

MANHATTAN STREET GREEN INFRASTRUCTURE PROJECT- GREEN INFRASTRUCTURE IMPLEMENTATION

Downtown North Tonawanda prides itself on sustainable practices, which is evident through many green infrastructure projects within the corridor located on Main, Manhattan, and Webster streets. In 2010, the Manhattan Street Green Infrastructure Project was completed, which included permeable pavement and the installation of seven rain gardens. This project set the precedent and was one of the first completed green infrastructure projects in Western New York. The rain gardens reduce storm water run-off and filter out any pollutants before it is released back into our waterways. Long term, this project will conserve water, protect our local waterways, improve water quality, and reduce flooding and erosion. It creates a healthy and sustainable environment for future generations.

Stormwater capture calculations for this project, utilizing EPA's National Stormwater Calculator is as follows: 1.58 acres= 9,910,771 square inches * .54 inches max rainfall retained= 5,351,816.34 cubic inches. Converts to 3,097 cubic feet per storm event.

Recent efforts by Project Pride (a grassroots-volunteer driven organization that strives to promote identity and pride among the residents and business people in North Tonawanda by focusing on the beautification of the city's downtown area and Oliver Street Corridor) have continued work at the site including installation of informational plaques and a recent grant award to complete maintenance of this project site. The following two links provide more information on these ongoing efforts:

https://www.niagara-gazette.com/news/local_news/rain-garden-plaques-celebrated-in-nt/article_2c095721-4c39-5a7a-99d1-0e2178bef20d.html

<https://www.cfgb.org/news/attorney-general-james-governor-hochul-award-over-900000-to-environmental-projects-in-tonawanda/>

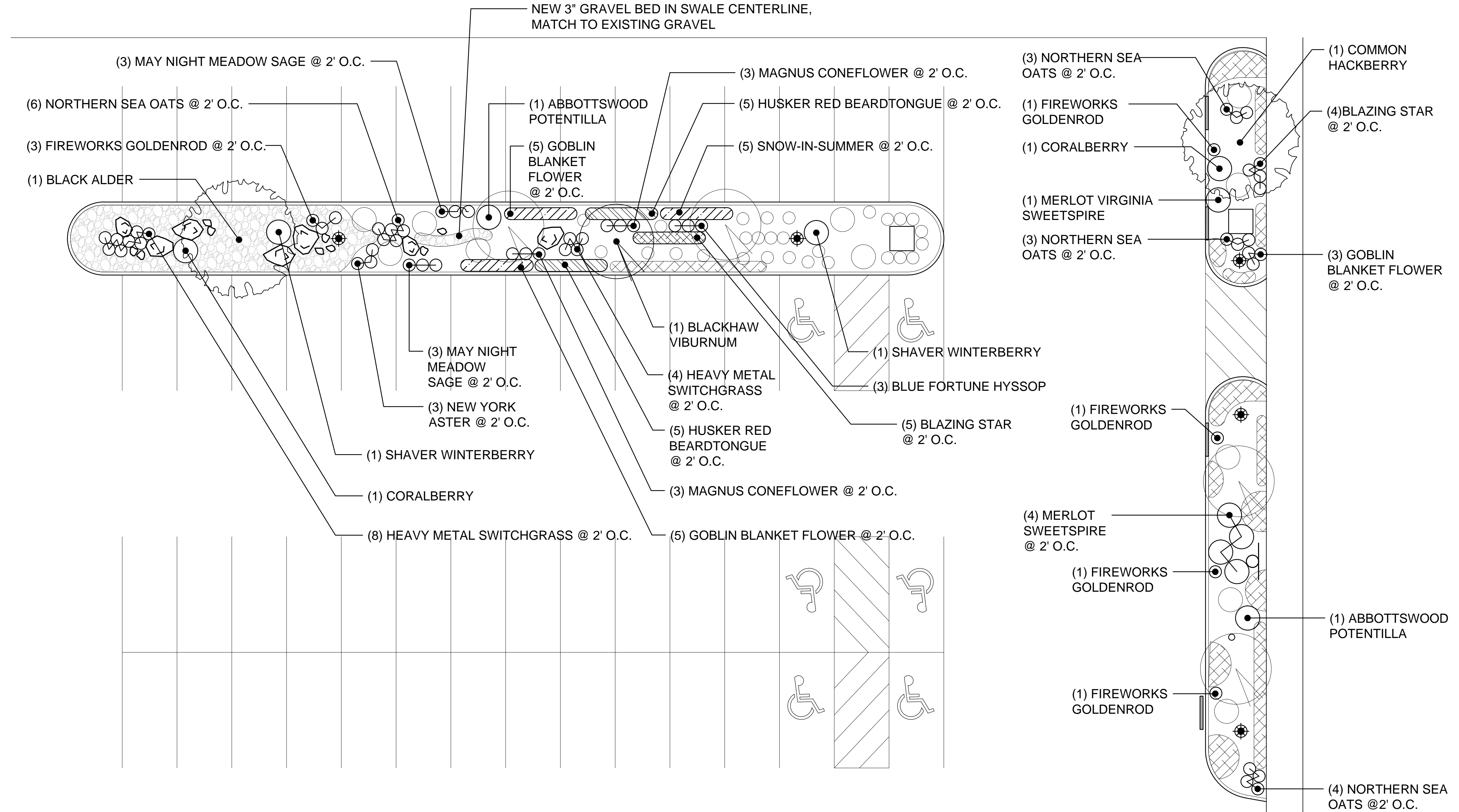
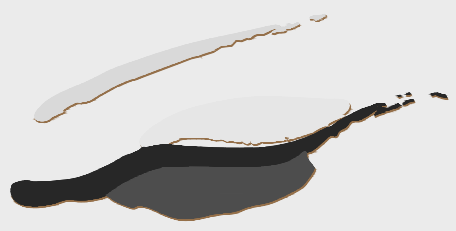
Before Photo:



After Photos:







Sheet L101

Sheet L102

1 SITE PLANTING PLAN
SCALE: 1" = 10'-0"



LEGEND:

- EXISTING LIGHT POLE & FOUNDATION
- EXISTING TREES
- NEW TREES
- EXISTING SHRUBS & PERENNIALS
- NEW SHRUBS, GRASSES, & PERENNIALS
- EXISTING STORM CATCH BASIN
- EXISTING YARD INLET
- EXISTING SIGNAGE
- GRAVEL BED
- NEW 2'-4' BOULDER

GENERAL NOTES:

1. SEE SHEET L103 FOR PLANTING DETAILS. SEE SHEETS L102 & L103 FOR CONTINUATION OF PLANTING PLAN.

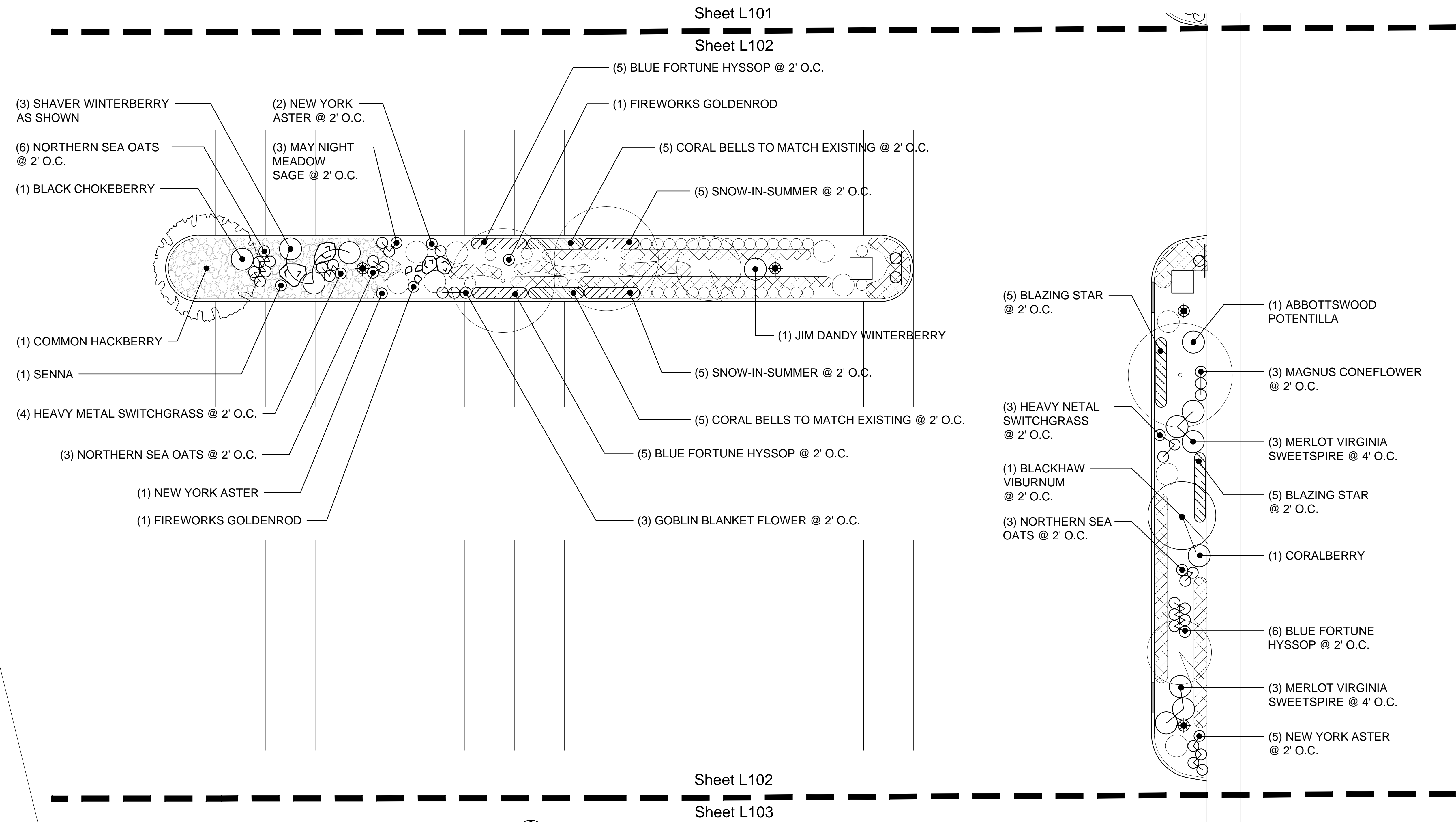
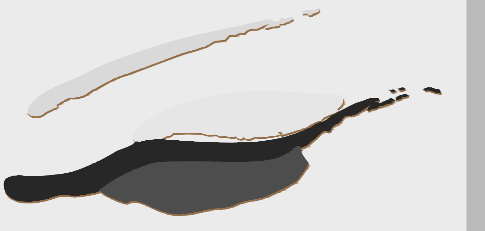
PLANT LEGEND

| QTY | BOTANICAL NAME | COMMON NAME | SIZE | ROOT | COMMENT |
|---------------------------------|-------------------------------|----------------------------|------------|-------------|-----------|
| TREES | | | | | |
| 2 | ALNUS GLUTINOSA | BLACK ALDER | 2" CAL | B&B | |
| 3 | CELTIS OCCIDENTALIS | COMMON HACKBERRY | 2" CAL | B&B | |
| 2 | VIBURNUM PRUNIFOLIUM | BLACKHAW VIBURNUM | 1-1/2" CAL | B&B | TREE-FORM |
| SHRUBS | | | | | |
| 1 | ARONIA MELANOCARPA | BLACK CHOKEBERRY | 24" | NO. 3 CONT. | |
| 2 | ILEX VERTICILLATA 'JIM DANDY' | JIM DANDY WINTERBERRY | 24" | NO. 3 CONT. | MALE |
| 8 | ILEX VERTICILLATA 'SHAVER' | SHAVER WINTERBERRY | 24" | NO. 3 CONT. | FEMALE |
| 16 | ITEA VIRGINICA 'MERLOT' | MERLOT VIRGINIA SWEETSPIRE | 18" | NO. 3 CONT. | |
| 3 | POTENTILLA F. 'ABBOTTWOOD' | ABBOTTWOOD POTENTILLA | 15" | NO. 3 CONT. | |
| 6 | SYMPHOCARPOS ORBICULATUS | CORALBERRY | 15" | NO. 3 CONT. | |
| PERENNIALS & GRASSES | | | | | |
| 22 | AGASTACHE X 'BLUE FORTUNE' | BLUE FORTUNE HYSSOP | CLUMP | NO. 2 CONT. | |
| 17 | ASTER NOVI BELGII | NEW YORK ASTER | CLUMP | NO. 2 CONT. | |
| 2 | CASSIA HEBECARPA | SENNA | CLUMP | NO. 2 CONT. | |
| 20 | CERASTIUM TOMENTOSUM | SNOW-IN-SUMMER | CLUMP | NO. 1 CONT. | |
| 35 | CHASMANTHIUM LATIFOLIUM | NORTHERN SEA OATS | CLUMP | NO. 2 CONT. | |
| 12 | ECHINACEA X 'MAGNUS' | MAGNUS CONEFLOWER | CLUMP | NO. 2 CONT. | |
| 27 | GAILLARDIA X 'GOBLIN' | GOBLIN BLANKET FLOWER | CLUMP | NO. 2 CONT. | |
| 10 | HEUCHERA SANGUINEA | CORAL BELLS | CLUMP | NO. 2 CONT. | |
| 19 | LIATRIS SPICATA | BLAZING STAR | CLUMP | NO. 2 CONT. | |
| 26 | PANICUM V. 'HEAVY METAL' | HEAVY METAL SWITCHGRASS | CLUMP | NO. 2 CONT. | |
| 20 | PENSTEMON D. 'HUSKER RED' | HUSKER RED BEARDTONGUE | CLUMP | NO. 2 CONT. | |
| 19 | SALVIA NEMEROSA 'MAY NIGHT' | MAY NIGHT MEADOW SAGE | CLUMP | NO. 2 CONT. | |
| 11 | SOLIDAGO RUGOSA 'FIREWORKS' | FIREWORKS GOLDENROD | CLUMP | NO. 2 CONT. | |
| 7 | TRADESCANTIA OHIENSIS | SPIDERWORT | CLUMP | NO. 2 CONT. | |

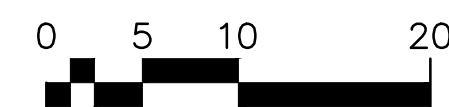
| NO. | BY | REVISIONS | DATE |
|-----|----|-----------|------|
| | | | |

DWG. TITLE
PLANTING PLAN

DATE: JUNE 11, 2010
SCALE: AS SHOWN
DWN. ALL CHK. JMK
PROJ. JKL 13006
No.
DWG. No. **L101**



1 SITE PLANTING PLAN
SCALE: 1" = 10'-0"



GENERAL NOTES:

- SEE SHEET L101 FOR PLANT LIST; SEE SHEET L103 FOR PLANTING DETAILS. SEE SHEETS L101 & L103 FOR CONTINUATION OF PLANTING PLAN.

LEGEND:

| | | | |
|-----------------------------------|--|----------------------------------|--|
| EXISTING TREES | | EXISTING LIGHT POLE & FOUNDATION | |
| NEW TREES | | EXISTING STORM CATCH BASIN | |
| EXISTING SHRUBS & PERENNIALS | | EXISTING YARD INLET | |
| NEW SHRUBS, GRASSES, & PERENNIALS | | EXISTING SIGNAGE | |
| | | GRAVEL BED | |
| | | NEW 2'-4' BOULDER | |

| NO. | REVISIONS | DATE |
|-----|-----------|------|
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| DWG. TITLE |
|---------------|
| PLANTING PLAN |

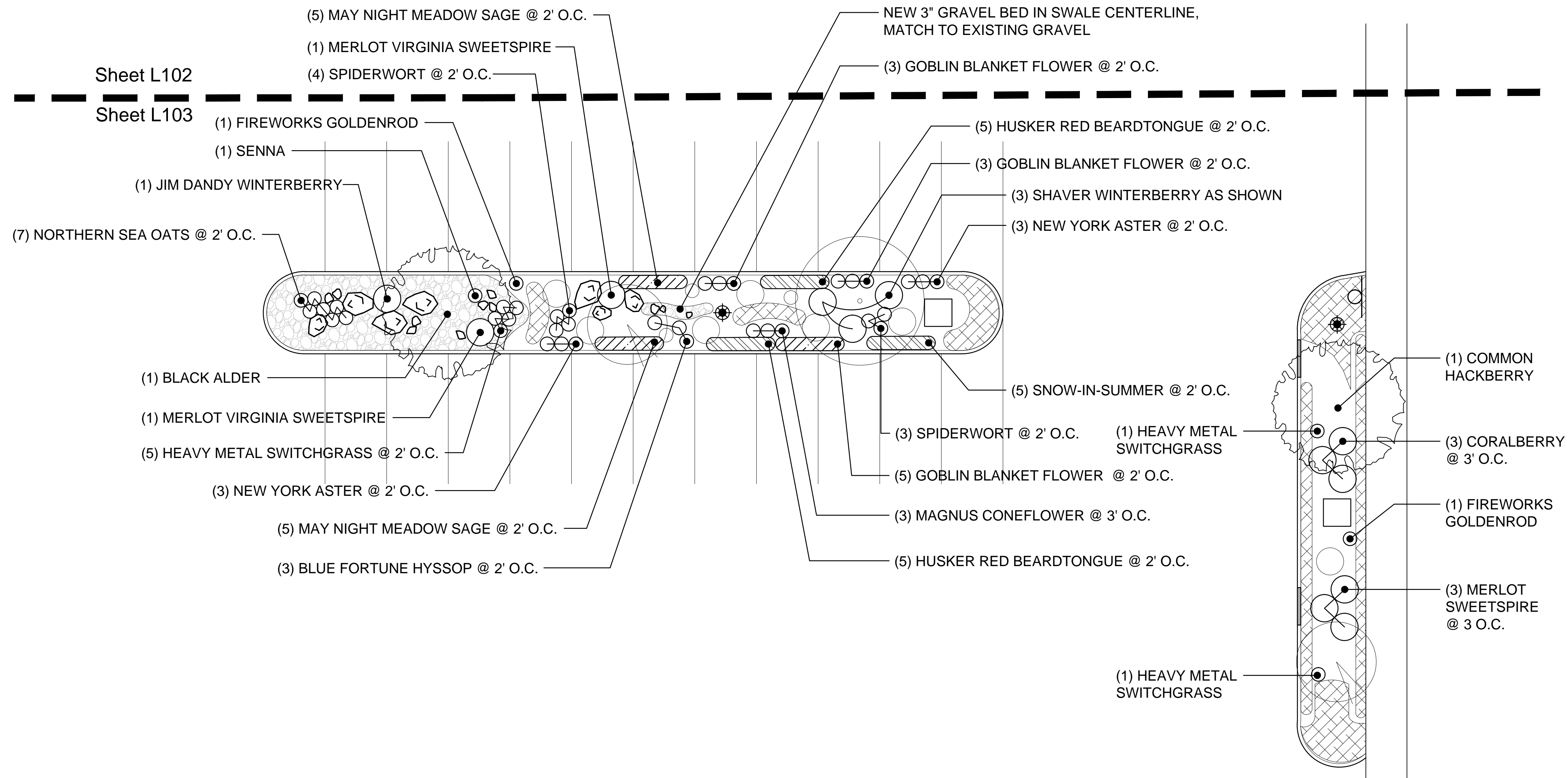
| | |
|----------|---------------|
| DATE | JUNE 11, 2013 |
| SCALE | AS SHOWN |
| DWN. ALL | CHK. JMK |
| PROJ. | JKA 13006 |
| No. | |
| DWG. No. | L102 |



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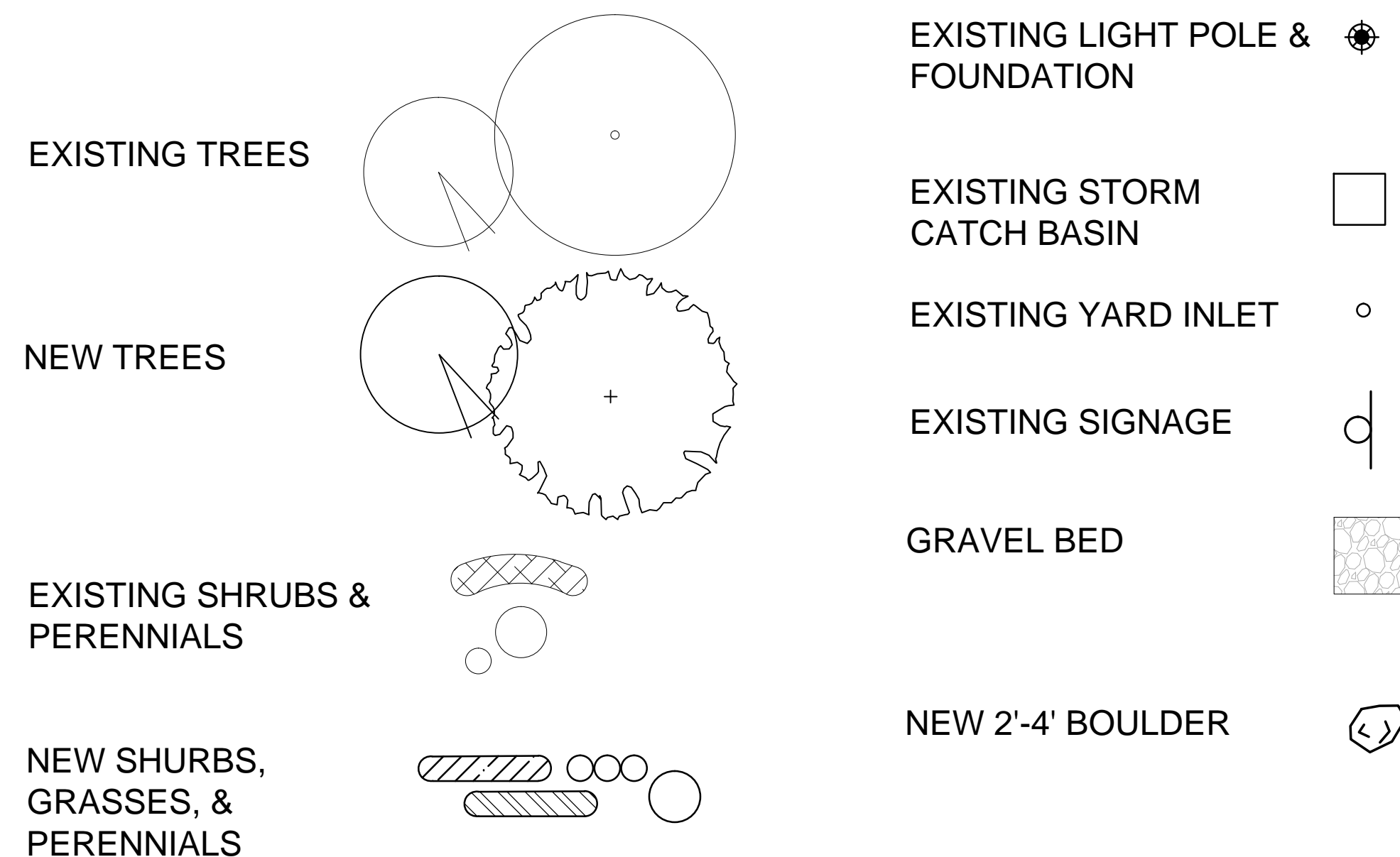
PHASE II



1 SITE PLANTING PLAN
SCALE: 1" = 10'-0"

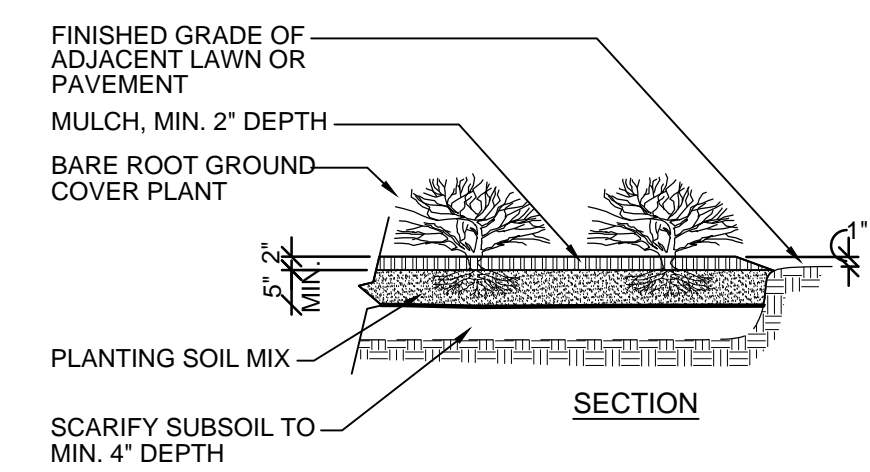
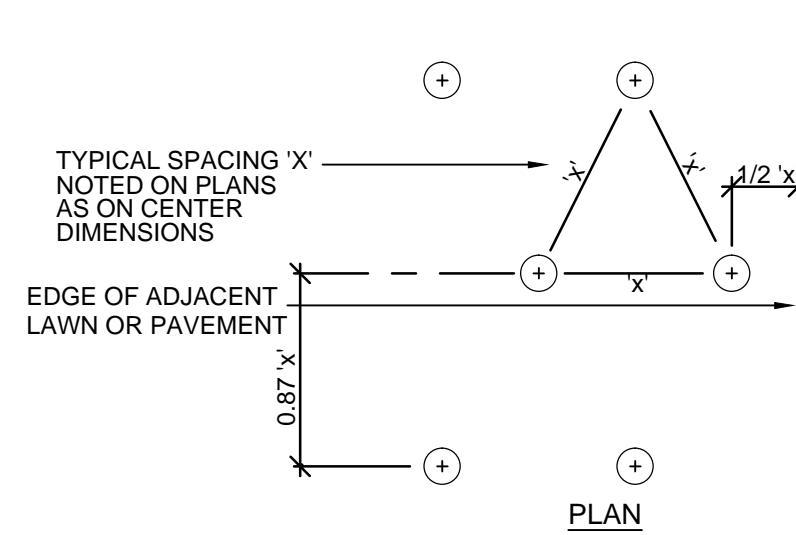


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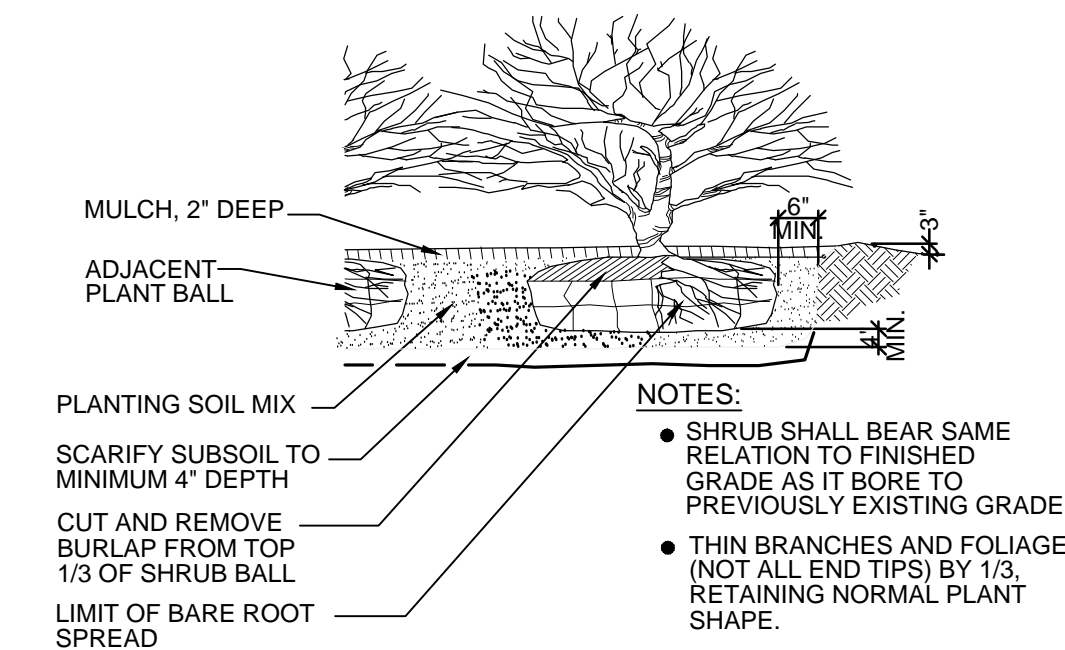


GENERAL NOTES:

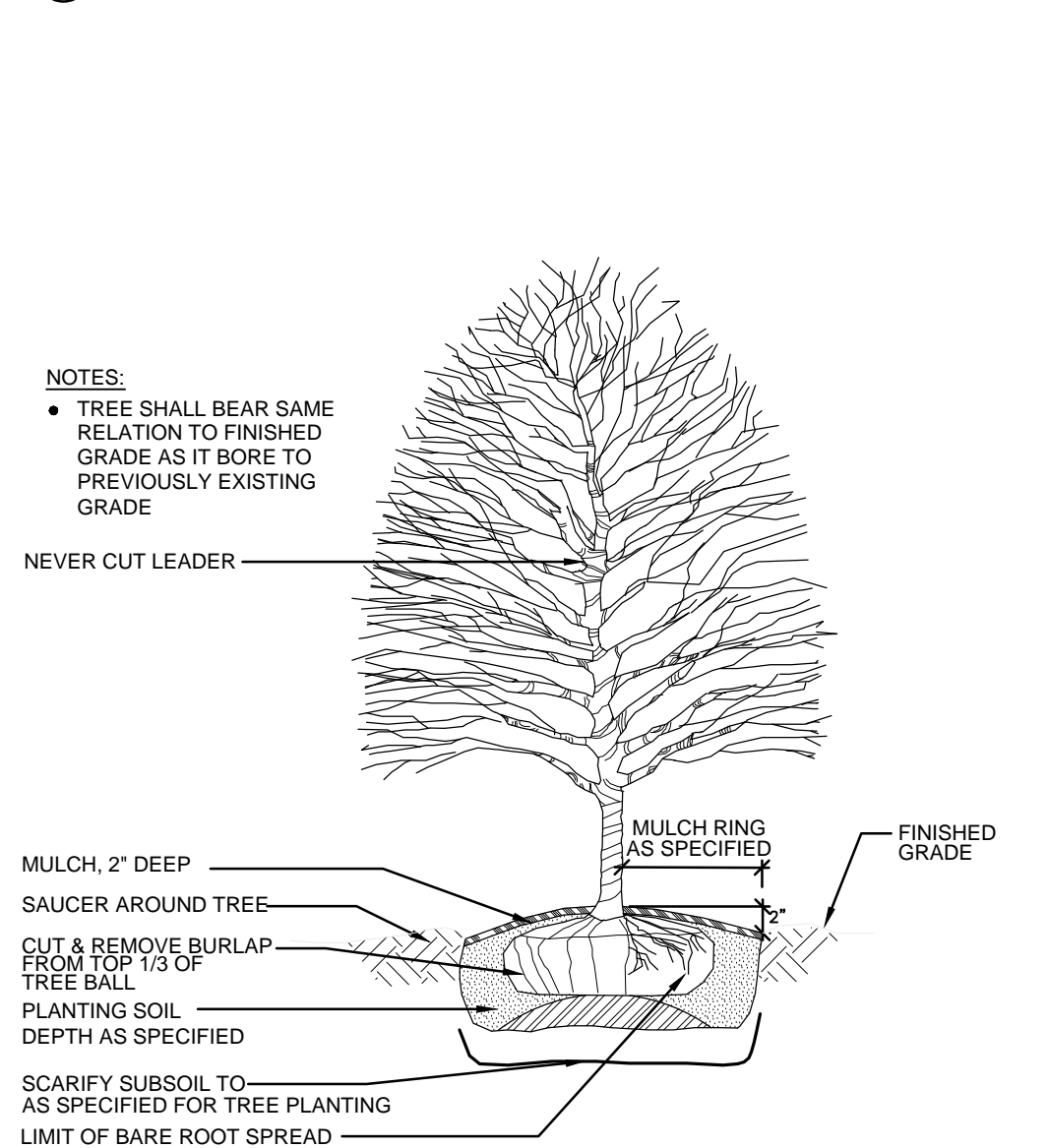
- SEE SHEET L101 FOR PLANT LIST. SEE SHEETS L101 & L102 FOR CONTINUATION OF PLANTING PLAN.



27 PERENNIAL PLANTING
SCALE: NTS



28 SHRUB PLANTING
SCALE: NTS



17 DECIDUOUS TREE PLANTING
SCALE: NTS

| NO. | BY | REVISIONS | DATE |
|-----|----|-----------|------|
| | | | |

DWG. TITLE
LANDSCAPE PLAN

DATE: JUNE 11, 2013
SCALE: AS SHOWN
DWN. ALL CHK. JMK
PROJ. JKA 13006
No.
DWG. No. **L103**

SECTION 329300

PLANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Plants.
 - 2. Planting soils soil amendments, mixing and placing.
 - 3. Tree stabilization.
 - 4. Landscape edgings.
 - 5. Mulching of plant beds
 - 6. Initial maintenance of landscape materials and guarantee period

1.3 DEFINITIONS

- A. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.
- C. Balled and Potted Stock: Plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required.
- D. Bare-Root Stock: Plants with 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 type and size of plant required.
- E. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.
- F. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.

- G. Fabric Bag-Grown Stock: Healthy, vigorous, well-rooted plants established and grown in-ground in a porous fabric bag with well-established root system reaching sides of fabric bag. Fabric bag size is not less than diameter, depth, and volume required by ANSI Z60.1 for type and size of plant.
- H. Finish Grade: Elevation of finished surface of planting soil.
- I. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- J. Pests: Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- K. Planting Area: Areas to be planted.
- L. Planter Bed/Box Growing Media: Standardized growing medium produced off-site by homogeneously blending soil and/or non-soil materials such as peat.
- M. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- N. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.
- O. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.
- P. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.
- Q. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
- R. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- S. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated, including soils.
 - 1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
 - 2. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to the Project.

3. Plant Photographs: Include color photographs in digital format of each required species and size of plant material as it will be furnished to the Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For species where more than 20 plants are required, include a minimum of three photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.
- B. Samples for Verification: For each of the following:
1. Organic Mulch: 1-pint volume of each organic mulch required; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup.
- C. Qualification Data: For qualified landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.
- D. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:
1. Manufacturer's certified analysis of standard products.
 2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
- E. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before start of required maintenance periods.
- F. Material Test Reports: For standardized ASTM D 5268 topsoil, existing native surface topsoil, existing in-place surface soil and imported or manufactured topsoil.
- G. Warranty: Sample of special warranty.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful establishment of plants.
1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
 2. Experience: Ten years' experience in landscape installation in addition to requirements in Division 01 Section "Quality Requirements."
 3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
 4. Personnel Certifications: Installer's field supervisor shall have certification in all of the following categories from the Professional Landcare Network:

- a. Certified Landscape Technician - Exterior, with installation and specialty area(s), designated CLT-Exterior.
 - b. Certified Ornamental Landscape Professional, designated COLP.
- B. Soil-Testing Laboratory Qualifications: An independent or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.
- C. Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; sodium absorption ratio; deleterious material; pH; and mineral and plant-nutrient content of the soil.
1. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
 2. The soil-testing laboratory shall oversee soil sampling; with depth, location, and number of samples to be taken per instructions from Architect. A minimum of three representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.
 3. Report suitability of tested soil for plant growth.
 - a. Based upon the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. or volume per cu. yd. for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.
 - b. Planting soil shall meet the following requirements:
 - 1) Organic content range: 4.5% to 6.0% organic matter inclusive.
 - 2) Soil acidity range: pH 5.5 to pH 7.0 inclusive.
 - 3) Soil salinity by electrical-conductivity measurements shall not exceed three million per centimeter at 25 degree C., as determined by the saturated soil paste method described in USDA Circular No. 982.
 - 4) Soil fertility shall rate "high" in natural nutrients based on the coordinated ratings in pounds per acre as established by the National Soil and Fertilizer Research Committee.
 - 5) Soil texture shall be a classification that will sustain normal healthy growth and development of the plants and lawns, and shall consist of 10-30 percent clay, 10-60 percent sand, and 30-70 percent silt as determined by the buoyous hydrometer or the decantation method.
 - c. Should test and analysis indicate that soil proposed for use is deficient in any of the above requirements, a system of ameliorating may be proposed for approval. Any system proposed shall provide for an acidity range of pH 6.1 to pH 6.5 inclusive.
 - d. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.
- D. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.

1. Selection of plants purchased under allowances will be made by Architect, who will tag plants at their place of growth before they are prepared for transplanting.
- E. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.
1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes.
 2. Other Plants: Measure with stems, petioles, and foliage in their normal position.
- F. Plant Material Observation: Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Architect retains right to observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.
1. Notify Architect of sources of planting materials seven days in advance of delivery to site.
- G. Preinstallation Conference: Conduct conference at Project site.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable.
- B. Bulk Materials:
1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or planting areas to remain.
 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.
- C. Do not remove plants from place of growth until so approved by Architect.
- D. Deliver bare-root stock plants freshly dug. Immediately after digging up bare-root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting.
- E. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their

natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.

- F. Handle planting stock by root ball.
- G. Store bulbs, corms, and tubers in a dry place at 60 to 65 deg F (16 to 18 deg C) until planting.
- H. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.
 - 1. Heel-in bare-root stock. Soak roots that are in dry condition in water for two hours. Reject dried-out plants.
 - 2. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
 - 3. Do not remove container-grown stock from containers before time of planting.
 - 4. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly-wet condition.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.
- B. Interruption of Existing Services or Utilities: Do not interrupt services or utilities to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary services or utilities according to requirements indicated:
 - 1. Notify Construction Manager and Owner no fewer than three days in advance of proposed interruption of each service or utility.
 - 2. Do not proceed with interruption of services or utilities without Construction Manager's and Owner's written permission.
- C. Planting Restrictions: Proceed with, and complete landscape work as rapidly as portions of site become available, working within seasonal limitations for each kind of landscape work required.
 - 1. Plant or install materials during normal planting seasons for each type of plant material required.
 - a. Deciduous – Spring Planting: March 15th to June 30th
Fall Planting: September 1st to December 1st
 - 2. Correlate planting with specified maintenance periods to provide maintenance from date of substantial completion.

- D. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.
- E. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.
 - 1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

1.8 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner, or incidents that are beyond Contractor's control.
 - b. Structural failures including plantings falling or blowing over.
 - c. Faulty performance of tree stabilization and edgings.
 - d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 2. Warranty Periods from Date of Acceptance:
 - a. Trees, Shrubs, and Ornamental Grasses: 12 months, or one full growing season depending on planting completion.
 - b. Ground Covers, Perennials, and Other Plants: 12 months, or one full growing season depending on planting completion.
 - 3. Include the following remedial actions as a minimum:
 - a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
 - b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
 - c. A limit of two replacements of each plant will be required except for losses or replacements due to failure to comply with requirements.
 - d. Plant material shall be replaced in the same location only twice and then the Architect will determine whether the plant material shall be relocated or deleted from the Contract, at no added cost to the Owner.
 - e. Provide extended warranty for period equal to original warranty period, for replaced plant material.

1.9 MAINTENANCE SERVICE DURING WARANTEE PERIOD

- A. Initial Maintenance Service for Trees and Shrubs: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance

immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.

1. Maintenance Period: Through 3 months past substantial completion/occupancy. If weather or seasonal issues push 3 month period to next growing season, maintenance will be additional 3 months from start of next growing season.
- B. Initial Maintenance Service for Ground Cover and Other Plants: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.
1. Maintenance Period: Through 3 months past substantial completion/occupancy. If weather or seasonal issues push 3 month period to next growing season, maintenance will be additional 3 months from start of next growing season.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

- A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule or Plant Legend shown on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4 inch in diameter; or with stem girdling roots will be rejected.
 2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.
- B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.
- C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.
- D. Balled Plants: Plants designated B&B in the plant list shall be adequately balled with firm, natural balls of soil of a diameter not less than for plant size required and of width and depth to encompass sufficient fibrous and feeding roots to insure full recovery and development of the plants. Ball shall be firmly wrapped with strong burlap. No balled plant will be accepted by the Architect when the ball of earth surrounding its roots has been cracked or broken, either preparatory to or during the process of planting; or when the burlap, staves, ropes, or platform required in connection with its use have been removed.

- E. Labeling: Label at least one plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant as shown on Drawings.
- F. If formal arrangements or consecutive order of plants is shown on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.
- G. Plants marked "cans, pots or other container" on the plant list shall have been grown in the containers for a minimum of six months and a maximum of two years. Roots shall fill the containers but show no evidence of being, or having been, root-bound. Plants shall not be picked up or moved by stems or branches, but shall be lifted and handled from sides of containers.
- H. Plants shall not be pruned prior to delivery except upon special approval by the Architect.
- I. Deciduous Trees: Provide trees of height and caliper noted on schedule and with branch configuration recommended by ANSI Z60.1 for type and species required. Provide single stem trees except where special forms are shown or listed.
 - 1. Provide balled and burlapped (B&B) deciduous trees.
- J. Deciduous Shrubs: Provide shrubs of the height noted on schedule and with not less than minimum number of canes required by ANSI Z60.1 for type and height of shrub required.
 - 1. Provide balled and burlapped (B&B) deciduous shrubs.
 - 2. Container grown deciduous shrubs will be acceptable in lieu of balled and burlapped deciduous shrubs subject to specified limitations for container grown stock when approved by architect.
- K. Perennials: Provide healthy, field-grown plants from a commercial nursery, of species and variety noted on schedule.

2.2 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
 - 1. Class: T, with a minimum of 99 percent passing through No. 8 sieve and a minimum of 75 percent passing through No. 60 sieve.
 - 2. Class: O, with a minimum of 95 percent passing through No. 8 sieve and a minimum of 55 percent passing through No. 60 sieve.
 - 3. Provide lime in form of ground dolomitic limestone.
- B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent sulfur, with a minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.
- C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

- D. Aluminum Sulfate: Commercial grade, unadulterated.
- E. Perlite: Horticultural perlite, soil amendment grade.
- F. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 sieve.
- G. Sand: Clean, washed, natural or manufactured, and free of toxic materials.
- H. Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight.
- I. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.

2.3 ORGANIC SOIL AMENDMENTS

- A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
 - 1. Organic Matter Content: 50 to 60 percent of dry weight.
 - 2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.
- B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or granular texture, with a pH range of 3.4 to 4.8.
- C. Muck Peat: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent.
- D. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials.
 - 1. In lieu of decomposed wood derivatives, mix partially decomposed wood derivatives with ammonium nitrate at a minimum rate of 0.15 lb/cu. ft. of loose sawdust or ground bark, or with ammonium sulfate at a minimum rate of 0.25 lb/cu. ft. of loose sawdust or ground bark.
- E. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.

2.4 FERTILIZERS

- A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 20 percent phosphoric acid.
- B. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.

- C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
 - 1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
 - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.
- D. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
 - 1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
 - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.
- E. Planting Tablets: Tightly compressed chip type, long-lasting, slow-release, commercial-grade planting fertilizer in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots.
 - 1. Size: 5-gram tablets.
 - 2. Nutrient Composition: 20 percent nitrogen, 10 percent phosphorous, and 5 percent potassium, by weight plus micronutrients.
- F. Chelated Iron: Commercial-grade FeEDDHA for dicots and woody plants, and commercial-grade FeDTPA for ornamental grasses and monocots.

2.5 PLANTING SOILS

- A. Planting Soil: Existing, in-place surface soil. Verify suitability of existing surface soil to produce viable planting soil according to testing requirements noted in this specification. Remove stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth. Mix surface soil with the following soil amendments and fertilizers in the following quantities to produce planting soil as per recommendations in soil reports from a qualified soil-testing laboratory:
 - 1. Ratio of Loose Compost to Topsoil by Volume: 1:2.
 - 2. Ratio of Loose Muck Peat to Topsoil by Volume: 1:3.
 - 3. Weight of ground dolomitic Lime per cubic yard: 2 lbs.
 - 4. Weight of Iron Sulfate per cubic yard: 2 lbs.
 - 5. Weight of Agricultural Gypsum per cubic yard: 1 lb.
 - 6. Volume of Sand per cubic yard: 1:4.
 - 7. Weight of Bonemeal per cubic yard: 3 lbs.
 - 8. Weight of Commercial Fertilizer per cubic yard: 2 lbs.
 - 9. Weight of Slow-Release Fertilizer per cubic yard: 2 lbs.
- B. Planting Soil: Imported topsoil or manufactured topsoil from off-site sources. Verify suitability of imported topsoil or manufactured topsoil from off-site sources to produce viable planting soil according to testing requirements noted in this specification. Obtain

topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches deep; do not obtain from agricultural land, bogs, or marshes.

1. Additional Properties of Imported Topsoil or Manufactured Topsoil: Screened and free of stones 1 inch or larger in any dimension; free of roots, plants, sod, clods, clay lumps, pockets of coarse sand, paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials harmful to plant growth; free of obnoxious weeds and invasive plants including quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and brome grass; not infested with nematodes; grubs; or other pests, pest eggs, or other undesirable organisms and disease-causing plant pathogens; friable and with sufficient structure to give good tilth and aeration. Continuous, air-filled pore space content on a volume/volume basis shall be at least 15 percent when moisture is present at field capacity. Soil shall have a field capacity of at least 15 percent on a dry weight basis.
2. Mix imported topsoil or manufactured topsoil with the following soil amendments and fertilizers in the following quantities to produce planting soil as per recommendations in soil reports from a qualified soil-testing laboratory:
 - a. Ratio of Loose Compost to Topsoil by Volume: 1:2.
 - b. Ratio of Loose Muck Peat to Topsoil by Volume: 1:3.
 - c. Weight of ground dolomitic Lime per cubic yard: 2 lbs.
 - d. Weight of Iron Sulfate per cubic yard: 2 lbs.
 - e. Weight of Agricultural Gypsum per cubic yard: 1 lb.
 - f. Volume of Sand per cubic yard: 1:4.
 - g. Weight of Bonemeal per cubic yard: 3 lbs.
 - h. Weight of Commercial Fertilizer per cubic yard: 2 lbs.
 - i. Weight of Slow-Release Fertilizer per cubic yard: 2 lbs.

2.6 MULCHES

- A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:
 1. Type: Double shredded hardwood.
 2. Size Range: 2 inches maximum, 1/2 inch minimum.
 3. Color: Natural.
- B. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content of 2 to 5 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
 1. Organic Matter Content: 50 to 60 percent of dry weight.
 2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

2.7 TREE STABILIZATION MATERIALS

- A. Stakes and Guys:

1. Upright and Guy Stakes: Rough-sawn, sound, new hardwood, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal by length indicated, pointed at one end.
2. Wood Deadmen: Timbers measuring 8 inches in diameter and 48 inches long, treated with specified wood pressure-preservative treatment.
3. Flexible Ties: Wide rubber or elastic bands or straps of length required to reach stakes or turnbuckles.
4. Guys and Tie Wires: ASTM A 641/A 641M, Class 1, galvanized-steel wire, two-strand, twisted, 0.106 inch in diameter.
5. Tree-Tie Webbing: UV-resistant polypropylene or nylon webbing with brass grommets.
6. Guy Cables: Five-strand, 3/16-inch- diameter, galvanized-steel cable, with zinc-coated turnbuckles, a minimum of 3 inches long, with two 3/8-inch galvanized eyebolts.
7. Flags: Standard surveyor's plastic flagging tape, white, 6 inches long.

2.8 MISCELLANEOUS PRODUCTS

- A. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's written instructions.
- B. Burlap: Non-synthetic, biodegradable.
- C. Planter Drainage Gravel: Washed, sound crushed stone or gravel complying with ASTM D 448 for Size No. 8.
- D. Planter Filter Fabric: Woven geotextile manufactured for separation applications and made of polypropylene, polyolefin, or polyester fibers or combination of them.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive plants for compliance with requirements and conditions affecting installation and performance.
 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
 2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
 3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
 4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

- C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- C. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Architect's acceptance of layout before excavating or planting. Make minor adjustments as required.
- D. Lay out plants at locations directed by Architect. Stake locations of individual trees and shrubs and outline areas for multiple plantings.
- E. Apply antidesiccant to trees and shrubs using power spray to provide an adequate film over trunks (before wrapping), branches, stems, twigs, and foliage to protect during digging, handling, and transportation.
 - 1. If deciduous trees or shrubs are moved in full leaf, spray with antidesiccant at nursery before moving and again two weeks after planting.
- F. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.

3.3 PLANTING AREA ESTABLISHMENT

- A. Loosen subgrade of planting areas to a minimum depth of 8 inches . 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.
 - 1. Apply phosphoric acid fertilizer (other than that constituting a portion of complete fertilizers) directly to subgrade before applying planting soil and tilling.
 - 2. Thoroughly blend planting soil off-site before spreading.
 - a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
 - b. Mix lime with dry soil before mixing fertilizer.
 - 3. Spread planting soil to a depth of 6 inches but not less than required to meet finish grades after natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
 - a. Spread approximately one-half the thickness of planting soil over loosened subgrade. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil to achieve total 6 inches of depth.

- B. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.
- C. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 EXCAVATION FOR TREES AND SHRUBS IN TYPICAL SOILS

- A. Planting Pits and Trenches: Excavate circular planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are not acceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
 - 1. Excavate approximately three times as wide as ball diameter for balled and burlapped, balled and potted and container-grown stock.
 - 2. Excavate at least 12 inches wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
 - 3. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
 - 4. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
 - 5. Maintain required angles of repose of adjacent materials as shown on the Drawings. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
 - 6. Maintain supervision of excavations during working hours.
 - 7. Keep excavations covered or otherwise protected after working hours.
- B. Subsoil and topsoil removed from excavations shall not be used as planting soil.
- C. Obstructions: Notify Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.
 - 1. Hardpan Layer: Drill 6-inch-diameter holes, 24 inches apart, into free-draining strata or to a depth of 10 feet, whichever is less, and backfill with free-draining material.
- D. Drainage: Notify Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.
- E. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

3.5 TREE, SHRUB, AND VINE PLANTING IN TYPICAL SOILS

- A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the

top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

- B. Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.
- C. Set balled and burlapped stock plumb and in center of planting pit or trench with root flare 2 inches above adjacent finish grades.
 - 1. Use planting soil for backfill.
 - 2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
 - 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets.
 - 4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
 - 5. Continue backfilling process. Water thoroughly after placing final layer of soil.
- D. Set balled and potted and container-grown stock plumb and in center of planting pit or trench with root flare 2 inches above adjacent finish grades.
 - 1. Use planting soil for backfill.
 - 2. Carefully remove root ball from container without damaging root ball or plant.
 - 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets.
 - 4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
 - 5. Continue backfilling process. Water thoroughly after placing final layer of soil.
- E. When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.
- F. Keep excavations covered or otherwise protected after working hours.

3.6 TREE, SHRUB, AND VINE PRUNING

- A. Remove any trunk wrapping or tags that may be present.
- B. Remove only dead, dying, or broken branches. Do not prune for shape unless specifically directed by Architect.
- C. Prune, thin, and shape trees, shrubs, and vines as directed by Architect.
- D. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Architect, do not

cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.

- E. Do not shear plants.
- F. Do not apply pruning paint to wounds.

3.7 TREE STABILIZATION

- A. Install trunk stabilization as follows unless otherwise indicated:
 - 1. Upright Staking and Tying: Stake trees of 2- through 5-inch caliper. Stake trees of less than 2-inch caliper only as required to prevent wind tip out. Use a minimum of two stakes of length required to penetrate at least 18 inches below bottom of backfilled excavation and to extend at least 72 inches above grade. Set vertical stakes and space to avoid penetrating root balls or root masses.
 - 2. Use two stakes for trees up to 12 feet high and 2-1/2 inches or less in caliper; three stakes for trees less than 14 feet high and up to 4 inches in caliper. Space stakes equally around trees.
 - 3. Support trees with strands of tie wire on opposing sides of tree at equal height, each attached to a stainless steel eye-screw embedded fully into trunk at an angle of 90 degrees and with head of screw oriented vertically. Pre-drill holes if needed. Allow enough slack to avoid rigid restraint of tree.
- B. Staking and Guying: Stake and guy trees more than 14 feet in height and more than 3 inches in caliper unless otherwise indicated. Securely attach no fewer than three guys to stakes 30 inches long, driven to grade.
 - 1. Site-Fabricated Staking-and-Guying Method:
 - a. For trees more than 6 inches in caliper, anchor guys to wood deadmen buried at least 36 inches below grade. Provide turnbuckle for each guy wire and tighten securely.
 - b. Support trees with strands of cable or multiple strands of tie wire, each attached to a stainless steel eye-screw embedded fully into stake at an angle of 90 degrees and with head of screw oriented vertically, and reaching to turnbuckle. Pre-drill holes in stake if needed. Allow enough slack to avoid rigid restraint of tree.
 - c. Attach flags to each guy wire, 30 inches above finish grade.
 - d. Paint turnbuckles with luminescent white paint.

3.8 GROUND COVER AND PLANT PLANTING

- A. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated in even rows with triangular spacing.
- B. Use planting soil for backfill.
- C. Dig holes large enough to allow spreading of roots.

- D. For rooted cutting plants supplied in flats, plant each in a manner that will minimally disturb the root system but to a depth not less than two nodes.
- E. Work soil around roots to eliminate air pockets.
- F. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.
- G. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.9 PLANTING AREA MULCHING

- A. Install weed-control barriers before mulching in all planter areas larger than 12 feet by 12 feet according to manufacturer's written instructions. Completely cover area to be mulched, overlapping edges a minimum of 12 inches and secure seams with galvanized pins.
- B. Mulch backfilled surfaces of planting areas and other areas indicated.
 - 1. Trees and Tree-like Shrubs in Turf Areas: Apply organic mulch ring of 2-inch average thickness, with 24-inch radius around trunks or stems. Do not place mulch within 3 inches of trunks or stems.
 - 2. Organic Mulch in Meadow Areas: Apply extending 12 inches beyond edge of individual plant, planting pit or trench, and finish level with adjacent finish grades. Do not place mulch within 2-inches of trunks or stems. Mulch all plants within meadow areas prior to all seeding of meadow areas.

3.10 EDGING INSTALLATION

- A. Steel Edging: Install steel edging where indicated according to manufacturer's written instructions. Anchor with steel stakes spaced approximately 30 inches apart, driven below top elevation of edging.

3.11 PLANT MAINTENANCE DURING WARRANTY PERIOD

- A. Refer to Maintenance Service Section 1 of this specification for service requirements.
- B. Maintain plantings by pruning dead plant material as needed or as specifically directed by Architect, cultivating, watering, weeding, fertilizing, mulching, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.
 - 1. Use integrated pest management practices whenever possible to minimize and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.
- C. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.

- D. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.12 CLEANUP AND PROTECTION

- A. During planting, keep adjacent paving and construction clean and work area in an orderly condition.
- B. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.
- C. After installation and before Substantial Completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

3.13 DISPOSAL

- A. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.

END OF SECTION 329300