5.8.2.4 Alternate Traffic Methods
1.5.8.2.5  ADA Accessibility
1.5.8.2.6  Fire Exit Paths
1.5.8.2.7  Access
1.5.8.2.8  Debris
1.5.8.2.9  Limited Access
  1.5.8.2.9.1  Moist Ground
  1.5.8.2.9.2  Pedestrian Traffic
1.5.8.2.10  Pest Control
1.5.8.2.11  Removal of Protection
1.5.8.2.12  Waste Materials
  1.5.8.2.12.1  Extra Materials

1.5.9  Plant Guarantee and Maintenance Requirements
  1.5.9.1  Inspection
  1.5.9.2  Missing Plants
  1.5.9.3  Rejecting Plants
  1.5.9.4  Replacement Plants

1.6  Lawn Sprinkler Piping
1.6.1  Materials
  1.6.1.1  PVC & PVC Pipe Fittings
  1.6.1.1.1  Pipe & Fittings
  1.6.1.2  P.E. Pipe & P.E. Pipe Fittings
  1.6.1.2.1  Pipe & Fittings
  1.6.1.3  Flexible Swing Pipe or Triple Swing Joint
    1.6.1.3.1  Requirements
    1.6.1.3.2  Fitting Types
    1.6.1.3.3  Lateral Pipe – Triple Swing
    1.6.1.3.4  Lateral Pipe – Flexible Swing
  1.6.1.4  Pipe and Tube Fittings
    1.6.1.4.1  PVC Fittings
    1.6.1.4.2  PE Pipe
  1.6.1.5  Joining Materials
    1.6.1.5.1  Slip Fittings
    1.6.1.5.2  Threaded Fittings
  1.6.1.6  Valves and Valve Specialties
    1.6.1.6.1  Remote Control Valves
    1.6.1.6.2  Master Valves
    1.6.1.6.3  Flow Sensors
    1.6.1.6.4  Remote Control Valves
    1.6.1.6.5  Valve Box Cover
    1.6.1.6.6  Sprinklers
    1.6.1.6.7  Double Check Assembly
  1.6.1.7  Wiring
    1.6.1.7.1  Copper Conductor
    1.6.1.7.2  Electric Control Wires
    1.6.1.7.3  Above-Ground Wires
    1.6.1.7.4  Below-Ground Wires
  1.6.1.8  Automatic Control System
    1.6.1.8.1  Controller

1.6.2  Execution
1.6.2.1  Preparation
  1.6.2.1.1  Flags
  1.6.2.2  Trenching & Backfilling
    1.6.2.2.1  Sleeve Installation
    1.6.2.2.2  Covering
      1.6.2.2.2.1  Lateral Pipe
1.6.2.2.2 Mainline Pipe
1.6.2.2.2.3 Sleeves

1.6.2.3 Piping Installation
   1.6.2.3.1 Temperature

1.6.2.4 Automatic Control System Installation
   1.6.2.4.1 Wiring
   1.6.2.4.2 Flushing
   1.6.2.4.3 Testing
   1.6.2.4.4 Potable Water Application
Appendix 1 Landscape Planting

1.1 General

Provisions of the General Requirements, Division 1, are a part of this Division and Section.

1.2 Scope of Work

1.2.1 The work to be done on this contract shall consist of furnishing all materials, labor, and equipment to execute all work for landscape planting and landscape irrigation installation in accordance with these specifications and plans. Work is to include: protection of existing trees and shrubs; finish grading, changes to existing irrigation system; installation of new irrigation, turf grass planting (seeding and/or sodding), planting of all trees, shrubs, perennials, bulbs, and groundcovers; pruning and/or removal of existing trees, shrubs, weeds, and/or stumps; maintenance of turf until acceptance date; and maintenance of all new tree, shrub, ground cover, bulb, and perennial (including ornamental grass) planting beds for one year after Partial Occupancy. (This varies from project to project.)

1.3 Materials

1.3.1 Topsoil

1.3.1.1 Topsoil – a natural or cultivated surface - shall be a soil layer containing organic matter and sand, silt, and clay particles. It shall be friable, pervious, and a darker shade of brown than underlying subsoil. It shall also be reasonably free of subsoil, clay lumps, grass, weeds, brush, roots, stumps, toxic substances, litter, gravel, stones or other materials greater than 1-½" in diameter, and other deleterious material. Topsoil shall not contain plant parts of Nutsedge, Johnson Grass, Nimblewill, Bermuda Grass, Bindweed or other noxious weeds. Topsoil shall not be delivered in a muddy or frozen condition.

1.3.1.2 Soil pH should be 5.5 min., 7.0 max

1.3.2 Soil Amendments

1.3.2.1 Peat Moss – Shall be pulverized type of sphagnum peat with a pH of 3-4, and shall be 1-5% ash, 0.6 – 1.4% N.

1.3.2.2 Iron Sulfate – High Yield, 11% sulfur, 19% iron, trade name: “Copperas” produced by Fertilome – Voluntary Purchasing Group, Bonhomme, Texas, 75418, (903) 583-9789.

1.3.2.3 Elemental Sulfur – 90% sulfur, disintegrating pellets, produced by Fertilome – Voluntary Purchasing Groups, Bonhomme, Texas, 75418, (903) 583-9789.

1.3.3 Mulch
1.3.3.1 Mulch for tree beds and tree/shrub beds shall be hardwood mulch an average of approximately 1 ½" in length, mixed in size. Mulch for ground cover beds shall be premium hardwood mulch, double ground, approximately 1" long, mixed in size. Mulch shall be fresh, clean, and free from soil, rocks, diseased material and foreign organic and non-organic matter. Hardwood chip mulch can be purchased from Foster Brothers, Rt. 1 Box 249, 6465 State Rd. E, Auxvasse, Missouri 65231, (573) 386-2271. Samples are to be brought to the Owner for approval prior to installation.

1.3.3.2 The excelsior blanket shall consist of a machine-produced mat of curled wood excelsior of 80% six-inch or longer fiber length, with consistent thickness and the fiber evenly distributed over the entire area of the blanket. The top side of each blanket shall be covered with photodegradable extruded plastic mesh.

1.3.3.3 For turf, blown mulch shall consist of fresh, clean, and 95% weed-free prairie hay or wheat straw.

1.3.3.4 Heavy jute mesh shall be Soil Saver Type #48 with one inch openings weighing approximately one pound per square yard as available from Jim Walls Co., 12820 Hillcrest Rd., Suite 109, Dallas, Texas 75230, (972) 239-8577, Fax (972) 387-9087 or approved equal. Staples used to secure mesh shall be #11 gauge wire six inches long with a one-inch space between teeth.

1.3.4 Fertilizer

1.3.4.1 The grass starter fertilizer shall be a 10-18-22 Par Ex slow release type with a minimum of 2.7% water insoluble nitrogen (WIN) from IBDU and a minimum .6% iron. The second grass fertilizer applied shall be a 28-3-8 Par Ex slow release type with a minimum of 8.1% WIN from IBDU, 2.5% iron, .5% magnesium, .2% manganese, and .2% zinc.

1.3.4.2 The tree, shrub, and ground cover fertilizer shall be a 14-12-14 Woodace Nursery slow release type with a minimum of 3.2% WIN from IBDU and 8.35% coated nitrogen (sulfur-coated).

1.3.4.3 The grass and tree/shrub fertilizer is available from The Greenkeeper Co., P.O. Box 371123, Omaha, Nebraska 68137, (800) 451-8873.

1.3.4.4 Additional fertilizer for pH modified soil shall be Green Garde slow release micronized iron available from Swecker-Knipp (785) 234-5652.

1.3.4.5 The Contractor shall submit sample labels for approval to the Owner prior to application.

1.3.4.6 The Contractor shall notify the Owner of application time at least 24 hours in advance.
1.3.5 Plant Materials

1.3.5.1 General – All plant material shall conform to the species and cultivars specified in the plant list. No substitutions will be allowed, except where the Contractor has made written application stating the change they desire to make, any alteration in price from this change, if the completion of the project would be materially delayed by unavailability of specified material, and has obtained the written approval of the Owner. All plants in a particular planting bed or planting group shall be of the same size and form. All plants shall conform to the American Standard for Nursery Stock, ANSI Z60.1, as published by the American Association of Nurserymen.

1.3.5.2 Where plants are specified according to height or spread, the height or spread shall take precedence over the container size. No container shall be smaller than specified.

1.3.5.3 If plants of greater caliper or size are selected by the Contractor for any plants herein specified, the diameter of the ball increases proportionately.

1.3.5.4 Plants shall be sound, healthy, vigorous, free from plant diseases, insect pests or their eggs and shall have balanced, healthy, normal root systems. Plants shall be nursery grown stock in a climate compatible with Manhattan, Kansas. Collected stock shall not be accepted.

1.3.5.5 Plants shall not be pruned prior to delivery except as authorized by the Owner. Prune only branches that are damaged, rubbing on other branches, or as directed by the Owner, retaining the natural shape of the plant. In no case shall the central leader of a deciduous or coniferous tree be cut unless specifically directed by the Owner.

1.3.5.6 All plants shall have been transplanted or root pruned at least once in the past three years. All trees shall be at least twice transplanted or root pruned and be from properly spaced blocks in the nursery. Inspection for the required root system will be made upon delivery of the plants to the site. The Contractor shall notify the Owner at least 24 hours in advance of the plant delivery time. No plant material shall be installed prior to inspection by the Owner.

1.3.5.7 Balled and burlapped plants shall be dug with firm natural balls of earth of a diameter not less than specified in the American Standard for Nursery Stock for the respective size and kind of plant material. Plants with balls cracked and broken before or during planting will not be accepted.

1.3.5.8 Balls shall be securely wrapped with burlap and tightly bound with rope or wire.
1.3.5.9 Container grown plants shall have been grown in pots or cans for a minimum of 6 months and a maximum of 2 years and shall have sufficient roots to hold the plant earth ball together when removed from the container.

1.3.5.10 Plant material shall be symmetrical, typical for the variety and species, and shall conform to the measurements specified in the plant list.

1.3.5.11 Plants used where symmetry is required shall be matched as nearly as possible. These situations include hedges, plant massing, and specimen plantings where plants indicated on the plans are of the same species and size.

1.3.5.12 Plants marked "B&B" in the Plants Schedule shall be adequately balled and burlapped with balls not less than the diameter specified in the American Standard for Nursery Stock and of sufficient depth to incorporate enough fibrous and feeding roots necessary for the full recovery of the plant. Container grown material of the same variety and size with an equivalent earth and root ball may be substituted for deciduous trees with a trunk diameter under one inch and for all shrubs and ground covers listed in the plant schedule as balled and burlapped ("B&B"), but not for coniferous and other evergreen trees. Balled and burlapped material of the same variety, size, and equivalent earth ball size may be substituted for all plants listed in the plant schedule in the construction plans as container grown. The ball size of all balled and burlapped material substitutions and container size of all container material substitutions shall conform to the American Standard for Nursery Stock.

1.3.5.13 All balled and burlapped plants that cannot be planted immediately upon delivery shall be set on the ground in the shade and the balls well covered with soil, mulch or other acceptable materials, then watered thoroughly and regularly to maintain good health and vigor, while maintaining a firm earth ball. Container grown plants shall be placed in the shade until time of planting and watered thoroughly and regularly to maintain good health and vigor. Windy storage places shall be avoided or adequate wind breaks and protection shall be provided by the Contractor.

1.3.5.14 Bare root deciduous shrubs and perennials, if specified, shall have a well-branched root system characteristic of the species. Root spread to height of plant ratio shall be as outlined in the American Standard for Nursery Stock.

1.3.5.15 Bare root ground cover, if specified, shall have as a minimum one, six inch long healthy runner and a minimum of three, four inch long healthy roots.

1.3.5.16 Potted ground cover shall have at least the minimum number and length of runners, for the specified pot size, as outlined in the current edition of the American Standard for Nursery Stock.

APP 1-12
January 2013
1.3.5.17 No plants with grafted root stock shall be accepted.

1.3.6 Turf Materials

1.3.6.1 Bluegrass mixture shall contain fresh, clean, new-crop seed with a minimum purity of 98% and minimum germination of 85%. The seed mixture (by weight) shall be 100% improved Kentucky Bluegrass containing at least two varieties, in equal amounts, of acceptable varieties such as Adelphi, America, Baron, Majestic, Ram, Touchdown, or approved equal. (Note to consultant: this mixture is for overseeding existing Bluegrass areas only.)

1.3.6.2 Turf- Type Tall Fescue mixture shall contain fresh, clean, new-crop seed with a minimum purity of 98% and minimum germination of 85%. The seed mixture (by weight) shall be improved dwarf turf-type Tall Fescue containing at least two varieties, in equal amounts, of equal color and texture, containing acceptable varieties, including Barlexus, Revolution, Arid, Bonanza, Mustang, Olympic, Falcon, Jaquar, Rebel II, or approved equal. (Note to consultant: this mixture is the standard campus mixture for new turf installations.)

1.3.6.3 Tall Fescue mixture shall contain fresh, clean, new-crop seed with a minimum purity of 95% and minimum germination of 80%. The seed mixture (by weight) shall be 90% K31 Tall Fescue and 10% common Kentucky Bluegrass. (Note to consultant: this mixture is for campus areas that receive extremely low maintenance.)

1.3.6.4 Sod – General

1.3.6.4.1 Sod shall be an approved, nursery grown turf type dwarf Tall Fescue sod of high quality from certified seed. Sod shall be free of noxious weeds as well as excessive amounts of other crop and weedy plants at the time of harvest. It shall also be free of objectionable grassy and broadleaf weeds. Sod shall be considered free of such weeds if less than 5 such plants are found per 100 square feet of area. Sod will not be acceptable if it contains any of the following weeds: common bermudagrass (wire grass), quackgrass, johnsongrass, poison ivy, nutsedge, nimblewill, Canadian or Russian thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel and bromegrass.

1.3.6.4.2 Sod shall be reasonably free of disease, nematodes, and soil borne insects.

1.3.6.4.3 Sod shall be free of thatch: up to ¼ inch is allowable (uncompressed).
1.3.6.4.4 The Contractor shall submit to the Owner for approval prior to delivery of sod, information as to the field location, species, and percentage of purity of the grass sod intended for use.

1.3.6.4.5 All sod shall be stripped at a uniform solid thickness of approximately 1" plus or minus ¼". Measurement for thickness shall exclude top growth and thatch, and shall be determined at the time of field cutting. Sod thatch, uncompressed, shall not exceed ¼".

1.3.6.4.6 Root development shall be such that standard size pieces will support their own weight and retain their shape when suspended vertically from a firm grasp in the uppermost 10% of area, or when rolled and unrolled 3 times.

1.3.6.4.7 Before stripping, the sod shall be mowed uniformly at a height of 2 to 2 ½ ".

1.3.6.4.8 Sod shall not be harvested or transplanted when moisture content (excessively dry or wet) may adversely affect survival of the sod.

1.3.6.4.9 Sod shall be harvested, delivered, and installed within a period of 36 hours. Sod not transplanted within this period shall be inspected and subject to rejection.

1.3.6.5 Bluegrass sod shall contain a mixture of 100% weight improved Kentucky Bluegrass (two certified varieties at 50% by weight each.)

1.3.6.6 Fescue sod shall be turf-type dwarf Tall Fescue sod or an approved mixture of improved turf-type Tall Fescue and improved Kentucky Bluegrass. Bluegrass content of the mixture shall not exceed 10% by weight.

1.3.7 Herbicide

1.3.7.1 The Fescue post-emergent broadleaf and grassy weed herbicide shall be Trimec Plus as manufactured by PBI/Gordon Corp. applied as required to control weeds in the grass. The pre-emergent herbicide for tree, shrub, bulb and ground cover buds is XL-2G containing Surflan and Benefin as manufactured by Helena Chemical (901) 761-0050. Contractor is to use suitable alternative herbicide for plants not labeled for XL-2G use.

1.3.7.2 All herbicides shall be applied as directed by the product labels.

1.3.7.3 The Contractor shall submit sample labels for approval to the Owner prior to application.

1.3.7.4 The Contractor shall notify the Owner of application time at least 24 hours in advance.

APP 1-14
January 2013
1.3.8 Miscellaneous Landscape Materials

1.3.8.1 Timber Landscape Edging for sign beds shall be 6" by 6" rough-cut Southern Pine, pressure treated with water-borne preservatives for ground contact use. This preservative should be CCA .40 (Chromated Copper Arsenate), complying with AWPB LP-22. Edging shall be secured with ½", reinforcing rod stakes and wood connector strips to match edging, and constructed to sizes as shown in the Drawings. All anchoring nails shall be galvanized.

1.3.8.2 Non-Selective Herbicide shall be Glyphosate as marked under the trade name “Round-Up,” or approved equal. The Fescue post-emergent broadleaf and grassy weed herbicide shall be Trimec Plus as manufactured by PBI/Gordon Corp., applied as required to control weeds in the grass. The pre-emergent herbicide for tree, shrub, bulb and ground cover beds, is XL – 2G containing Surflan and Benefin as manufactured by Helena Chemical (901) 761-0050. Contractor is to use suitable alternative herbicide for plants not labeled for XL – 2G use.

1.3.8.3 Antidesiccant shall be an emulsion-type, film-forming agent designed to permit transpiration and retard excessive loss of moisture from the plants, such as “Wilt-Pruf,” or approved equal.

1.3.8.4 Weed Barrier Fabric, if required by project, shall be a water-permeable, black, polypropylene fabric, 4.0 to 5.0 ounces per square yard product. Fabric shall be Pro 5 Weed Barrier as manufactured by DeWitt Company, RR3, Box 338, Sikeston, Missouri 63801, (800) 888-9669, or approved equal.

1.3.8.5 Tree Wrap is required for newly installed mountain ash, apple, maple, and dogwood.

1.3.8.6 Tree Wrap for maples, dogwoods, and mountain ash shall be double-layered kraft paper with a tar layer between, four-inch wide tape specifically manufactured for tree wrapping.

1.3.9 Guying and Staking Material

1.3.9.1 Tree anchors shall be made of high impact and shock resistant tensaloy aluminum alloy. The anchor holding power for trees of three inch or less caliper shall be 300 pounds and its weight shall be one ounce. Holding power shall be 1100 pounds and anchor weight to be 4.5 ounces for trees of greater caliper than three inches.

1.3.9.2 Cable shall be 7x7 galvanized steel cable with white vinyl coating, which has a breaking strength of no less than 480 pounds for trees of three inch caliper or less and 1700 pounds for trees of greater than three inch caliper.

1.3.9.3 Tree collars shall be 12" long, made from .5 ID x .062 wall PVC tubing with ultraviolet inhibitors.
1.3.9.4 Cable clamps shall be 1/16", zinc plated, U-bolt and clevis type.

1.3.9.5 Anchor shall be driven in with the anchor drive rod specified by the manufacturer.

1.3.9.6 Tree anchor kit for trees of three inch caliper or less shall be Duckbill Model 40 DTS-W, and tree anchor kit for trees greater than three inch caliper shall be Duckbill Model 68 DTS-W, or approved equal.

1.3.9.7 All evergreen trees shall be staked with wood stakes. The stake shall be 2 x 2 sound hardwood and connected to the tree with two strands of twisted 12 gauge galvanized wire within a 2-ply reinforced rubber hose collar (approx. ½ " I.D.).

1.3.10 The Contractor shall install durable, expandable, long lasting polyethylene tree guards at the base of all proposed deciduous trees located in lawn areas. The guards shall be 7 to 10 inches in height and gray in color. The guards shall be the “Tree Protector” as sold by Seaberry Landscape, Inc., 3259 Terminal Drive, Eagan, Minnesota, 55121, (612) 454-9511, or approved equal.

1.4 Quality of Plant Materials

1.4.1 Nursery Growing Conditions – All plant material shall be grown in conditions as closely approximating the project site climatic conditions as possible. Balled and burlapped (B & B) nursery stock shall be dug from field areas that are free from noxious weeds including Bindweed, Nutsedge, Johnson Grass, Bermuda Grass and Canadian Thistle.

1.4.2 Nursery Stock Freshness – All B & B plants shall be freshly dug nursery stock. Heeled-in stock or stock from cold storage shall not be accepted.

1.4.3 All balled and burlapped plants that cannot be planted immediately upon delivery shall be set on the ground in the shade and the balls well covered with soil, mulch or other acceptable material, then watered thoroughly and regularly to maintain good health and vigor, while maintaining a firm earth ball. Container grown plants shall be placed in the shade until time of planting and watered thoroughly and regularly to maintain good health and vigor. Windy storage places shall be avoided or adequate wind breaks and protection shall be provided by the Contractor.

1.4.4 Pruning Prior to Delivery – Plant material shall not be pruned prior to delivery except as authorized by the Owners Representative.

1.4.5 Condition of Nursery Stock – All plants shall have a normal habit of growth for the species and shall be sound, healthy and vigorous; grown at a recognized nursery in accordance with accepted horticultural practice; and free of disease, insects, eggs, larvae and defects, including knots, sun-scales, injuries, abrasions or disfigurement. All cuts over 1-¼" shall be callused over.

1.4.6 Specimen Quality Plants – Bid prices shall permit using specimen stock, which is “better than average nursery row material,” particularly for large deciduous material and evergreen trees. “Specimen quality plants” refers to the quality of
the plant material, as it relates to approval of the plants along with size and branching habit.

1.4.7 Nursery Stock Measurement – Plants shall conform to the measurements indicated on the plant list. The caliber of tree trunks shall be the diameter of the trunk measured 12 inches above the natural surface of the ground.

1.4.8 Nursery Stock Inspection – The Owner reserves the right to inspect the plants at the source and/or on the site before planting for compliance with the requirements. All protective tree trunk covering shall be removed prior to inspection of plants on the site. The Contractor shall furnish the Landscape Architect with a list indicating the source (location – i.e. state, local) of each of the plant types to be supplied. This source list must be submitted within two weeks after receipt of the notice to proceed.

1.4.9 Nursery Stock Delivery – All shipments of plant stock shall comply with existing State and Federal laws and regulations governing plant disease, infection, and interstate movement of nursery stock. Protective covering during delivery shall include covering top and sides of truck to protect from wind burn. Nursery stock with loose or damaged root balls will not be accepted.

1.4.10 Nursery Stock Storage – If planting is delayed for more than six hours after delivery, set plant material in a shaded area, protected from weather and mechanical damage, and keep roots moist by covering with mulch, burlap, or other acceptable means of retaining moisture. Contractor is responsible for watering the heeled-in nursery stock.

1.5 Execution

1.5.1 Preparation

1.5.1.1 Layout – The location for all trees and outlines for all planting beds shall be staked in the ground by the Contractor and must be approved by the Landscape Architect before excavation of planting holes begins. Adjustments in planting locations shall be made by the contractor as directed by the Landscape Architect. The spacing between the center of the shrubs and the edge of the bed shall be equal to the spacing between shrubs unless otherwise noted on the drawings. *Plants shall not cover electric eyes when fully grown and should be planted 2 feet away.*

1.5.1.2 All existing turf and weed areas scheduled for planting bed development shall be sprayed with a non-selective herbicide such as Glyphosate, following manufacturer’s recommended rate of application. Commencement of planting bed construction shall depend on herbicide manufacturer’s recommended waiting period.

1.5.1.3 For all proposed turf areas and planting beds outside of the dripline of existing trees, subgrades soil (6" below finish grade) that has been compacted by vehicles, equipment, material storage, and in other areas designated on the drawings, shall be plowed to a depth of 12" in two directions at 90 degrees to each other by a chisel tooth plow or other suitable machine to loosen the subsurface of the soil. After
plowing, the area shall be regarded to a smooth and even grade. The top 6” of subsoil shall be free of scrap lumber, trash, rocks larger than 3-inch diameter, concentrations of crushed rock, scraps of waste concrete and asphalt, and other deleterious materials prior to topsoil placement.

1.5.2 Planting Trees, Shrubs, Perennials, Bulbs, and Ground Covers

1.5.2.1 Preparation of planting areas:

1.5.2.1.1 Grasses, weeds and other debris shall be removed from all planting beds, shrub, and tree pits to prevent re-establishment of the grasses or weeds. Undesirable grasses and weeds shall be killed by using Roundup at the manufacturer’s recommended rates of application. Additional applications of Roundup will be required if prior applications do not kill the undesirable grasses and weeds. Remove dead plant debris prior to plant bed tilling and plant installation. All removed material shall be legally disposed of off-site away from all University property.

1.5.2.1.2 Prior to planting, till planting beds to an 8” depth. Till planting beds that require soil amendments to a 12” depth. Suitable excess soil shall be used as fill material on the site or removed from the site as directed by the Owner. Prior to planting and mulching, the edges of all planting beds shall be neatly and smoothly outlined with a spaded edge where indicated on the plans. The spaded edge shall be three inches deep in ground cover beds and four inches deep in shrub beds with soil tapered back into the planting bed. The soil surface of the bed shall be raked smooth prior to mulching. The outline edge of all beds shall be established so as to eliminate areas difficult to mow with a riding mower as directed by the Owner. Where tree, shrub, perennial, or ground cover beds abut walks, mow strips, or other pavement, the Contractor shall remove soil along the walk or paved area to a depth of three inches in ground cover beds and four inches in shrub beds and gradually taper the soil back into the planting bed so as to hold the mulch in place. Mulch is to be placed so as to be even with the pavement surface.

1.5.2.1.3 In tree, shrub, perennial, and ground cover beds apply 14-12-14 slow release fertilizer at a rate of one pound actual N per 1,000 square feet. Follow manufacturer’s instructions for method of application. In addition to the 14-12-14 slow release fertilizer, in pH modified beds, apply slow release micronized iron at a rate of one pound per 1,000 (one thousand) square feet.

1.5.2.1.4 Unless otherwise specified by the Owner, all plants shall be set at such a level that after settlement, the crown of the plant will be at or slightly above the surrounding finished grade.

1.5.2.1.5 All pits shall be circular and be excavated to have sloped sides
and shall be of the minimum dimensions shown in the details of the plans. Each plant to be installed in an individual pit shall be planted in the center thereof. All wire mesh from balled shrubs is to be removed. Wire mesh from balled trees is to be cut vertically to the bottom of ball at four evenly spaced places around ball. The mesh is to be cut off from top one-half of ball and removed. All burlap and lashings from balled and burlapped plants shall be removed from the top one-third of shrub and tree balls after the plant has been placed in the plant pit and immediately prior to backfilling, but no rope lashing or burlap shall be pulled out from under the balls. Remove shrub balls from container grown plants by cutting the cans on two sides with an acceptable can cutter or by carefully removing shrub balls from knock-out containers. After removal from container, the roots on the outside of the shrub ball are to be cut vertically around the ball at approximately 4 inch-6 inch intervals and the root ends “fluffed” so as to encourage them to grow into the surrounding soil and not to girdle the plant. Peat pots may be used for deciduous shrubs and ground cover. Peat pot is to be removed unless the rootball of shrubs would be damaged; then, remove at least top one-third of peat pot and cut vertically around pot at approximately 4 to 6 inch intervals, as approved by the Owner on site. Great care shall be exercised so as not to loosen or break the root ball. Plants with broken balls will not be accepted.

1.5.2.1.6 No material in a frozen condition shall be used for backfilling plant pits.

1.5.2.2 Plants shall be so handled that the roots are protected at all times, and if delivery is made in open vehicles the entire load shall be covered with canvas to prevent desiccation of material. Wind damaged plant material will not be accepted.

1.5.2.3 Plants shall be properly marked for identification with legible, weatherproof labels securely attached thereto before delivery to the site. Labels are to be left on the plants for identification until the Contractor is designated by the Owner to remove them. The labels will be removed at the Partial Occupancy site visit or immediately thereafter as directed by the Owner. All labels shall be sufficiently loose so as not to cause girdling of the plants.

1.5.2.4 No plant shall be so bound with rope, wire, or coverings at any time so as to cause damage to the bark, break branches, destroy its natural shape or impair its vigor.

1.5.2.5 Damaged and unhealthy limbs of trees and shrubs shall be pruned on site. Central leaders of trees shall not be removed without prior consent of Owner.

1.5.2.6 When each plant is placed in the plant pit at the proper level, the backfill will be placed around the plant and settled by watering thoroughly. The backfill shall not be tamped or
packed down by pressure. Further watering of plants is to begin two days after planting, as needed.

1.5.2.7 In the spring, apply a pre-emergent herbicide at the manufacturer’s recommended rate to all tree beds and shrub, perennial, bulb, and ground cover beds after planting and mulching. The Contractor shall use a pre-emergent currently labeled for use with the plant material within the beds. The Contractor shall submit a sample label for approval by the Owner prior to application.

1.5.2.8 Mulch for the trees and shrub planting shall consist of a 3” minimum and a 4” maximum layer of hardwood mulch. Mulch around ground cover plants shall consist of a 2” minimum and 3” maximum layer of hardwood mulch. The mulch layer thickness specified is expected after settlement.

1.5.2.9 All trees shall be braced by sound stakes or guy wires as detailed in the construction drawings, using specific materials. Trees are to be able to sway 3 to 4 inches after staking. Contractor is to remove all stakes, guy wires, and other guying material at the end of the guarantee period.

1.5.2.10 The maintenance shall begin immediately after planting. The trees, shrubs, ornamental grasses, perennial, bulb, and ground cover plantings shall be protected and maintained by watering, pruning, fertilizing, and replanting as necessary up until acceptance of the Project by the Owner at the time of Partial Occupancy so as to assure healthy plants in a vigorous growing condition. After acceptance of the Work, the Contractor shall be responsible for maintaining the newly installed plant materials and plant beds for a period of one year after date of Partial Occupancy. This work shall include watering, weeding, insect and disease control and general care of all woody plants, ground cover, ornamental grass, bulbs and perennials installed in a planting bed under this Contract.

1.5.2.11 Ground cover and shrubs in areas of greater than 10% slope are to be stabilized, if needed, after mulching and before planting with heavy jute mesh. Secure mesh to slope with 6” long wire staples. Down-channel end of roll to overlap upchannel end of roll by 18” and staple 12” on center. Overlap sides of rolls 4” and staple 3’ on center.

1.5.2.12 Soil pH shall be modified with twenty pounds of elemental sulfur per 1000 (one thousand) square feet, five pounds of iron sulfate per 1000 (one thousand) square feet, and three inches of peat on soil surface, all being tilled twelve inches minimum into the soil for plant materials that require soil pH to be less than 7 pH.

1.5.3 Planting of New Turf Areas – Seeding

1.5.3.1 All lawn areas disturbed by construction except tree pits and other tree, shrub and ground cover planting beds, as well as
areas designated on the Drawings to be sodded, shall be seeded as specified below.

1.5.3.2 The seeding operation shall not commence until site conditions are satisfactory. Seeding shall not be done during high winds or when the ground is excessively wet, frozen, or untillable.

1.5.3.3 All areas to be seeded shall meet the specified finish grades and be free of deleterious materials, including weeds, existing grass, tree branches, oil drippings, stones greater than 1-½” diameter, concentration of crushed rock, mortar, and other loose building materials. Finish grade shall consist of a minimum 6-inch topsoil finish layer except where greater thicknesses are noted on the Drawings.

1.5.3.4 Contractor shall protect seeded areas by watering, mowing, fertilizing, applying herbicide and replanting as necessary for as long as is required to establish a uniform stand of grass to a 3” height and until acceptance. Seeded areas will require the application of herbicides to kill broadleaf and grassy weeds. A fertilizer application of 23-3-8 at a rate of one pound actual N per 1,000 square feet shall be applied. When this operation is completed, no heavy objects shall be moved over or placed upon these areas at any time unless protected in a manner approved by the Owner’s Representative.

1.5.3.5 The turf grass seeding rates are as follows:

1.5.3.5.1 Improved Bluegrass mixture: 2 - 3 pounds per 1000 square feet.

1.5.3.5.2 Improved Turf-Type Tall Fescue mixture: 7 - 8 pounds per 1000 square feet.

1.5.3.5.3 Kentucky 31 Tall Fescue Mixture: 6 - 8 pounds per 1000 square feet.

1.5.3.6 The turf mixture for each area shall be divided into two equal parts, each to be broadcast in a separate operation with the second seeding to be over the first and at right angles to it. Seed shall be uniformly distributed with a “brilliontype,” cultipacker seeder, rotary fertilizer spreader, or other approved mechanical seeding equipment. A grain seed drill shall be used. Hydroseeding will not be accepted. After placement of seed, the seedbed shall be scarified to an average depth of ¼” and raked to incorporate the seed into the soil to insure good seed/soil contact. A drill or slicer seeder is recommended to seed grasses – allows seed to come into contact with soil.

1.5.3.7 Straw mulch shall be broadcast evenly, 4 to 5 straws deep, with a straw blower over the seeded areas using not less than 1 bale per 1000 square feet. Approximately 50% of the soil surface shall show through the mulch. In lieu of broadcasting the straw blower, the mulch shall be anchored to the soil by light disking, or other approved method, which will secure the
straw firmly in the ground to form a soft binding mulch and prevent loss or bunching by the wind.

1.5.3.8 All slopes equal to or greater than one vertical foot to three horizontal feet, or areas of concentrated surface storm water drainage (i.e. drainage channels) shall be covered with erosion control fabric after seeding. Staple the 6" overlap of erosion control fabric at a minimum of every 24 inches.

1.5.4 Planting of Turf Areas – Sodding

1.5.4.1 All areas to be sodded are indicated on the Drawings.

1.5.4.2 The sodding operation shall not commence until site conditions are satisfactory. Sodding shall not be done when the ground is excessively wet, frozen or untillable.

1.5.4.3 All areas to be sodded shall meet the specified finish grades before sodding and be free of deleterious materials, including weeds, existing grasses, tree branches, oil drippings, stones greater than 1-½" diameter, concentrations of crushed rock, mortar and other loose building materials. Finish grade shall consist of a minimum 6" layer of topsoil except where greater thicknesses are noted on the Drawings. Grades for the flow lines of swales and ditches, detailed on the Drawings, shall be carefully established at a level even with the thatch surface of the sod. Sod placement, rolling, and watering shall conform with the grades shown on the Drawings.

1.5.4.4 Prepare sod bed by applying slow release fertilizer with ratios of approximately 10-18-22, supplemented with iron, at a rate of one pound actual N per 1,000 square feet of area to be sodded. The fertilizer shall be thoroughly incorporated into the soil by tilling to a depth of 4 to 6 inches with a mechanical tiller or other approved method. The sod bed is to be smooth, free of rocks, clods and other debris larger than one inch; and free from hollows or depressions. Sod bed shall be in a firm, but uncompacted condition with a fine texture prior to laying of sod.

1.5.4.5 Sod shall be installed in tightly abutted parallel rows with the lateral joints staggered at a minimum distance equal to the width of the sod slab. Voids between sod strips will not be accepted.

1.5.4.6 For sloping surfaces, sod shall be laid at the base of the slope with staggered joints and at right angles to the flow of water. Sod placed on 3:1 slopes or steeper, and in ditch flow lines, shall be staked with 6 stakes per square yard or roll of sod. Stakes shall be wood, with ½" of the top above sod line. Stakes should be set sufficiently in the ground to permit mowing.

1.5.4.7 The sod shall be watered immediately after installation. Prevent sod from drying during progress of work. After sodding is completed in any one section, the entire area shall
be thoroughly irrigated to at least one-inch depth below the new sod pad. Subsequent watering should maintain moisture to a depth of at least 4 inches.

1.5.4.8 Maintenance shall begin immediately after planting. The sod shall be protected and maintained by watering, mowing, fertilizing and replanting for as long as it is necessary to establish a uniform stand of grass. Any sod not surviving prior to its first mowing shall be replaced with new sod from the same source. Mowing of the sod will be the responsibility of the Owner.

1.5.5 Maintenance of Turf

1.5.5.1 Seeded Turf Areas: The Contractor shall protect seeded areas by watering, mowing, fertilizing, applying herbicide, and replanting as necessary for as long as is required to establish a uniform stand of grass to a 3\" height and until acceptance. Seeded areas will require the application of herbicides to kill broadleaf and grassy weeds. A fertilizer application of 23-3-8 at a rate of one pound actual N per 1,000 square feet shall be made in April of the following year. Scattered bare spots, (none of which are larger than one square foot) will be allowed in up to a maximum of five percent of any planted area. The Contractor is to supply water by hoses and sprinkler equipment as needed until acceptance of the seeded areas.

1.5.5.2 Sodded Turf Areas: The maintenance shall begin immediately after planting. The sod shall be protected and maintained by watering, mowing, fertilizing and replanting for a minimum of 21 days or as long as necessary to establish a uniform stand of grass. Any sod not surviving shall be replaced by new sod from the same source. A fertilizer application of 28-3-8 at a rate of one pound actual N per 1,000 square feet of sod shall be made in April of the following year. The Contractor is to supply water by hoses and sprinkler equipment as needed until acceptance of the sodded areas.

1.5.6 Relocation of Existing Trees and Shrubs

1.5.6.1 Trees and shrubs to be relocated shall be balled and burlapped (B & B) according to accepted nursery industry standards. Plants shall be dug with firm natural balls of earth in a diameter not less than specified by “American Standard for Nursery Stock,” ANSI Z60.1 and shall be securely wrapped with burlap or canvas, and tightly bound with rope or wire.

1.5.6.2 Trees and shrubs shall be immediately replanted or heeled-in after digging in accordance with the specifications.

1.5.7 Installation of Landscape Bed Edging (Wood Timbers)

1.5.7.1 Place Edging in areas and with dimensions indicated on the Drawings.
1.5.7.2 Installed edging shall be flush with the finish grade of the adjacent turf area and ½" above the mulched bed.

1.5.7.3 Anchor edging with reinforcing rod stakes spaced not more than 3 feet on center and driven at least 24 inches into the subgrade. Stakes shall be placed in the holes that are drilled on center with the timber edging. Four galvanized nails shall be used per wood “connector strip.”

1.5.8 Clean-Up and Protection

1.5.8.1 Site Cleaning

1.5.8.1.1 Pick up litter within project site and any litter within 50 feet of the University’s side of the project site fence, along access routes, Contractor storage yards and parking area, on a daily basis. Debris to be placed in Contractor’s trash containers. Contractor is responsible for all removal of construction debris.

1.5.8.1.2 Keep weeds and grasses in control every five days within project site and in Contractor parking/storage yards (use weed eater or mower for cutting.)

1.5.8.1.3 Contractor is to use planking, or other protective measures.

1.5.8.1.4 Contractor is to clean concrete trucks within the project site or off campus property.

1.5.8.1.5 On a daily basis, power wash streets and sidewalks after Contractor’s vehicles have left tracks on the way to or from the project site. Spud hoe up clods of dirt thrown from or crushed by tires, etc. and remove from site. Street sweep access routes used by contractors to edge of campus as well as provide follow up cleaning; i.e. broom and wash.

1.5.8.1.6 On a daily basis, remove stains from paved surfaces caused by rubber from tire tracks, oils, fuels, solvents, etc.

1.5.8.2 Site Access – The campus is a pedestrian campus and must remain accessible for the safe movement of pedestrians through the entire campus.

1.5.8.2.1 Contractor shall provide alternate or temporary sidewalks to keep people moving, with adequate surfaces for safety.

1.5.8.2.2 Contractor is to use boring methods to pass utility lines under and keep all paved areas intact to the greatest extent possible.

1.5.8.2.3 Contractor must share sidewalks and streets with pedestrians and other service vehicles along their access route to their project site boundaries.
1.5.8.2.4 Alternate traffic methods need to comply with all applicable codes and regulations.

1.5.8.2.5 ADA accessibility must be maintained.

1.5.8.2.6 Required fire exit paths from buildings must be maintained with a hard surface and never be blocked by Contractor equipment, materials or work at any time during the work day.

1.5.8.2.7 Access to site for University personnel or other Contractors must be maintained at all times.

1.5.8.2.8 Contractor is to remove construction debris from site on a daily basis, or keep debris fully enclosed in commercial containers.

1.5.8.2.9 Contractor may use sidewalks/streets for limited access to site, provided:

1.5.8.2.9.1 When the ground is moist, planking is required along the path of access to prevent construction vehicle damage to grounds.

1.5.8.2.9.2 Contractor Personnel shall direct pedestrian traffic for safety purposes adjacent to project site when heavy equipment needs access to and from project site across sidewalks/streets.

1.5.8.10 Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid the Project of rodents, insects, and other pests.

1.5.8.11 Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.

1.5.8.12 Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner’s property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of lawfully.

1.5.8.12.1 Where extra materials of value remain after completion of associated Work, they become the Owner’s property. Dispose of these materials as directed by the Owner.

1.5.9 Plant Guarantee and Maintenance Requirements

APP 1-25
January 2013
1.5.9.1 At the end of the guarantee period, inspection will be made by the Owner upon written notice requesting such inspection submitted by the Contractor at least 10 days prior to the anticipated date. Any and all parts which prove defective in material or workmanship shall be replaced by the Contractor at their expense.

1.5.9.2 During construction time up to the date of Partial Occupancy as approved by the Owner, any plants missing due to theft or vandalism shall be replaced by the Contractor at their expense as soon as conditions permit during the normal planting season. Normal fall planting season shall be from September 1 to October 31 for seeding, sodding, shrub, perennial, bulb and groundcover planting in the Fall. Tree planting may continue until December 15, weather permitting. Normal spring planting season shall begin when weather permits or soil conditions are suitable until May 24.

1.5.9.3 Any plant material required under this Contract that is not in satisfactory vigor and growth at the end of the guarantee period for any reason except hail, flood, tornado, fire, earthquake, and/or Owner damage, as determined by the Owner, shall be removed from the site. These plants and any plants missing because of the Contractor’s negligence shall be replaced by the Contractor at their expense as soon as conditions permit during the normal planting season. In case of a rejected plant, the Contractor may elect, upon agreement by the Owner, to allow such plant to remain through another complete growing season. The rejected plant, if found not to be in healthy or vigorous growing condition after another growing season, shall be replaced by the Contractor, in a larger than specified size if necessary, to match other plants in a particular bed or planting group planted under this contract.

1.5.9.4 All replacements shall be plants of the same kind as specified in the plant list. They shall be furnished and planted as specified under planting of trees, shrubs, perennials, bulbs, and groundcovers and the cost shall be borne by the Contractor.

1.6 Lawn Sprinkler Piping

1.6.1 Materials

1.6.1.1 PVC and PVC Pipe Fittings

1.6.1.1.1 Mainline pipe shall be virgin, high impact, polyvinyl chloride (PVC) Schedule 40. Lateral lines shall be polyvinyl chloride (PVC) pipe Class 200 or specified P.E. pipe. All PVC pipe shall be continuously and permanently marked with manufacturer’s name, material, size and schedule or type. Pipe shall meet ASTM D2241 specifications for PVC plastic pipe or latest revision thereof. Pipe sizes are shown on
drawings as minimum allowable sizes. Larger sizes may be used by Contractor.

1.6.1.2 P.E. Pipe and P.E. Pipe Fittings

1.6.1.2.1 For lateral lines, of sizes shown below, the installer may use polyethylene pipe (P.E.) Class 160. Pipe sizes on drawings shall be adjusted to the following sizes for P.E. pipe:

<table>
<thead>
<tr>
<th>PVC</th>
<th>P.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1”</td>
<td>1 – ½”</td>
</tr>
<tr>
<td>1 – ½”</td>
<td>2”</td>
</tr>
</tbody>
</table>

1.6.1.3 Flexible Swing Pipe or Triple Swing Joint

1.6.1.3.1 Flexible swing pipe shall be ½” polyethylene (P.E.) pipe, Class 160. The flexible pipe should not extend over 3 feet and should be placed to provide positive drainage to the lateral line.

1.6.1.3.2 Fittings for the flexible swing pipe shall be the ‘spiral barb’ type, as specified for P.E. pipe and clamps.

1.6.1.3.3 Use a triple swing joint on lateral pipe sizes 2” or larger.

1.6.1.3.4 Use flexible swing polyethylene pipe on laterals of sizes less than 2”.

1.6.1.4 Pipe and Tube Fittings

1.6.1.4.1 All PVC fittings shall be schedule 40 and 80: ASTM D 2466.

1.6.1.4.2 Insert fittings for P.E. Pipe: Fittings shall be held in place on the pipe with screw tightened stainless steel clamps fastened around the fitting serration.

1.6.1.5 Joining Materials

1.6.1.5.1 All slip fittings shall be solvent welded. Primer is to be a different color than cement.

1.6.1.5.2 Use Teflon tape on all threaded fittings, applied with a single wrap with 50% overlap.

1.6.1.6 Valves and valve specialities

1.6.1.6.1 Remote control valve shall be Weathermatic 11000 CR series with pressure regulator.

1.6.1.6.2 Master valves shall be Weathermatic 8000 CR or 11000 CR series.
1.6.1.6.3 Flow sensor shall be a model supplied by Data Industrial, or approved equal, with a schedule 80 PVC tee and fitted with a removable sensor insert.

1.6.1.6.4 Remote Control Valves for flows less than 10 G.P.M. shall be Rainbird XCZ-075 prepackaged control zone kit including (1) XBV-075 ball valve, (1) RBY-075-200 MX inline filter, (1) 75-DVX remote control valve, (1) PSI-M30X pressure regulator, (2) 3/4" (20/27) x 1-1/2" schedule 80 nipples.

1.6.1.6.5 R.C.V. valve box cover shall be green in color.

1.6.1.6.6 Sprinklers shall be Hunter (gear, pop-up). Strip head sprinklers shall be Hunter, Toro, Rainbird.

1.6.1.6.7 Use double check assembly for checking the water in underground vault.

1.6.1.7 Wiring

1.6.1.7.1 Wire to the automatic controller from the power source shall be copper conductor, No. 12 AWG Type-TW or THHN wire.

1.6.1.7.2 Electric control wires from the automatic controller to the automatic valves shall be direct burial No. 14 AWG copper, UF Type wire. The insulation shall be 60⁰ Celsius with insulation thickness of 3/64". The common wire shall be white and another individual color shall be dedicated to each valve. Extra wires shall be installed as shown on plan and as herein specified with ends properly water proofed with King ‘one-step’ connectors or approved equal.

1.6.1.7.3 Wires used above ground shall be encased in U.L. listed electrical metallic tubing attached to the vertical mounting surface with zinc plated clips placed two feet on center.

1.6.1.7.4 Wires beneath sidewalks or roads shall be installed in a P.V.C. sleeve.

1.6.1.8 Automatic Control System

1.6.1.8.1 Controller shall be Eicon wall or pedestal mount enclosure that is waterproof & lockable. Ground according to manufacturer’s recommendations.

1.6.2 Execution

1.6.2.1 Preparation

1.6.2.1.1 Flags shall be set to identify preliminary locations of lawn sprinklers.

APP 1-28
January 2013
1.6.2.2 Trenching and Backfilling

1.6.2.2.1 Sleeves for piping and wiring shall be installed under sidewalks.

1.6.2.2.2 Piping or sleeves shall be covered to these minimums:

- 1.6.2.2.2.1 Lateral Pipe – 18 inches, Class 200 P.V.C.
- 1.6.2.2.2.2 Mainline Pipe – 28 inches, Schedule 40 P.V.C.
- 1.6.2.2.2.3 Sleeves – 28 inches or 18 inches, Schedule 40 P.V.C.

1.6.2.3 Piping Installation

1.6.2.3.1 Install P.V.C. pipe in dry weather at temperatures above 40 degrees Fahrenheit for 24 hours at this temperature before testing.

1.6.2.4 Automatic Control System Installation

1.6.2.4.1 Wiring should be installed in same trench with piping. To allow for expansion, loop wire at control valves and controllers and 100 foot intervals. Bundle wires every 10 feet.

1.6.2.4.2 Pipe shall be flushed free of dirt and debris before installation of sprinklers or other devices.

1.6.2.4.3 Test entire system at normal working pressure for 3 hours and demonstrate operation to Owner’s maintenance personnel.

1.6.2.4.4 The specification standards listed herein are designed for potable water lawn irrigation application only. Chemical injection and reclaimed water through irrigation piping is not permitted.

End of Section