

An aerial photograph of New Orleans, Louisiana, showing the Mississippi River and surrounding land. The image is overlaid with a semi-transparent blue band at the bottom. The text is centered on the map.

**CITY OF NEW ORLEANS
MAINTENANCE MANUAL FOR**

**GREEN INFRASTRUCTURE
FACILITIES**

2025

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INTRODUCTION

OVERVIEW

This maintenance manual is an overview of the routine maintenance activities for green infrastructure (GI) projects. The manual is intended to be used by maintenance crews to understand the tasks required to maintain each different type of GI facility.

Maintenance is important to ensure that the GI projects are functioning properly and therefore helping to reduce flooding within the City of New Orleans. By maintaining the GI projects, they will continue to function and provide benefits for the surrounding neighborhoods.

SITE VISIT PREPARATION

Each of the following sections on maintenance will outline some required tools and materials that may be needed to perform the maintenance tasks.

In addition to the tools needed, copies of this maintenance manual and a mobile phone or tablet should be brought to the site.

Bring a camera to the site to document the maintenance tasks performed or to document any issues that were unable to be resolved in the field. Photos shall be uploaded to the [maintenance portal](#).

SAFETY CONSIDERATIONS

- **OSHA (Occupational Safety and Health Administration)**
 - » OSHA compliance means following rules that describe how employers must protect their employees from hazards. The rules are established and enforced by the Department of Labor.
 - » To ensure compliance with OSHA standards, employers must keep records of workplace injuries, limit exposure to hazardous chemicals, monitor hazards in the work environment, and require the use of safe practices and equipment.
- **Roadway Safety**
 - » Many GI facilities are installed along roadways. It is important for all maintenance crews to be aware of their surroundings.
 - » Set up a safety perimeter when working along roadways. Traffic control measures, such as cones or barricades, may be needed to create a safety buffer around the GI facility.
 - » Do not block accessible routes.
 - » Do not block bike lanes without providing a clear and safe alternative route for bicyclists.
 - » Do not leave any materials or tools in travel lanes, parking lanes, bike lanes, or sidewalks.
 - » It is recommended that maintenance be performed during daylight hours and avoid rush hour.
- **Personal Protective Equipment (PPE)**
 - » Crews should wear protective gear when conducting maintenance. This includes safety vests or shirts, work gloves, closed-toed shoes, hard hats, and hearing protection if needed. It is recommended that crews wear protective eyewear.
- **Heavy Equipment**
 - » Workers shall be certified to operate any heavy equipment that is being used during maintenance activities.
 - » When using heavy equipment, ensure there is no damage to any GI components like plants, curbs, standpipes, etc.

INTRODUCTION CONT.

WASTE DISPOSAL

Maintenance will typically require the disposal of trash, plant trimmings, and sediment. Heavy duty trash bags, buckets, and trash pickers may be useful. Work gloves should always be worn when handling trash.

Care should be taken when disposing of broken glass or needles. It is recommended that trash pickers be used when removing sharp objects from the site. Sharp objects should be disposed of properly in a sharp's container.

All waste shall be disposed of off-site.

GENERAL MAINTENANCE REPORTING

Maintenance tasks shall be tracked in the online maintenance portal whenever maintenance or an inspection is performed at a GI site.

Photos of each maintenance task shall be uploaded to the maintenance portal. Videos may be included if necessary to display a problem on site.

Additional notes should be included on any maintenance tasks that were unable to be completed, or if another problem arose in the field. These notes should be reviewed with the [City Point of Contact](#).

Contact List by Department:

| | | | |
|----------------------------------|-----------------------|-----------------------|----------------|
| S&WB | Inspection: | Mr. Kyle Breaux | 504-865-0435 |
| | Electrical Engineers: | Mr. Celso Antunez | 504-583-0263 |
| Dept. of Public Works | Maintenance: | Mr. Eric Kelly | 504-658-8062 |
| | Traffic: | | |
| | Engineering: | Mr. Nguyen Phan | 504-658-8030 |
| | Street Lighting: | Mr. Joseph Loy | 504-658-8049 |
| Entergy | Electrical: | Mr. William Armstrong | 504-595-3855 |
| | Gas: | Mr. Stephen Mirambell | 504-593-3473 |
| | After Hours: | | |
| AT&T | | Mr. Kshitiz Pokhrel | 504-355-7461 |
| Cox | | Mr. Dennis Lacombe | 504-358-6079 |
| Dept. of Parks and Parkways | Chief Urban Forester: | Mr. Michael Dennis | 504-658-3224 |
| Louisiana One Call | | | 1-800-272-3020 |
| Historic Preservation Specialist | | | |
| Archaeologist | | Mr. Michael Godzinski | 504-658-8632 |

INTRODUCTION CONT.

CNO SEVERE WEATHER CHECKLIST

The City of New Orleans has developed the following operating procedures and checklist in the event of severe weather events. Contractors will be notified by the City of New Orleans prior to the threat of a severe weather event.

All contractors shall stop current operations and ensure that the site, materials, infrastructure, and equipment are secured leading up to the storm event.

Contractors shall log their observations in the online maintenance portal with photos providing backup that each action was taken.

72-Hour Severe Weather Watch:

1. Inspect the construction site, identify material storage items that require anchors. Be prepared to anchor or restrain any object that could be blown away from the site or become a projectile including but not limited to lumber, gravel, sand, and tools.
2. Schedule dumpsters to be emptied. If the dumpster service is unable to remove the dumpster content from the site, the contractor shall secure a cover to prevent the debris from becoming windblown hazards.
3. Verify that all erosion and sediment control devices are in place and/or removed from catch basins.
4. Ensure there is sufficient supply of tools and supplies available to secure the site including but not limited to banding, clips, tape, tarps, and sandbags. Confirm staff is available to accomplish preparations.

48-Hour Severe Weather Warning:

1. Verify that storage containers are anchored or removed from the project site and/or staging areas.
2. Begin securing loose construction materials and supplies.
3. Review site drainage patterns and relocated stored materials to ensure water can flow to the drain system.
4. Remove hazardous materials from the site to prevent water contamination.
5. Remove any non-essential barricades, signs, and fencing from the project site.

24-Hour Severe Weather Checklist:

1. Confirm site has been prepared for the storm event with photos.
2. Cover and secure any materials which may move under storm conditions. Secure materials that may not be moved such as but not limited to rebar, concrete blocks, timber, etc.
3. Document all stored materials for potential of windblown damage.
4. Ensure all storm drains are open and clear. Remove all inlet protectors and silt materials from catch basins.



MAINTENANCE TASKS FOR

**BIORETENTION CELLS &
BIOSWALES**

BIORETENTION CELL & BIOSWALE MAINTENANCE

This section includes grounds maintenance, drainage maintenance, and plant maintenance for Bioretention Cells and Bioswales.

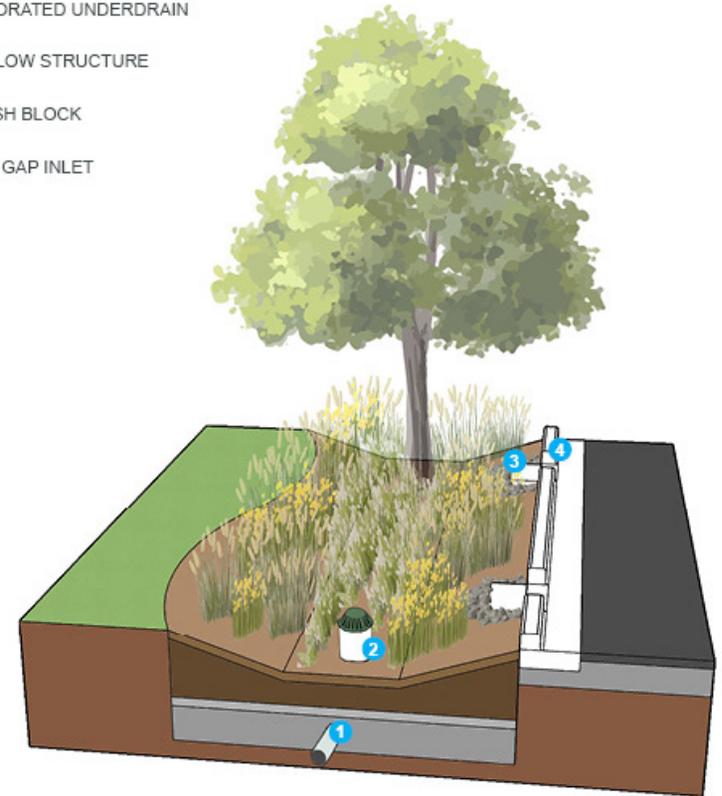
Bioretention Cells are used to collect and detain stormwater runoff and allow for both infiltration and filtration. Bioretention cells provide both surface and subsurface storage. The name “bioretention” refers to the biological processes that plants use to uptake and retain pollutants in their vascular system, as well as soil microbes that capture and break down pollutants.

Bioswales are used to collect, slow, and convey stormwater runoff while allowing for infiltration and filtration. Bioswales provide both surface and subsurface storage and are used to convey stormwater runoff from one area toward an outlet.

Tools needed:

- Camera
- High visibility vest
- Work gloves
- Work boots
- Hand spade
- Pruning sheers
- Rake
- Push broom
- Flat shovel
- Trash picker
- Trash bags/buckets

- 1 PERFORATED UNDERDRAIN
- 2 OUTFLOW STRUCTURE
- 3 SPLASH BLOCK
- 4 CURB GAP INLET



BIORETENTION CELL & BIOSWALE MAINTENANCE

GROUNDS MAINTENANCE

Trash and Debris Removal

1. Collect trash and debris at [every site visit](#).
 - » Remove trash, debris, and sediments from the GI facility and surrounding areas, including sidewalks, driveways, roadways, and curb.
 - » Trash and debris shall be bagged and removed from the site.

What is debris?

- Grass clippings
- Leaves
- Sticks
- Branches

Erosion & Sedimentation

1. Check areas of the bioretention cell for erosion at [every site visit](#).
 - » Erosion is typically caused by a flush of runoff into the GI facility from surrounding impervious surfaces. This can occur at the inlet, or from adjacent sidewalks or driveways.
2. Regrade areas that are eroded with a shovel or rake, ensuring that plants are not damaged.
 - » If a site has regular erosion at the same location, additional erosion control measures may need to be installed. Geotextile, organic fiber matting, or additional planting may be needed.
 - » An additional investigation by the [City Point of Contact](#) will be conducted and they will provide a written recommendation on how to proceed.
 - Reference the Contact List included in this document.
3. Fill in areas where soil has eroded, if necessary.
 - » Sand may be used to infill small, eroded areas that are less than four square-feet in area.
 - » Bioretention soil mix shall be used to infill eroded areas that are larger than four square-feet in area.
 - Bioretention soil mix: 70% sand/ 30% organic material
 - » Sand or soil shall not be placed on top of any plants.
 - » Do not let the sand or soil enter the outflow structure.
 - » Do not let sand or soil block the inlet of the GI facility.
4. Check areas for sediment build up at [every site visit](#), specifically around the inlets of the GI facility.
 - » Excessive sediment shall be removed by hand or with a shovel, ensuring that plants are not damaged.
 - » Reinstall the energy dissipation material after removing the sediment.
 - » Energy dissipation material may need to be replaced every other year.

BIORETENTION CELL & BIOSWALE MAINTENANCE

DRAINAGE MAINTENANCE

Inlet Maintenance

1. Check the inlet for any obstructions that are preventing runoff from entering the GI facility at every site visit.
 - » Remove the obstructions and dispose of off-site.
2. Energy dissipation material at each inlet shall be removed, washed, and reinstalled twice a year.
 - » If energy dissipation material is in poor condition (clogged with debris) the aggregate and the geotextile fabric under it shall be replaced.
3. If there is a runnel and footbridge that flows into the GI facility, cleaning the runnel channel shall be done four times a year.
 - » Remove debris from the runnel with a shovel and dispose of off-site.
 - » If the debris cannot be reached with a shovel, use a pressure washer to loosen the debris until it can be shoveled and disposed of off-site.

Outlet Maintenance

1. Check the outflow structure for any obstructions that are preventing runoff from entering the outlet at every site visit.
 - » Standing water in the GI facility 48 hours after a rain event would be evidence that the outflow structure may not be functioning, or that the soil is clogged due to erosion or too much organic matter build-up.
2. Remove the cover of the outlet and dispose of any sediment, trash, or debris that has entered the structure at every site visit.
 - » If there is a large amount of sediment that has entered the outlet structure, a vacuum truck may be needed to remove debris.
3. After the outflow structure has been cleaned, replace the aggregate and geotextile (if present) around the structure.

Pipe Maintenance

1. Pipes shall be inspected for blockages every other year.
 - » Access to the pipes can be from either the outflow structure or from cleanouts.
2. Conduct a CCTV inspection of the pipes. If the pipes are blocked or need to be cleaned of debris, use a high-pressure nozzle to flush the pipe clear.
 - » After flushing the pipe clear, inspect the drainage structure (catch basin or drainage manhole) that the pipe connects to for debris.
 - » Remove debris from the drainage structure by shovel or with a vacuum machine.

BIORETENTION CELL & BIOSWALE MAINTENANCE

PLANT MAINTENANCE

Tree Maintenance

1. Trees shall be pruned by a Louisiana licensed arborist every 5 years.
 - » Trees shall be pruned if they:
 - Are obstructing lines-of-sight
 - Have broken, dead, or hanging branches
2. Water trees as needed during the establishment period and during periods of drought. The establishment period of a tree lasts for 12 months after the tree has been planted.
 - » Tree watering bags shall be installed on all newly planted trees.
 - » During the establishment period, water the trees if there has not been a rain event for more than 14 days.
 - » After the establishment period is over, water the trees if there has not been a rain event for more than 21 days.
3. Mulch trees twice a year in March and October.
 - » Install 3 inches of pine straw mulch around each tree.
 - » Do not pile mulch at the base of the tree trunk.
 - » Do not use hardwood, dyed mulch, or cypress mulch.
 - » Do not let mulch enter the outflow structure.
 - » Do not let mulch block the inlet of the GI facility.

Shrub Maintenance

1. Shrubs shall be pruned or sheared under the supervision of a Louisiana licensed landscape horticulturalist once a year.
 - » Shrubs shall be pruned or sheared if they:
 - Are obstructing the flow of water into the GI facility
 - Are preventing water from draining out of the outflow structure
 - Are obstructing lines-of-sight
 - Have vegetation that is on an adjacent walkways or streets
 - » Prune woody shrubs using sharp pruning shears. Shear grasses using sharp hedge shears.
 - » Debris from pruning and shearing shall be removed from the planting areas and disposed of off-site.
2. Water shrubs as needed during the establishment period and during periods of drought. The establishment period of a shrub lasts for 12 months after the shrub has been planted.
 - » During the establishment period, water the shrubs if there has not been a rain event for more than 7 days.
 - » After the establishment period is over, water the shrubs if there has not been a rain event for more than 14 days.
3. Mulch shrubs twice a year in March and October.
 - » Check to ensure mulch is covering bare soil of planting areas. Replace any mulch that has been washed away during heavy storm events.
 - » Install 3 inches of pine straw mulch around the shrub planting area.
 - » Do not use hardwood, dyed mulch, or cypress mulch.
 - » Do not let mulch enter the outflow structure.
 - » Do not let mulch block the inlet of the GI facility.

BIORETENTION CELL & BIOSWALE MAINTENANCE

PLANT MAINTENANCE CONT.

Weeding

1. Chemical controls, such as herbicides and pesticides, shall not be used in green infrastructure facilities.
2. Weeds shall be removed from the GI facility by hand.
3. Weeds shall be removed 7 times per year during the growing season, and 3 times per year during the dormant season.
 - » Remove the entire plant including the root mass.
 - » All weeds shall be removed from the planting areas and disposed of off-site.
 - » Hand spades may be used to loosen soil around the weeds.
4. After weeding, ensure all soil is covered by a 3-inch layer of mulch.

Common weeds:

- Nutsedge
- Torpedo grass
- Johnson grass



Nutsedge Seed head



Nutsedge



Torpedo grass seed head



Torpedo grass



Johnson grass seed head



Johnson grass



MAINTENANCE TASKS FOR

STORMWATER PLANTERS

STORMWATER PLANTER MAINTENANCE

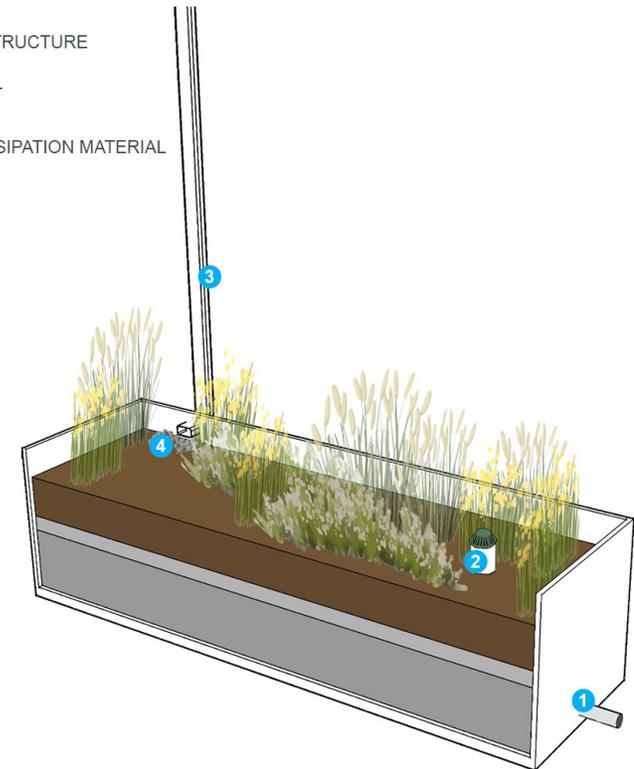
This section includes grounds maintenance, drainage maintenance, and plant maintenance for Stormwater Planters.

Stormwater Planters are used to collect and detain stormwater runoff, usually from roofs or canopy structures through downspouts, rain chains, or sheet flow. Stormwater planters provide both surface and subsurface storage. Their function is similar to bioretention cells, but they are characterized by hard edges and sides that are either completely or partially above ground.

Tools needed:

- Camera
- High visibility vest
- Work gloves
- Work boots
- Hand spade
- Pruning sheers
- Rake
- Push broom
- Flat shovel
- Trash picker
- Trash bags/buckets

- 1 PERFORATED UNDERDRAIN
- 2 OUTFLOW STRUCTURE
- 3 DOWNSPOUT
- 4 ENERGY DISSIPATION MATERIAL



STORMWATER PLANTER MAINTENANCE

GROUNDS MAINTENANCE

Trash and Debris Removal

1. Collect trash and debris at [every site visit](#).
 - » Remove trash, debris, and sediments from the GI facility and surrounding areas, including sidewalks, driveways, roadways, and curb.
 - » Trash and debris shall be bagged and removed from the site.

What is debris?

- Grass clippings
- Leaves
- Sticks
- Branches

Erosion & Sedimentation

1. Check the SW planter for erosion at [every site visit](#).
 - » Erosion is typically caused by a flush of runoff into the SW planter from downspouts.
2. Regrade areas that are eroded with a shovel or rake, ensuring that plants are not damaged.
 - » If a site has regular erosion at the same location, additional erosion control measures may need to be installed. Geotextile, organic fiber matting, or additional planting may be needed.
 - » An additional investigation by the [City Point of Contact](#) will be conducted and they will provide a written recommendation on how to proceed.
 - Reference the Contact List included in this document.
3. Fill in areas where soil has eroded, if necessary.
 - » Sand may be used to infill small, eroded areas that are less than four square-feet in area.
 - » Bioretention soil mix shall be used to infill eroded areas that are larger than four square-feet in area.
 - Bioretention soil mix: 70% sand/ 30% organic material
 - » Sand or soil shall not be placed on top of any plants.
 - » Do not let the sand or soil enter the outflow structure.
 - » Do not let sand or soil block the inlet of the GI facility.
4. Check areas for sediment build up at [every site visit](#), specifically at the bottom of downspouts.
 - » Excessive sediment shall be removed by hand or with a shovel, ensuring that plants are not damaged.
 - » Reinstall the energy dissipation material after removing the sediment.
 - » Energy dissipation material may need to be replaced every other year.

STORMWATER PLANTER MAINTENANCE

DRAINAGE MAINTENANCE

Inlet Maintenance

1. Check the downspout for any obstructions that are preventing runoff from entering the SW planter at [every site visit](#).
 - » Remove the obstructions and dispose of off-site.
2. Energy dissipation material at each inlet shall be removed, washed, and replaced [every other year](#).
 - » Energy dissipation material may need to be replaced every other year.

Outlet Maintenance

1. Check the outflow structure for any obstructions that are preventing runoff from entering the outlet at [every site visit](#).
 - » Standing water in the GI facility 48 hours after a rain event would be evidence that the outflow structure may not be functioning, or that the soil is clogged due to erosion or too much organic matter build-up.
2. Remove the cover of the outlet and dispose of any sediment, trash, or debris that has entered the structure [at every site visit](#).
 - » If there is a large amount of sediment that has entered the outlet structure, a vacuum truck may be needed to remove debris.
3. After the outflow structure has been cleaned, replace the aggregate around the structure.

Pipe Maintenance

1. Pipes shall be inspected for blockages [every other year](#).
 - » Access to the pipes can be from either the outflow structure or from cleanouts.
2. Conduct a CCTV inspection of the pipes. If the pipes are blocked or need to be cleaned of debris, use a high-pressure nozzle to flush the pipe clear.
 - » After flushing the pipe clear, inspect the drainage structure (catch basin or drainage manhole) that the pipe connects to for debris.
 - » Remove debris from the drainage structure by shovel or with a vacuum machine.

STORMWATER PLANTER MAINTENANCE

PLANT MAINTENANCE

Tree Maintenance

1. It is not common for trees to be planted in SW planters due to their limited size. If large plant material is found growing in the SW planter, review the original planting plan, and consult the owner on how to proceed.
2. Trees shall be pruned by a Louisiana licensed arborist every 5 years.
 - » Trees shall be pruned if they:
 - Are obstructing lines-of-sight
 - Have broken, dead, or hanging branches
3. Water trees as needed during the establishment period and during periods of drought. The establishment period of a tree lasts for 12 months after the tree has been planted.
 - » Tree watering bags shall be installed on all newly planted trees.
 - » During the establishment period, water the trees if there has not been a rain event for more than 14 days.
 - » After the establishment period is over, water the trees if there has not been a rain event for more than 21 days.
4. Mulch trees twice a year in March and October.
 - » Install 3 inches of pine straw mulch around each tree.
 - » Do not pile mulch at the base of the tree trunk.
 - » Do not use hardwood, dyed mulch, or cypress mulch.
 - » Do not let mulch enter the outflow structure.
 - » Do not let mulch block the inlet of the GI facility.

Shrub Maintenance

1. Shrubs shall be pruned or sheared under the supervision of a Louisiana licensed landscape horticulturalist once a year.
 - » Shrubs shall be pruned or sheared if they:
 - Are obstructing the flow of water into the GI facility
 - Are preventing water from draining out of the outflow structure
 - Are obstructing lines-of-sight
 - Have vegetation that is on an adjacent walkways or streets
 - » Prune woody shrubs using sharp pruning shears. Shear grasses using sharp hedge shears.
 - » Debris from pruning and shearing shall be removed from the planting areas and disposed of off-site.
2. Water shrubs as needed during the establishment period and during periods of drought. The establishment period of a shrub lasts for 12 months after the shrub has been planted.
 - » During the establishment period, water the shrubs if there has not been a rain event for more than 7 days.
 - » After the establishment period is over, water the shrubs if there has not been a rain event for more than 14 days.
3. Mulch shrubs twice a year in March and October.
 - » Check to ensure mulch is covering bare soil of planting areas. Replace any mulch that has been washed away during heavy storm events.
 - » Install 3 inches of pine straw mulch around the shrub planting area.
 - » Do not use hardwood, dyed mulch, or cypress mulch.
 - » Do not let mulch enter the outflow structure.
 - » Do not let mulch block the inlet of the GI facility.

STORMWATER PLANTER MAINTENANCE

PLANT MAINTENANCE CONT.

Weeding

1. Chemical controls, such as herbicides and pesticides, shall not be used in green infrastructure facilities.
2. Weeds shall be removed from the GI facility by hand.
3. Weeds shall be removed 7 times per year during the growing season, and 3 times per year during the dormant season.
 - » Remove the entire plant including the root mass.
 - » All weeds shall be removed from the planting areas and disposed of off-site.
 - » Hand spades may be used to loosen soil around the weeds.
4. After weeding, ensure all soil is covered by a 3-inch layer of mulch.

Common weeds:

- Nutsedge
- Torpedo grass
- Johnson grass



Nutsedge Seed head



Nutsedge



Torpedo grass seed head



Torpedo grass



Johnson grass seed head



Johnson grass

An aerial photograph of a coastal region, showing a winding river in the foreground, a large body of water in the middle ground, and various land parcels and infrastructure. The image is overlaid with a semi-transparent blue banner at the bottom.

MAINTENANCE TASKS FOR

INFILTRATION TRENCHES

INFILTRATION TRENCH MAINTENANCE

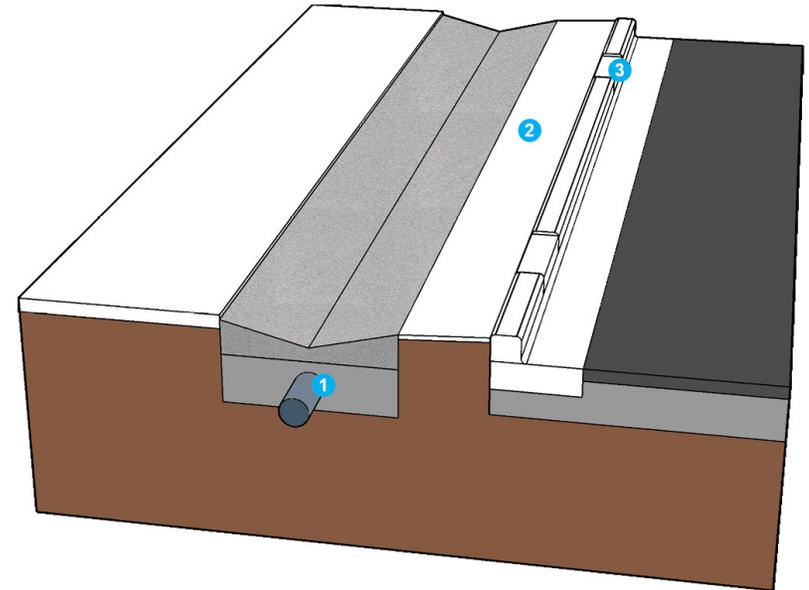
This section includes grounds maintenance, drainage maintenance, and plant maintenance for Infiltration Trenches.

Infiltration Trenches, also known as French drains, are used primarily in linear spaces to store, convey, and facilitate infiltration of stormwater runoff. Infiltration trenches consist of an aggregate-filled channel with underdrains.

Tools needed:

- Camera
- High visibility vest
- Work gloves
- Work boots
- Rake
- Push broom
- Flat shovel
- Trash picker
- Trash bags/buckets

- 1 PERFORATED UNDERDRAIN
- 2 STEP OUT ZONE
- 3 CURB GAP INLET



INFILTRATION TRENCH MAINTENANCE

GROUNDS MAINTENANCE

Trash and Debris Removal

1. Collect trash and debris at [every site visit](#).
 - » Remove trash, debris, and sediments from the GI facility and surrounding areas, including sidewalks, driveways, roadways, and curb.
 - » Trash and debris shall be bagged and removed from the site.

What is debris?

- Grass clippings
- Leaves
- Sticks
- Branches

Erosion & Sedimentation

1. Check the GI facility for erosion at [every site visit](#).
 - » Erosion is typically caused by a flush of runoff into the GI facility from surrounding impervious surfaces. This can occur at the inlet, or from adjacent sidewalks or driveways.
2. Regrade areas that are eroded with a shovel or rake.
 - » If a site has regular erosion at the same location, additional erosion control measures may need to be installed. Geotextile, organic fiber matting, or additional planting may be needed.
 - » An additional investigation by the *City Point of Contact* will be conducted and they will provide a written recommendation on how to proceed.
 - Reference the Contact List included in this document.
3. Fill in areas where aggregate has eroded, if necessary.
 - » Do not let the aggregate enter the outflow structure.
 - » Do not let aggregate block the inlet of the GI facility.
4. Check areas for sediment build up at [every site visit](#), specifically around the inlets of the GI facility.
 - » Excessive sediment shall be removed by hand or with a shovel.

INFILTRATION TRENCH MAINTENANCE

DRAINAGE MAINTENANCE

Inlet Maintenance

1. Check the inlet for any obstructions that are preventing runoff from entering the GI facility at [every site visit](#).
 - » Remove the obstructions and dispose of off-site.
2. Aggregate at each inlet has a higher chance of becoming clogged with sediment. These areas of aggregate shall be removed, washed, and replaced as defined in the maintenance calculator.

Outlet Maintenance

1. Check the outflow structure for any obstructions that are preventing runoff from entering the outlet at [every site visit](#).
 - » Standing water in the GI facility 48 hours after a rain event would be evidence that the outflow structure may not be functioning, or that the soil is clogged due to erosion or too much organic matter build-up.
2. Remove the cover of the outlet and dispose of any sediment, trash, or debris that has entered the structure [at every site visit](#).
 - » If there is a large amount of sediment that has entered the outlet structure, a vacuum truck may be needed to remove debris.
3. After the outflow structure has been cleaned, replace the aggregate around the structure.

Pipe Maintenance

1. Pipes shall be inspected for blockages [every other year](#).
 - » Access to the pipes can be from either the outflow structure or from cleanouts.
2. Conduct a CCTV inspection of the pipes. If the pipes are blocked or need to be cleaned of debris, use a high-pressure nozzle to flush the pipe clear.
 - » After flushing the pipe clear, inspect the drainage structure (catch basin or drainage manhole) that the pipe connects to for debris.
 - » Remove debris from the drainage structure by shovel or with a vacuum machine.

INFILTRATION TRENCH MAINTENANCE

PLANT MAINTENANCE

Weeding

1. Chemical controls, such as herbicides and pesticides, shall not be used in green infrastructure facilities.
2. Weeds shall be removed from the GI facility by hand.
3. Weeds shall be removed 7 times per year during the growing season, and 3 times per year during the dormant season.
 - » Remove the entire plant including the root mass.
 - » All weeds shall be removed from the planting areas and disposed of off-site.
 - » Hand spades may be used to loosen soil around the weeds.
4. After weeding, ensure all soil is covered by a 3-inch layer of mulch.
5. Replace the top layer of aggregate (the filter course) if it has become overgrown by plants and weeds.

Common weeds:

- Nutsedge
- Torpedo grass
- Johnson grass



Nutsedge Seed head



Nutsedge



Torpedo grass seed head



Torpedo grass



Johnson grass seed head



Johnson grass

An aerial photograph of a coastal region, showing a winding river in the foreground, a large body of water in the middle ground, and various land parcels and infrastructure. The image is overlaid with a semi-transparent blue band at the bottom.

MAINTENANCE TASKS FOR

PERVIOUS PAVEMENT

PERVIOUS PAVEMENT MAINTENANCE

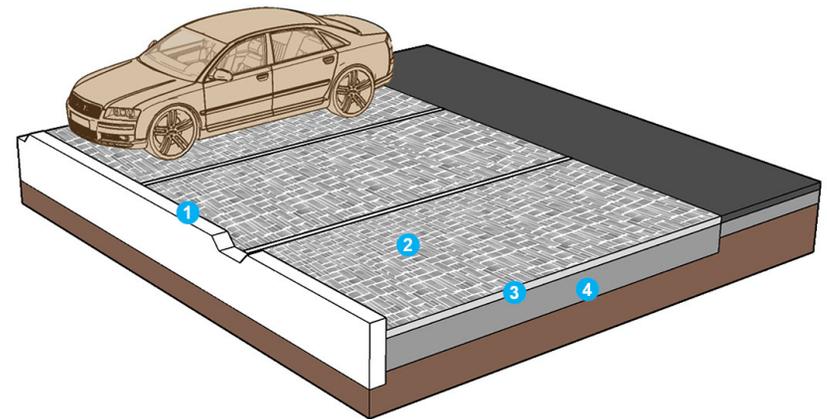
This section includes grounds maintenance, drainage maintenance, and plant maintenance for Pervious Pavement.

Pervious Pavement allows stormwater runoff to infiltrate through the pavement surface, either through joints or through voids in the pavement itself. There is storage below the pavement section in the form of aggregate that supports the pervious pavement. Sediments in the runoff are filtered as it flows through the pavement and aggregate sections. To comply with the City of New Orleans Stormwater building code, pervious paving must be either precast pervious concrete panels or pervious pavers.

Tools needed:

- Camera
- High visibility vest
- Work gloves
- Work boots
- Rake
- Paving block extractor
- Push broom
- Leaf blower
- Trash picker
- Trash bags/buckets
- Vacuum equipment
 - » Vacuum equipment shall include a regenerative air sweeper or high-power vacuum sweeper.
 - » Vacuum equipment shall have a highly efficient air conveyance system, a highly productive sweep system with a suction nozzle, and a specialized vacuum head that includes high pressure water nozzles.

- 1 BARRIER CURB
- 2 PERVIOUS PAVEMENT
- 3 FILTER AGGREGATE
- 4 STORAGE AGGREGATE



PERVIOUS PAVEMENT MAINTENANCE

GROUNDS MAINTENANCE

Trash and Debris Removal

1. Collect trash and debris at every site visit.
 - » Remove trash, debris, and sediments from the GI facility and surrounding areas, including sidewalks, driveways, roadways, and curb.
 - » Rakes, brooms, leaf blowers, or street sweepers can be used to remove leaves and branches.
 - Do not blow debris into catch basins
 - » Trash and debris shall be bagged and removed from the site.

Pre-cleaning Infiltration Test

1. An infiltration test should be performed before maintenance has begun to determine how effective the cleaning was of the pavement. Perform an infiltration test based on the following installations:
 - » Parking lots: one infiltration test in every set of parking stalls that is going to be cleaned.
 - » Street parking/gutters: two infiltration tests per block of paving that is going to be cleaned.
 - » Record the infiltration test results in the maintenance manual portal.



Crew cleans pervious pavement with a vacuum truck attachment

What is debris?

- Grass clippings
- Leaves
- Sticks
- Branches

DRAINAGE MAINTENANCE

Pipe Maintenance

1. Pipes shall be inspected for blockages every other year.
 - » Access to the pipes is from the cleanouts.
2. Conduct a CCTV inspection of the pipes. If the pipes are blocked or need to be cleaned of debris, use a high-pressure nozzle to flush the pipe clear.
 - » After flushing the pipe clear, inspect the drainage structure (catch basin or drainage manhole) that the pipe connects to for debris.
 - » Remove debris from the drainage structure by shovel or with a vacuum machine.

SEDIMENTATION AND VACUUMING

General Vacuuming

- Frequency of vacuuming is dependent on site conditions. Areas with high traffic and dense overhead vegetation may require multiple cleanings per year.
- **Routine Vacuuming** occurs when a previous cleaning of the pervious pavement has taken place within a year.
- **Restorative Vacuuming** occurs when a previous cleaning of the pervious pavement has not taken place for more than a year.

PERVIOUS PAVEMENT MAINTENANCE

SEDIMENTATION AND VACUUMING CONT.

Vacuuming - Precast Pervious Concrete Panels

1. **Precast Pervious Concrete Panels** can typically handle a higher suction rate from the vacuum equipment. If debris is difficult to remove, the suction rate can be increased
2. Start at the upstream area of the pervious pavement and work downstream.
3. Pay attention to the edges of where pervious pavement meets impervious surfaces, such as the roadway, curblines, or walkways. These are generally the areas where the most sedimentation occurs.
4. After removing debris from the surface, vacuum the permeable pavers as directed by the product manufacturer.
 - » For a *routine vacuuming*, make at least two passes over the permeable pavement.
 - » For a *restorative vacuuming*, make at least four passes over the permeable pavement.
5. After vacuuming is complete, perform an infiltration test based on the following installations in accordance with ASTM C1701:
 - » Parking lots: one infiltration test in every set of parking stalls that was cleaned.
 - » Street parking/gutters: two infiltration tests per block of paving that was cleaned.
 - » Record the infiltration rate results in the maintenance manual portal.
 - Precast Pervious Concrete Panels can reach an infiltration rate of 800 inches per hour.
 - The infiltration rate shall be a minimum of 200 inches per hour.
 - » Infiltration testing shall be performed with the *City Point of Contact* present on site.

Vacuuming - Permeable Pavers: Aggregate Filled Joints

1. **Permeable pavers with aggregate filled joints** are the most common types of permeable pavers. Runoff flows through the aggregate joints into the aggregate subbase below.
2. Start at the upstream area of the pervious pavement and work downstream.
3. After removing debris from the surface, vacuum the permeable pavers as directed by the product manufacturer.
 - » The suction power should be carefully monitored when cleaning pavers with aggregate filled joints. If the suction power is set too high, the pavers can be uplifted by the vacuum or sucked into the hose.
 - » For a *routine vacuuming*, make at least two passes over the permeable pavement.
 - » For a *restorative vacuuming*, make at least four passes over the permeable pavement.
4. After vacuuming is complete, install aggregate into the paver joints. Clean aggregate shall be broom swept into the joints. The process of sweeping aggregate will need to be repeated until the aggregate meets the top of the paver.
 - » Water can be used to help spread and settle the aggregate into the paver joints.
 - » No. 8 aggregate is commonly used in paver joints, but the size of the aggregate will vary depending on the specific product.
5. After vacuuming is complete, perform an infiltration test based on the following installations in accordance with ASTM C1701:
 - » Parking lots: one infiltration test in every set of parking stalls that was cleaned.
 - » Street parking/gutters: two infiltration tests per block of paving that was cleaned.
 - » Record the infiltration rate results in the maintenance manual portal.
 - The infiltration rate shall be a minimum of 200 inches per hour.
 - » Infiltration testing shall be performed with the *Owner/Client* present on site.

PERVIOUS PAVEMENT MAINTENANCE

SEDIMENTATION AND VACUUMING CONT.

Vacuuming - Permeable Pavers: Open Joint

1. An **open joint paver** is a paver that does not contain aggregate between the pavers. Runoff flows directly between the pavers into the aggregate subbase below.
2. Start at the upstream area of the pervious pavement and work downstream.
3. After removing debris from the surface, vacuum the permeable pavers as directed by the product manufacturer.
 - » Pressure washing the joints before cleaning with the vacuum may help to loosen the debris.
 - Pressure washing should start at the upstream area of the pavement.
 - » For a *routine vacuuming*, make at least two passes over the permeable pavement.
 - » For a *restorative vacuuming*, make at least four passes over the permeable pavement.
4. After vacuuming is complete, perform an infiltration test based on the following installations in accordance with ASTM C1701:
 - » Parking lots: one infiltration test in every set of parking stalls that was cleaned.
 - » Street parking/gutters: two infiltration tests per block of paving that was cleaned.
 - » Record the infiltration rate results in the maintenance manual portal.
 - The infiltration rate of permeable paver can vary depending on the product.
 - The infiltration rate shall be a minimum of 200 inches per hour.
 - » Infiltration testing shall be performed with the *Owner/Client* present on site.

Cleaning - Gravel Pavers aka. Porous Flexible Paving

1. **Gravel pavers** are modular pavement systems typically comprised of a plastic grid system that is backfilled with aggregate.
2. Aggregate covers the surface of the gravel pavers. This means that they cannot be vacuumed.
3. To clean gravel pavers:
 - » Remove the plastic grid pieces.
 - » Remove the top layer of aggregate.
 - » Reinstall the plastic grid pieces.
 - If the plastic grid piece is cracked or broken, it should be replaced.
 - » Reinstall the aggregate. Smooth to a finished surface to the top of the aggregate is level with the stop of the plastic grid.
 - No. 8 aggregate is commonly used in gravel pavers, but the size of the aggregate will vary depending on the specific product.



Vacuum truck cleans pervious pavers with aggregate filled joints

PERVIOUS PAVEMENT MAINTENANCE

PLANT MAINTENANCE

Weeding

1. Chemical controls, such as herbicides and pesticides, shall not be used in green infrastructure facilities.
2. Weeds shall be removed from the joints of pervious pavements by hand at every site visit.
 - » Remove the entire plant including the root mass.
 - » All weeds shall be removed and disposed of off-site.
 - » If removing the weeds loosens the permeable pavers, remove the paver with a paving block extractor, re-level and compact the aggregate base, and put the paver back in place.

Common weeds:

- Nutsedge
- Torpedo grass
- Johnson grass



Nutsedge Seed head



Nutsedge



Torpedo grass seed head



Torpedo grass



Johnson grass seed head



Johnson grass



MAINTENANCE TASKS FOR

TREE CELLS

TREE CELL MAINTENANCE

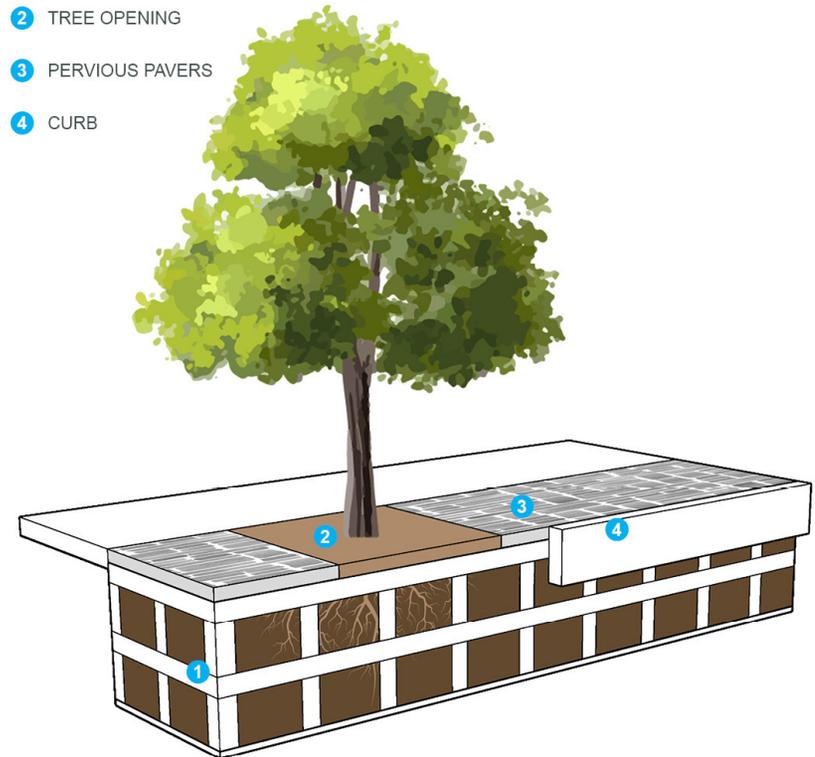
This section includes grounds maintenance, drainage maintenance, and plant maintenance for Tree Cells.

Tree Cells are modular suspended pavement systems that provide substantial subsurface space for uncompacted soil, water, and air, which provide ideal growing conditions for tree roots, while also structurally supporting paving above. Tree cells provide subsurface detention and filtration by soils and the trees planted in them.

Tools needed:

- Camera
- High visibility vest
- Work gloves
- Work boots
- Hand spade
- Pruning sheers
- Rake
- Push broom
- Flat shovel
- Trash picker
- Trash bags/buckets

- 1 MODULAR SUSPENDED PAVEMENT SYSTEM
- 2 TREE OPENING
- 3 PERVIOUS PAVERS
- 4 CURB



TREE CELL MAINTENANCE

GROUNDS MAINTENANCE

Trash and Debris Removal

1. Collect trash and debris at [every site visit](#).
 - » Remove trash, debris, and sediments from the GI facility and surrounding areas, including sidewalks, driveways, roadways, and curb.
 - » Trash and debris shall be bagged and removed from the site.

Erosion & Sedimentation

1. Check areas of the tree cell for erosion at [every site visit](#).
 - » Erosion is typically caused by a flush of runoff into the GI facility from surrounding impervious surfaces. This can occur at the inlet, or from adjacent sidewalks or driveways.
2. Regrade areas that are eroded with a shovel or rake, ensuring that plants are not damaged.
 - » If a site has regular erosion at the same location, additional erosion control measures may need to be installed. Geotextile, organic fiber matting, or additional planting may be needed.
 - » An additional investigation by the [City Point of Contact](#) will be conducted and they will provide a written recommendation on how to proceed.
 - Reference the Contact List included in this document.
3. Fill in areas where soil has eroded, if necessary.
 - » Sand may be used to infill small, eroded areas that are less than four square-feet in area.
 - » Bioretention soil mix shall be used to infill eroded areas that are larger than four square-feet in area.
 - Bioretention soil mix: 70% sand/ 30% organic material
 - » Sand or soil shall not be placed on top of any plants.
 - » Do not let sand or soil block the inlet of the GI facility.

What is debris?

- Grass clippings
- Leaves
- Sticks
- Branches

4. Check areas for sediment build up at [every site visit](#), specifically around the inlets of the GI facility.
 - » Excessive sediment shall be removed by hand or with a shovel, ensuring that plants are not damaged.

Pervious Pavement

1. If pervious pavement is used in conjunction with tree cells, refer to [Maintenance Tasks for Pervious Pavement](#) on page 21.

TREE CELL MAINTENANCE

DRAINAGE MAINTENANCE

Inlet Maintenance

1. Check the inlet for any obstructions that are preventing runoff from entering the GI facility at every site visit.
 - » Remove the obstructions and dispose of off-site.
2. If there is a runnel and footbridge that flows into the GI facility, cleaning the runnel channel shall be done four times per year.
 - » Remove debris from the runnel with a shovel and dispose of off-site.
 - » If the debris cannot be reached with a shovel, use a pressure washer to loosen the debris until it can be shoveled and disposed of off-site.

Pipe Maintenance

1. Pipes shall be inspected for blockages every other year.
 - » Access to the pipes can be from the cleanouts.
2. Conduct a CCTV inspection of the pipes. If the pipes are blocked or need to be cleaned of debris, use a high-pressure nozzle to flush the pipe clear.
 - » After flushing the pipe clear, inspect the drainage structure (catch basin or drainage manhole) that the pipe connects to for debris.
 - » Remove debris from the drainage structure by shovel or with a vacuum machine.

TREE CELL MAINTENANCE

PLANT MAINTENANCE

Tree Maintenance

1. Trees shall be pruned by a Louisiana licensed arborist every 5 years.
 - » Trees shall be pruned if they:
 - Are obstructing lines-of-sight
 - Have broken, dead, or hanging branches
2. Water trees as needed during the establishment period and during periods of drought. The establishment period of a tree lasts for 12 months after the tree has been planted.
 - » Tree watering bags shall be installed on all newly planted trees.
 - » During the establishment period, water the trees if there has not been a rain event for more than 14 days.
 - » After the establishment period is over, water the trees if there has not been a rain event for more than 21 days.
3. Mulch trees twice a year in March and October.
 - » Check to ensure mulch is covering bare soil of planting areas
 - » Install 3 inches of pine straw mulch around each tree.
 - » Do not pile mulch at the base of the tree trunk.
 - » Do not use hardwood, dyed mulch, or cypress mulch.
 - » Do not let mulch enter the outflow structure.
 - » Do not let mulch block the inlet of the GI facility.

Shrub Maintenance

1. Shrubs or groundcover plants may be used in tree cells.
2. Shrubs shall be pruned or sheared under the supervision of a Louisiana licensed landscape horticulturalist once a year.
 - » Shrubs shall be pruned or sheared if they:
 - Are obstructing the flow of water into the GI facility
 - Are preventing water from draining out of the outflow structure
 - Are obstructing lines-of-sight
 - Have vegetation that is on an adjacent walkways or streets
 - » Prune woody shrubs using sharp pruning shears. Shear grasses using sharp hedge shears.
 - » Debris from pruning and shearing shall be removed from the planting areas and disposed of off-site.
3. Water shrubs as needed during the establishment period and during periods of drought. The establishment period of a shrub lasts for 12 months after the shrub has been planted.
 - » During the establishment period, water the shrubs if there has not been a rain event for more than 7 days.
 - » After the establishment period is over, water the shrubs if there has not been a rain event for more than 14 days.
4. Mulch shrubs twice a year in March and October.
 - » Check to ensure mulch is covering bare soil of planting areas. Replace any mulch that has been washed away during heavy storm events.
 - » Install 3 inches of pine straw mulch around the shrub planting area.
 - » Do not use hardwood, dyed mulch, or cypress mulch.
 - » Do not let mulch enter the outflow structure.
 - » Do not let mulch block the inlet of the GI facility.

TREE CELL MAINTENANCE

PLANT MAINTENANCE CONT.

Weeding

1. Chemical controls, such as herbicides and pesticides, shall not be used in green infrastructure facilities.
2. Weeds shall be removed from the GI facility by hand.
3. Weeds shall be removed 7 times per year during the growing season, and 3 times per year during the dormant season.
 - » Remove the entire plant including the root mass.
 - » All weeds shall be removed from the planting areas and disposed of off-site.
 - » Hand spades may be used to loosen soil around the weeds.
4. After weeding, ensure all soil is covered by a 3-inch layer of mulch.

Common weeds:

- Nutsedge
- Torpedo grass
- Johnson grass



Nutsedge Seed head



Nutsedge



Torpedo grass seed head



Torpedo grass



Johnson grass seed head



Johnson grass

An aerial photograph of a coastal region, likely a bay or estuary, showing a network of waterways and land parcels. The water is a light blue, and the land is a mix of brown and green. A prominent river winds through the center of the image. Several large, irregularly shaped areas are highlighted in a darker blue, representing detention basins. The overall scene is a detailed topographic or hydrological map.

MAINTENANCE TASKS FOR

DETENTION BASINS

DETENTION BASIN MAINTENANCE

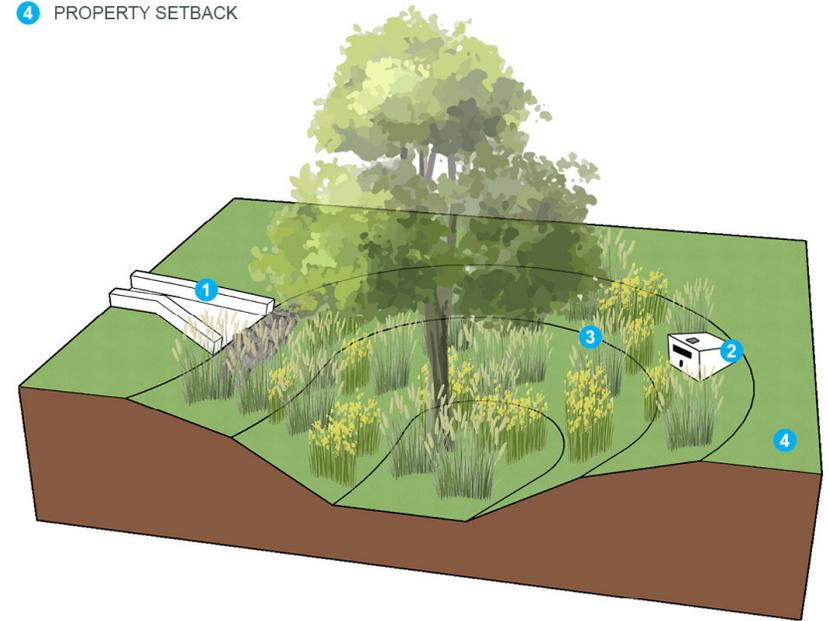
This section includes grounds maintenance, drainage maintenance, and plant maintenance for Detention Basins.

Detention Basins, or dry ponds, are used to detain large volumes of stormwater. The basin collects and discharges stormwater runoff slowly, allowing time for suspended solids and other pollutants to be filtered by plants and soils. Stormwater runoff also has time to infiltrate into the ground. Detention basins are designed to fully drain all surface water. Vegetation that can tolerate temporary inundation is planted in detention basins.

Tools needed:

- Camera
- High visibility vest
- Work gloves
- Work boots
- Hand spade
- Pruning sheers
- Rake
- Push broom
- Flat shovel
- Trash picker
- Trash bags/buckets
- Riding mowers
- Push mowers for smaller areas
- Weed eaters

- 1 STORMWATER RUNNEL
- 2 OUTLET BOX
- 3 4:1 SLOPE
- 4 PROPERTY SETBACK



DETENTION BASIN MAINTENANCE

GROUNDS MAINTENANCE

Trash and Debris Removal

1. Collect trash and debris at [every site visit](#).
 - » Remove trash, debris, and sediments from the GI facility and surrounding areas, including sidewalks, driveways, roadways, and curb.
 - » Trash and debris shall be bagged and removed from the site.

Erosion & Sedimentation

1. Check areas of the detention basin for erosion at [every site visit](#).
 - » Erosion is typically caused by a flush of runoff into the GI facility from surrounding impervious surfaces. This can occur at the inlet, or from adjacent sidewalks or driveways.
2. Regrade areas that are eroded with a shovel or rake, ensuring that plants are not damaged.
 - » If a site has regular erosion at the same location, additional erosion control measures may need to be installed. Geotextile, organic fiber matting, or additional planting may be needed.
 - » An additional investigation by the [City Point of Contact](#) will be conducted and they will provide a written recommendation on how to proceed.
 - Reference the Contact List included in this document.
3. Fill in areas where soil has eroded, if necessary.
 - » Sand may be used to infill small, eroded areas that are less than four square-feet in area.
 - » Sand or soil shall not be placed on top of any plants.
 - » Do not let the sand or soil enter the outflow structure.
 - » Do not let sand or soil block the inlet of the GI facility.

What is debris?

- Grass clippings
- Leaves
- Sticks
- Branches

4. Check areas for sediment build up at [every site visit](#), specifically around the inlets of the GI facility.
 - » Excessive sediment shall be removed by hand or with a shovel, ensuring that plants are not damaged.
 - » Reinstall the energy dissipation material after removing the sediment.
 - » Energy dissipation material may need to be replaced every other year.

DETENTION BASIN MAINTENANCE

DRAINAGE MAINTENANCE

Inlet Maintenance

1. Check the inlet for any obstructions that are preventing runoff from entering the GI facility at every site visit.
 - » Remove the obstructions and dispose of off-site.
2. Energy dissipation material at each inlet shall be removed, washed, and replaced every other year.
3. If there is a runnel and footbridge that flows into the GI facility, cleaning the runnel channel shall be done every other month.
 - » Remove debris from the runnel with a shovel and dispose of off-site.
 - » If the debris cannot be reached with a shovel, use a pressure washer to loosen the debris until it can be shoveled and disposed of off-site.
 - » Do not pressure wash the debris into the detention basin.

Outlet Maintenance

1. Check the outflow structure for any obstructions that are preventing runoff from entering the outlet at every site visit.
 - » Standing water in the GI facility 48 hours after a rain event would be evidence that the outflow structure may not be functioning, or that the soil is clogged due to erosion or too much organic matter build-up.
2. Remove the cover of the outlet and dispose of any sediment, trash, or debris that has entered the structure at every site visit.
 - » If there is a large amount of sediment that has entered the outlet structure, a vacuum truck may be needed to remove debris.
3. After the outflow structure has been cleaned, replace the aggregate around the structure.

Pipe Maintenance

1. Pipes shall be inspected for blockages every other year.
 - » Access to the pipes can be from the outflow box
2. Conduct a CCTV inspection of the pipes. If the pipes are blocked or need to be cleaned of debris, use a high-pressure nozzle to flush the pipe clear.
 - » After flushing the pipe clear, inspect the drainage structure (catch basin or drainage manhole) that the pipe connects to for debris.
 - » Remove debris from the drainage structure by shovel or with a vacuum machine.

DETENTION BASIN MAINTENANCE

PLANT MAINTENANCE

Tree Maintenance

1. Trees shall be pruned by a Louisiana licensed arborist every 5 years.
 - » Trees shall be pruned if they:
 - Are obstructing lines-of-sight
 - Have broken, dead, or hanging branches
2. Water trees as needed during the establishment period and during periods of drought. The establishment period of a tree lasts for 12 months after the tree has been planted.
 - » Tree watering bags shall be installed on all newly planted trees.
 - » During the establishment period, water the trees if there has not been a rain event for more than 14 days.
 - » After the establishment period is over, water the trees if there has not been a rain event for more than 21 days.
3. Mulch trees twice a year in March and October.
 - » Install 3 inches of pine straw mulch around each tree.
 - » Do not pile mulch at the base of the tree trunk.
 - » Do not use hardwood, dyed mulch, or cypress mulch.
 - » Do not let mulch enter the outflow structure.
 - » Do not let mulch block the inlet of the GI facility.

Shrub Maintenance

1. Shrubs shall be pruned or sheared under the supervision of a Louisiana licensed landscape horticulturalist once a year.
 - » Shrubs shall be pruned or sheared if they:
 - Are obstructing the flow of water into the GI facility
 - Are preventing water from draining out of the outflow structure
 - Are obstructing lines-of-sight
 - Have vegetation that is on an adjacent walkways or streets
 - » Prune woody shrubs using sharp pruning shears. Shear grasses using sharp hedge shears.
 - » Debris from pruning and shearing shall be removed from the planting areas and disposed of off-site.
2. Water shrubs as needed during the establishment period and during periods of drought. The establishment period of a shrub lasts for 12 months after the shrub has been planted.
 - » During the establishment period, water the shrubs if there has not been a rain event for more than 7 days.
 - » After the establishment period is over, water the shrubs if there has not been a rain event for more than 14 days.
3. Mulch shrubs twice a year in March and October.
 - » Check to ensure mulch is covering bare soil of planting areas. Replace any mulch that has been washed away during heavy storm events.
 - » Install 3 inches of pine straw mulch around the shrub planting area.
 - » Do not use hardwood, dyed mulch, or cypress mulch.
 - » Do not let mulch enter the outflow structure.
 - » Do not let mulch block the inlet of the GI facility.

DETENTION BASIN MAINTENANCE

PLANT MAINTENANCE CONT.

Turfgrass Maintenance

1. Turfgrass shall be mowed on a regular basis. The height of turfgrass shall not reach more than 4 inches before being mowed.
2. Turfgrass shall be mowed 14 times during the growing season and 5 times during the dormant season.
3. Extra precautions shall be taken when mowing around shrubs and trees.
 - » Mowers shall never be used on areas that are mulched.
 - » Weed eaters shall never be used in areas that are mulched or around the base of trees.
 - If a weed eater cuts the trunk of a tree, take a picture and note the location and report it to the owner for further action.
4. Edging shall be done around walkways, driveways, and curblines.
5. All debris from mowing shall be removed from walkways, driveways, roadways, and curbs and disposed of off-site.
6. Any bare spots of turfgrass shall be repaired by installing sod.

Weeding

1. Chemical controls, such as herbicides and pesticides, shall not be used in green infrastructure facilities.
2. Weeds shall be removed from the GI facility by hand.
3. Weeds shall be removed 7 times per year during the growing season, and 3 times per year during the dormant season.
 - » Remove the entire plant including the root mass.
 - » All weeds shall be removed from the planting areas and disposed of off-site.
 - » Hand spades may be used to loosen soil around the weeds.
4. After weeding, ensure all soil is covered by a 3-inch layer of mulch.

Common weeds:

- Nutsedge
- Torpedo grass
- Johnson grass



Johnsongrass



Nutsedge Seed head



Nutsedge



Torpedo grass seed head



Torpedo grass

An aerial photograph of a coastal region, likely a bay or estuary, showing a network of waterways and land parcels. The water is a light blue, and the land is a mix of brown and green. A prominent river winds through the center of the image. The overall scene is semi-transparent, serving as a background for the text.

MAINTENANCE TASKS FOR

RETENTION BASINS

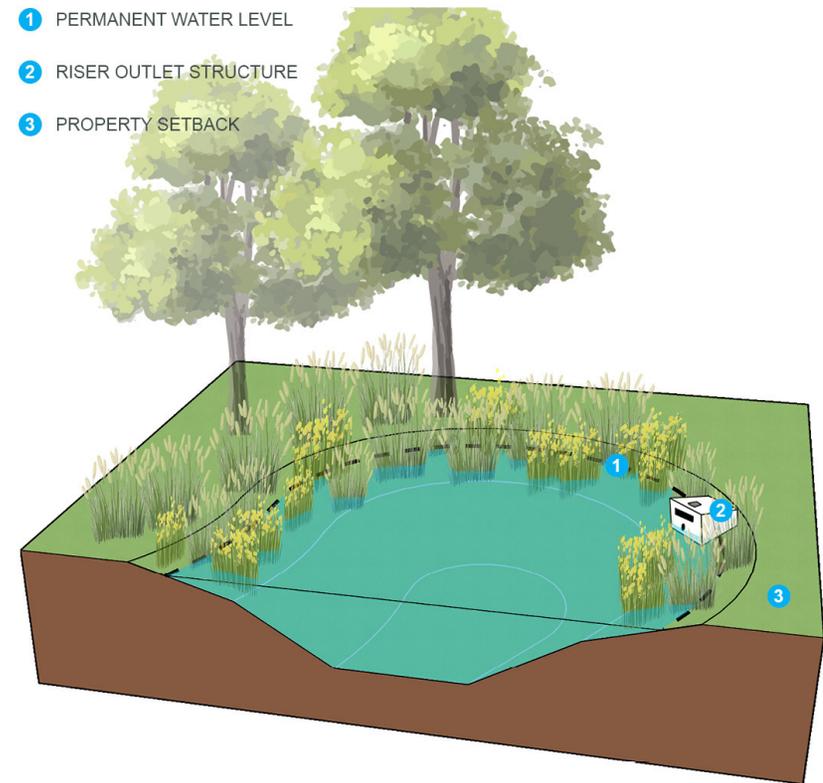
RETENTION BASIN MAINTENANCE

This section includes grounds maintenance, drainage maintenance, and plant maintenance for Retention Basins.

Retention Basins, or wet ponds, are excavated ponding areas. Retention basins maintain a permanent ponding depth and allow for storage of specific design storms depending on the height of the freeboard and configuration of the outlet structure. They can be linear in shape to encourage settling of sediments prior to discharge, or they can have a smaller sediment basin at the inflow point. Generally, retention basins are planted with water-tolerant plants surrounding the permanent water level

Tools needed:

- Camera
- High visibility vest
- Work gloves
- Work boots
- Hand spade
- Pruning sheers
- Rake
- Push broom
- Flat shovel
- Trash picker
- Trash bags/buckets
- Mini excavator



RETENTION BASIN MAINTENANCE

GROUNDS MAINTENANCE

Trash and Debris Removal

1. Collect trash and debris at [every site visit](#).
 - » Remove trash, debris, and sediments from the GI facility and surrounding areas, including sidewalks, driveways, roadways, and curb.
 - » Trash and debris shall be bagged and removed from the site.

Erosion & Sedimentation

1. Check areas of the detention basin for erosion at [every site visit](#).
 - » Erosion is typically caused by a flush of runoff into the GI facility from surrounding impervious surfaces. This can occur at the inlet, or from adjacent sidewalks or driveways.
2. Regrade areas that are eroded with a shovel or rake, ensuring that plants are not damaged.
 - » If a site has regular erosion at the same location, additional erosion control measures may need to be installed. Geotextile, organic fiber matting, or additional planting may be needed.
 - » An additional investigation by the [City Point of Contact](#) will be conducted and they will provide a written recommendation on how to proceed.
 - Reference the Contact List included in this document.
3. Fill in areas where soil has eroded, if necessary.
 - » Sand may be used to infill eroded areas.
 - » Sand or soil shall not be placed on top of any plants.
 - » Do not let the sand enter the permanent water area.
 - » Do not let sand or soil block the inlet of the GI facility.

What is debris?

- Grass clippings
- Leaves
- Sticks
- Branches

4. Check areas for sediment build up specifically in the forebay [once a year](#).
 - » The forebay shall be dredged when 20% of the capacity has been filled
 - To determine if the forebay is at 20% of its capacity, spot elevations shall be taken.
 - Spot elevations should be taken [every year](#).
 - Measure the elevation of the surface below the water level in the forebay. Take another elevation at the surrounding grades outside of the forebay.
 - These elevations shall be compared to the original design documents.
 - An additional investigation by the [City Point of Contact](#) will be conducted and they will provide a written recommendation on how to proceed.
 - » The forebay may need to be dredged of sediment [every 1 to 5 years](#), depending on the volume of sediment in the runoff entering the facility.
 - Use a mini excavator to remove sediment build up. Sediment should be removed and disposed of off-site.
 - Regrade the forebay [as needed](#).
 - Reinstall plant material that was disturbed during excavation and grading.

RETENTION BASIN MAINTENANCE

DRAINAGE MAINTENANCE

Inlet Maintenance

1. Check the inlet for any obstructions that are preventing runoff from entering the GI facility at [every site visit](#).
 - » Remove the obstructions and dispose of off-site.
2. Energy dissipation material at each inlet shall be removed, washed, and replaced.
 - » Energy dissipation material may need to be replaced every other year.
3. If there is a runnel and footbridge that flows into the GI facility, pressure washing of the runnel channel may be needed to remove debris.
 - » Do not pressure wash the debris into the retention basin.

Outlet Maintenance

1. Check the outflow structure for any obstructions that are preventing runoff from entering the outlet at [every site visit](#).
2. Remove the cover of the outlet and dispose of any sediment, trash, or debris that has entered the structure [at every site visit](#).
 - » Check that there is no debris blocking the orifice or riser.
 - » If there is a large amount of sediment that has entered the outlet structure, a vacuum truck may be needed to remove debris.

Pipe Maintenance

1. Pipes shall be inspected for blockages [every other year](#).
 - » Access to the pipes can be from the outflow structure or from cleanouts.
2. Conduct a CCTV inspection of the pipes. If the pipes are blocked or need to be cleaned of debris, use a high-pressure nozzle to flush the pipe clear.
 - » After flushing the pipe clear, inspect the drainage structure (catch basin or drainage manhole) that the pipe connects to for debris.
 - » Remove debris from the drainage structure by shovel or with a vacuum machine.

RETENTION BASIN MAINTENANCE

PLANT MAINTENANCE

Tree Maintenance (if applicable)

1. Trees shall be pruned by a Louisiana licensed arborist every 5 years.
 - » Trees shall be pruned if they:
 - Are obstructing lines-of-sight
 - Have broken, dead, or hanging branches
2. Water trees as needed during the establishment period and during periods of drought. The establishment period of a tree lasts for 12 months after the tree has been planted.
 - » Tree watering bags shall be installed on all newly planted trees.
 - » During the establishment period, water the trees if there has not been a rain event for more than 14 days.
 - » After the establishment period is over, water the trees if there has not been a rain event for more than 21 days.
3. Mulch trees twice a year in March and October.
 - » Install 3 inches of pine straw mulch around each tree.
 - » Do not pile mulch at the base of the tree trunk.
 - » Do not use hardwood, dyed mulch, or cypress mulch.
 - » Do not let mulch enter the outflow structure.
 - » Do not let mulch block the inlet of the GI facility.

Shrub Maintenance (if applicable)

1. Shrubs shall be pruned or sheared under the supervision of a Louisiana licensed landscape horticulturalist once a year.
 - » Shrubs shall be pruned or sheared if they:
 - Are obstructing the flow of water into the GI facility
 - Are preventing water from draining out of the outflow structure
 - Are obstructing lines-of-sight
 - Have vegetation that is on an adjacent walkways or streets
 - » Prune woody shrubs using sharp pruning shears. Shear grasses using sharp hedge shears.
 - » Debris from pruning and shearing shall be removed from the planting areas and disposed of off-site.
2. Water shrubs as needed during the establishment period and during periods of drought. The establishment period of a shrub lasts for 12 months after the shrub has been planted.
 - » During the establishment period, water the shrubs if there has not been a rain event for more than 7 days.
 - » After the establishment period is over, water the shrubs if there has not been a rain event for more than 14 days.
3. Mulch shrubs twice a year in March and October.
 - » Check to ensure mulch is covering bare soil of planting areas. Replace any mulch that has been washed away during heavy storm events.
 - » Install 3 inches of pine straw mulch around the shrub planting area.
 - » Do not use hardwood, dyed mulch, or cypress mulch.
 - » Do not let mulch enter the outflow structure.
 - » Do not let mulch block the inlet of the GI facility.

RETENTION BASIN MAINTENANCE

PLANT MAINTENANCE CONT.

Turfgrass Maintenance

1. Turfgrass shall be mowed on a regular basis. The height of turfgrass shall not reach more than 4 inches before being mowed.
2. Turfgrass shall be mowed 14 times during the growing season and 5 times during the dormant season.
3. Extra precautions shall be taken when mowing around shrubs and trees.
 - » Mowers shall never be used on areas that are mulched.
 - » Weed eaters shall never be used in areas that are mulched or around the base of trees.
 - If a weed eater cuts the trunk of a tree, take a picture and note the location and report it to the owner for further action.
4. Edging shall be done around walkways, driveways, and curblines.
5. All debris from mowing shall be removed from walkways, driveways, roadways, and curbs and disposed of off-site.
6. Any bare spots of turfgrass shall be repaired by installing sod.

Weeding

1. Chemical controls, such as herbicides and pesticides, shall not be used in green infrastructure facilities.
2. Weeds shall be removed from the GI facility by hand.
3. Weeds shall be removed 7 times per year during the growing season, and 3 times per year during the dormant season.
 - » Remove the entire plant including the root mass.
 - » All weeds shall be removed from the planting areas and disposed of off-site.
 - » Hand spades may be used to loosen soil around the weeds.
4. After weeding, ensure all soil is covered by a 3-inch layer of mulch.

Common weeds:

- Nutsedge
- Torpedo grass
- Johnson grass



Johnsongrass



Nutsedge Seed head



Nutsedge



Torpedo grass seed head



Torpedo grass



MAINTENANCE TASKS FOR

**SUBSURFACE STORAGE
FACILITIES**

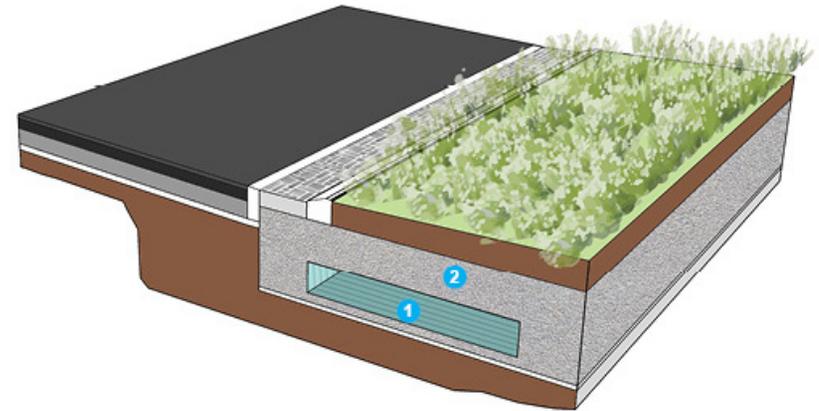
SUBSURFACE STORAGE FACILITY MAINTENANCE

This section includes grounds maintenance, drainage maintenance, and plant maintenance for Subsurface Storage Facilities.

Tools needed:

- Camera
- High visibility vest
- Work gloves
- Work boots
- Trash picker
- Trash bags/buckets
- Vacuum equipment

- 1 SUBSURFACE STORAGE TANK
- 2 SUBSURFACE STORAGE AGGREGATE



SUBSURFACE STORAGE FACILITY MAINTENANCE

DRAINAGE MAINTENANCE

The specific maintenance practices for the various types of subsurface storage facilities will vary. Review the manufacturer's details and maintenance manuals prior to going to the job site.

Inlet Maintenance

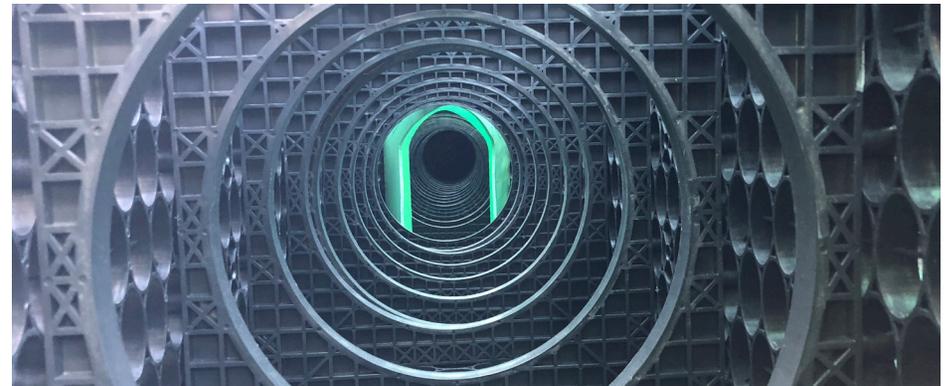
1. Most subsurface storage systems can go years without needing maintenance if pre-treatment is used.
 - » Even if the pre-treatment is properly maintained, inlets and maintenance ports but should still be inspected regularly.
2. Check the inlet for any obstructions that are preventing runoff from entering the GI facility at every site visit.
 - » Subsurface storage facilities typically have an inlet filter, skimmer basket, or similar that prevents debris from entering the larger storage area.
 - » Remove the obstructions and dispose of off-site.
 - » If there is a large amount of sediment that has entered the inlet structure, a vacuum truck may be needed to remove debris.

Outlet Maintenance

1. Check the outflow structure for any obstructions that are preventing runoff from entering the outlet at every site visit.
2. Remove the cover of the outlet structure or inspection port and dispose of any sediment, trash, or debris that has entered the structure at every site visit.
 - » If there is a large amount of sediment that has entered the outlet structure, a vacuum truck may be needed to remove debris.

Pipe Maintenance

1. Pipes (inlet and outlet) shall be inspected for blockages every year.
 - » Access to the pipes can be from the inlet or outlet structure.
2. Conduct a CCTV inspection of the pipes. If the pipes are blocked or need to be cleaned of debris, use a high-pressure nozzle to flush the pipe clear.
 - » After flushing the pipe clear, inspect the drainage structure (catch basin or drainage manhole) that the pipe connects to for debris.
 - » Remove debris from the drainage structure by shovel or with a vacuum machine.



Pre-treatment row of a modular tank style subsurface storage system.



Pre-treatment row of an arch style subsurface storage system.