

Save the Rain: Green Infrastructure Program Standard Maintenance Procedure (SMP)

SMP-09a: Tree General Maintenance - Tree Pit Weeding, Tree Pit Mulching, Soil Amendment with Organic Compost

Actions include visual inspection, weeding tree pits, straightening/resetting small caliper existing trees, mulching tree pits, and amending tree pits with organic compost.

Healthy trees should be able to withstand minor disease and insect damage without controls. Routine application of pesticides shall not be practiced, as this destroys natural predator-prey relationships in the environment. Where unusually high infestations or infections occur, an accurate identification of the disease or insect shall be made and the control selected with care, prior to application. All chemical controls must be applied under the supervision of a licensed and qualified pest control applicator, following the procedures set forth in the labeling of the product, as required by law.

Type of Maintenance - Preventative

Tools and Supplies

- Safety cones
- Safety gear (clothing, gloves, etc.)
- Mulch (as specified)
- Mulch fork
- Rake
- Trash bags for debris, weeds, etc.
- Hand Pruners, Weeding Tools
- Mowers
- Edgers

Frequency:

Inspection: Minimum 1x/year (Late May to early June and/or early September)

Weeding of Tree Pit Areas: Weed tree pits a minimum of 2 times per year, at least once in late spring/early summer and once in fall.

Mulching: Minimum 1x/year (Spring)

Amending Soil with Organic Compost: 1x/year (Spring) in Year 2 and Year 4

Labor Hours: 2 people for approximately 4-8 hours per site depending on size of site

Maintenance Procedure (numbers correspond with Maximo sequencing):

- 10 *Safety set-up:* Set up a safety perimeter. Protect existing trees from damage due to landscape operations and maintenance and operations of other contractors and trades.

- 20 *Inspect:* Note the species and location of dead trees. Visually inspect trees for dead, diseased or damaged branches. Inspect for signs of frost heave and note the location and species of those trees that need to be repositioned. Inspect trees for signs of excessive drought, disease, nutrient deficiency, and/or pest problems. Inspect tree pits for signs of soil compaction, soil subsidence, excessive salt deposits, or ponding of water. Inspect any areas of standing water in and around tree pits for mosquito larvae.

Note species and location of all trees experiencing any problems listed above. Record observations in the **Maintenance Report Log** and report as necessary. If possible, take photographs to document site conditions.

NOTE: Based on the above observations, determine if it is necessary for a skilled tree care professional/arborist to conduct a follow up visit to assess any potential tree health issues. Note this in the **Maintenance Report Log**.

- 30 *Remove trash/debris:* Remove any leaves, debris, and trash that have accumulated in or around the trees/treepits and legally dispose of them off Owner's property.

Disposal of refuse resulting from the maintenance operation is the responsibility of the party conducting the work.

- 40 *Weed:* Weeding of tree pits should occur 2 times a year, with a minimum of one spring and one fall visit.

Restrictions: Do not mow or use weed whackers (trimmers) within 2 feet of tree trunks. Hand weed instead.

Refer to project's **Plant ID Sheet** for photographs of plants in order to be able to identify what plants should remain and what plants are weeds and should be removed.

All tree pit areas shall be kept free of weeds, using mechanical methods defined below;

- a) Carefully hand pull or dig out weeds and invasive plants taking care not to damage surrounding plants.
- b) For control of invasive species, spot spraying with herbicide may be employed only by a Certified Pesticide Applicator after notifying the proper authorities and getting approval to apply herbicides. Spraying is allowed only after receiving approval. Before applying herbicides, the type of weed shall be identified and the control selected accordingly, using the most effective control for the species, the location and the season.

(See recommended herbicidal list in Appendix A: Herbicides for Control of Invasive Plants).

Weeds shall not be allowed to grow in paved areas such as driveways, walks, curbs, gutters, etc. If herbicide is applied, dead weeds shall be removed from the paved areas.

- 50 *Straightening and Raising Existing Small Caliper Trees:*

NOTE: The one-year warranty period after tree installation should cover the straightening and raising of small caliper trees.

If necessary, reset existing small caliper trees that are leaning and need to be straightened. Also reset (raise) trees where the top of root balls have sunken below “finish grade”. If roots need to be cut they shall be done so with a sharp cutting tool. **DO NOT CUT ROOTS THAT ARE MORE THAN 1-INCH (1”) IN DIAMETER.** Trees shall be set straight, back filled, and mulched. Ensure that trees are not planted too deep – the root flare must remain visible at finish grade.

Fill in soil subsidence that may occur because of settling or other processes as necessary.

60 *Amending Soil with Organic Compost (Only Years 2 and 4):*

Apply 2 (two) inches of compost and incorporate into the top 2 (two) inches of soil using a hand tool such as a trowel or a steel rake, keeping tools away from the trunk and being careful to leave tree roots intact as you encounter them.

Do not place compost directly against the trunk or a tree or shrub or exposed woody roots (as this could cause rot and invite pest or disease). Top surface of soil with mulch as described below.

70 *Mulch:* After weeding the existing mulched area, apply additional mulch across surface of tree pit and/or planting bed in uniform manner; do not apply more than 3-4 inches thick. Mulch should be re-applied one time per year (in the spring), unless additional applications are needed after heavy rain events.

a) Type of Mulch: shredded bark mulch:

- Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:
 - Type: Shredded hardwood or ground or shredded bark.
 - Size Range: 3 inches maximum, 1/2 inch (13 mm) minimum.
 - Color: Natural.

b) Application rate:

- Apply organic mulch throughout plant bed to an average thickness, of 3 to 4 inches (75-mm) in a uniform manner.
- Do not place mulch within 3 inches (150 mm) of the base of the root flare.
- Mulch should be applied in a 4 to 6 foot diameter with the highest point at the outer edge of the ring and graded gently to the center of the ring. Do not shape mulch like a “volcano” at tree trunk.

80 *Clean up:* Remove surplus mulch and waste material including trash and debris, and legally dispose of them off Owner’s property

90 *Record:* Make note of any additional observations in the **Maintenance Report Log**.

100 *Safety completion:* Remove safety perimeter.

SMP-09b: Planter/Plant Bed, Rain Garden, and Bioswale (Shrub and Herbaceous Plant Material) General Maintenance, Weeding, Mulching

Actions include visual inspection, weeding, and mulching

Plant beds, or planters, are typically a combination of trees, shrubs, and herbaceous perennials (flowering plants) in a contained planting bed, with a covering of mulch. Planters can be contained within concrete curbs or seatwalls, or are often at ground level.

Rain gardens and bioswales are shallow surface depressions planted with specially selected native vegetation (trees, shrubs, grasses, and perennials) to treat and capture stormwater runoff. They are often designed to be planted on top of a layer of sand or gravel storage.

Healthy plants and lawns should be able to withstand minor disease and insect damage without controls. Routine application of pesticides shall not be practiced, as this destroys natural predator-prey relationships in the environment. Where unusually high infestations or infections occur, an accurate identification of the disease or insect shall be made and the control selected with care, prior to application. All chemical controls must be applied under the supervision of a licensed and qualified pest control applicator, following the procedures set forth in the labeling of the product, as required by law.

Type of Maintenance - Preventative

Tools and Supplies

- Hand Pruners
- Mulch (as specified)
- Mulch fork
- Rake
- Spade shovel
- Pitchfork or spade
- Weeding fork
- Plant and Weed Photo ID Sheet
- Trash bag, gloves

Frequency:

Inspection: 1x/year minimum (Late May to early July, and/or late August/early September)

Weeding: 3x/year minimum (Spring clean up, summer maintenance, fall put to bed)

Mulching: Minimum 1x/year (Spring)

Labor Hours: 2 people for approximately 4-6 hours per site

Maintenance Procedure (numbers correspond with Maximo sequencing):

- 10 *Safety set-up:* Set up a safety perimeter. Protect existing plants from damage due to landscape operations and maintenance and operations of other contractors and trades.
- 20 *Inspect:* Visually inspect for any bare areas of vegetation or for specimen vegetation that has died and needs to be removed and/or replaced. Inspect for signs of frost heave and note any plants that may need to be replaced. Inspect plants for signs of excessive drought, disease, nutrient deficiency, and/or pest problems. Inspect planting areas for signs of soil compaction, soil subsidence, excessive salt

deposits, or ponding of water. Inspect any areas of standing water for mosquito larvae. Also inspect areas (e.g. stabilized outfalls) that may experience erosion or increased sediment deposits which would inhibit infiltration.

Record observations in the **Maintenance Report Log** and report as necessary. If possible, take photographs to document site conditions.

NOTE: Based on the above observations, determine if it is necessary for a skilled horticulture professional to conduct a follow up visit to assess any potential plant health issues. Note this in the **Maintenance Report Log**.

- 30 *Remove trash/debris:* Remove any leaves, debris, and trash that have accumulated in or around the plant beds/planters and legally dispose of them off Owner's property.

All refuse resulting from the maintenance operation of properties shall be disposed of at locations designated by the Manager/Owner.

- 40 *Weed:* Weeding shall occur 3x/year at minimum (spring, summer, and fall).

Weeding is easiest if done when soil is moist. It is also recommended to pay attention to specific sites and keep track of weed presence on the **Maintenance Report Log** for each site. Weeding is easier and more effective if done consistently throughout the growing season and done BEFORE weeds go to seed.

Refer to project's **Plant ID Sheet** for photographs of plants in order to be able to identify what plants should remain and what plants are weeds and should be removed.

All planting areas shall be kept free of weeds, using either mechanical or chemical methods defined below;

- a) Carefully hand pull or dig out weeds and invasive plants taking care not to damage surrounding plants.
- b) For control of invasive species, spot spraying with herbicide may be employed by a Certified Pesticide Applicator only after notifying the proper authorities and getting approval to apply herbicides. Spraying is allowed only after receiving approval. Before applying herbicides, the type of weed shall be identified and the control selected accordingly, using the most effective control for the species, the location and the season.

(See recommended herbicidal list in **Appendix A: Herbicides for Control of Invasive Plants**).

Weeds shall not be allowed to grow in paved areas such as driveways, walks, curbs, gutters, etc. Dead weeds shall be removed from the paved areas.

- 60 *Mulch:* After weeding, apply specified mulch across surface of planter and/or planting bed in uniform manner; do not apply more than 3-4 inches thick. Mulching is only once/year in the spring, unless additional applications are needed after heavy rain events.

- a) Type: organic shredded hardwood mulch (or mulch specified for specific site)

- Shall be free of ceramic, man-made trash or debris of any kind, wood or other objectionable materials.
- b) Application rate: 3 inches applied to a settled thickness of 2 inches.
- Do not place mulch within 2 inches (150 mm) of shrub trunks or perennial/plant stems in order to prevent rot from occurring
 - Do not shape mulch like a “volcano”. Spread mulch evenly to a uniform, level height.
- 70 *Clean up:* Remove surplus mulch and waste material including trash and debris, and legally dispose of them off Owner’s property
- 80 *Record:* Make note of any additional observations in the **Maintenance Report Log**.
- 90 *Safety completion:* Remove safety perimeter.

SMP-09c: Meadow Inspection, Control of Invasive Species

A meadow is a field consisting primarily of herbaceous grasses, forbs, wildflowers, and other non-woody plants. Meadow inspection consists of a visual inspection, trash/debris removal, and invasive species management.

Refer to **SMP-12 Meadow Mowing** for meadow maintenance and management of most meadow weeds.

Healthy plants and lawns should be able to withstand minor disease and insect damage without controls. Routine application of pesticides shall not be practiced, as this destroys natural predator-prey relationships in the environment. Where usually high infestations or infections occur, an accurate identification of the disease or insect shall be made and the control selected with care, prior to application. All chemical controls must be applied under the supervision of a licensed and qualified pest control applicator, following the procedures set forth in the labeling of the product, as required by law.

Type of Maintenance - Preventative

Tools and Supplies

- Hand Pruners
- Trowel
- Spade
- Pitchfork and Weed fork
- Plant and Weed Photo ID Sheet
- Trash bag, gloves

Frequency:

Inspection: Minimum 3x/year (Spring, Summer, Fall)

- Monitor meadow **monthly** during growing season for invasive species during the first 2 to 3 years

Labor Hours: 2 people for approximately 4-8 hours per site

Maintenance Procedure (numbers correspond with Maximo sequencing):

10 *Safety set-up:* Set up a safety perimeter. Protect existing plants from damage due to landscape operations and maintenance.

20 *Inspect:* Visually inspect for any bare areas of vegetation or specimen vegetation that has died and needs to be removed and/or replaced. Inspect plants for signs of excessive drought, disease, nutrient deficiency, and/or pest problems. Inspect any areas of standing water for mosquito larvae.

Inspect meadow area for evidence of invasive species and woody plant establishment. Monitor meadow monthly during growing season for invasive species during the first 2 to 3 years. Examples of invasive species include thistle, knapweed, phragmites, and general weeds such as dandelions.

Record observations in the **Maintenance Report Log** and report as necessary. If possible, take photographs to document site conditions.

NOTE: Based on the above observations, determine if it is necessary for a skilled horticulture professional to conduct a follow up visit to assess any potential plant health issues. Note this in the **Maintenance Report Log**.

30 *Control of Invasive Species:*

Refer to **SMP-12 Meadow Mowing** for information on managing invasive species in meadows, which is primarily done through mowing.

Refer to project's **Plant ID Sheet** for photographs of plants in order to be able to identify what plants should remain and what plants are weeds and should be removed.

For the control of certain types of invasive species not able to be managed by mowing, such as Crown Vetch, spot spraying and hand pulling should be conducted as directed below:

- a) Carefully hand pull or dig out invasive plant species taking care not to damage surrounding plants in meadow.
- b) For control of invasive species, spot spraying with herbicide may be employed only by a Certified Pesticide Applicator after notifying the proper authorities and getting approval to apply herbicides. Spraying is allowed only after receiving approval. Before applying herbicides, the type of weed shall be identified and the control selected accordingly, using the most effective control for the species, the location and the season.

(See recommended herbicidal list in Appendix A: Herbicides for Control of Invasive Plants).

40 *Remove trash/debris:* Remove any leaves, debris, and trash that have accumulated in or around the meadow. All refuse resulting from the maintenance operation of properties shall be disposed of at locations designated by the Manager/Owner.

50 *Record:* Make note of any additional observations in the **Maintenance Report Log**.

60 *Safety completion:* Remove safety perimeter.

Appendix A: Herbicides for Control of Invasive Plants

HERBICIDES FOR CONTROL OF INVASIVE PLANTS

These sprays were reviewed with NPS and approved by the New River Gorge National River Natural Resources Branch (Ken Stevens, Chief) for use at the Sandstone Visitor/Orientation Center.

Glyphosphate

Glyphosphate herbicide may be used for total vegetation control and is safe to use immediately prior to planting and up to four days after seeding. Glyphosphate may also be used to target individual weeds as a careful spot spraying after planting, but some non-target plants are likely to be damaged and killed as well. A formulation such as Roundup can be used for total vegetation control prior to planting in the grassland and mow strip areas. A formulation approved for wetland use, such as Rodeo, can be used in storm water infiltration basins and swales.

Plateau (Best application for areas near Rain gardens)

Plateau herbicide is a very good herbicide for pre and post-emergent weed control for establishing warm-season grasses. Pre-emergent application prior to planting is best. Plateau's utility is limited when wildflowers or cool-season grasses are incorporated into the seeding mix. Native forbs, depending on the species, may or may not be tolerant of Plateau. Cool season grasses are not very tolerant of Plateau. Switch grass is not as tolerant to Plateau as other warm season grasses.

Transline

Transline is a selective herbicide for the control of composites, polygonums, and legumes such as Crown Vetch. If carefully used as directed, it is an effective post-planting spot spray, because it will not kill all of the desired vegetation that is touched by over-spray. Transline can be sprayed over the top of grass plantings where Crown Vetch is abundant and where there are no desired composite wildflowers or legumes. Control of Crown Vetch will likely require at least 2 to 3 years of scouting and retreating with spot spray applications. Legumes and composites should be planted sparingly in the successional grassland in treated Crown Vetch areas.

Note: All products mentioned here are for information only and are not an endorsement of a particular brand.

DEER REPELLENT

No one deer repellent appears to stand out as more effective than any other in our experience, but newer repellents are easier to apply and last longer than previous formulations.

Save the Rain: Green Infrastructure Program Standard Maintenance Procedure (SMP)

SMP-09a: Tree General Maintenance - Tree Pit Weeding, Tree Pit Mulching, Soil Amendment with Organic Compost

Actions include visual inspection, weeding tree pits, straightening/resetting small caliper existing trees, mulching tree pits, and amending tree pits with organic compost.

Healthy trees should be able to withstand minor disease and insect damage without controls. Routine application of pesticides shall not be practiced, as this destroys natural predator-prey relationships in the environment. Where unusually high infestations or infections occur, an accurate identification of the disease or insect shall be made and the control selected with care, prior to application. All chemical controls must be applied under the supervision of a licensed and qualified pest control applicator, following the procedures set forth in the labeling of the product, as required by law.

Type of Maintenance - Preventative

Tools and Supplies

- Safety cones
- Safety gear (clothing, gloves, etc.)
- Mulch (as specified)
- Mulch fork
- Rake
- Trash bags for debris, weeds, etc.
- Hand Pruners, Weeding Tools
- Mowers
- Edgers

Frequency:

Inspection: Minimum 1x/year (Late May to early June and/or early September)

Weeding of Tree Pit Areas: Weed tree pits a minimum of 2 times per year, at least once in late spring/early summer and once in fall.

Mulching: Minimum 1x/year (Spring)

Amending Soil with Organic Compost: 1x/year (Spring) in Year 2 and Year 4

Labor Hours: 2 people for approximately 4-8 hours per site depending on size of site

Maintenance Procedure (numbers correspond with Maximo sequencing):

- 10 *Safety set-up:* Set up a safety perimeter. Protect existing trees from damage due to landscape operations and maintenance and operations of other contractors and trades.

- 20 *Inspect:* Note the species and location of dead trees. Visually inspect trees for dead, diseased or damaged branches. Inspect for signs of frost heave and note the location and species of those trees that need to be repositioned. Inspect trees for signs of excessive drought, disease, nutrient deficiency, and/or pest problems. Inspect tree pits for signs of soil compaction, soil subsidence, excessive salt deposits, or ponding of water. Inspect any areas of standing water in and around tree pits for mosquito larvae.

Note species and location of all trees experiencing any problems listed above. Record observations in the **Maintenance Report Log** and report as necessary. If possible, take photographs to document site conditions.

NOTE: Based on the above observations, determine if it is necessary for a skilled tree care professional/arborist to conduct a follow up visit to assess any potential tree health issues. Note this in the **Maintenance Report Log**.

- 30 *Remove trash/debris:* Remove any leaves, debris, and trash that have accumulated in or around the trees/treepits and legally dispose of them off Owner's property.

Disposal of refuse resulting from the maintenance operation is the responsibility of the party conducting the work.

- 40 *Weed:* Weeding of tree pits should occur 2 times a year, with a minimum of one spring and one fall visit.

Restrictions: Do not mow or use weed whackers (trimmers) within 2 feet of tree trunks. Hand weed instead.

Refer to project's **Plant ID Sheet** for photographs of plants in order to be able to identify what plants should remain and what plants are weeds and should be removed.

All tree pit areas shall be kept free of weeds, using mechanical methods defined below;

- a) Carefully hand pull or dig out weeds and invasive plants taking care not to damage surrounding plants.
- b) For control of invasive species, spot spraying with herbicide may be employed only by a Certified Pesticide Applicator after notifying the proper authorities and getting approval to apply herbicides. Spraying is allowed only after receiving approval. Before applying herbicides, the type of weed shall be identified and the control selected accordingly, using the most effective control for the species, the location and the season.

(See recommended herbicidal list in Appendix A: Herbicides for Control of Invasive Plants).

Weeds shall not be allowed to grow in paved areas such as driveways, walks, curbs, gutters, etc. If herbicide is applied, dead weeds shall be removed from the paved areas.

- 50 *Straightening and Raising Existing Small Caliper Trees:*

NOTE: The one-year warranty period after tree installation should cover the straightening and raising of small caliper trees.

If necessary, reset existing small caliper trees that are leaning and need to be straightened. Also reset (raise) trees where the top of root balls have sunken below “finish grade”. If roots need to be cut they shall be done so with a sharp cutting tool. **DO NOT CUT ROOTS THAT ARE MORE THAN 1-INCH (1”) IN DIAMETER.** Trees shall be set straight, back filled, and mulched. Ensure that trees are not planted too deep – the root flare must remain visible at finish grade.

Fill in soil subsidence that may occur because of settling or other processes as necessary.

60 *Amending Soil with Organic Compost (Only Years 2 and 4):*

Apply 2 (two) inches of compost and incorporate into the top 2 (two) inches of soil using a hand tool such as a trowel or a steel rake, keeping tools away from the trunk and being careful to leave tree roots intact as you encounter them.

Do not place compost directly against the trunk or a tree or shrub or exposed woody roots (as this could cause rot and invite pest or disease). Top surface of soil with mulch as described below.

70 *Mulch:* After weeding the existing mulched area, apply additional mulch across surface of tree pit and/or planting bed in uniform manner; do not apply more than 3-4 inches thick. Mulch should be re-applied one time per year (in the spring), unless additional applications are needed after heavy rain events.

a) Type of Mulch: shredded bark mulch:

- Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:
 - Type: Shredded hardwood or ground or shredded bark.
 - Size Range: 3 inches maximum, 1/2 inch (13 mm) minimum.
 - Color: Natural.

b) Application rate:

- Apply organic mulch throughout plant bed to an average thickness, of 3 to 4 inches (75-mm) in a uniform manner.
- Do not place mulch within 3 inches (150 mm) of the base of the root flare.
- Mulch should be applied in a 4 to 6 foot diameter with the highest point at the outer edge of the ring and graded gently to the center of the ring. Do not shape mulch like a “volcano” at tree trunk.

80 *Clean up:* Remove surplus mulch and waste material including trash and debris, and legally dispose of them off Owner’s property

90 *Record:* Make note of any additional observations in the **Maintenance Report Log**.

100 *Safety completion:* Remove safety perimeter.

SMP-09b: Planter/Plant Bed, Rain Garden, and Bioswale (Shrub and Herbaceous Plant Material) General Maintenance, Weeding, Mulching

Actions include visual inspection, weeding, and mulching

Plant beds, or planters, are typically a combination of trees, shrubs, and herbaceous perennials (flowering plants) in a contained planting bed, with a covering of mulch. Planters can be contained within concrete curbs or seatwalls, or are often at ground level.

Rain gardens and bioswales are shallow surface depressions planted with specially selected native vegetation (trees, shrubs, grasses, and perennials) to treat and capture stormwater runoff. They are often designed to be planted on top of a layer of sand or gravel storage.

Healthy plants and lawns should be able to withstand minor disease and insect damage without controls. Routine application of pesticides shall not be practiced, as this destroys natural predator-prey relationships in the environment. Where unusually high infestations or infections occur, an accurate identification of the disease or insect shall be made and the control selected with care, prior to application. All chemical controls must be applied under the supervision of a licensed and qualified pest control applicator, following the procedures set forth in the labeling of the product, as required by law.

Type of Maintenance - Preventative

Tools and Supplies

- Hand Pruners
- Mulch (as specified)
- Mulch fork
- Rake
- Spade shovel
- Pitchfork or spade
- Weeding fork
- Plant and Weed Photo ID Sheet
- Trash bag, gloves

Frequency:

Inspection: 1x/year minimum (Late May to early July, and/or late August/early September)

Weeding: 3x/year minimum (Spring clean up, summer maintenance, fall put to bed)

Mulching: Minimum 1x/year (Spring)

Labor Hours: 2 people for approximately 4-6 hours per site

Maintenance Procedure (numbers correspond with Maximo sequencing):

- 10 *Safety set-up:* Set up a safety perimeter. Protect existing plants from damage due to landscape operations and maintenance and operations of other contractors and trades.
- 20 *Inspect:* Visually inspect for any bare areas of vegetation or for specimen vegetation that has died and needs to be removed and/or replaced. Inspect for signs of frost heave and note any plants that may need to be replaced. Inspect plants for signs of excessive drought, disease, nutrient deficiency, and/or pest problems. Inspect planting areas for signs of soil compaction, soil subsidence, excessive salt

deposits, or ponding of water. Inspect any areas of standing water for mosquito larvae. Also inspect areas (e.g. stabilized outfalls) that may experience erosion or increased sediment deposits which would inhibit infiltration.

Record observations in the **Maintenance Report Log** and report as necessary. If possible, take photographs to document site conditions.

NOTE: Based on the above observations, determine if it is necessary for a skilled horticulture professional to conduct a follow up visit to assess any potential plant health issues. Note this in the **Maintenance Report Log**.

- 30 *Remove trash/debris:* Remove any leaves, debris, and trash that have accumulated in or around the plant beds/planters and legally dispose of them off Owner's property.

All refuse resulting from the maintenance operation of properties shall be disposed of at locations designated by the Manager/Owner.

- 40 *Weed:* Weeding shall occur 3x/year at minimum (spring, summer, and fall).

Weeding is easiest if done when soil is moist. It is also recommended to pay attention to specific sites and keep track of weed presence on the **Maintenance Report Log** for each site. Weeding is easier and more effective if done consistently throughout the growing season and done BEFORE weeds go to seed.

Refer to project's **Plant ID Sheet** for photographs of plants in order to be able to identify what plants should remain and what plants are weeds and should be removed.

All planting areas shall be kept free of weeds, using either mechanical or chemical methods defined below;

- a) Carefully hand pull or dig out weeds and invasive plants taking care not to damage surrounding plants.
- b) For control of invasive species, spot spraying with herbicide may be employed by a Certified Pesticide Applicator only after notifying the proper authorities and getting approval to apply herbicides. Spraying is allowed only after receiving approval. Before applying herbicides, the type of weed shall be identified and the control selected accordingly, using the most effective control for the species, the location and the season.

(See recommended herbicidal list in **Appendix A: Herbicides for Control of Invasive Plants**).

Weeds shall not be allowed to grow in paved areas such as driveways, walks, curbs, gutters, etc. Dead weeds shall be removed from the paved areas.

- 60 *Mulch:* After weeding, apply specified mulch across surface of planter and/or planting bed in uniform manner; do not apply more than 3-4 inches thick. Mulching is only once/year in the spring, unless additional applications are needed after heavy rain events.

- a) Type: organic shredded hardwood mulch (or mulch specified for specific site)

- Shall be free of ceramic, man-made trash or debris of any kind, wood or other objectionable materials.

b) Application rate: 3 inches applied to a settled thickness of 2 inches.

- Do not place mulch within 2 inches (150 mm) of shrub trunks or perennial/plant stems in order to prevent rot from occurring
- Do not shape mulch like a “volcano”. Spread mulch evenly to a uniform, level height.

70 *Clean up:* Remove surplus mulch and waste material including trash and debris, and legally dispose of them off Owner’s property

80 *Record:* Make note of any additional observations in the **Maintenance Report Log**.

90 *Safety completion:* Remove safety perimeter.

SMP-09c: Meadow Inspection, Control of Invasive Species

A meadow is a field consisting primarily of herbaceous grasses, forbs, wildflowers, and other non-woody plants. Meadow inspection consists of a visual inspection, trash/debris removal, and invasive species management.

Refer to **SMP-12 Meadow Mowing** for meadow maintenance and management of most meadow weeds.

Healthy plants and lawns should be able to withstand minor disease and insect damage without controls. Routine application of pesticides shall not be practiced, as this destroys natural predator-prey relationships in the environment. Where usually high infestations or infections occur, an accurate identification of the disease or insect shall be made and the control selected with care, prior to application. All chemical controls must be applied under the supervision of a licensed and qualified pest control applicator, following the procedures set forth in the labeling of the product, as required by law.

Type of Maintenance - Preventative

Tools and Supplies

- Hand Pruners
- Trowel
- Spade
- Pitchfork and Weed fork
- Plant and Weed Photo ID Sheet
- Trash bag, gloves

Frequency:

Inspection: Minimum 3x/year (Spring, Summer, Fall)

- Monitor meadow **monthly** during growing season for invasive species during the first 2 to 3 years

Labor Hours: 2 people for approximately 4-8 hours per site

Maintenance Procedure (numbers correspond with Maximo sequencing):

10 *Safety set-up:* Set up a safety perimeter. Protect existing plants from damage due to landscape operations and maintenance.

20 *Inspect:* Visually inspect for any bare areas of vegetation or specimen vegetation that has died and needs to be removed and/or replaced. Inspect plants for signs of excessive drought, disease, nutrient deficiency, and/or pest problems. Inspect any areas of standing water for mosquito larvae.

Inspect meadow area for evidence of invasive species and woody plant establishment. Monitor meadow monthly during growing season for invasive species during the first 2 to 3 years. Examples of invasive species include thistle, knapweed, phragmites, and general weeds such as dandelions.

Record observations in the **Maintenance Report Log** and report as necessary. If possible, take photographs to document site conditions.

NOTE: Based on the above observations, determine if it is necessary for a skilled horticulture professional to conduct a follow up visit to assess any potential plant health issues. Note this in the **Maintenance Report Log**.

30 *Control of Invasive Species:*

Refer to **SMP-12 Meadow Mowing** for information on managing invasive species in meadows, which is primarily done through mowing.

Refer to project's **Plant ID Sheet** for photographs of plants in order to be able to identify what plants should remain and what plants are weeds and should be removed.

For the control of certain types of invasive species not able to be managed by mowing, such as Crown Vetch, spot spraying and hand pulling should be conducted as directed below:

- a) Carefully hand pull or dig out invasive plant species taking care not to damage surrounding plants in meadow.
- b) For control of invasive species, spot spraying with herbicide may be employed only by a Certified Pesticide Applicator after notifying the proper authorities and getting approval to apply herbicides. Spraying is allowed only after receiving approval. Before applying herbicides, the type of weed shall be identified and the control selected accordingly, using the most effective control for the species, the location and the season.

(See recommended herbicidal list in Appendix A: Herbicides for Control of Invasive Plants).

- 40 *Remove trash/debris:* Remove any leaves, debris, and trash that have accumulated in or around the meadow. All refuse resulting from the maintenance operation of properties shall be disposed of at locations designated by the Manager/Owner.
- 50 *Record:* Make note of any additional observations in the **Maintenance Report Log**.
- 60 *Safety completion:* Remove safety perimeter.

Appendix A: Herbicides for Control of Invasive Plants

HERBICIDES FOR CONTROL OF INVASIVE PLANTS

These sprays were reviewed with NPS and approved by the New River Gorge National River Natural Resources Branch (Ken Stevens, Chief) for use at the Sandstone Visitor/Orientation Center.

Glyphosphate

Glyphosphate herbicide may be used for total vegetation control and is safe to use immediately prior to planting and up to four days after seeding. Glyphosphate may also be used to target individual weeds as a careful spot spraying after planting, but some non-target plants are likely to be damaged and killed as well. A formulation such as Roundup can be used for total vegetation control prior to planting in the grassland and mow strip areas. A formulation approved for wetland use, such as Rodeo, can be used in storm water infiltration basins and swales.

Plateau (Best application for areas near Rain gardens)

Plateau herbicide is a very good herbicide for pre and post-emergent weed control for establishing warm-season grasses. Pre-emergent application prior to planting is best. Plateau's utility is limited when wildflowers or cool-season grasses are incorporated into the seeding mix. Native forbs, depending on the species, may or may not be tolerant of Plateau. Cool season grasses are not very tolerant of Plateau. Switch grass is not as tolerant to Plateau as other warm season grasses.

Transline

Transline is a selective herbicide for the control of composites, polygonums, and legumes such as Crown Vetch. If carefully used as directed, it is an effective post-planting spot spray, because it will not kill all of the desired vegetation that is touched by over-spray. Transline can be sprayed over the top of grass plantings where Crown Vetch is abundant and where there are no desired composite wildflowers or legumes. Control of Crown Vetch will likely require at least 2 to 3 years of scouting and retreating with spot spray applications. Legumes and composites should be planted sparingly in the successional grassland in treated Crown Vetch areas.

Note: All products mentioned here are for information only and are not an endorsement of a particular brand.

DEER REPELLENT

No one deer repellent appears to stand out as more effective than any other in our experience, but newer repellents are easier to apply and last longer than previous formulations.

Save the Rain: Green Infrastructure Program Standard Maintenance Procedure (SMP)

SMP-10a: Tree Watering

***NOTE:** Tree watering for the first year after installation should be covered by the one-year maintenance agreement as outlined in the project specifications and contract/warranty provisions.

This Tree Watering SMP takes effect one year after tree installation (beginning of Year 2).

Type of Maintenance - Preventative

Tools and Supplies

- Gator bags
- Sprinkler & Hose
- Hydrant
- Water truck (if no access to water hydrant)

Frequency:

Initial Tree Establishment (First Year After Tree Installation)*: Water twice a week in the absence of rain during first year after tree installation. (15-25 gallons of water twice per week).

Year 2: Water weekly (once a week) in the absence of rain during second year after tree installation. Water to supplement rainfall in order to maintain a rate of 1" of water per week. (15-25 gallons of water once per week)

Year 3 and beyond: Water as needed during extended periods of drought, only when ground is not frozen.

Labor Hours: 2 people for approximately 1-5 hours per site depending on site size

Maintenance Procedure (numbers correspond with Maximo sequencing):

10 *Safety set-up:* Set up a safety perimeter.

20 *Inspect:* Visually inspect for any trees or tree branches that have died and need to be removed and/or replaced (in the case of an entire tree being dead). Inspect for signs of frost heave and note any plants that may need to be replaced. Inspect trees for signs of vandalism, plow damage, excessive drought, disease, and/or pest problems. Inspect soil surface in tree pits for signs of overly compacted soils or evidence that trees were planted too deeply. Ensure that root flare is still visible at finish grade.

Record observations in the **Maintenance Report Log** and report as necessary. If possible, take photographs to document site conditions.

30 *Remove trash/debris:* Remove any litter, debris, and trash that have accumulated in the landscaped area around trees and/or in the tree pits.

40 *Water:*

During the first year after tree installation, regular watering to supplement rainfall shall occur between the months of April/May through November. Apply 15-25 gallons of water twice a week in the absence of rain in Year One.

During the second year after tree installation, apply 15-25 gallons of water once a week in the absence of rainfall, between the months of April/May through November.

In general, water to supplement rainfall in order to maintain a rate of 1" of water per week during the growing season, especially during late summer months experiencing higher temperatures and when available water in soil from spring snow melt has depleted.

There is no need to water trees if rainfall has fulfilled the 1" of water per week requirement.

Discontinue watering activities once temperatures create frozen soil conditions. Start again in spring when tree buds swell and sprout new leaves.

After the first two years, only water in the manner above between April/May and November during extended periods of drought.

Watering Technique:

Using a hose, water at the base of the tree but avoid watering directly on the tree trunk. Water deeply, allowing 15-25 gallons to seep slowly down to the roots.

If watering from a piped water source, water for approximately 10 minutes for each tree, with water at half pressure, or when water starts ponding and running off.

If watering in clay soils, water at a rate of ¼ inch per hour because infiltration will be slower. Crews may need to repeat an "on/off watering cycle" to get water throughout the top 18-24 inches. This may take a couple of days, especially during long periods of drought.

Water as necessary so planting soil remains moist 2-3 inches below the finished grade. Use a trickling hose or a Tree Gator to ensure steady, slow water flow.

50 *Record:* Make note of any additional observations in the **Maintenance Report Log**.

60 *Safety completion:* Remove safety perimeter.

SMP-10b: Plant Bed (Planter) Watering, Rain Garden/Bioswale Watering, Meadow Watering

NOTE: Landscape watering for the first year after installation should be covered by the one-year maintenance agreement as outlined in the project specifications and contract/warranty provisions.

This Landscape Watering SMP takes effect one year after tree installation (beginning of Year 2).

Plant beds, or planters, are typically a combination of trees, shrubs, and perennials (flowering plants) in a contained planting bed, with a covering of mulch. Planters can be contained within concrete curbs or seatwalls, or are often at ground level.

Rain gardens and bioswales are shallow surface depressions planted with specially selected native vegetation (trees, shrubs, grasses, and perennials) to treat and capture stormwater runoff. They are often designed to be planted on top of a layer of sand or gravel storage.

A meadow is a field consisting primarily of herbaceous grasses, forbs, wildflowers, and other non-woody plants.

If Trees are present, refer to **SMP-10a Tree Watering**.

Type of Maintenance - Preventative

Tools and Supplies

- Hose
- Sprinkler
- Hydrant
- Water backpack (for small areas)
- Water truck (if no access to water hydrant)

Frequency:

Initial Establishment (First Year after Plant Installation): Water in absence of rainfall in order to maintain a rate of 1" of water per week.

Year 2, Year 3: Water as needed (generally up to ½" of water per week) during the first 4-6 weeks of the growing season, and then only during extended periods of drought and only when ground is not frozen.

Year 4 and Beyond: Water to supplement rainfall only during extended periods of drought and only when ground is not frozen.

Labor Hours: 2 people for approximately 1-5 hours per site depending on site size

Maintenance Procedure (numbers correspond with Maximo sequencing):

10 *Safety set-up:* Set up a safety perimeter.

20 *Inspect:* Visually inspect for any bare areas within planters/plant beds/rain gardens/bioswales and also for specimen vegetation that has died and needs to be removed and/or replaced. Inspect plants for signs of excessive drought, disease, and/or pest problems. Inspect any areas of standing water for mosquito larvae.

Record observations in the **Maintenance Report Log** and report as necessary. If possible, take photographs to document site conditions.

30 *Remove trash/debris:* Remove any large debris and trash that has accumulated in the plant beds/planters.

40 *Water:*

During the first year after plant installation, water to supplement rainfall throughout the growing season (April through November) if soil conditions are dry. Do not water if ground is frozen. The amount of water recommended (combination of rainfall and/or supplemental watering) is 1" of water per week. *If resources permit, 2" of water per week is recommended during extreme drought conditions for ideal plant growth and peak performance.*

During the second and third year after plant installation, water to supplement rainfall in the first 4-6 weeks of each growing season (April through May) if soil conditions are dry and there is not adequate spring snow melt to provide soil moisture. Do not water if ground is frozen. Also water throughout the growing season if there is extreme drought. The amount of water recommended (combination of rainfall and/or supplemental watering is 1" of water per week). *If resources permit, 2" of water per week is recommended during extreme drought conditions for ideal plant growth and peak performance.*

There is no need to water plants if rainfall has fulfilled the 1" of water per week requirement.

Discontinue watering activities once temperatures create frozen soil conditions. Start again in spring when tree buds swell and sprout new leaves.

Watering Technique:

For tree watering, refer to **SMP-10a Tree Watering**.

Water as necessary so planting soil remains moist 2-3 inches below the finished grade. Use a trickling hose if possible to ensure steady, slow water flow. Water plant roots and avoid watering plant leaves (foliage). Water deeply to promote deeper root growth, which will ultimately enable plants to be more tolerant of drought in the long term.

50 *Record:* Make note of any additional observations in the **Maintenance Report Log**.

60 *Safety completion:* Remove safety perimeter.

Save the Rain: Green Infrastructure Program Standard Maintenance Procedure (SMP)

SMP-10a: Tree Watering

***NOTE:** Tree watering for the first year after installation should be covered by the one-year maintenance agreement as outlined in the project specifications and contract/warranty provisions.

This Tree Watering SMP takes effect one year after tree installation (beginning of Year 2).

Type of Maintenance - Preventative

Tools and Supplies

- Gator bags
- Sprinkler & Hose
- Hydrant
- Water truck (if no access to water hydrant)

Frequency:

Initial Tree Establishment (First Year After Tree Installation)*: Water twice a week in the absence of rain during first year after tree installation. (15-25 gallons of water twice per week).

Year 2: Water weekly (once a week) in the absence of rain during second year after tree installation. Water to supplement rainfall in order to maintain a rate of 1" of water per week. (15-25 gallons of water once per week)

Year 3 and beyond: Water as needed during extended periods of drought, only when ground is not frozen.

Labor Hours: 2 people for approximately 1-5 hours per site depending on site size

Maintenance Procedure (numbers correspond with Maximo sequencing):

10 *Safety set-up:* Set up a safety perimeter.

20 *Inspect:* Visually inspect for any trees or tree branches that have died and need to be removed and/or replaced (in the case of an entire tree being dead). Inspect for signs of frost heave and note any plants that may need to be replaced. Inspect trees for signs of vandalism, plow damage, excessive drought, disease, and/or pest problems. Inspect soil surface in tree pits for signs of overly compacted soils or evidence that trees were planted too deeply. Ensure that root flare is still visible at finish grade.

Record observations in the **Maintenance Report Log** and report as necessary. If possible, take photographs to document site conditions.

30 *Remove trash/debris:* Remove any litter, debris, and trash that have accumulated in the landscaped area around trees and/or in the tree pits.

40 *Water:*

During the first year after tree installation, regular watering to supplement rainfall shall occur between the months of April/May through November. Apply 15-25 gallons of water twice a week in the absence of rain in Year One.

During the second year after tree installation, apply 15-25 gallons of water once a week in the absence of rainfall, between the months of April/May through November.

In general, water to supplement rainfall in order to maintain a rate of 1" of water per week during the growing season, especially during late summer months experiencing higher temperatures and when available water in soil from spring snow melt has depleted.

There is no need to water trees if rainfall has fulfilled the 1" of water per week requirement.

Discontinue watering activities once temperatures create frozen soil conditions. Start again in spring when tree buds swell and sprout new leaves.

After the first two years, only water in the manner above between April/May and November during extended periods of drought.

Watering Technique:

Using a hose, water at the base of the tree but avoid watering directly on the tree trunk. Water deeply, allowing 15-25 gallons to seep slowly down to the roots.

If watering from a piped water source, water for approximately 10 minutes for each tree, with water at half pressure, or when water starts ponding and running off.

If watering in clay soils, water at a rate of ¼ inch per hour because infiltration will be slower. Crews may need to repeat an "on/off watering cycle" to get water throughout the top 18-24 inches. This may take a couple of days, especially during long periods of drought.

Water as necessary so planting soil remains moist 2-3 inches below the finished grade. Use a trickling hose or a Tree Gator to ensure steady, slow water flow.

50 *Record:* Make note of any additional observations in the **Maintenance Report Log**.

60 *Safety completion:* Remove safety perimeter.

SMP-10b: Plant Bed (Planter) Watering, Rain Garden/Bioswale Watering, Meadow Watering

NOTE: Landscape watering for the first year after installation should be covered by the one-year maintenance agreement as outlined in the project specifications and contract/warranty provisions.

This Landscape Watering SMP takes effect one year after tree installation (beginning of Year 2).

Plant beds, or planters, are typically a combination of trees, shrubs, and perennials (flowering plants) in a contained planting bed, with a covering of mulch. Planters can be contained within concrete curbs or seatwalls, or are often at ground level.

Rain gardens and bioswales are shallow surface depressions planted with specially selected native vegetation (trees, shrubs, grasses, and perennials) to treat and capture stormwater runoff. They are often designed to be planted on top of a layer of sand or gravel storage.

A meadow is a field consisting primarily of herbaceous grasses, forbs, wildflowers, and other non-woody plants.

If Trees are present, refer to **SMP-10a Tree Watering**.

Type of Maintenance - Preventative

Tools and Supplies

- Hose
- Sprinkler
- Hydrant
- Water backpack (for small areas)
- Water truck (if no access to water hydrant)

Frequency:

Initial Establishment (First Year after Plant Installation): Water in absence of rainfall in order to maintain a rate of 1" of water per week.

Year 2, Year 3: Water as needed (generally up to ½" of water per week) during the first 4-6 weeks of the growing season, and then only during extended periods of drought and only when ground is not frozen.

Year 4 and Beyond: Water to supplement rainfall only during extended periods of drought and only when ground is not frozen.

Labor Hours: 2 people for approximately 1-5 hours per site depending on site size

Maintenance Procedure (numbers correspond with Maximo sequencing):

10 *Safety set-up:* Set up a safety perimeter.

20 *Inspect:* Visually inspect for any bare areas within planters/plant beds/rain gardens/bioswales and also for specimen vegetation that has died and needs to be removed and/or replaced. Inspect plants for signs of excessive drought, disease, and/or pest problems. Inspect any areas of standing water for mosquito larvae.

Record observations in the **Maintenance Report Log** and report as necessary. If possible, take photographs to document site conditions.

30 *Remove trash/debris:* Remove any large debris and trash that has accumulated in the plant beds/planters.

40 *Water:*

During the first year after plant installation, water to supplement rainfall throughout the growing season (April through November) if soil conditions are dry. Do not water if ground is frozen. The amount of water recommended (combination of rainfall and/or supplemental watering) is 1" of water per week. *If resources permit, 2" of water per week is recommended during extreme drought conditions for ideal plant growth and peak performance.*

During the second and third year after plant installation, water to supplement rainfall in the first 4-6 weeks of each growing season (April through May) if soil conditions are dry and there is not adequate spring snow melt to provide soil moisture. Do not water if ground is frozen. Also water throughout the growing season if there is extreme drought. The amount of water recommended (combination of rainfall and/or supplemental watering is 1" of water per week). *If resources permit, 2" of water per week is recommended during extreme drought conditions for ideal plant growth and peak performance.*

There is no need to water plants if rainfall has fulfilled the 1" of water per week requirement.

Discontinue watering activities once temperatures create frozen soil conditions. Start again in spring when tree buds swell and sprout new leaves.

Watering Technique:

For tree watering, refer to **SMP-10a Tree Watering**.

Water as necessary so planting soil remains moist 2-3 inches below the finished grade. Use a trickling hose if possible to ensure steady, slow water flow. Water plant roots and avoid watering plant leaves (foliage). Water deeply to promote deeper root growth, which will ultimately enable plants to be more tolerant of drought in the long term.

50 *Record:* Make note of any additional observations in the **Maintenance Report Log**.

60 *Safety completion:* Remove safety perimeter.

Save the Rain: Green Infrastructure Program Standard Maintenance Procedure (SMP)

SMP-11a: Tree Pruning

NOTE This SMP includes activities that should be supervised by a certified arborist.

Tree pruning standards shall comply with the following benchmark standards:

ANSI A300 Standard

ANSI Z133.1 Safety Standards

ISA Best Management Practices: Tree Pruning

To ensure that pruning is appropriate for the species and tree/site conditions, it is important to have a clear understanding of the specific needs of the tree and the objectives for pruning. Pruning objectives for shade trees include the following:

- Improve structural strength and reduce failure potential (including dead branch removal)
- Prevent or mitigate a pest problem
- Improve aesthetic characteristics
- Provide clearance for pedestrians, vehicles, and structures
- Improve safety and security for residents and visitors
- Repair structural damage from wind loading
- Reduce maintenance costs (i.e., when applied to young trees)
- Influence flowering and fruiting of some species

Type of Maintenance - Preventative

Tools and Supplies

- Hand Pruners (including hand pruners on pole attachment)
- Pruning Equipment (poles with pruning and saw attachment)
- Bucket Truck (required for pruning once tree is over 20' tall)
- Trash bag, gloves

Frequency:

Pruning: **Year 1 (Pruning of deadwood only)** 1x per tree in Year 1, either January to March or June to September

Year 3 (Correction of Structural Issues) 1x per tree in Year 3, either January to March or June to September:

- a. Reduce or Remove codominant stems
- b. Eliminate included bark and crossing branches
- c. Create balanced canopy
- d. Prevent lion's tailing and over-lifting

-
- e. Remove large lower limbs

Year 5, 8, 12, 18, 24, 30, 36, 44, 52, 60 (Initiation of Structural pruning) 1x per tree in these years, either January to March or June to September:

- a. Develop or maintain central leader
- b. Identify lowest branches in the permanent canopy. Prevent branches below the permanent canopy from growing too large
- d. Keep all branches less than one half the trunk diameter
- e. Space main branches along one dominant trunk
- f. Suppress growth on branches with included bark

Labor Hours: 1 person per tree Years 1-12;
10 minutes per tree Years 1 through 6;
20 minutes per tree Years 6 to 12;

Bucket truck required after year 12 (typically when tree has reached 20' in height);
20 minutes per crew Years 12 to 24;
30 minutes per crew Years 25 to 36.

Approximate labor hours may vary depending on tree size.

Maintenance Procedure (numbers correspond with Maximo sequencing):

- 10 *Safety set-up:* Set up a safety perimeter. During pruning, keep adjacent paving and construction clean and work area in an orderly condition. Protect existing plants from damage due to landscape maintenance operations and operations of other contractors and trades.
- 20 *Inspect:* Visually inspect for any trees or tree branches that are dead or broken and need to be removed and/or replaced (in the case of an entire tree being dead). Inspect for signs of frost heave and note any plants that may need to be replaced. Inspect trees for signs of vandalism, trunk damage, excessive drought, disease, and/or pest problems. Inspect soil surface in tree pits for signs of overly compacted soils or evidence that trees were planted too deeply (ensure that root flare is still visible).

Record observations in the **Maintenance Report Log** and report as necessary. If possible, take photographs to document site conditions.

- 30 *Remove trash/debris:* Remove any large debris and trash that has accumulated around trees and tree pits and legally dispose of them off Owner's property.
- 40 *Tree Canopy Structural Pruning:*
 - a. Develop or maintain central leader
 - b. Identify lowest branches in the permanent canopy.

-
- c. Prevent branches below the permanent canopy from growing too large
 - d. Keep all branches less than one half the trunk diameter
 - e. Space main branches along one dominant trunk
 - f. Suppress growth on branches with included bark

Pruning may be done before or after planting at the direction of the City-County Arborist or authorized representative. Pruning shall be done with clean, sharp tools, and not by snapping or chopping portions of the tree

Prune, thin, and shape trees according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by City Arborist, do not cut or remove the central tree leader; remove only injured, dying, or dead branches. Remove all sucker growth from trees and remove overlapping branches to prevent rubbing.

Prune to retain natural character/form. All trees shall be allowed to grow to their natural genetic form and size, unless specifically accepted. Any pruning shall be done to promote structural strength and to accentuate the natural form and features of the tree.

Pruning of street trees shall be carried out to permit unobstructed passage to pedestrians and motor vehicles. Branches shall be maintained to a minimum of 7-1/2 feet above sidewalks and a minimum of 12 feet immediately above vehicular use areas. Within sight clearance restricted areas at traffic intersections, tree canopies shall be maintained at a minimum of 8-1/2 feet above finished grade. Trees in planters or plant beds which do not obstruct passage shall not be limbed up unless otherwise instructed.

Stripping of lower branches of young trees shall not be permitted. Lower branches shall be retained in a pinched condition with as much foliage as possible to promote trunk caliper. Lower branches should be cut off only after the tree is able to stand erect without staking or other support.

Thinning of certain species and individual specimens may be required to prevent wind damage. Suckers, water sprouts, rubbing and heavily laden branches shall be removed to provide less wind resistance.

- 50 *Disposal:* Gather and dispose of vegetation debris as appropriate.
- 60 *Record:* Make note of any additional observations in the **Maintenance Report Log**.
- 70 *Safety completion:* Remove safety perimeter.

SMP-11b: Plant Bed/Planter/Rain Garden/Bioswale

(Shrub and Herbaceous Groundcover) Pruning, Division, and Cutback (Removal of Dead Vegetation)

Plant beds, or planters, are typically a combination of trees, shrubs, and perennials (flowering plants) in a contained planting bed, with a covering of mulch. Planters can be contained within concrete curbs or seatwalls, or are often at ground level.

Rain gardens and bioswales are shallow surface depressions planted with specially selected native vegetation (trees, shrubs, grasses, and perennials) to treat and capture stormwater runoff. They are often designed to be planted on top of a layer of sand or gravel storage.

Plants are chosen for their natural shape and growth habit and maintenance should encourage vegetation health and enhance the natural form of plant material. Activities such as trimming and pruning should not alter plant form considerably.

Type of Maintenance - Preventative

Tools and Supplies

- Hand Pruners
- Trowel
- Spade shovel
- Pitchfork
- Bow saw (if necessary)
- Trash bag, gloves

Frequency: 1x/year, see below.

Shrubs: 1x/year in March/April or September/October depending on species

Perennials: 1x/year cutback in March/April or September/October (March/April recommended)

Grasses: 1x/year cut back as needed, March/April

Labor Hours: 2 people for approximately 1-8 hours per site, depending on site size

Maintenance Procedure (numbers correspond with Maximo sequencing):

10 *Safety set-up:* Set up a safety perimeter. During pruning, keep adjacent paving and construction clean and work area in an orderly condition. Protect plants from damage due to landscape maintenance operations and operations of other contractors and trades.

20 *Inspect:* Visually inspect for any bare areas of vegetation, or for specimen vegetation that has died and needs to be removed and/or replaced. Inspect plants for signs of excessive drought, disease, and/or pest problems. Inspect any areas of standing water for mosquito larvae.

Record observations in the **Maintenance Report Log** and report as necessary. If possible, take photographs to document site conditions.

30 *Remove trash/debris:* Remove any large debris and trash that has accumulated in and around planters/plant beds and legally dispose of them off Owner's property.

40 *Prune:*

Shrubs:

Prune, thin, and shape shrubs according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by City Arborist, remove only injured, dying, or dead branches from shrubs; and prune to retain natural character/form. Do not prune for shape.

Shrubs shall be pruned to maintain growth within space limitations, to maintain or enhance the natural growth habit, or to eliminate diseased or damaged growth. Some species shall be trimmed appropriately to influence flowering and fruiting, or to improve vigor.

Shrubs must be trimmed as needed to permit unobstructed passage to residents or vehicles. Trimming shrubs within site clearance restricted areas at intersections is appropriate and shall have a maximum height of 2-1/2 feet from vehicular surface. Any curbs or raised planting areas shall be factored into the maximum 2-1/2 feet height. Shrubs must be trimmed 4 inches from the edges of sidewalks and curbs.

Shrubs shall be pruned to conform to the design concept of the landscape. Individual shrubs shall not be clipped into balled or boxed forms, except where specifically instructed.

Perennials and Herbaceous Plants:

Established plants bordering sidewalks or curbs shall be edged as often as necessary to prevent encroachment. Plants shall not be allowed to cover the crowns of shrubs or trees.

Refer to **Plant ID Sheet** to identify weeds from intended plants.

Perennial cutback/clean-up/removal of dead vegetation: Removing dead vegetation (on perennials) shall occur a minimum of 1x/year during the spring or fall, with a recommendation towards mid-spring before new vegetated growth has emerged or when plant is dormant. Use hand shears to remove dead vegetation and cut back perennials to 6-8" above root crown.

If dried seed pods or dried flowers are considered desirable by the property owner, then the dead vegetation may be allowed to remain through the winter and should be cut back in the spring. Some species have seed pods that act as food for birds/wildlife and/or decorative dried features, however other species may spread seed or look unkempt when dried and this may not be desired.

Perennial Division and Thinning: Depending on the species, perennials may need dividing every 3 – 5 years. This is because as certain plants get older, they die back starting from the center. Division is also done in order to prevent crowding as a plant grows and becomes larger in size. To divide perennials, dig up the old plant, remove the dead vegetation entirely, and replant the healthier sections. To thin perennials, selectively remove individual plant stems (either healthy or dead) if overcrowding is occurring. Thinning of perennials is done to prevent overcrowding and mildew by encouraging air circulation between individual plants.

Grasses:

Refer to **Plant ID Sheet** to identify weeds from intended plants.

Grass cutback: Cut back foliage to 6 – 10" above root crown in mid-spring before warm season grasses emerge, but when cool season weeds are actively growing. Leave a minimum 4-6" of previous growing

season's growth depending on the ornamental grass species. Shorter species such as Blue Fescue will be 4" while taller species such as Switchgrass will be 6".

Grass division: Ornamental and/or clumping grasses shall also be divided every 3 to 5 years to increase vigor. Groundcover grasses and meadow grasses do not need dividing.

List of example grasses that require division:

Sedges (Carex spp.)
Miscanthus (Maiden Grass)
Pennisetum (Fountain Grass)
Andropogon gerardii (Big Bluestem)
Schizachyrium scoparium (Little Bluestem)
Panicum virgatum (Switchgrass)
Calamagrostis x acutiflora (Feather Reed Grass)
Chasmanthium latifolium (Northern Sea Oats)
Festuca ovina var. glauca (Blue Fescue)

50 *Record:* Make note of any additional observations in the **Maintenance Report Log.**

60 *Safety completion:* Remove safety perimeter

Save the Rain: Green Infrastructure Program Standard Maintenance Procedure (SMP)

SMP-11a: Tree Pruning

NOTE This SMP includes activities that should be supervised by a certified arborist.

Tree pruning standards shall comply with the following benchmark standards:

ANSI A300 Standard

ANSI Z133.1 Safety Standards

ISA Best Management Practices: Tree Pruning

To ensure that pruning is appropriate for the species and tree/site conditions, it is important to have a clear understanding of the specific needs of the tree and the objectives for pruning. Pruning objectives for shade trees include the following:

- Improve structural strength and reduce failure potential (including dead branch removal)
- Prevent or mitigate a pest problem
- Improve aesthetic characteristics
- Provide clearance for pedestrians, vehicles, and structures
- Improve safety and security for residents and visitors
- Repair structural damage from wind loading
- Reduce maintenance costs (i.e., when applied to young trees)
- Influence flowering and fruiting of some species

Type of Maintenance - Preventative

Tools and Supplies

- Hand Pruners (including hand pruners on pole attachment)
- Pruning Equipment (poles with pruning and saw attachment)
- Bucket Truck (required for pruning once tree is over 20' tall)
- Trash bag, gloves

Frequency:

Pruning: **Year 1 (Pruning of deadwood only)** 1x per tree in Year 1, either January to March or June to September

Year 3 (Correction of Structural Issues) 1x per tree in Year 3, either January to March or June to September:

- a. Reduce or Remove codominant stems
- b. Eliminate included bark and crossing branches
- c. Create balanced canopy
- d. Prevent lion's tailing and over-lifting

-
- e. Remove large lower limbs

Year 5, 8, 12, 18, 24, 30, 36, 44, 52, 60 (Initiation of Structural pruning) 1x per tree in these years, either January to March or June to September:

- a. Develop or maintain central leader
- b. Identify lowest branches in the permanent canopy. Prevent branches below the permanent canopy from growing too large
- d. Keep all branches less than one half the trunk diameter
- e. Space main branches along one dominant trunk
- f. Suppress growth on branches with included bark

Labor Hours: 1 person per tree Years 1-12;
10 minutes per tree Years 1 through 6;
20 minutes per tree Years 6 to 12;

Bucket truck required after year 12 (typically when tree has reached 20' in height);
20 minutes per crew Years 12 to 24;
30 minutes per crew Years 25 to 36.

Approximate labor hours may vary depending on tree size.

Maintenance Procedure (numbers correspond with Maximo sequencing):

- 10 *Safety set-up:* Set up a safety perimeter. During pruning, keep adjacent paving and construction clean and work area in an orderly condition. Protect existing plants from damage due to landscape maintenance operations and operations of other contractors and trades.
- 20 *Inspect:* Visually inspect for any trees or tree branches that are dead or broken and need to be removed and/or replaced (in the case of an entire tree being dead). Inspect for signs of frost heave and note any plants that may need to be replaced. Inspect trees for signs of vandalism, trunk damage, excessive drought, disease, and/or pest problems. Inspect soil surface in tree pits for signs of overly compacted soils or evidence that trees were planted too deeply (ensure that root flare is still visible).

Record observations in the **Maintenance Report Log** and report as necessary. If possible, take photographs to document site conditions.

- 30 *Remove trash/debris:* Remove any large debris and trash that has accumulated around trees and tree pits and legally dispose of them off Owner's property.
- 40 *Tree Canopy Structural Pruning:*
 - a. Develop or maintain central leader
 - b. Identify lowest branches in the permanent canopy.

-
- c. Prevent branches below the permanent canopy from growing too large
 - d. Keep all branches less than one half the trunk diameter
 - e. Space main branches along one dominant trunk
 - f. Suppress growth on branches with included bark

Pruning may be done before or after planting at the direction of the City-County Arborist or authorized representative. Pruning shall be done with clean, sharp tools, and not by snapping or chopping portions of the tree

Prune, thin, and shape trees according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by City Arborist, do not cut or remove the central tree leader; remove only injured, dying, or dead branches. Remove all sucker growth from trees and remove overlapping branches to prevent rubbing.

Prune to retain natural character/form. All trees shall be allowed to grow to their natural genetic form and size, unless specifically accepted. Any pruning shall be done to promote structural strength and to accentuate the natural form and features of the tree.

Pruning of street trees shall be carried out to permit unobstructed passage to pedestrians and motor vehicles. Branches shall be maintained to a minimum of 7-1/2 feet above sidewalks and a minimum of 12 feet immediately above vehicular use areas. Within sight clearance restricted areas at traffic intersections, tree canopies shall be maintained at a minimum of 8-1/2 feet above finished grade. Trees in planters or plant beds which do not obstruct passage shall not be limbed up unless otherwise instructed.

Stripping of lower branches of young trees shall not be permitted. Lower branches shall be retained in a pinched condition with as much foliage as possible to promote trunk caliper. Lower branches should be cut off only after the tree is able to stand erect without staking or other support.

Thinning of certain species and individual specimens may be required to prevent wind damage. Suckers, water sprouts, rubbing and heavily laden branches shall be removed to provide less wind resistance.

- 50 *Disposal:* Gather and dispose of vegetation debris as appropriate.
- 60 *Record:* Make note of any additional observations in the **Maintenance Report Log**.
- 70 *Safety completion:* Remove safety perimeter.

SMP-11b: Plant Bed/Planter/Rain Garden/Bioswale

(Shrub and Herbaceous Groundcover) Pruning, Division, and Cutback (Removal of Dead Vegetation)

Plant beds, or planters, are typically a combination of trees, shrubs, and perennials (flowering plants) in a contained planting bed, with a covering of mulch. Planters can be contained within concrete curbs or seatwalls, or are often at ground level.

Rain gardens and bioswales are shallow surface depressions planted with specially selected native vegetation (trees, shrubs, grasses, and perennials) to treat and capture stormwater runoff. They are often designed to be planted on top of a layer of sand or gravel storage.

Plants are chosen for their natural shape and growth habit and maintenance should encourage vegetation health and enhance the natural form of plant material. Activities such as trimming and pruning should not alter plant form considerably.

Type of Maintenance - Preventative

Tools and Supplies

- Hand Pruners
- Trowel
- Spade shovel
- Pitchfork
- Bow saw (if necessary)
- Trash bag, gloves

Frequency: 1x/year, see below.

Shrubs: 1x/year in March/April or September/October depending on species

Perennials: 1x/year cutback in March/April or September/October (March/April recommended)

Grasses: 1x/year cut back as needed, March/April

Labor Hours: 2 people for approximately 1-8 hours per site, depending on site size

Maintenance Procedure (numbers correspond with Maximo sequencing):

10 *Safety set-up:* Set up a safety perimeter. During pruning, keep adjacent paving and construction clean and work area in an orderly condition. Protect plants from damage due to landscape maintenance operations and operations of other contractors and trades.

20 *Inspect:* Visually inspect for any bare areas of vegetation, or for specimen vegetation that has died and needs to be removed and/or replaced. Inspect plants for signs of excessive drought, disease, and/or pest problems. Inspect any areas of standing water for mosquito larvae.

Record observations in the **Maintenance Report Log** and report as necessary. If possible, take photographs to document site conditions.

30 *Remove trash/debris:* Remove any large debris and trash that has accumulated in and around planters/plant beds and legally dispose of them off Owner's property.

40 *Prune:*

Shrubs:

Prune, thin, and shape shrubs according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by City Arborist, remove only injured, dying, or dead branches from shrubs; and prune to retain natural character/form. Do not prune for shape.

Shrubs shall be pruned to maintain growth within space limitations, to maintain or enhance the natural growth habit, or to eliminate diseased or damaged growth. Some species shall be trimmed appropriately to influence flowering and fruiting, or to improve vigor.

Shrubs must be trimmed as needed to permit unobstructed passage to residents or vehicles. Trimming shrubs within site clearance restricted areas at intersections is appropriate and shall have a maximum height of 2-1/2 feet from vehicular surface. Any curbs or raised planting areas shall be factored into the maximum 2-1/2 feet height. Shrubs must be trimmed 4 inches from the edges of sidewalks and curbs.

Shrubs shall be pruned to conform to the design concept of the landscape. Individual shrubs shall not be clipped into balled or boxed forms, except where specifically instructed.

Perennials and Herbaceous Plants:

Established plants bordering sidewalks or curbs shall be edged as often as necessary to prevent encroachment. Plants shall not be allowed to cover the crowns of shrubs or trees.

Refer to **Plant ID Sheet** to identify weeds from intended plants.

Perennial cutback/clean-up/removal of dead vegetation: Removing dead vegetation (on perennials) shall occur a minimum of 1x/year during the spring or fall, with a recommendation towards mid-spring before new vegetated growth has emerged or when plant is dormant. Use hand shears to remove dead vegetation and cut back perennials to 6-8" above root crown.

If dried seed pods or dried flowers are considered desirable by the property owner, then the dead vegetation may be allowed to remain through the winter and should be cut back in the spring. Some species have seed pods that act as food for birds/wildlife and/or decorative dried features, however other species may spread seed or look unkempt when dried and this may not be desired.

Perennial Division and Thinning: Depending on the species, perennials may need dividing every 3 – 5 years. This is because as certain plants get older, they die back starting from the center. Division is also done in order to prevent crowding as a plant grows and becomes larger in size. To divide perennials, dig up the old plant, remove the dead vegetation entirely, and replant the healthier sections. To thin perennials, selectively remove individual plant stems (either healthy or dead) if overcrowding is occurring. Thinning of perennials is done to prevent overcrowding and mildew by encouraging air circulation between individual plants.

Grasses:

Refer to **Plant ID Sheet** to identify weeds from intended plants.

Grass cutback: Cut back foliage to 6 – 10" above root crown in mid-spring before warm season grasses emerge, but when cool season weeds are actively growing. Leave a minimum 4-6" of previous growing

season's growth depending on the ornamental grass species. Shorter species such as Blue Fescue will be 4" while taller species such as Switchgrass will be 6".

Grass division: Ornamental and/or clumping grasses shall also be divided every 3 to 5 years to increase vigor. Groundcover grasses and meadow grasses do not need dividing.

List of example grasses that require division:

Sedges (Carex spp.)
Miscanthus (Maiden Grass)
Pennisetum (Fountain Grass)
Andropogon gerardii (Big Bluestem)
Schizachyrium scoparium (Little Bluestem)
Panicum virgatum (Switchgrass)
Calamagrostis x acutiflora (Feather Reed Grass)
Chasmanthium latifolium (Northern Sea Oats)
Festuca ovina var. glauca (Blue Fescue)

50 *Record:* Make note of any additional observations in the **Maintenance Report Log.**

60 *Safety completion:* Remove safety perimeter

Save the Rain: Green Infrastructure Program Standard Maintenance Procedure (SMP)

SMP-12: Meadow Mowing and Invasive Species Management

A meadow is a field consisting primarily of herbaceous grasses, forbs, wildflowers, and other non-woody plants. Mowing a meadow helps to prevent and control woody plant and weed establishment, while also helping to disperse seeds of desirable species. Mowing manages for cool season weeds, which helps promote warm season grass establishment. Using a flail-type mower for large grassland areas results in finely chopped plant material, encourages more rapid breakdown of leaf litter and eliminates the need to bale and remove any cut grasses and/or weeds.

Type of Maintenance - Preventative

Tools and Supplies (see Appendix B: Meadow Maintenance Equipment List)

- Hand Scythes (small meadows)
- Power Strimmer (String Trimmer/Weed Whacker) (small meadows)
- Power Scythe (large meadows)
- Flail-type Mower – suggested mower for large meadows
- Riding or Push Mower – suggested mower for small to medium meadows
- Trash bag, gloves

Frequency:

Initial establishment: 1st Growing Season (Year 1)

- Mow meadow **once a month** during growing season (April through November)

Initial establishment: Year 2

- Mow **once in fall**

Long Term Maintenance regime: Year 3 and after:

- Mow **once every 2 years in early to mid-spring** prior to significant warm season grass regrowth, but when cool season weeds are actively growing. If basin bottom is too wet for spring mowing, mow in late fall (after plants have set seed).

Labor Hours: 2 people for approximately 2-6 hours per site, depending on site size

Maintenance Procedure (numbers correspond with Maximo sequencing):

10 *Safety set-up:* Set up a safety perimeter.

20 *Inspect:* Visually inspect the meadow for any bare areas of vegetation or for specimen vegetation that has died and needs to be removed and/or replaced. Inspect plants for signs of excessive drought, disease, and/or pest problems. Inspect any areas of standing water for mosquito larvae.

Inspect meadow area for evidence of invasive species establishment. Examples of invasive species include thistle, crown vetch, knapweed, phragmites, and general weeds such as dandelions.

Note areas that will require hand pulling and spot spraying of invasive species (only if the invasive species will not be managed through mowing). Refer to SMP-11c for the instructions on hand pulling and spot spraying of invasives.

Record observations in the **Maintenance Report Log** and report as necessary. If possible, take photographs to document site conditions.

30 *Remove trash/debris:* Remove any large debris and trash that has accumulated in the meadow area and legally dispose of them off Owner's property.

40 *Mowing:*

Never mow when soil is saturated with water.

During mowing, keep adjacent paving and construction clean and work area in an orderly condition. Protect plants from damage due to landscape maintenance operations and operations of other contractors and trades.

Small meadows can be cut/mown with hand scythes or a power trimmer. Larger meadows can be cut/mown with a power scythe or a tractor mower (flail-type mower is recommended).

Refer to Appendix B: Meadow Maintenance Equipment List

- **Initial establishment: 1st Growing Season (Year 1)**
 - Mow meadow when plants/grasses reach a height of approximately 10-inches (10"), which is about once a month during the growing season. Mow down to to height of 6" (or just above the height of emerging native grass seedlings).
 - Remove, finely chop, and redistribute mowings to prevent cut weeds from smothering native grass seedlings.
- **Initial establishment: Year 2**
 - Fall: Mow once during fall to a height of 8".
- **Long Term Maintenance regime: Year 3 and after:**
 - Mow to a height of 6-8" once every 2 years in early to mid-spring prior to significant warm season grass regrowth, but when cool season weeds are actively growing. If basin bottom is too wet for spring mowing, mow in late fall (after plants have set seed).
 - Remove cut material, or mow with a flail mower to finely chop residue.
 - If dry leaf litter builds up:
 - Mow every year or
 - Pull out lower litter that a mower can't reach with a harrow or rake.

50 *Record:* Make note of any additional observations in the **Maintenance Report Log**.

60 *Safety completion:* Remove safety perimeter.

Appendix B: Meadow Maintenance Equipment List

Riding or Push Mower with 30" Max. Cutting Deck

Use this mower to maintain the fescue mow strips, Landscape Management Zone 4.0 "Mow strips/ Grassed Edges." Use a 3" minimum mow height.

Flail-type mower

Flail mowers are suggested for maintenance of large grassland/meadow areas. The advantage to using flail mowers is that they chop material into fine pieces, encouraging more rapid breakdown of leaf litter and eliminating the need to bale and remove cut grasses or weeds. A flail mower with an arm will be useful in mowing islands and slopes.

Harrow

Harrows may be necessary to rejuvenate meadow stands periodically if flail mowers do not remove enough old plant litter, but they are not needed for annual use.

Save the Rain: Green Infrastructure Program Standard Maintenance Procedure (SMP)

SMP-13a: Plant (Shrub and Herbaceous Plant Material) Replacement

Plant (shrub and herbaceous plant material) replacement involves replacing missing, dead, or diseased shrubs and herbaceous plant material (perennials, forbs, grasses) in planter beds, planters, rain gardens, and/or bioswales if replacement has been deemed necessary.

NOTE: Tree replacement is not part of this SMP and will occur separately.

Type of Maintenance - Replacement

Tools and Supplies

- Safety cones
- Safety gear (clothing, gloves, etc.)
- Planting and Mulching Equipment – shovels, pitchfork, rake, etc.
- Shrubs, plants, and seeds (to be planted)
- Mulch (as specified)
- Trash bags for debris, weeds, etc.

Frequency: Spring and Fall, Replacement as necessary

Labor Hours: 2 people for approximately 2-6 hours per site depending on scope of replacement

Maintenance Procedure (numbers correspond with Maximo sequencing):

10 *Safety set-up:* Set up a safety perimeter. Protect existing plants from damage due to landscape operations and maintenance.

20 *Inspect:* Visually inspect for any bare areas of vegetation or specimen vegetation that has died and needs to be removed and/or replaced. Inspect areas where plants will be planted (replaced) and note signs of soil subsidence, soil compaction, standing water, evidence of disease/fungus, and animal burrowing.

Record observations in the **Maintenance Report Log** and report as necessary. If possible, take photographs to document site conditions.

30 *Remove trash/debris:* Remove any leaves, debris, and trash that have accumulated in or around the plant beds/planters.

All refuse resulting from the maintenance operation of properties shall be disposed of at locations designated by the Manager/Owner.

40 *Replacement:* Follow the below instructions if shrub and herbaceous groundcover replacement has been deemed necessary. **Tree replacement will occur separately.**

a) Replacement requirements for shrubs and groundcover:

- Shrubs: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, 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.
- Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required.
 - Set balled and potted and container-grown stock plumb and in center of planting pit or trench with root flare 1 inch (25 mm) above adjacent finish grades.
 - Pit should be twice as wide as it is deep
 - Use planting soil for backfill, of types specified and scheduled.
 - Carefully remove root ball from container without damaging root ball or plant.
 - Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 - If amending soil, place amendment tablets or incorporate amendments in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. If using amendment tablets, place tablets beside the root ball about 1 inch (25 mm) from root tips; do not place tablets in bottom of the hole.
 - Continue backfilling process. Water again after placing and tamping final layer of soil.
- Groundcover and Perennial Plugs: 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.
 - Set out and space ground cover and plants in swaths to fill in vegetated gaps in plant bed.
 - Dig holes large enough to allow spreading of roots.
 - Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.
 - Water thoroughly after planting, taking care not to cover plant crowns with wet soil.
 - Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.
- Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.
 - Shrubs:
 - Spring Planting: March 1 to May 1.
 - Fall Planting: September 1 to November 1.
 - Grass & Perennial Plugs:
 - Spring Planting: April 1 to June 15.
 - Fall Planting: August 1 to September 15.

- Bulbs:
 - Fall Planting: September 15 to October 30.

50 *Cleanup:* Stones, debris, tools, equipment, rope, pruned branches, tree debris, etc., shall be removed from the site upon completion of work. Excess soil outside of the saucer areas shall be removed and the area raked smooth. Paved areas shall be broom cleaned.

60 *Record:* Make note of any additional observations in the **Maintenance Report Log**.

70 *Safety completion:* Remove safety perimeter.

SMP-13b: Meadow Replacement

Meadow replacement involves reseeding or replugging meadow grasses or herbaceous groundcover plants if replacement has been deemed necessary.

Type of Maintenance - Replacement

Tools and Supplies

- Safety cones
- Safety gear (clothing, gloves, etc.)
- Planting Equipment – shovels, etc.
- Plant plugs and seed (to be planted)
- Mulch (as specified)
- Trash bags for debris, weeds, etc.

Frequency: Spring and Fall , Replacement/Reseeding as Necessary

Labor Hours: 2 people for approximately 4-6 hours per site depending on scope of replacement

Maintenance Procedure (numbers correspond with Maximo sequencing):

10 *Safety set-up:* Set up a safety perimeter. Protect plants from damage due to landscape operations and maintenance.

20 *Inspect:* Visually inspect for any bare areas of vegetation or specimen vegetation that has died and needs to be removed and/or replaced. Inspect areas where plants will be planted (replaced) and note signs of soil subsidence, soil compaction, standing water, evidence of disease/fungus, and animal burrowing.

Record observations in the **Maintenance Report Log** and report as necessary. If possible, take photographs to document site conditions.

30 *Remove trash/debris:* Remove any leaves, debris, and trash that have accumulated in or around the meadow.

All refuse resulting from the maintenance operation of properties shall be disposed of at locations designated by the Manager/Owner.

50 *Replace Plants (Plugging/Reseeding):* Follow the below instructions if meadow reseeding has been deemed necessary. For Shrubs and Herbaceous Groundcover, see **SMP-15 Plant (Shrub and Herbaceous Groundcover) Replacement**.

a) Replacement Requirements:

- Re-plugging: see **SMP-13a Plant (Shrub and Herbaceous Groundcover) Replacement** for instructions.

b) Reseeding Requirements:

- Reseed bare areas with same materials specified for respective grasses & forbs.
- Seed mixture shall be fresh, clean, new crop seed. Seed shall be of the previous year's crop and in no case shall the weed seed content exceed 0.25% by weight. The seed shall be furnished and delivered in the proportion specified below in new, clean, sealed and

properly labeled containers. All seed shall comply with State and Federal seed laws. Submit manufacturer's Certificates of Compliance. Seed that has become wet, moldy or otherwise damaged shall not be acceptable.

- Percent Pure Live Seed (PLS) shall be calculated for all seed lots using each seed lot's own unique purity and germination test results. Percent Pure Live Seed is defined by the following formula: $\text{Percent (\% Purity)} \times \text{Percent (\% Germination)} / 100 = \text{Percent (\% Pure Live Seed (PLS))}$. The minimum % PLS shall be 75% for each seed lot. A "PLS Pound" is defined as the bulk weight of seed required to equal one pound of 100% pure, germinable seed.

b) Reseeding Instructions:

- Weather Limitations: Proceed with seeding only when existing and forecasted weather conditions permit.
- Seeded areas to be lightly scarified with springy rake to loosen soil before reseeding.
- For small areas, hand broadcast seed to match initial seeding rate specified for site.
 - Mix seed with two-thirds of a bushel of moist vermiculite before sowing. Divide seed and vermiculite mix into quantities for each area to be reseeded.
 - Broadcast seed evenly across meadow area.
 - After broadcast seeding by hand, firm the seeded area with a land roller, such as a cultipacker or equivalent machinery. Cultipacking is not required if using a Truax no-till drill or a Brillion seeder.
- For larger areas, use no-till seed drill or broadcast seeder, without inert matter added.
 - Seeders such as a "Truax" no-till drill or a double box "Brillion" grass and legume broadcast seeder are recommended. The use of other drill or seeder will require approval of seed supplier prior to use for meadow seeding. The Brillion seeder requires that a fine-graded seedbed be worked up prior to seeding.
- Maintain and establish vegetation by watering, reseeding, weeding, controlling pests and diseases, and other operations. Roll, regrade, and reseed bare or eroded areas and remulch to produce a uniformly smooth vegetative cover.
- Add new mulch in areas where mulch has been disturbed by wind or maintenance operations sufficiently to nullify its purpose. Anchor as required to prevent displacement.
- Meadow Mowing: Refer to **SMP-12 Meadow Mowing**.

c) Reseeding Restrictions:

- Seed during one of the following periods.
 - Meadow Seeding: March 15th to June 15th
 - Warm-Season Meadow Seeding: April 15th to June 15th and August 15th to September 15th

- 50 *Cleanup:* Stones, debris, tools, equipment, rope, pruned branches, plant debris, etc., shall be removed from the site upon completion of work. Excess soil outside of the saucer areas shall be removed and the area raked smooth. Paved areas shall be broom cleaned.
- 60 *Record:* Make note of any additional observations in the **Maintenance Report Log**.
- 70 *Safety completion:* Remove safety perimeter.

Save the Rain: Green Infrastructure Program Standard Maintenance Procedure (SMP)

SMP-13a: Plant (Shrub and Herbaceous Plant Material) Replacement

Plant (shrub and herbaceous plant material) replacement involves replacing missing, dead, or diseased shrubs and herbaceous plant material (perennials, forbs, grasses) in planter beds, planters, rain gardens, and/or bioswales if replacement has been deemed necessary.

NOTE: Tree replacement is not part of this SMP and will occur separately.

Type of Maintenance - Replacement

Tools and Supplies

- Safety cones
- Safety gear (clothing, gloves, etc.)
- Planting and Mulching Equipment – shovels, pitchfork, rake, etc.
- Shrubs, plants, and seeds (to be planted)
- Mulch (as specified)
- Trash bags for debris, weeds, etc.

Frequency: Spring and Fall, Replacement as necessary

Labor Hours: 2 people for approximately 2-6 hours per site depending on scope of replacement

Maintenance Procedure (numbers correspond with Maximo sequencing):

10 *Safety set-up:* Set up a safety perimeter. Protect existing plants from damage due to landscape operations and maintenance.

20 *Inspect:* Visually inspect for any bare areas of vegetation or specimen vegetation that has died and needs to be removed and/or replaced. Inspect areas where plants will be planted (replaced) and note signs of soil subsidence, soil compaction, standing water, evidence of disease/fungus, and animal burrowing.

Record observations in the **Maintenance Report Log** and report as necessary. If possible, take photographs to document site conditions.

30 *Remove trash/debris:* Remove any leaves, debris, and trash that have accumulated in or around the plant beds/planters.

All refuse resulting from the maintenance operation of properties shall be disposed of at locations designated by the Manager/Owner.

40 *Replacement:* Follow the below instructions if shrub and herbaceous groundcover replacement has been deemed necessary. **Tree replacement will occur separately.**

a) Replacement requirements for shrubs and groundcover:

- Shrubs: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, 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.
- Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required.
 - Set balled and potted and container-grown stock plumb and in center of planting pit or trench with root flare 1 inch (25 mm) above adjacent finish grades.
 - Pit should be twice as wide as it is deep
 - Use planting soil for backfill, of types specified and scheduled.
 - Carefully remove root ball from container without damaging root ball or plant.
 - Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 - If amending soil, place amendment tablets or incorporate amendments in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. If using amendment tablets, place tablets beside the root ball about 1 inch (25 mm) from root tips; do not place tablets in bottom of the hole.
 - Continue backfilling process. Water again after placing and tamping final layer of soil.
- Groundcover and Perennial Plugs: 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.
 - Set out and space ground cover and plants in swaths to fill in vegetated gaps in plant bed.
 - Dig holes large enough to allow spreading of roots.
 - Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.
 - Water thoroughly after planting, taking care not to cover plant crowns with wet soil.
 - Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.
- Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.
 - Shrubs:
 - Spring Planting: March 1 to May 1.
 - Fall Planting: September 1 to November 1.
 - Grass & Perennial Plugs:
 - Spring Planting: April 1 to June 15.
 - Fall Planting: August 1 to September 15.

- Bulbs:
 - Fall Planting: September 15 to October 30.

50 *Cleanup:* Stones, debris, tools, equipment, rope, pruned branches, tree debris, etc., shall be removed from the site upon completion of work. Excess soil outside of the saucer areas shall be removed and the area raked smooth. Paved areas shall be broom cleaned.

60 *Record:* Make note of any additional observations in the **Maintenance Report Log**.

70 *Safety completion:* Remove safety perimeter.

SMP-13b: Meadow Replacement

Meadow replacement involves reseeding or replugging meadow grasses or herbaceous groundcover plants if replacement has been deemed necessary.

Type of Maintenance - Replacement

Tools and Supplies

- Safety cones
- Safety gear (clothing, gloves, etc.)
- Planting Equipment – shovels, etc.
- Plant plugs and seed (to be planted)
- Mulch (as specified)
- Trash bags for debris, weeds, etc.

Frequency: Spring and Fall , Replacement/Reseeding as Necessary

Labor Hours: 2 people for approximately 4-6 hours per site depending on scope of replacement

Maintenance Procedure (numbers correspond with Maximo sequencing):

10 *Safety set-up:* Set up a safety perimeter. Protect plants from damage due to landscape operations and maintenance.

20 *Inspect:* Visually inspect for any bare areas of vegetation or specimen vegetation that has died and needs to be removed and/or replaced. Inspect areas where plants will be planted (replaced) and note signs of soil subsidence, soil compaction, standing water, evidence of disease/fungus, and animal burrowing.

Record observations in the **Maintenance Report Log** and report as necessary. If possible, take photographs to document site conditions.

30 *Remove trash/debris:* Remove any leaves, debris, and trash that have accumulated in or around the meadow.

All refuse resulting from the maintenance operation of properties shall be disposed of at locations designated by the Manager/Owner.

50 *Replace Plants (Plugging/Reseeding):* Follow the below instructions if meadow reseeding has been deemed necessary. For Shrubs and Herbaceous Groundcover, see **SMP-15 Plant (Shrub and Herbaceous Groundcover) Replacement**.

a) Replacement Requirements:

- Re-plugging: see **SMP-13a Plant (Shrub and Herbaceous Groundcover) Replacement** for instructions.

b) Reseeding Requirements:

- Reseed bare areas with same materials specified for respective grasses & forbs.
- Seed mixture shall be fresh, clean, new crop seed. Seed shall be of the previous year's crop and in no case shall the weed seed content exceed 0.25% by weight. The seed shall be furnished and delivered in the proportion specified below in new, clean, sealed and

properly labeled containers. All seed shall comply with State and Federal seed laws. Submit manufacturer's Certificates of Compliance. Seed that has become wet, moldy or otherwise damaged shall not be acceptable.

- Percent Pure Live Seed (PLS) shall be calculated for all seed lots using each seed lot's own unique purity and germination test results. Percent Pure Live Seed is defined by the following formula: $\text{Percent (\% Purity)} \times \text{Percent (\% Germination)} / 100 = \text{Percent (\% Pure Live Seed (PLS))}$. The minimum % PLS shall be 75% for each seed lot. A "PLS Pound" is defined as the bulk weight of seed required to equal one pound of 100% pure, germinable seed.

b) Reseeding Instructions:

- Weather Limitations: Proceed with seeding only when existing and forecasted weather conditions permit.
- Seeded areas to be lightly scarified with springy rake to loosen soil before reseeding.
- For small areas, hand broadcast seed to match initial seeding rate specified for site.
 - Mix seed with two-thirds of a bushel of moist vermiculite before sowing. Divide seed and vermiculite mix into quantities for each area to be reseeded.
 - Broadcast seed evenly across meadow area.
 - After broadcast seeding by hand, firm the seeded area with a land roller, such as a cultipacker or equivalent machinery. Cultipacking is not required if using a Truax no-till drill or a Brillion seeder.
- For larger areas, use no-till seed drill or broadcast seeder, without inert matter added.
 - Seeders such as a "Truax" no-till drill or a double box "Brillion" grass and legume broadcast seeder are recommended. The use of other drill or seeder will require approval of seed supplier prior to use for meadow seeding. The Brillion seeder requires that a fine-graded seedbed be worked up prior to seeding.
- Maintain and establish vegetation by watering, reseeding, weeding, controlling pests and diseases, and other operations. Roll, regrade, and reseed bare or eroded areas and remulch to produce a uniformly smooth vegetative cover.
- Add new mulch in areas where mulch has been disturbed by wind or maintenance operations sufficiently to nullify its purpose. Anchor as required to prevent displacement.
- Meadow Mowing: Refer to **SMP-12 Meadow Mowing**.

c) Reseeding Restrictions:

- Seed during one of the following periods.
 - Meadow Seeding: March 15th to June 15th
 - Warm-Season Meadow Seeding: April 15th to June 15th and August 15th to September 15th

- 50 *Cleanup:* Stones, debris, tools, equipment, rope, pruned branches, plant debris, etc., shall be removed from the site upon completion of work. Excess soil outside of the saucer areas shall be removed and the area raked smooth. Paved areas shall be broom cleaned.
- 60 *Record:* Make note of any additional observations in the **Maintenance Report Log**.
- 70 *Safety completion:* Remove safety perimeter.

Save the Rain: Green Infrastructure Program Standard Maintenance Procedure (SMP)

SMP-15: Lawn Mowing and Weed Eating

A grass lined infiltration trench requires standard lawn mowing and weed eating around structures bi-weekly during the growing season. Utilize the following procedure for completing the work.

Type of Maintenance - Preventative

Tools and Supplies

- Lawn Mower (push/walk behind or riding, depending on area being mowed)
- Weed Whacker
- Trash bag, gloves

Frequency:

- Bi-weekly during the growing season (mid-April through mid-November).

Labor Hours: 1 person for approximately 1-4 hours per site, depending on site size

Maintenance Procedure (numbers correspond with Maximo sequencing):

10 *Safety set-up:* Set up a safety perimeter.

20 *Inspect:* Visually inspect the area to be mowed for any bare areas of vegetation or for specimen vegetation that has died and needs to be removed and/or replaced. Inspect grass for signs of excessive drought, disease, and/or pest problems.

Record observations in the **Maintenance Report Log** and report as necessary. If possible, take photographs to document site conditions.

30 *Remove trash/debris:* Remove any large debris and trash that has accumulated in the meadow area and legally dispose of them off Owner's property.

40 *Mowing:* Never mow when soil is saturated with water. During mowing, keep adjacent paving and construction clean and work area in an orderly condition. Protect adjacent plants from damage due to mowing operations. Direct grass clippings away from impervious surfaces (i.e. roads, sidewalks, parking lots, etc.)

50 *Weed Eating:* Weed whack around structures, trees, and other obstructions that prevent mowing via a lawn mower. Protect structures, trees, etc. from damage due to weed eating operations.

60 *Record:* Make note of any additional observations in the **Maintenance Report Log**.

70 *Safety completion:* Remove safety perimeter.