

**CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC UTILITIES**

**SUPPLEMENTAL SPECIFICATION 1609
GREEN INFRASTRUCTURE ESTABLISHMENT ACTIVITIES
DATED MARCH 31, 2017**

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GREEN INFRASTRUCTURE ESTABLISHMENT ACTIVITIES

1609.01 Description. This specification details the activities and procedures that the Contractor must follow after Green Infrastructure (GI) components have been completed and shall be in effect until the project has received Final Acceptance by the City. Activities include, but are not limited to, plant establishment, temporary protections, site stabilization and trash collection, repair/replacement, and inspections/reporting. CMSC 661 Planting Trees, Shrubs, and Vines requirements shall apply when Section SS 1609 is specified.

1609.02 Applicable Standards

- A. City of Columbus CMSC (current standards)
 - 1. Section 659: Seeding and Mulching
 - 2. Section 661: Planting Trees, Shrubs and Vines
 - 3. Section 662: Landscape Watering
 - 4. Section 666: Pruning Existing Trees
 - 5. SS 1601: Site Activity Plan for Projects Containing Green Infrastructure Facilities
 - 6. SS 1604: Bioretention Soils for Green Infrastructure Projects

1609.03 Submittals

- A. Prior to the start of the Period of Establishment provided for in CMSC 661.17, as amended in this and other supplemental specifications or special provisions, the Contractor shall submit material data, testing results, certifications and other submittal data that has been updated or revised since the date of initial submittals as required by the following specifications:
 - 1. CMSC 659, Seeding and Mulching
 - 2. CMSC 661, Planting Trees, Shrubs, and Vines
 - 3. SS 1604, Bioretention Soils
- B. Prior to the start of the Period of Establishment, Contractor shall submit to the City/Engineer a list of the anticipated site visit dates and total number of visits in accordance with the Applicable Standards defined in SS 1601.
- C. Contractor qualifications as described in SS 1609.04.
- D. Certifications for new materials and plants that are installed during the Period of Establishment.

1609.04 Contractor Qualifications

- A. The Contractor shall provide documentation of no less than two representative GI projects within the greater Columbus area, including contact information for references for the City to confirm that work was provided in an acceptable manner.

1. The representative experience must specifically relate to the type of GI installed under this contract, including the installation and establishment of bioretention devices.
 2. The representative experience must demonstrate the Contractor's knowledge and experience of the different types of GI that has been maintained. The representative experience shall include experience in the identification and removal of Ohio native, noxious, and invasive plant species.
- B. Other documentation confirming that the Contractor has general knowledge of GI plant care, stormwater features, and the theory of stormwater quality practices may be submitted to support the Contractor's qualifications.

1609.05 Summary of Work

A. Period of Establishment Timeframes

The period of establishment for GI facilities, shall consist of two consecutive seasons of establishment as follows:

1. The timeframe of Period of Establishment Season 1 shall be per CMSC 661.17.
2. The timeframe of Period of Establishment Season 2, shall begin on October 1 immediately upon completion of Period of Establishment Season 1 as defined in CMSC 661.17 and shall continue through October 1 of the second full growing season following installation of the plants.

B. General

In addition to the requirements in CMSC 661, as amended in this and other supplemental specifications or special provisions, the following activities shall be performed throughout both Season 1 and 2 periods of establishment as defined in 1609.05.A.

1. The Contractor shall furnish all labor, materials, equipment and incidentals required to provide GI Period of Establishment, as detailed in the CMSC 661.17, as amended in this and other supplemental specifications or special provisions.
2. Debris shall be hand removed from structures, grates, under-drain access points, observation ports/cleanouts.
3. Contractor is responsible for proper disposal of all vegetative debris, litter and other waste material.
4. Contractor shall protect and maintain all trees, shrubs, ground cover, and plants alive and thriving for the duration of the Period of Establishment. This includes from the time the plantings are installed, through the Period of Establishment, until Final Acceptance.

C. Additional Requirements for Period of Establishment

In addition to the requirements in CMSC 661, as amended in this and other supplemental specifications or special provisions, the following activities shall be performed throughout both Season 1 and 2 periods of establishment as defined in 1609.05.A.

1. Weeding: Weeding shall occur at a frequency and intensity as to completely rid the planted and mulched areas of weeds, shrubs, grasses trees, or any other vegetation not shown on the planting schedule before they go to seed. Removal shall include the root and shall be accomplished by hand pulling with or without the use of small hand tools. At a minimum, plants to be removed shall include, but are not limited to, the following:

Common Name	Botanical Name	Common Name	Botanical Name
Heath Aster	<i>Aster ericoides</i>	Air-potato	<i>Dioscorea batatas</i>
Burdock	<i>Arctium minus</i>	Asian bittersweet	<i>Celastrus orbiculatus</i>
Wild lettuce	<i>Lactuca sp.</i>	Bouncing bet	<i>Saponaria officinalis</i>
Cmn. Evening Primrose	<i>Oenothera biennis</i>	Canada thistle	<i>Cirsium arvense</i>
Goldenrod	<i>Solidago sp. (except S. nemoralis and S.patula)</i>	Cattail, hybrid	<i>Typha Xglauca</i>
Blackberry sp.	<i>Rubus sp.</i>	Cattail, narrow-leaved	<i>Typha angustifolia</i>
Pear tree	<i>Pyrus calleryana</i>	Celandine, lesser	<i>Ranunculus ficaria</i>
Birdfoot trefoil	<i>Lotus corniculatus</i>	Crown-vetch	<i>Securigera varia</i>
Giant Mullein	<i>Verbascum thapsus</i>	Curly pondweed	<i>Potamogeton crispus</i>
Common ragweed	<i>Ambrosia artemisiifolia</i>	Dame's rocket	<i>Hesperis matronalis</i>
Giant ragweed	<i>Ambrosia trifida</i>	Day-lily	<i>Hemerocallis fulva</i>
Morning Glory	<i>Ipomoea sp.</i>	European cranberry-bush	<i>Viburnum opulus var. opulus</i>
Mugwort	<i>Artemisia vulgaris</i>	Eurasian water-milfoil	<i>Myriophyllum spicatum</i>
Chicory	<i>Cichorium intybus</i>	Field bindweed	<i>Convolvulus arvensis</i>
Nightshade	<i>Solanum carolinense, Solanum dulcamara, Solanum ptycanthum</i>	Flowering-rush	<i>Butomus umbellatus</i>
Common Dandelion	<i>Taraxacum officinale</i>	Japanese barberry	<i>Berberis thunbergii</i>
Self Heal	<i>Prunella vulgaris</i>	Johnson grass	<i>Sorghum halepense</i>
Plantain	<i>Plantago sp.</i>	Meadow fescue	<i>Festuca pratensis</i>
Poison ivy	<i>Toxicodendron radicans</i>	Moneywort	<i>Lysimachia nummularia</i>
Pokeweed	<i>Phytolacca americana</i>	Lesser naiad	<i>Najas minor</i>
Apple of Peru	<i>Nicandra physalodes</i>	Periwinkle or myrtle	<i>Vinca minor</i>
Canada thistle	<i>Cirsium arvense L. (Scop.)</i>	Privet, common	<i>Ligustrum vulgare</i>
Cressleaf groundsel	<i>Senecio glabellus</i>	Quack grass	<i>Agropyron repens</i>
Giant hogweed	<i>Heracleum mantegazzianum</i>	Queen Anne's lace	<i>Daucus carota</i>
Grapevines	<i>Vitis spp.</i>	Russian-olive	<i>Elaeagnus angustifolia</i>
Johnson Grass	<i>Sorghum halepense L. (Pers.)</i>	Smooth brome	<i>Bromus inermis</i>
Kochia	<i>Bassia scoparia</i>	Sweet-clover, white	<i>Melilotus alba</i>
Marestail	<i>Conyza canadensis</i>	Sweet-clover, yellow	<i>Melilotus officinalis</i>

Common Name	Botanical Name	Common Name	Botanical Name
Mile-A-Minute weed	<i>Polygonum perfoliatum</i>	Teasel, common	<i>Dipsacus fullonum (sylvestris)</i>
Musk thistle	<i>Carduus nutans</i>	Teasel, cut-leaved	<i>Dipsacus laciniatus</i>
Oxeye daisy	<i>Chrysanthemum leucanthemum var. pinnatifidum</i>	Tree-of-heaven	<i>Ailanthus altissima</i>
Palmer amaranth	<i>Amaranthus palmeri</i>	Water-cress	<i>Rorippa nasturtium-aquaticum</i>
Poison hemlock	<i>Conium maculatum</i>	Willow-herb, hairy	<i>Epilobium hirsutum</i>
Purple loosestrife	<i>Lythrum salicaria</i>	Willow herb, small-flowered hairy	<i>Epilobium parviflorum</i>
Russian thistle	<i>Salsola Kali var. tenuifolia</i>	Winged euonymus	<i>Euonymus alatus</i>
Shatter cane	<i>Sorghum bicolor</i>	Wintercreeper	<i>Euonymus fortunei</i>
Wild carrot	<i>Daucus carota L.</i>	Yellow flag	<i>Iris pseudacorus</i>
Wild mustard	<i>Brassica kaber var. pinnatifida</i>	Black swallow-wort	<i>Vincetoxicum nigrum</i>
Wild parsnip	<i>Pastinace sativa</i>	Chinese silvergrass	<i>Miscanthus sinensis</i>
Autumn-olive	<i>Elaeagnus umbellata</i>	Dog rose	<i>Rosa canina</i>
Buckthorn, glossy	<i>Rhamnus frangula</i>	Giant knotwood	<i>Polygonum sachalinense</i>
Buckthorn, European	<i>Rhamnus cathartica</i>	Honeysuckle, showy pink	<i>Lonicera Xbella</i>
Common reed grass	<i>Phragmites australis</i>	Kudzu	<i>Pueraria lobata</i>
Garlic mustard	<i>Alliaria petiolata</i>	Leafy spurge	<i>Euphorbia esula</i>
Honeysuckle, amur	<i>Lonicera maackii</i>	Mile-a-minute vine	<i>Polygonum perfoliatum</i>
Honeysuckle, Japanese	<i>Lonicera japonica</i>	Nepalgrass	<i>Microstegium vimineum</i>
Honeysuckle, Morrow	<i>Lonicera morrowii</i>	Nodding thistle	<i>Carduus nutans</i>
Honeysuckle, Tatarian	<i>Lonicera tatarica</i>	Porcelain-berry	<i>Ampleopsis brevipedunculata</i>
Japanese knotweed	<i>Polygonum cuspidatum</i>	Privet, border	<i>Ligustrum obtusifolium</i>
Multiflora rose	<i>Rosa multiflora</i>	Spotted knapweed	<i>Centaurea maculosa</i>
Reed canary grass	<i>Phalaris arundinacea</i>	Star-of-Bethlehem	<i>Onithigalum umbellatum</i>

- a. Application of chemicals is discouraged. In the event that chemical application is the only viable option, the Contractor shall submit a request to the City that includes the type of chemical to be applied, the application rate, proposed application dates, and procedures. The Contractor shall not apply chemicals until written approval has been granted by the City. Certain chemicals may require a State Licensed Operator to apply chemicals such as herbicides. The City will request a copy of the license from the operator before any work is performed.
2. Erosion and Sediment Control: If erosion is evident, Contractor shall seek source of erosion and stabilize exposed soil immediately. Any visible erosion, rilling, or gullies caused by erosion shall be filled with specified bioretention soil and stabilized with mulch per the Contract Documents.
 3. Activity and Frequency Schedule

The following activities shall be performed at the frequency and time of year specified for the establishment of GI during Season 1 and Season 2.

Activity	Frequency	Time of Year
Remove sedimentation from upstream contributing area within project limits	Monthly	Monthly
Remove trash	Monthly	Monthly
Remove leaf and tree debris	Monthly	Monthly
Remove weeds	Monthly	Between April 1 and October 1
Prune trees and shrubs in accordance with CMSC 666	Annually	March
Replace bioretention soil due to erosion or settling	Annually	April
Replace mulch due to erosion or decay	Annually	April
Inspection by Certified Arborist	Quarterly	Quarterly
Remove/replace dead or diseased plants	Monthly	Between April 1 and October 1
Watering in accordance with CMSC 662	Weekly	Between May 1 and October 1
Prune perennials* in accordance with CMSC 666	Annually	November
Inspect structures	Semi-annually	May and November
*Prairie Dropseed and Common Rush shall be pruned during February		

1609.06 Inspection and Reporting

- A. The Contractor shall inspect the GI facility monthly throughout Season 1 and Season 2 to assess that the condition of the GI facility is in accordance with the requirements of this Supplemental Specification.
- B. Wet Weather Inspection: Contractor shall inspect the site once annually between the months of April and November during a rain event to evaluate surface infiltration of each GI facility.
- C. Monthly Establishment Inspection: Contractor shall inspect monthly to evaluate plant health and overall condition of the GI facility. Contractor shall not perform monthly establishment inspections during times when site activity may result in damage or compaction to bioretention soil, or when the site is covered with trash, debris, snow, or standing water such as during large rain events or within 48 hours after a one half inch (1/2") or greater measurable rain event unless directed by the city.
- D. The Contractor shall provide a detailed record of activities performed during the Period of Establishment Season 1 and Season 2.
- E. At a minimum, the establishment schedule shall include a spring clean-up, fall clean-up, and monthly visits throughout the growing season. Additional visits are required as

necessary in order to maintain the life and viability of plant materials according to this Section.

- F. The detailed schedule shall include two plant survival inspections each year in accordance with the requirements of CSMC 661.18.
- G. The Contractor shall submit a monthly report of activities during the previous month including:
 - 1. Inspection report.
 - 2. Dates and times of maintenance.
 - 3. Weather conditions during establishment activities.
 - 4. Summary of plant establishment activities performed including watering, fertilizing, pruning, chemical applications, etc.
 - 5. General description of plant conditions during each activity.
 - 6. Report from quarterly arborist inspection of the health of the trees and shrubs.
 - 7. Dates and times for replacement plant installation.
 - 8. Description, location, and quantity of replacement plants.
 - 9. Photographs documenting activities performed. If no deficiencies are observed Contractor shall photographs at each facility as proof of inspection.

1609.7 Method of Payment

- A. Period of Establishment Season 1, including all requirements of CMSC 661.17, as amended in this and other supplemental specifications or special provisions, shall be incidental to CMSC 661.
- B. The City will measure Green Infrastructure Period of Establishment Season 2 as a lump sum activity. Monthly payments shall be based on the lump sum value of the bid item divided by 12.

1609.8 Basis of Payment

- A. The City will pay for accepted Green Infrastructure Period of Establishment Season 2 at contract price as follows.

Item	Unit	Description
1609	Lump Sum	Green Infrastructure Period of Establishment Season 2