



CAPITAL REGION™

WATER

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Prepared By:



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CAPITAL REGION WATER

GREEN STORMWATER INFRASTRUCTURE ADOPT-A-RAINGARDEN MANUAL

STORMWATER PLANTER

A stormwater planter, planted with native grasses, flowering perennials, and shrubs is typically located inside the sidewalk area in more dense urban areas where limited space is available. Planters typically divert runoff from the adjacent roadway via a curb cut with a concrete apron or with a trench drain that carries water underneath the parking step-out zone and into the planter. Additional runoff from the sidewalk may be conveyed via sheet flow or through small openings in the planter box wall. Water infiltrates through the planting soil into a stone storage layer. A domed riser and underdrain pipe convey overflows out of the planter.

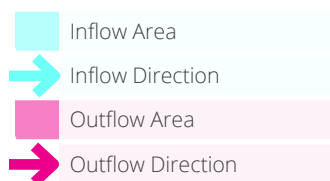
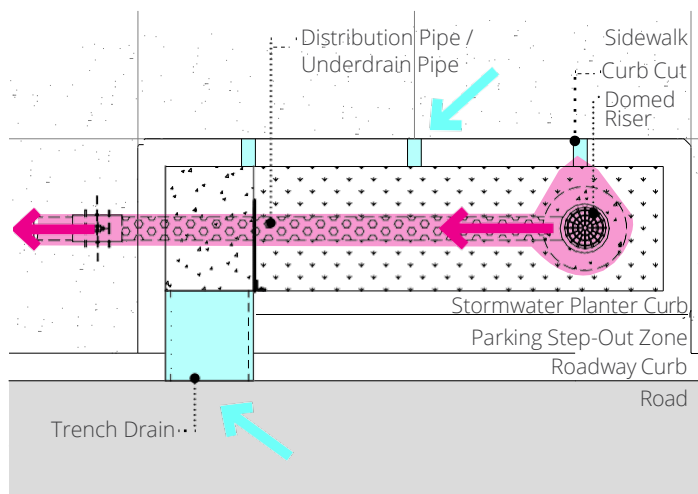


FIGURE 1 - STORMWATER PLANTER INFLOW AND OUTFLOW PLAN

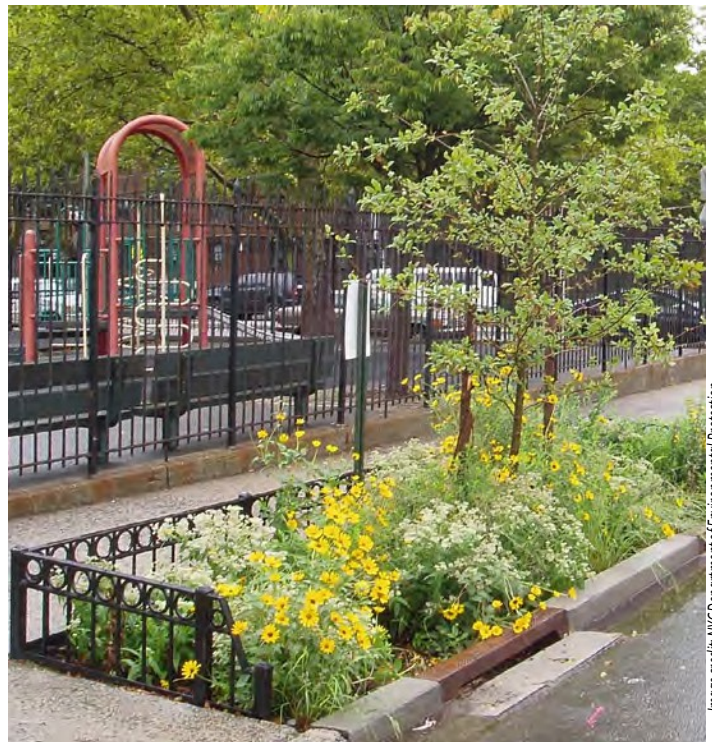


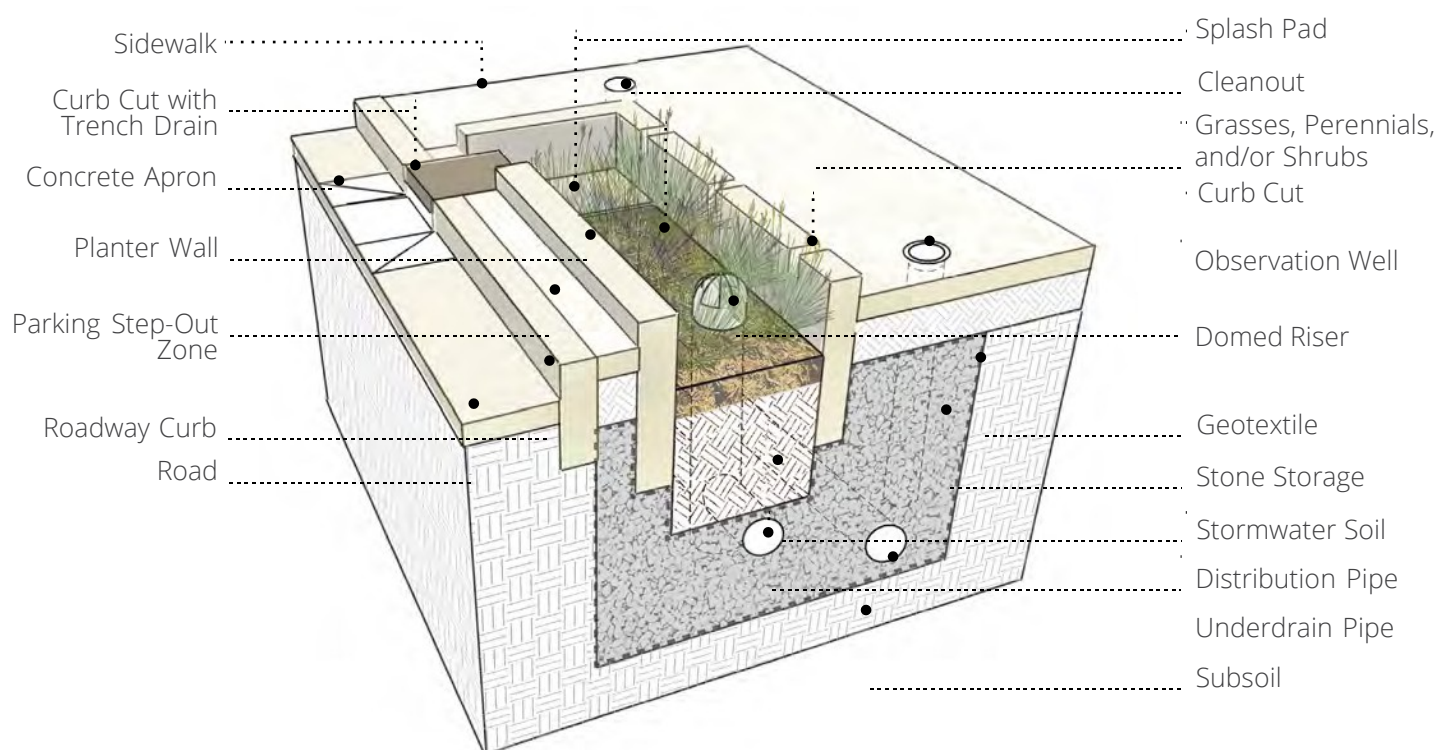
Image credit: WV Department of Environmental Protection



Image credit:

TABLE 1 - STORMWATER PLANTER COMPONENTS

COMPONENT	DESCRIPTION
Cleanout	<ul style="list-style-type: none"> Allows access to the distribution pipe and underdrain pipe from the surface.
Concrete Apron	<ul style="list-style-type: none"> A sloped concrete panel that collects water from the gutter and directs it into a curb cut or inlet.
Curb Cut	<ul style="list-style-type: none"> An opening in the curb that directs water into the SCM.
Curb Cut with Trench Drain	<ul style="list-style-type: none"> An opening in the curb that directs water through a linear drain underneath a walkway or other paved area into the SCM.
Distribution Pipe	<ul style="list-style-type: none"> Perforated and/or solid pipes that deliver stormwater runoff to an SCM. A cleanout pipe allows access to the distribution pipe from the surface.
Domed Riser	<ul style="list-style-type: none"> Controls the overflow of stormwater from the system.
Geotextile	<ul style="list-style-type: none"> Heavy-duty fabric made of synthetic fibers that is often used as a barrier between different types of drainage materials (such as stone and stormwater soil). Some systems also have an impermeable geomembrane liner if infiltration into underlying soils is not intended.
Grasses, Perennials, and/or Shrubs	<ul style="list-style-type: none"> Provides water filtration and volume reduction through biological processes.
Observation Well	<ul style="list-style-type: none"> Allows measurement from the surface of the water level in the system.
Planter Wall	<ul style="list-style-type: none"> A perimeter wall, often made of concrete, that separates the planter bed from the surrounding area.
Stormwater Soil	<ul style="list-style-type: none"> Engineered soil mix that provides growth media for plants and soil microorganisms and supports filtration and infiltration of runoff.
Splash Pad	<ul style="list-style-type: none"> A panel of stone or concrete that dissipates the energy of fast-moving water.
Stone Storage	<ul style="list-style-type: none"> Gravel layer made of clean-washed, open-graded stone to provide subsurface storage of water. An observation well allows measurement from the surface of the water level in the system.
Underdrain Pipe	<ul style="list-style-type: none"> Subsurface perforated pipe that collects and conveys runoff from the SCM back to the sewer system. The pipe usually has an end cap or orifice to control the rate at which water is released from the system.



STORMWATER BUMPOUT

A stormwater bumpout is a vegetated curb extension of the pedestrian zone into roadway that intercepts gutterflow via inlets or curb-cuts. Stormwater bumpouts are located mid-block, at intersections, or at the downslope end of the block where they capture the most drainage area. The system is composed of a stone bed layer topped with engineered soil media and plants designed to store, infiltrate, or evapotranspire stormwater runoff. Stormwater bumpouts are commonly planted with a variety of grasses and flowering perennials placed to maintain adequate sight lines. A domed riser is typically installed within a bumpout and provides an overflow to the subsurface stone bed layer during intense rainfall events. The subsurface stone storage bed may extend under the sidewalk and/or farther upslope to provide additional storage. Excess stormwater runoff is slowly released back to the existing sewer system via perforated underdrain pipe conveyance.

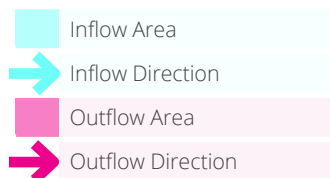
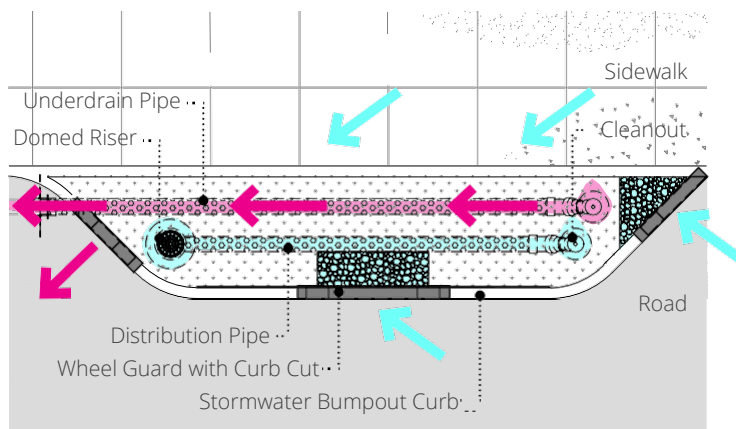


FIGURE 2 - STORMWATER BUMPOUT INFLOW AND OUTFLOW PLAN

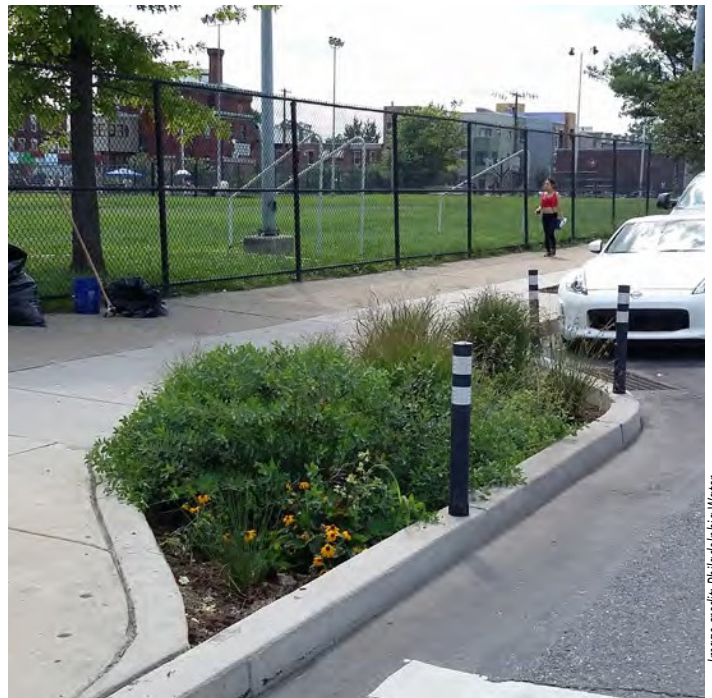
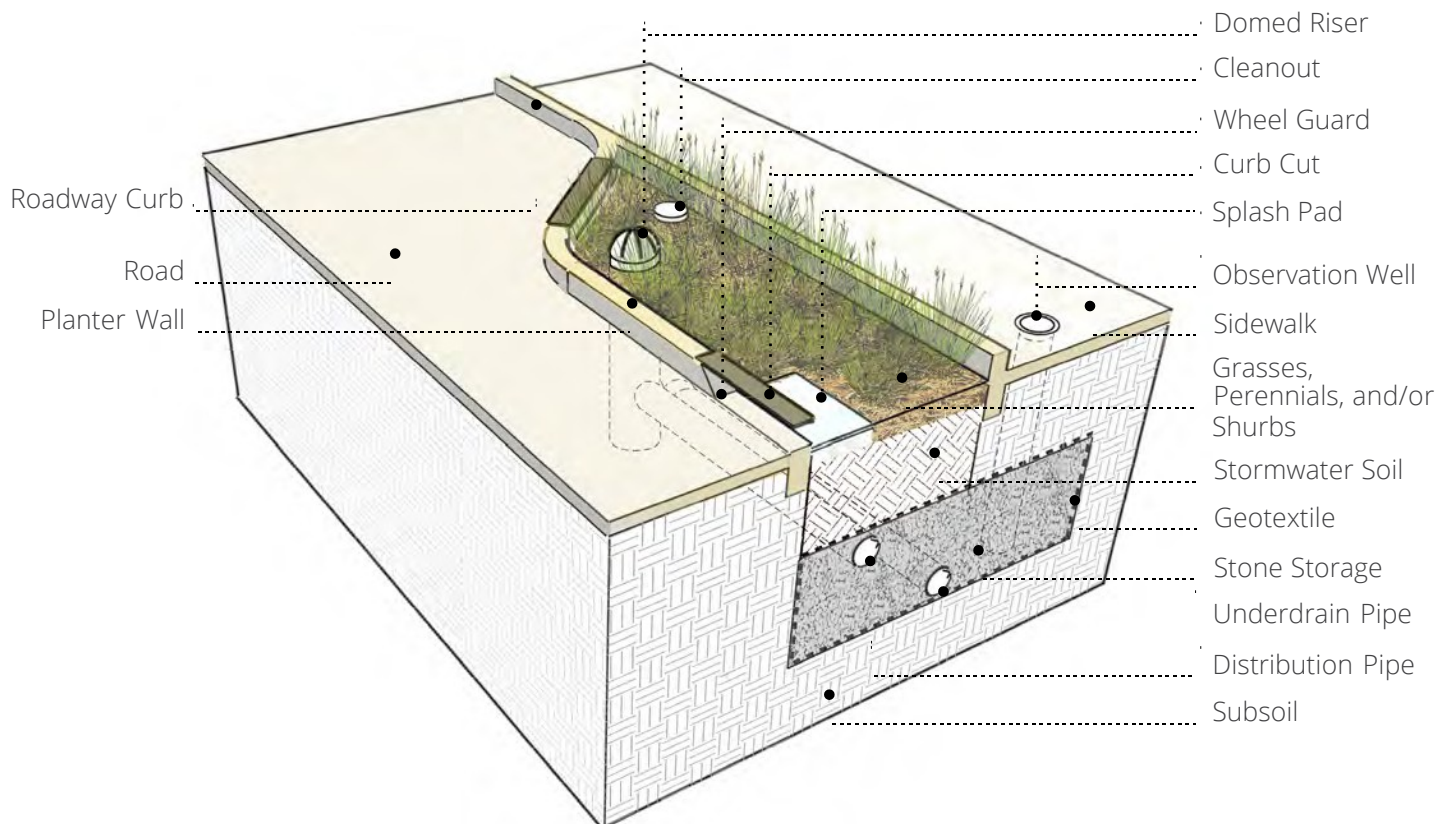


TABLE 2 - STORMWATER BUMPOUT COMPONENTS

COMPONENT	DESCRIPTION
Cleanout	<ul style="list-style-type: none"> Allows access to the distribution pipe and underdrain pipe from the surface.
Curb Cut	<ul style="list-style-type: none"> An opening in the curb that directs water into the GSI system.
Domed Riser	<ul style="list-style-type: none"> Controls the overflow of stormwater from the system.
Distribution Pipe	<ul style="list-style-type: none"> Perforated and/or solid pipes that deliver stormwater runoff to an SCM. A cleanout pipe allows access to the distribution pipe from the surface.
Geotextile	<ul style="list-style-type: none"> Heavy-duty fabric made of synthetic fibers that is often used as a barrier between different types of drainage materials (such as stone and stormwater soil). Some systems also have an impermeable geomembrane liner if infiltration into underlying soils is not intended.
Grasses, Perennials, and/or Shrubs	<ul style="list-style-type: none"> Provides water quality and water quantity management through biological processes.
Observation Well	<ul style="list-style-type: none"> Allows measurement from the surface of the water level in the system.
Planter Wall	<ul style="list-style-type: none"> A perimeter wall, often made of concrete, that separates the planter bed from the surrounding area.
Stormwater Soil	<ul style="list-style-type: none"> Engineered soil mix that provides growth media for plants and soil microorganisms and supports filtration and infiltration of runoff.
Splash Pad	<ul style="list-style-type: none"> A panel of stone or concrete that dissipates the energy of fast-moving water.
Stone Storage	<ul style="list-style-type: none"> Gravel layer made of clean-washed, open-graded stone to provide subsurface storage of water.
Underdrain Pipe	<ul style="list-style-type: none"> Subsurface perforated pipe that collects and conveys runoff from the SCM back to the sewer system. The pipe usually has an end cap or orifice to control the rate at which water is released from the system.
Wheel Guard	<ul style="list-style-type: none"> A plate placed across a curb cut to maintain a constant surface along the top of the curb and prevent cars from entering the opening.

**FIGURE 3 - STORMWATER BUMPOUT COMPONENTS**

Components diagrammed above are typical for this SCM but may be configured differently for individual systems.

RAIN GARDEN

A rain garden is a vegetated area designed to collect stormwater runoff from surrounding impervious surfaces such as roadways, roofs, walkways, playgrounds, and parking lots. Stormwater runoff is captured via trench drain, curb opening, or a stormwater inlet and conveyed to a shallow basin where it is filtered by a mix of native grasses, perennials, and/or shrubs, and is infiltrated through layers of stormwater soil and stone. Inlet pre-treatment devices, such as forebays and inlet filter bags, are sometimes used to catch sediment before it enters the planting bed. Captured water is slowly released back to the existing sewer system via a domed riser and perforated underdrain pipe. During large storms any excess water the system cannot hold is safely conveyed over the spillway.

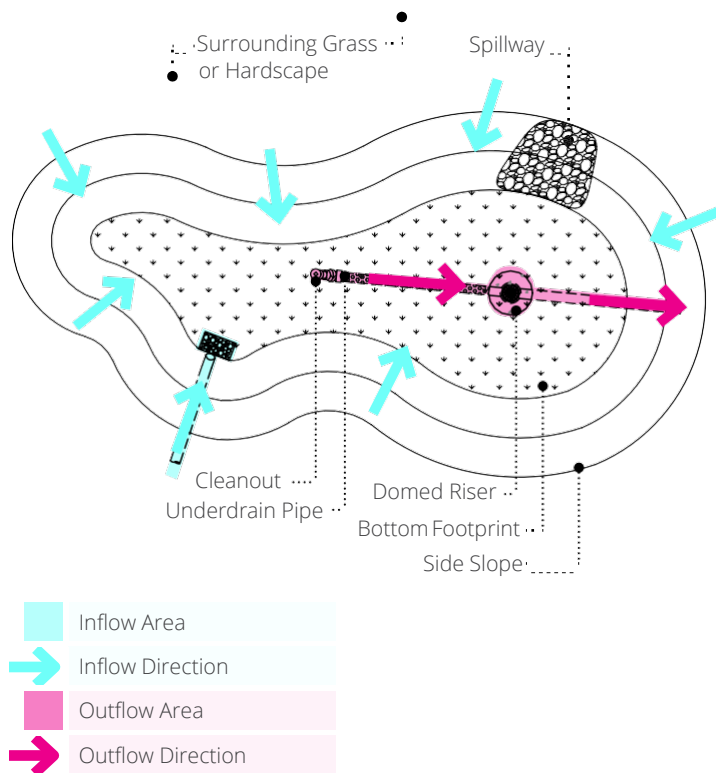


FIGURE 4 - RAIN GARDEN INFLOW AND OUTFLOW PLAN

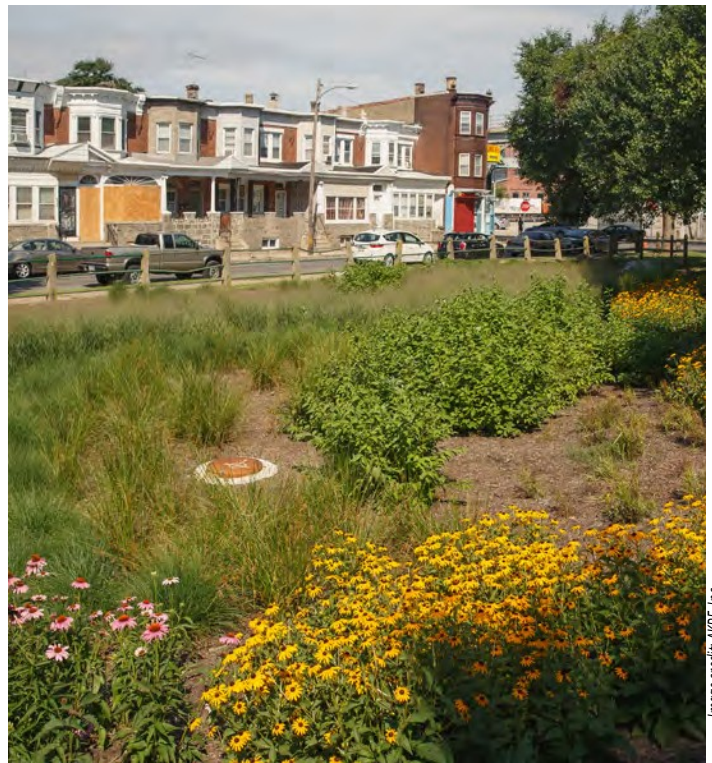
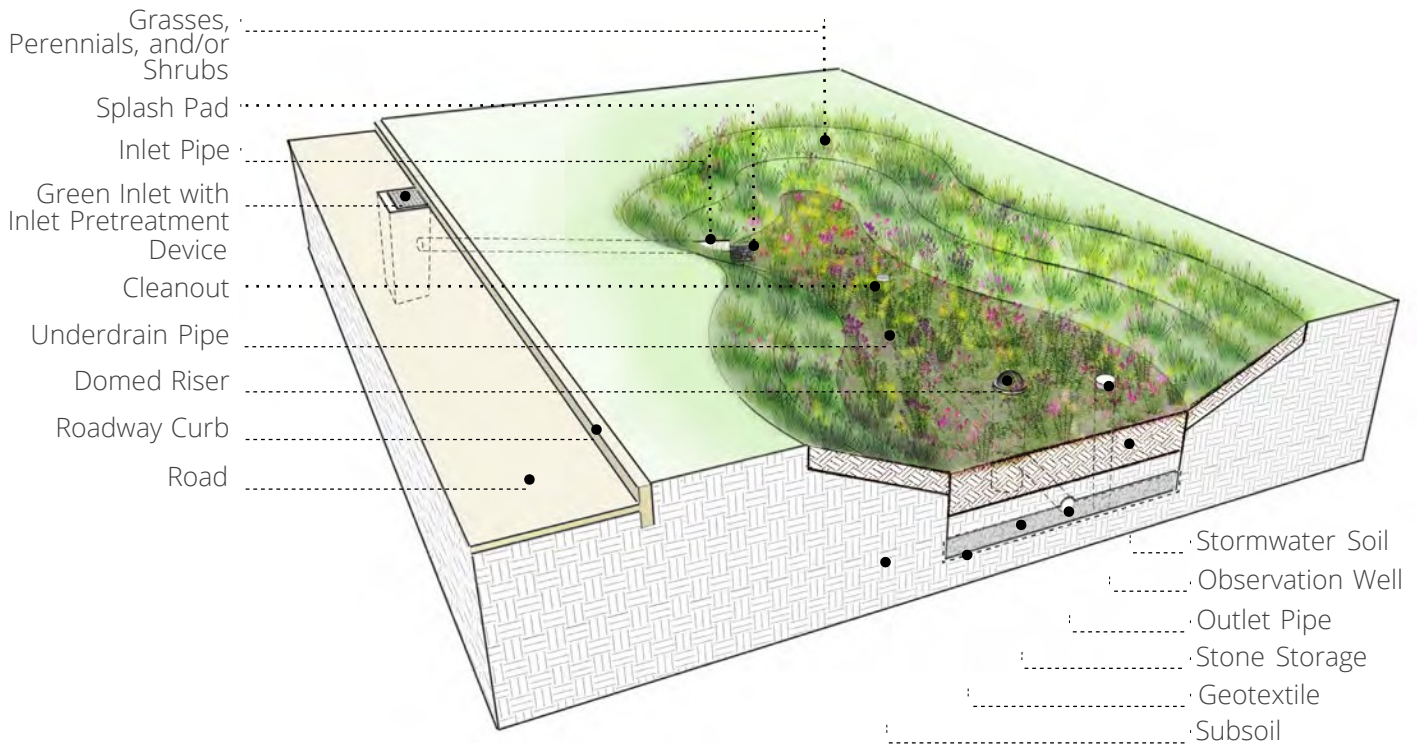


TABLE 3 - RAIN GARDEN COMPONENTS

COMPONENT	DESCRIPTION
Cleanout	▪ Allows access to the underdrain pipe from the surface.
Domed Riser	▪ Controls the release of stormwater from the system.
Geotextile	▪ Heavy-duty fabric made of synthetic fibers that is often used as a barrier between different types of drainage materials (such as stone and stormwater soil). Some systems also have an impermeable geomembrane liner if infiltration into underlying soils is not intended.
Grasses, Perennials, and/or Shrubs	▪ Provides water quality and water quantity management through biological processes.
Green Inlet	▪ An inlet placed within an existing gutter or other surface flow path that diverts runoff from paved areas and redirects it into a green stormwater infrastructure system.
Inlet Pipe	▪ Conveys stormwater from a green inlet onto the SCM.
Inlet Pretreatment Device	▪ Structures that capture trash, sediment, and/ or other pollutants from stormwater runoff before delivery to a surface detention area or media.
Observation Well	▪ Allows measurement from the surface of the water level in the system.
Outlet Pipe	▪ Conveys water from an outlet structure back to the municipal storm sewer system.
Stormwater Soil	▪ Engineered soil mix that provides growth media for plants and soil microorganisms and supports filtration and infiltration of runoff.
Sediment Forebay	▪ A pool or basin located at the stormwater runoff inflow point and designed to trap and settle sediment or other pollutants.
Splash Pad	▪ A panel of stone or concrete that dissipates the energy of fast-moving water.
Stone Storage	▪ Gravel layer made of clean-washed, open-graded stone to provide subsurface storage of water.
Underdrain Pipe	▪ Subsurface perforated pipe that collects and conveys runoff from the SCM back to the sewer system. The pipe usually has an end cap or orifice to control the rate at which water is released from the system.

**FIGURE 5 - RAIN GARDEN COMPONENTS**

Components diagrammed above are typical for this SCM but may be configured differently for individual systems.



1

INSPECTION AND MAINTENANCE PROCEDURES

STORMWATER PLANTER MAINTENANCE

ROUTINE MAINTENANCE

Stormwater planters are maintained routinely to keep them neat, clean, safe, and functional, as outlined below. For problems beyond the scope of routine maintenance, additional analysis and planning may be needed to complete corrective maintenance repairs ([refer to pages 42-43](#)).

Routine maintenance typically consists of general cleanup and plant care, with minor repairs and replacements performed as needed. Refer to [Table 3.10](#) for a list of maintenance tasks, with references to the appropriate detailed specifications ([Appendix A - GSI Maintenance Specifications](#)). Note that not all tasks will be needed every visit, and certain seasonal tasks (such as watering and replanting) should only be done at the specific request of CRW.

Common routine maintenance activities may include:

- Trash and sediment removal (year-round);
- Weeding (during the growing season);
- Watering and mulching (during plant establishment);
- Planting, cutting back, and pruning plants (as seasonally appropriate); and
- Minor repairs and replacements as needed.

MAINTENANCE ZONE KEY

	Hardscape
	Inflow
	Vegetated Area
	Outflow

Refer to SCM Overview for component locations and descriptions.



DEP NYC/Flickr credit: Image

A clean and clear curb cut allows stormwater runoff to easily flow into the stormwater planter.

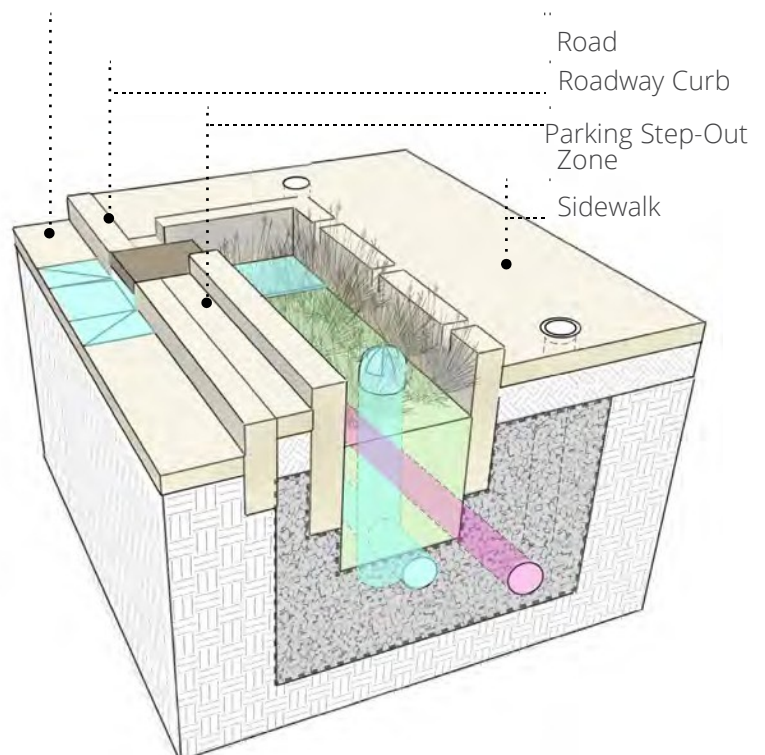


FIGURE 1.1 - STORMWATER PLANTER MAINTENANCE ZONES

TABLE 1.1 - STORMWATER PLANTER ROUTINE MAINTENANCE TASKS

SPECIFICATION REFERENCE	TASK	DESCRIPTION	ZONE
	Tasks To Be Performed Every Routine Surface Maintenance Event Or As Needed*		
1.3.A	Sediment Removal	Removal of sediment from surface-accessible components.	<div><div></div><div></div><div></div><div></div></div>
1.3.B	Organic Debris Removal	Removal of fallen leaves and branches, or spent plant material from surface-accessible components.	<div><div></div><div></div><div></div><div></div></div>
1.3.C	Trash Removal	Removal of trash from surface-accessible components.	<div><div></div><div></div><div></div><div></div></div>
1.3.D	Weeding	Removal of all weeds.	<div><div></div><div></div><div></div><div></div></div>
1.3.E	Inlet and Structure Grate Cleaning	Clearing grate surfaces to ensure proper flow of water into and out of the system.	<div><div></div><div></div><div></div><div></div></div>
1.3.F	Waste Disposal	Disposal of non-hazardous waste materials generated or collected during the performance of surface maintenance activities. The task includes proper containment, transport and disposal of waste material.	<div><div></div><div></div><div></div><div></div></div>

CREW IS RESPONSIBLE FOR REPORTING ANY NON-ROUTINE MAINTENANCE SITE ISSUES TO CRW.

* Determined by the maintenance foreman on site.
** Performed only when a Watering Work Order is assigned.

CORRECTIVE MAINTENANCE

Corrective maintenance may be needed to address problems related to drainage, plant health or establishment, soil erosion or settling, or condition of masonry, concrete, or other structures. Examples of some of these problem conditions are shown on the following page. These examples are not exhaustive. If these conditions are observed during routine maintenance, they must be photographed and documented in the work order.

CALL AN EXPERT

If the problems pose a direct safety hazard to the public or the maintenance crew, stop work, secure the site, and report the problem immediately (refer to [Appendix D - Contact List](#)).



Image credit: AKRF, Inc

The stormwater planter exemplifies a healthy, well-structured and functioning system.

RECURRING PLANT ESTABLISHMENT PROBLEMS

Image credit: AKRF, Inc.

Poor plant establishment can be a problem if the plant species is not suitable for the location, or if there is repeated external stress (such as from large amounts of sediment).

FENCE DAMAGE

Image credit: AKRF, Inc.

Damage to fencing or structural components may be caused by a variety of factors and can create hazards for pedestrians and vehicles.

PROLONGED STANDING WATER

Image credit: AKRF, Inc.

Water should drain from properly-functioning SCMs within three days after a rainfall; if it does not, there may be a serious problem.

MAJOR EROSION OR SETTLING

Image credit: AKRF, Inc.

Eroded areas larger than 20 sf. in size, or settling more than 1 ft. deep could be an indicator of potentially hazardous problems. Report major erosion or settling immediately.

STORMWATER BUMPOUT MAINTENANCE

ROUTINE MAINTENANCE

Stormwater bumpouts are maintained routinely to keep them neat, clean, safe, and functional, as outlined below. For problems beyond the scope of routine maintenance, additional analysis and planning may be needed to complete corrective maintenance repairs ([refer to pages 46-47](#)).

Routine maintenance typically consists of general cleanup and plant care, with minor repairs and replacements performed as needed. Refer to [Table 3.11](#) for a list of maintenance tasks, with references to the appropriate detailed specifications ([Appendix A - GSI Maintenance Specifications](#)). Note that not all tasks will be needed every visit, and certain seasonal tasks (such as watering and replanting) should only be done at the specific request of CRW.

Common routine maintenance activities may include:

- Trash and sediment removal (year round);
- Weeding (during the growing season);
- Watering (during plant establishment);
- Planting, cutting back, and pruning plants (as seasonally appropriate); and
- Minor repairs and replacements as needed.



DEP NJ credit: image

A stormwater bumpout with a clean and clear inflow point and thriving vegetation.

MAINTENANCE ZONE KEY

	Hardscape
	Inflow
	Vegetated Area
	Outflow

Refer to SCM Overview for component locations and descriptions.

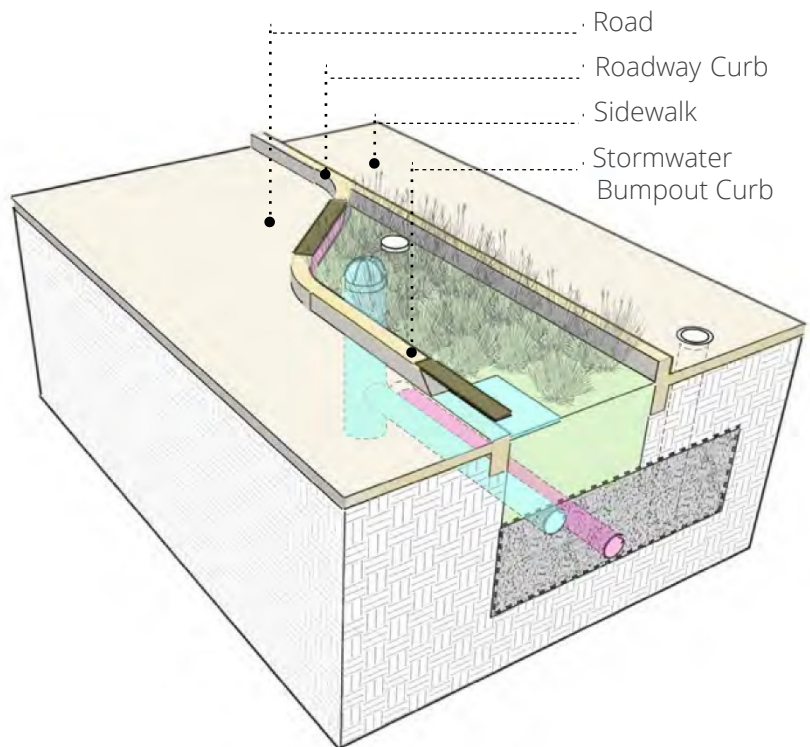








FIGURE 1.2 - STORMWATER BUMPOUT MAINTENANCE ZONES

TABLE 1.2 - STORMWATER BUMPOUT ROUTINE MAINTENANCE TASKS

SPECIFICATION REFERENCE	TASK	DESCRIPTION	ZONE
Tasks To Be Performed Every Routine Surface Maintenance Event Or As Needed*			
1.3.A	Sediment Removal	Removal of sediment from surface-accessible components.	
1.3.B	Organic Debris Removal	Removal of fallen leaves and branches, or spent plant material from surface-accessible components.	
1.3.C	Trash Removal	Removal of trash from surface-accessible components.	
1.3.D	Weeding	Removal of all weeds.	
1.3.E	Inlet and Structure Grate Cleaning	Clearing grate surfaces to ensure proper flow of water into and out of the system.	
1.3.F	Waste Disposal	Disposal of non-hazardous waste materials generated or collected during the performance of surface maintenance activities. The task includes proper containment, transport and disposal of waste material.	

CREW IS RESPONSIBLE FOR REPORTING ANY NON-ROUTINE MAINTENANCE SITE ISSUES TO CRW.

* Determined by the maintenance foreman on site.

** Watering should only be performed when a Watering Work Order is assigned.

CORRECTIVE MAINTENANCE

Corrective maintenance may be needed to address problems related to drainage, plant health or establishment, soil erosion or settling, or condition of masonry, concrete, or structures. Examples of some of these problem conditions are shown on the following page. These examples are not exhaustive. If these conditions are observed during routine maintenance, they should be photographed and documented in the work order.

CALL AN EXPERT

If the problems pose a direct safety hazard to the public or the maintenance crew, stop work, secure the site, and report the problem immediately (refer to [Appendix D - Contact List](#)).



Image credit: AKRF, Inc.

This stormwater bumpout exemplifies a well-maintained and highly functional feature.

EXCESSIVE SEDIMENTATION

Image credit: AKRF, Inc.

If sediment accumulation seems excessive in the period between maintenance, or if there is an unusual amount of grease or oil, it could be a sign of problems with the drainage area size, or activities upstream.

REOCCURRING PLANT ESTABLISHMENT PROBLEMS

Image credit: AKRF, Inc.

Poor plant establishment can be a problem if the plant species is not suitable for the location, or if there is repeated external stress (such as from large amounts of sediment).

PROLONGED STANDING WATER

Image credit: AKRF, Inc.

Water should drain from properly-functioning SCMs within three days after a rainfall; if it does not, there may be a serious problem.

CRACKED OR BROKEN CURB

Image credit: Redmond School District

Concrete curbs can become damaged beyond routine wear and tear due to collisions with vehicles.

RAIN GARDEN MAINTENANCE

ROUTINE MAINTENANCE





Rain gardens are maintained routinely to keep them neat, clean, safe, and functional, as outlined below. For problems beyond the scope of routine maintenance, additional analysis and planning may be needed to complete corrective maintenance repairs ([refer to pages 66-67](#)).

Routine maintenance typically consists of general cleanup and plant care, with minor repairs and replacements performed as needed. Refer to [Table 3.16](#) for a list of maintenance tasks, with references to the appropriate detailed specifications ([Appendix A - GSI Maintenance Specifications](#)). Note that not all tasks will be needed every visit, and certain seasonal tasks (such as watering and replanting) should only be done at the specific request of CRW.

Common routine maintenance activities may include:

- Trash and sediment removal (year round);
- Weeding (during the growing season);
- Watering and mulching (during plant establishment);
- Planting, cutting back, and pruning plants (as seasonally appropriate);
- Pipe Inspections (annually); and
- Minor repairs and replacements as needed.

MAINTENANCE ZONE KEY

	Hardscape
	Inflow
	Vegetated Area
	Outflow

Refer to SCM Overview for component locations and descriptions.



A well-maintained rain garden promotes appreciation among the surrounding community.

Water Philadelphia credit: Image

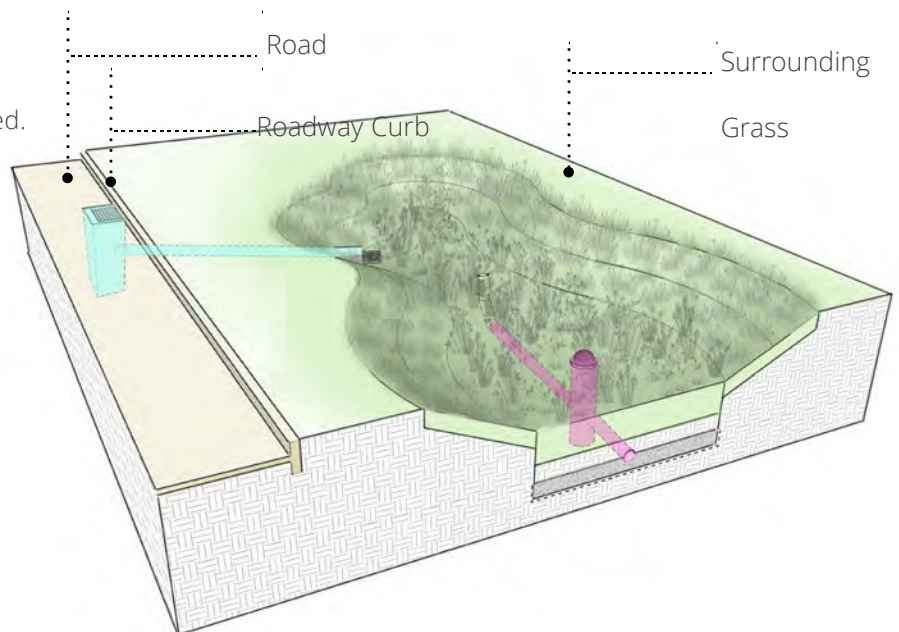


FIGURE 1.3 - RAIN GARDEN MAINTENANCE ZONES

TABLE 1.3 - RAIN GARDEN ROUTINE MAINTENANCE TASKS

SPECIFICATION REFERENCE	TASK	DESCRIPTION	ZONE
Tasks To Be Performed Every Routine Surface Maintenance Event Or As Needed*			
1.3.A	Sediment Removal	Removal of sediment from surface-accessible components.	
1.3.B	Organic Debris Removal	Removal of fallen leaves and branches, or spent plant material from surface-accessible components.	
1.3.C	Trash Removal	Removal of trash from surface-accessible components.	
1.3.D	Weeding	Removal of all weeds.	
1.3.E	Inlet and Structure Grate Cleaning	Clearing grate surfaces to ensure proper flow of water into and out of the system.	
1.3.F	Waste Disposal	Disposal of non-hazardous waste materials generated or collected during the performance of surface maintenance activities. The task includes proper containment, transport and disposal of waste material.	

CREW IS RESPONSIBLE FOR REPORTING ANY NON-ROUTINE MAINTENANCE SITE ISSUES TO CRW.

* Determined by the maintenance foreman on site.

** Watering should only be performed when a Watering Work Order is assigned.

CORRECTIVE MAINTENANCE

Corrective maintenance may be needed to address problems related to drainage, plant health or establishment, soil erosion or settling, or condition of masonry, concrete, or structures. Examples of some of these problem conditions are shown on the following page. These examples are not exhaustive. If these conditions are observed during routine maintenance, they should be photographed and documented in the work order.

CALL AN EXPERT

If the problems pose an direct safety hazard to the public or the maintenance crew, stop work, secure the site, and report the problem immediately (refer to [Appendix D - Contact List](#)).



Image credit: AKRF, Inc.

This newly planted rain garden built in at a playground manages runoff from the site and surrounding roadways.

BROKEN PIPE

Image credit: AKRF, Inc.

Pipes can be broken or damaged due to settling. Pipe repairs may require significant excavation and engineering.

REOCCURRING PLANT ESTABLISHMENT PROBLEMS

Image credit: AKRF, Inc.

Poor plant establishment can be a problem if the plant species is not suitable for the location, or if there is repeated external stress (such as from large amounts of sediment).

PROLONGED STANDING WATER

Image credit: AKRF, Inc.

Water should drain from properly-functioning SCMs within 3 days after a rainfall; if it does not, there may be a serious problem.

MAJOR EROSION OR SETTLING

Image credit: AKRF, Inc.

Eroded areas larger than 20 sf. in size, or settling more than 1 ft. deep could be a potential indicator of significant problems.



2

PUBLIC ENGAGEMENT

Many people are not familiar with GSI. Working in public spaces means members of the community who are curious about the work being done, or who may have an opinion they want to share, are likely to approach. When interacting with the public, it is essential to always be courteous and professional.

GSI maintenance personnel is in many ways the public face of CRW's GSI program, so it is important to make a good impression! These interactions are opportunities to promote the benefits of GSI while also educating citizens about how they work and why they have been installed.

If the community member appears upset, keep calm and avoid engaging in any kind of argument. Thank the individual for his or her input and stress that CRW is always interested in hearing from the community.

Keep in mind a few key pointers when engaging with members of the community:

- Introduce yourself and explain the work being done and that it is being completed for CRW.
- Use simple, non-technical terms whenever possible.
- Explain the goals of GSI maintenance—to keep the systems working properly and looking tidy.
- Acknowledge any concerns or feedback the community member offers. Write it down and report it back to a field supervisor. Document the community member's name, address and contact information that they are willing to share. Encourage them to call CRW at 888-510-0606 or contact CRW on-line at <https://capitalregionwater.com/report-problems/>

Offer printed public information materials about green infrastructure and the GSI program. Always carry a supply of these materials.

GREEN STORMWATER INFRASTRUCTURE TALKING POINTS

When talking to community members about SCMs, it is important to keep explanations brief and simple. For example, below are some talking points that can help explain what SCMs are and what they do.

- SCMs are designed to collect, infiltrate and absorb stormwater that runs off the streets and sidewalks when it rains.
- CRW is building rain gardens, tree trenches and other types of SCMs to manage stormwater and improve water quality in local waterways.
- Green stormwater infrastructure is a cost-effective way to help create a sustainable, beautiful Harrisburg. It can help to:
 - i. Beautify neighborhoods.
 - ii. Reduce temperature during hot weather.
 - iii. Improve street drainage.
 - iv. Reduce puddles and ponds.
- CRW is responsible for maintenance of GSI. Maintenance crews will remove litter, sediment, and weeds from each installation on a regular basis.



Boards with visuals of GSI helped show the new systems being built in the community.

FREQUENTLY ASKED QUESTIONS

WILL THE RAIN GARDEN ATTRACT MOSQUITOES?

Mosquitoes require a minimum of 72 hours in standing water for larvae development. SCMs are designed to drain down within 72 hours of the end of any rainfall event. If a system does not appear to be draining properly, community members can call 888-510-0606 or report it on-line at <https://capitalregionwater.com/report-problems/>

WILL TREE ROOTS CRACK THE SIDEWALK OR INTERFERE WITH UTILITY LINES?

During design and construction, CRW and utility companies work together to ensure that SCMs will not directly interfere with existing underground and aboveground utility service lines. Older tree roots can break sidewalks because the tree pit is not large enough for the tree roots; however, CRW's standard designs gives tree roots plenty of space to grow.

CONTRACTORS HAVE BEEN BUILDING GSI IN MY NEIGHBORHOOD BUT THERE ARE NO PLANTS. WHY ARE THESE SITES STILL UNFINISHED?

Construction may begin at different times throughout the year; however, planting must occur during the spring or fall when weather conditions are optimal. Construction may have begun earlier in order to be ready for the next appropriate planting season.

CAN I EXCHANGE PLANTS THAT WERE PLANTED IN AN SCM WITH PLANTS THAT I'VE SELECTED?

GSI plants are specially selected because of their ability to survive the difficult conditions and changing water levels in these systems. Please do not replace them—other plants may not work as well in this setting.

DON'T RAIN GARDENS LOOK WEEDY AND OVERGROWN?

Rain gardens can be planted to look naturalistic, like a meadow, or they can be maintained with a more formal garden appearance. Like any garden, regular maintenance will ensure that it does not become weedy and overgrown.

HOW WELL DOES PERMEABLE PAVEMENT WORK? IS IT DURABLE?

The key difference between conventional concrete and asphalt pavements and permeable pavements is that the smallest stone particles, or fines, are left out of the

permeable pavement mixture. This leaves small voids that allow water to infiltrate through the pavement, however, these pore spaces do slightly reduce the durability of the pavement in comparison with conventional pavements. With proper design, construction and maintenance, permeable pavement works well for many years, including in winter weather. Black ice does not form on permeable asphalt, as any thawed water infiltrates.

WON'T ROAD SALT KILL THE PLANTS IN THE SCMS?

SCMs, especially those located next to streets or sidewalks, are designed with plants that are salt tolerant. They are also designed with well-drained soil that helps flush salt through the soil more rapidly and reduce high concentrations that negatively affect plants. Thus, road salt rarely kills the plants, although it can cause stress and damage if used in large quantities. To reduce the potential for any damage, you can choose eco-friendly salt such as calcium chloride, which is safe for plants and pets, or you can reduce the amount of salt spread.



An expert pointing out the components within the rain garden.

Image credit: AKRF, Inc.

APPENDIX

A

**GREEN
STORMWATER
INFRASTRUCTURE
MAINTENANCE
SPECIFICATIONS**

PART 1: SURFACE MAINTENANCE

1.1 Materials & Equipment

- A. All Surface Maintenance tasks require the following minimum equipment:
 - i. Personal protective equipment (PPE)
 - ii. Small rake, shovel and/or trowel
 - iii. Contractor trash bags
 - iv. Tarp
 - B. Sediment Removal and Organic Debris Removal tasks require the following minimum equipment:
 - i. Push broom
 - C. Trash Removal task requires the following minimum equipment:
 - i. Trash grabber, broom, and/or dust pan
 - D. Weeding requires the following minimum equipment:
 - i. Weeding fork
 - ii. Garden shears
 - iii. Soil knife
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- I. Inlet and Structure Grate Cleaning requires the following minimum equipment:
 - i. A push broom
 - ii. Trash grabber, broom, and/or dust pan

1.2 Execution

- A. Sediment removal consists of the following tasks:
 - i. Remove accumulated sediment near stormwater inflow structures and from filter media surfaces.
 - ii. Collect and remove sediment using shovels, trash bags, and disposal containers as appropriate.
 - iii. Document the quantity of sediment removed using the assigned work order (sediment, organic debris, and trash quantities may be mixed and reported together).
- B. Organic debris removal consists of the following tasks:
 - i. Collect and remove organic debris within 4-5 feet within inflow structures and from filter media surfaces.
 - ii. Document the quantity of organic debris removed using the assigned work order (sediment, organic debris, and trash quantities may be mixed and reported together).
- C. Trash removal consists of the following tasks:
 - i. Collect and remove trash within 4-5 feet from stormwater inflow structures and from filter media surfaces.
 - ii. Document the quantity of trash removed using the assigned work orders (sediment, organic debris, and trash quantities may be mixed and reported together).
- D. Weeding consists of the following tasks:**
 - i. Identify weeds for removal. Consult with CRW if there is uncertainty.
 - ii. If necessary, use a soil knife, shovel or spade to loosen the soil surrounding plant root mass.
 - iii. Hand pull weeds when plants are big enough to grasp firmly but small enough that they are not established and/or when the soil is moist. Hand pull mature annual and tap-rooted herbaceous plants and tree seedlings.
 - iv. Remove the entire weed by gripping and pulling directly upward, ensuring the root is dislocated.
 - v. Remove the entire weed including root mass to prevent re-sprouting.
 - vi. Refill the remaining hole, regrading soil by hand or with a hand tool as needed to smooth surface.
 - vii. Document completion using the assigned work order.
- E. Inlet and structure grate cleaning consists of the following tasks:
 - i. Hand-remove or sweep, any debris at all grates for catch basins, domed risers, and control structures.
 - ii. For all catch basins located in the right-of-way, sweep the surrounding area, collecting trash/sediment/organic debris at least 4 feet from all sides.
 - iii. Document completion using the assigned work order.
- F. Waste disposal consists of the following tasks:**
 - i. Debris removed from the site will be disposed of at City waste facilities. Collect the material removed during the maintenance operation in applicable waste storage container (e.g., traps, bins, etc.).
 - ii. Dispose of the waste material as directed by disposal site.
- G. Reporting of non-maintenance site issues consists of the following tasks:
 - i. Some observations could present potential safety hazards to the public and to maintenance personnel (e.g., large sinkholes, widespread sealing, etc.). When safety issues are observed, maintenance personnel must immediately secure the site and contact the appropriate expert or individual listed in Appendix D - Contacts. Maintenance personnel must be diligent in detecting issues.