

SECTION 32 93 00_Plants and Planting

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PART 1 – GENERAL

Information in this Section is to be followed unless otherwise directed by University of Delaware (UD) Owner Representative **and** UD Grounds Representative.

Definition of UD Grounds Representative = UD Assistant Director of Grounds and UD Landscape Planner or their designated Grounds Representative.

1.1 SUMMARY

- A. This section defines standards for plant selection, handling, installation and care from the project’s start through substantial completion, guarantee period and final acceptance at end of the guarantee period. Included are standards for soils, planting bed preparation, products and handling, installation and maintenance through project completion.

1.2 RELATED DOCUMENTS AND REFERENCES

- A. ***American Standard for Nursery Stock, ANSI Z60.1.*** American Nursery and Landscape Association, 1250 Eye Street. NW, Suite 500, Washington, D.C. 20005. Latest Edition.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Perform all work in compliance with applicable requirements of governing authorities having jurisdiction.
- B. Installer Qualifications: Engage an experienced Installer who has professional and project experience similar in material, design, and extent to that indicated for landscape work and with a record of successful landscape / planting establishment.
- C. Installer’s Field Supervisor: Installer is to maintain an experienced full-time supervisor on the Project site during all times throughout execution of this portion of the Work, who is thoroughly familiar with the type of plants being installed and the proper materials and methods for their installation, to direct all work performed under this Section. This person shall have a minimum of 5-years’ experience in handling the specified plants and should have a set of prints of the project on site, as applicable.

D. Selection and Planting:

- Provide quality, size, genus, species, and variety of plants indicated on the Plans, in accordance with the applicable requirements of **ANSI Z60.1 American Standard for Nursery Stock**, latest edition. The highest horticultural standards shall be practiced from the time of plant purchase through delivery and installation on site to ensure health, vigor and establishment of all plants.
- All plants are subject to approval by UD Grounds Representative who may inspect plants either at place of growth or at site before planting, for compliance with requirements for genus, species, variety, size, and quality. UD Grounds Representative retains the right to further inspect plants for size and condition of balls and root systems, insects, injuries and latent defects, and to reject unsatisfactory or defective material **at any time during progress of work and during contract period**. Contractor shall remove rejected plants from project immediately and replace with approved replacement, at appropriate planting time, at no cost to Owner.
- All plants are to be provided as specified. Requests to use plant substitutes, whether for size or species/cultivar, shall be made prior to delivery of plants to a job site and only with permission by Owner's Representative and Assistant Director of Grounds / UD Landscape Planner, and confirmed in writing.
 - Plants of a larger size may be used if acceptable to Owner's Representative and UD Grounds Representative with a proportionate increase in size of roots or balls, and at no additions to the Contract Price.
 - Tree Measurements: Measure trees according to ANSI Z60.1 with branches and trunks or canes in their normal position. Do not prune to obtain required sizes.
- In the event that quantity discrepancies or material omissions occur between the Plant List and Planting Plan, Contractor is to immediately notify Owner's Representative and UD Grounds' Representative for clarification and to receive instruction about how to proceed.
- Nomenclature and interpretation of plant names shall reference the following. Where the names of plant descriptions disagree, the most current information will prevail:
 - The Royal Horticultural Society Horticultural Database (<http://www.rhs.org.uk/>).
 - USDA – The Germplasm Resources Information Network : <http://www.ars-grin.gov/>

- Manual of Woody Landscape Plants; Michael Dirr; Stipes Publishing, Champaign, Illinois; Most Current Edition.
- For woody plants and trees: Label each plant within each variety and size with a securely attached, waterproof tag bearing legible designation of botanical and common name.
- Plant handling shall comply with State and Federal laws, including quarantines with respect to inspection, plant diseases and insect infestation.
- Planting times shall be during one of the following periods. Coordinate planting periods with maintenance periods, as applicable, to provide required maintenance through date of final acceptance.
 - Spring Planting: April 26 – June 15 (frost-hardy and acclimatized plant material may be planted prior to April 26 with prior approval from UD Grounds Representative and when not restricted by inclement weather limitations).
 - Fall Planting: September 1 – October 15 (plant material may be planted after October 15 with prior approval from UD Grounds Representative and when not restricted by inclement weather limitations).
 - Summer Planting: to be performed on a project by project basis when not restricted by extreme heat and drought conditions, and when a water source and watering equipment are provided and are easily accessible.
 - Dig trees according to the best recommended time, as per fall and/or spring dig hazards.
- Proceed with planting only when existing and forecasted weather conditions permit. If projected or current weather will stress plants, reschedule planting/installation times and dates.
- Under no circumstances should work be performed in wet, muddy or frozen ground conditions that risk destruction of soil health and improper planting / installation.

E. Equipment:

1. Provide machinery and equipment necessary for the prompt, professional completion of the work. Such machinery shall be adequate to the task required and shall be operated by a person skilled and experienced in both operation of the equipment and the implementation of the task.
2. Upon request, promptly furnish satisfactory evidence of the organization, operator and equipment to be made available for the performance of the work.

F. Submittals, Documentation and Coordination:

1. *Submit documentation prior to the start of work under this Section* that all plants and related materials have been ordered.
2. *Plant delivery to site and timing of installation* is to be coordinated with Owner's Representative and UD Grounds Representative prior to delivery of plants to site.
3. *Coordination with Lawns:* Plant trees and shrubs after finish grades are established **and approved** but before installing lawns. If lawns are already established, protect with ¾" plywood, to be removed in manner that ensures viability of existing lawn.
4. *Amendments, Soil Analysis and Soil Samples:* Obtain analysis of soil, as per below, from an accredited soil laboratory, to determine suitability of topsoil and subsoils for plant growth.
 - i. Excavated topsoil (if proposed for reuse):
 1. Lab Analysis for physical, organic and chemical composition;
 - ii. Excavated subsoil (if proposed for reuse);
 1. Lab Analysis for physical, organic and chemical composition;
 - iii. Imported Topsoil:
 1. Current Lab Analysis for each batch of topsoil brought onsite;
 2. #1 sample, clearly labelled with soil type and date, from same batch as used for soil analysis;
 3. Name and location of vendor / source;
 - iv. Imported Subsoil:
 1. Current Lab Analysis for each batch of subsoil brought onsite;
 2. #1 sample, clearly labelled with soil type and date; from same batch as used for soil analysis;
 3. Name and location of vendor / source;
 - v. Fertilizer / Amendment – determined by soil analysis:
 1. Lab analysis of soils for nutrient deficiencies & Recommendations
5. *Notification of intent to install soil for planting bed preparation, and delivery / installation of plantings* to be provided 10 calendar days to UD Grounds Representative prior to delivery to site, and prior to installation, to ensure sufficient time to coordinate site reviews / observation of work.

G. Substantial Completion and Start of Guarantee Period:

1. Upon written notice from the Contractor, the Owner's Representative and UD Grounds Representative shall review the work and make a determination if the work is substantially complete.
2. The date of Substantial Completion of the planting shall be the date when the Owner's Representative and UD Grounds Representative accepts that all Planting work is complete.
3. All plants must be in a vigorous growing condition at the time of Substantial Completion.
4. The Plant Guarantee period begins at the date of written notification of Substantial Completion from the Owner's Representative and UD Grounds Representative. The date of Substantial Completion for planting may be different than the date of substantial completion for the other sections of the project.

PART 2 – PRODUCTS

2.1 PLANTS - GENERAL

- A. All plants shall be sound, healthy, vigorous nursery stock with normal habit of growth, well-developed branches and vigorous root systems, with growth habit and form typical of their species.
- B. Plants shall be free from damaging and defacing knots, girdling roots, leaf scorch, injuries, and abrasions of bark, plant diseases, insect eggs, borers, and all forms of infestation.
- C. All plants are subject to approval by Owner's Representative and UD Grounds Representative.
- D. Trees with multiple leaders, unless specified, will be rejected.

2.2 BALL AND BURLAP STOCK

- A. Ball and Burlap Stock shall be dug with firm natural balls of earth of sufficient diameter and depth to encompass the fibrous and feeding root system necessary to the plant's healthy establishment.
- B. Root balls shall be firmly wrapped with burlap and bound with twine or wire mesh.

- C. No balled and burlap plant will be accepted if the ball is cracked or broken either before or during the process of planting.

2.3 CONTAINER STOCK

- A. Container stock shall be grown in its delivery container for not less than six (6) months but not more than 2 years.
- B. Plants shall have well established root systems but not be root-bound.
- C. Plants with cracked or broken balls of earth when taken from the containers shall not be planted.

2.4 BARE-ROOT STOCK

- A. Bare-root stock should have a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than minimum root spread according to ANSI Z60.1 for kind and size typical of its species.
- B. Plants should be sufficiently packaged and stored to preserve moisture in fibrous root systems to ensure the health and vigor of the plant.

2.5 IMPORTED SOILS

To be used only after review and approval by UD Grounds Representative.

A. Imported Topsoil:

1. Satisfactory Imported Topsoil shall be a naturally produced USDA loam, and within 2% of optimum MC for soil type or as per field inspection by UD Grounds Representative at time of installation and during any time of soil manipulation / earthwork; soil to be suitable for the germination of seeds and the support of vegetation;
2. Shall be free from subsoil, sod, frozen material, weeds, plant or construction debris, large rocks or soil clods, woody material, refuse of any type or any item over .5" diameter;
3. Soils are not to be manipulated or installed when wet, muddy, frozen or when overly dry;

4. Shall have the following physical and chemical composition, as verified by onsite evaluation and current soil test / analysis from reputable soil testing laboratory:
 - **Sand: 40 – 65%**
 - **Silt: 15 – 30%**
 - **Clay: 5 – 25%**
 - **Silt and Clay in combination: less than 65%**
 - **pH shall be based on the specific plant requirements but will be within the range of 5.5 - 7.0, inclusive;**
 - **minimum of 4% organic matter and no more than 8%;**

B. Imported Subsoil:

1. Satisfactory Imported subsoil shall be within recommended MC for soil type or as per field inspection by UD Grounds Representative at time of installation and during any time of soil manipulation / earthwork;
2. Satisfactory Imported Subsoil shall be a naturally produced USDA subsoil with low organic matter (no more than 2%);
3. Shall be free of large rocks (anything greater than 2"D), organic or woody material, clods, sod, frozen material, noxious weeds, vegetation, construction debris or refuse of any type;
4. Shall have the following physical and chemical composition, as verified by onsite evaluation and current soil test / analysis from reputable soil testing laboratory:
 - **Sand: 40 – 57%**
 - **Silt: 15 – 30%**
 - **Clay: 5 – 13%**
 - **Gravel:**
 - **7.7% - 6.3mm (1/4")**
 - **0.3 % – 4mm (#5)**
 - **2.2% - 2mm (#10)**
 - **Organic matter: .25 – no more than 2%**
 - **pH shall be based on the specific plant requirements but will be within the range of 5.5 - 7.0, inclusive**

2.6 EXCAVATED SUBSOILS (TOPSOIL AND SUBSOIL)

- A. To be used only after field review and approval for re-use by UD Grounds Representative. *UD reserves the right to request soil analysis and testing for any in-situ material being proposed for re-use.*
- B. Soils are not to be manipulated when wet, muddy, frozen or when drought conditions exist;
- C. **Excavated Topsoil:**
 - 1. Remove grass and sod prior to stripping topsoil;
 - 2. Strip topsoil in a manner to prevent intermingling with underlying subsoil or other waste materials;
 - 3. Remove subsoil and non-soil materials from topsoil including trash, debris, weeds, lumps, clods, gravel, roots and debris including objects greater than .5" D;
 - 4. Inspection of topsoil by Grounds Manager and Landscape Planner is required;
 - 5. In the event of unsuitable soils or inability to store and reuse existing, suitable topsoils are to be provided as per Imported Topsoil described in 2.5 of this specification;
 - 6. Soils are to be stored without intermingling of other materials and shall be reinstalled only when within 2% of optimum moisture content for soil type at time of installation and compaction, or as is considered reasonably dry by field verification from UD Grounds Representative.
- D. **Excavated Subsoil:**
 - 1. Excavate subsoil in a manner to prevent intermingling with topsoil, organic material or other waste materials;
 - 2. Remove organic materials and non-soil materials from topsoil including trash, debris, weeds, lumps, clods, gravel, roots and any foreign item;
 - 3. Inspection of subsoil by UD Grounds Manager and Landscape Planner is required;
 - 4. In the event of unsuitable soils or inability to store and reuse, suitable backfill materials are to be provided as per Imported Subsoils as described in 2.5 of this specification;
 - 5. Soils are to be stored without intermingling of other materials and shall be reinstalled only when within 2% of optimum MC for soil type or as per field inspection by UD Grounds Representative.

2.7 COMPOST

- A. Compost shall be well decomposed, stable, weed free organic plant matter source, brown in color (black indicates possible burning), parent material no longer visible, structure is a mixture of fin and medium size particle and humus; Moisture: 30-40%, no ammonia or anaerobic odor (smells like rich hums from forest floor); pH : 6.5 – 8.5
- B. Compost added to existing soil is to be added at a 2" depth per 6" soil and turned/mixed to a depth of 4 - 6" for planting areas. Final compost: soil ratio should not exceed 8% organic matter in final mixture of soil. Final mixture should meet the specifications set forth for Imported Topsoil.

2.8 MULCH

- A. Mulch is to be 100% natural, free from deleterious materials, and suitable as a top dressing for plants.
- B. Double shredded hardwood bark mulch.
- C. Substitutions may be used only with prior approval from UD Grounds Representative

2.9 FERTILIZER AND SOIL AMENDMENTS

- A. Soil amendments and fertilizers are to be purchased and installed as per soil analysis recommendations and rates.

2.10 WATERING EQUIPMENT

To be provided on a project-by-project basis, as defined by Scope of Project, and is to remain the property of the Owner at the completion of the project:

- A. Gator Bags;
- B. Ooze Tubes sufficient for watering multi-stem trees or shrubs;
- C. Soaker Hose – should be black or dark color which could blend in appearance with mulch, which can be used above or below soil / mulch surface, will not burst if frozen and provides even distribution of water throughout the planting area or root zones. Installed as per manufacturer’s specifications and as directed by project.

2.11 STAKES AND GUYS FOR TREES

- A. Stakes, anchors, and wires shall be of sufficient strength to maintain the tree in an upright position in the conditions in which the tree will be installed.
- B. Guy wires shall be galvanized, multi-strand, twisted wire.

- C. At the location where guy wires are attached around the tree, the trunk shall be protected with 20-mm (3/4 in.) diameter rubber hose, black or dark green in color, and of sufficient length to extend past the trunk by more than 105 mm (6 in).

PART 3- EXECUTION

3.1 PLANTING BED PREPARATION

- A. Avoid plantings in areas within tree root zones, minimize disturbance under tree canopies and on slopes; do not perform site / soil work in wet, frozen or muddy conditions, or in times of extreme drought or in conditions that will cause undue compaction of soils;
- B. Restore areas if eroded or otherwise disturbed after finish grading and before planting;
- C. **Bed prep for areas damaged or disturbed by activity – includes but not limited to haul road, lay down, materials storage, event activities, etc.:**
 - 1. Remove all debris until existing topsoil or sub soil layer is revealed, and is existing without any remaining contamination or intermingling of construction material, fill, foreign soils, etc.;
 - 2. Loosen existing grades or subgrades to a depth of 12” and to an extent that water infiltration and decompacted soil conditions will support plant or lawn health;
 - 3. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
 - 4. Verify that sub-grades and finish grades are accurately established, allowing for 2” depth from finished grade for mulch layer;
 - 5. Spread approved topsoil or subsoil as needed to meet finish grades as per plans or to match existing adjacent grades after light rolling and natural settlement.
 - 6. Incorporate compost and fertilizer as directed by soil analysis / soil test;
 - 7. Perform finish grading;
 - i. Uniformly grade areas to a smooth surface, free from irregular surface changes;
 - ii. Comply with compaction requirements and grade to cross sections, spot elevations, benchmarks, lines, and contours indicated on plans, or as existing conditions warrant;
 - iii. Slope grades to direct water away from buildings central lawn or bed areas, and to prevent ponding (ensuring appropriate sloping of beds for positive flow of water toward SW infrastructure, drains, etc. or as existing conditions and plans dictate) ;

- iv. Provide a smooth transition between adjacent existing grades and new grades, including and especially in areas of material change from turf to planting beds, turf to pavers, planting beds to pavers, etc.;
 - v. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances;
 - 8. Planting beds and tree rings are to be vertically edged along turf or paver boundaries to a minimum of 2" depth or greater, enough to contain mulch layer within the planting bed. Work excess soil back into planting bed and rake smooth.
- D. **Bed prep for areas needing planting bed replacement / rejuvenation NOT caused by damage to area:** If beds are to be installed into areas unaltered or undisturbed by excavating, grading, or surface soil stripping operations, or any other activity, prepare planting bed as follows:
 - 1. All stumps, weeds, vegetation not being retained are to be grubbed out and/or removed. After grass or vegetation has been removed, dispose off-site in a manner that does not contaminate existing surface soil.
 - 2. Loosen surface soil to a depth of at least of 12 inches, or as compaction conditions indicate to ensure adequate plant health. Excavate and remove existing soil as required to accommodate depths of any recommended soil amendments. Apply soil amendments and fertilizers (as needed) as per soil test and mix thoroughly into top 6 inches of soil.
 - 3. Remove stones larger than 1 inch in any dimension and sticks, roots, trash, and other extraneous matter.
 - 4. Verify finish grades are accurately established, allowing for 2" depth from finished grade for mulch layer.
 - 5. Perform finish grading;
 - i. Uniformly grade areas to a smooth surface, free from irregular surface changes;
 - ii. Comply with compaction requirements and grade to cross sections, spot elevations, benchmarks, lines, and contours indicated on plans, or as existing conditions warrant;
 - iii. Slope grades to direct water away from buildings and central lawn or bed areas, and to prevent ponding (ensuring appropriate crowing in central lawn areas as conditions require);
 - iv. Provide a smooth transition between adjacent existing grades and new grades, including and especially in areas of material change from turf to planting, turf to pavers, planting to pavers, etc.;

- v. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances
- 6. Planting beds and tree rings are to be vertically edged along turf or paver boundaries to a minimum of 2" depth or greater, enough to contain mulch layer within the planting bed. Work excess soil back into planting bed and rake smooth.

3.2 PLANTING PIT PREPARATION FOR TREES

- A. Verify that subgrades are accurately established before digging tree pit.
- B. Dig a hole so that depth will enable tree to be installed in a manner that allows the root flare to be at or slightly above Finished Grade after normal compaction, and at the same relationship to finished grade as they were to the ground from which they were dug.
- C. Planting hole should be 2 – 3x wider than the size of the root ball.

3.3 DELIVERY, STORAGE AND HANDLING

- A. Plants must be sufficiently containerized, packaged, tarped, etc. to ensure viability of plants and the protection of roots and other plant parts against sun scald, drying, sweating, whipping, and other handling damage as well as climatic seasonal and other injuries.
- B. Trees: Deliver freshly dug trees. Do not prune before delivery, except as approved by Owner's Representative and Assistant Director of Grounds / UD Landscape Planner. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees in such a manner as to destroy natural shape. Provide protective covering during delivery to prevent wind burn. Do not drop trees during delivery.
- C. Water all trees and plants as needed from time of pick up through substantial completion.
- D. Do not lift or handle container plants by tops, stems or trunks at any time.
- E. Handle ball and burlap stock by the root ball only; do not stand on or tamp directly on root balls.

- F. Deliver trees and plants after preparations for planting have been completed and install immediately. If planting is delayed more than 6 hours after delivery, set planting materials in shade, protect from weather and mechanical damage, and keep roots moist. Properly protect plants with soil, moist mulch, etc., in a manner acceptable to Owner's Representative and Assistant Director of Grounds / UD Landscape Planner.
 - 1. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material, if not installed within six hours from delivery.
 - 1. Root balls/plants shall not be permitted to remain un-installed or exposed during periods of freezing weather or extreme weather conditions.
 - 2. Do not remove container-grown stock from containers before time of planting.
 - 3. Water root systems of trees stored on site as often and thoroughly as necessary to maintain root systems in a moist condition.

3.4 LAYOUT

- A. Layout specifications and area and perimeter measurements are provided as guidelines only and are to be confirmed in the field by Contractor(s) and adjusted as necessary and collaboratively with Owner's Representative and UD Landscape Planner.
- B. The location of new plants and new planting beds are to be staked out in collaboration with and approved by the Owner's Representative and UD Landscape Planner, prior to installation.

3.5 PLANT INSTALLATION

- A. All root balls removed from containers will be scarified and roots thoroughly separated prior to planting.
- B. All plastic or no-rot burlap or twine are to be completely removed from the plant ball prior to backfilling with planting soil. Biodegradable burlap and twine and wire cage material shall be cut away from the top 1/3 of the root ball and remove from the site.
- C. When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, **stop work** and notify Owner's Representative and UD Grounds' Representative for additional direction.
- D. Set plant plumb and in center of planting pit or trench with top of ball raised just above adjacent finish grade enough to allow for normal compaction and sufficient final planting depth, and so surface of root system will be flush with adjacent finished grades after normal settling.

- E. Maintain full depth of planting soil around root system of plants.
- F. Place soil around ball in layers, tamping gently to settle backfill and eliminate voids and air pockets - do not over tamp. When pit is approximately half backfilled, water thoroughly before placing remainder of backfill.

3.6 TREE INSTALLATION

- A. Place stock plumb and straight on cultivated subgrade. Place all trees at a level so that the tree flare is exposed and top of ball is just above or at finished grade at final compaction, do not cover top of root ball with soil.
- B. Cut and remove twine from collar of tree. Cut off and remove top 1/3 of wire baskets, fold back. Cut off and remove burlap at same level from balls and from sides, but do not remove from under balls. If there is no wire basket, cut and remove twine and burlap from top 1/3 of root ball. Plants with synthetic burlap and twine, or burlap treated with root growth inhibitors, will not be accepted unless all materials are cut and removed completely. Remove pallets, if any, before setting.
- C. Place soil around ball in layers, tamping to settle backfill and eliminate voids and air pockets. When pit is approximately half backfilled, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing and tamping final layer of backfill.

3.7 MULCH INSTALLATION

- A. Install mulch on top of raked and prepared planting bed to a depth of 2".
- B. Mulch is to be raked smooth, eliminating pockets and low points.
- C. Mulch is not to be applied so that it touches the bark of woody plants or tree trunks.
- D. For tree rings: At the time of planting, provide 3 inches high continuous soil saucer around perimeter of planting hole. Prior to end of guarantee period, but not sooner than 8 months after planting, contractor is required to shave off the saucer around the mulch ring area and top dress with new mulch. Cover root ball with no more than 1" (depth) of mulch, installed so that mulch does not touch the bark/trunk.

3.8 STAKING AND GUYING - TREES:

- A. Guy and stake trees more than 3 - 4-inch (75-mm) caliper unless otherwise indicated, or in situations such as sandy or poor soils, in windy locations, or on slopes. Trees that settle out of plumb due to inadequate soil compaction either under or adjacent to the root ball shall be excavated and reset. Trees that have settled out of plumb shall never be pulled straight using guy wires.

3.9 PROTECTION, CLEAN-UP AND MAINTENANCE

- A. During landscape installation, keep pavements clean and work area in an orderly condition. Place 3/4" plywood as needed to protect existing turf, paved areas, etc.
- B. Install plastic safety fencing as needed to provide barrier protection for newly planted areas or planting bed areas to be preserved.
- C. Protect new planting soils and beds, newly installed plantings, and existing plants to remain from damage due to landscape operations, operations by other contractors and trades, and trespassers. Maintain protection during installation and maintenance periods. Treat, repair, or replace damage to new or existing plantings at the expense of the Landscape Contractor.
- D. Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of it off the Owner's property.
- E. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, tightening and repairing stakes and guy supports, and resetting to proper grades or vertical position, as required to establish healthy, viable plantings. Spray as required to keep trees free of insects and disease. Maintain throughout project work period until Substantial Completion. All plantings which appear to be in distress or defective shall be removed immediately and replaced or replanted according to planting times and quality as defined in this section, with specimens of the same species and size as originally specified:
 - Watering:
 - The contractor shall be fully responsible to ensure that adequate water is provided to all plants throughout the work period until the date of Substantial Completion.
 - Hand water root balls of all plants to ensure that the root balls have moisture above wilt point and below field capacity, and appropriate for the species. As needed, moisture content in each root ball and soil outside the root ball can be tested to determine water content.

- F. Guy Wires and Stakes are to be maintained by Contractor until the end of the Guarantee Period (see section 3.10) to avoid girdling throughout the first growing season and removed after the first growing season if site conditions and adequate plant establishment permit.

3.10 ACCEPTANCE AND GUARANTEE

- A. Plants are to be guaranteed as per the following list, starting from the time of Substantial Completion. Defective materials shall be removed immediately and replaced according to planting times and quality as defined in this section, with specimens of the same species and size as originally specified, with new guarantee for the replacement plant starting at time of replacement. Written Final Acceptance shall be provided at the end of the guarantee period by Owner Representative and Assistant Director of Grounds or UD Landscape Planner once all conditions of this Section have been met. All plants must be in a vigorous growing condition at the end of the guarantee period:

- 1. ***Minimum of 1-year guarantee on all newly installed plant material;***
 - 2. ***2-year minimum for trees 4" cal. (inclusive) and above;***

- B. When Maintenance after Substantial Completion is by others, and not awarded to the Contractor:

After Substantial Completion Acceptance, the Contractor shall make sufficient site visits to observe the Owner's maintenance and notify the Owner's Representative and UD Assistant Director of Grounds/ UD Landscape Planner in writing if maintenance, including watering, is not sufficient to maintain plants in a healthy condition. Such notifications must be made in a timely period so that the Owner can take corrective action and/or schedule a time to review with the Contractor prior to taking corrective action. Notification must define the maintenance needs observed, include a date and request for site review.

In the event that the Contractor fails to visit the site and/ or notify the Owner's Representative in writing, with confirmation that Owner's Representative received the notification, lack of maintenance shall not be used as grounds for voiding or modifying the provisions of the warranty.

- C. Contractor is to be responsible for contacting Owner's Representative and Grounds' Representative Contacts defined at the start of this section (1) one month prior to end of guarantee period to review health and successful establishment of plantings. Guarantee remains in effect until this final review takes place.

PART 4 – ATTACHMENTS (no content)

END OF SECTION