



Operations and Maintenance Plan

Top Hat Energy, LLC

October, 2026



Submitted by:

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O&M Services Contact:

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Overview

As an owner-operator of solar systems nationwide, Nexamp has cultivated an in-house operations and maintenance team on par with the best in the industry. Nexamp's veteran team of power and solar professionals understands what it takes to manage, maintain and deliver ongoing performance and reliability from our solar plants. We provide full spectrum operations and maintenance services for our own, as well as third party systems.

Our team actively monitors and provides preventative, corrective, and condition-based maintenance for Hundreds of MWs at commercial, residential and government owned plants in NY and across the Country. This wide range of managed assets gives our team unprecedented knowledge that helps us keep facilities on-line and delivering clean, renewable energy to our customers consistently, with little downtime.

From the Nexamp Operations Center (NOC,) our entire fleet of assets are carefully monitored in real time 24/7/365. The NOC can remotely review alarms and operating trends, perform remote troubleshooting, including authorized resets, power cycles, or control adjustments. If necessary, Nexamp has field-response capability through Nexamp Asset Management, Environmental Health and Safety, National Grid and qualified contractors. With our remote monitoring capabilities, the safe operation of the project is not dependent on someone being physically present to control the system.

Our integrated O&M team should give the Town of Moreau the confidence it needs to know that the 2.5 MWac facility we're seeking to permit will remain operational and not prove to be a burden on the Town or its residence at any point during the facilities operation.

This Operations and Maintenance plan serves as an outline for the maintenance services and schedules that will be employed at Top Hat Energy, LLC. This plan will be filed with the Town codes office for reference and use during inspections. Nexamp will be held responsible to adherence of this plan and shall notify the Town if changes are made to the plan within 30 days of modification.

Site Description and Access

Top Hat Energy is a 2.5 MWac Community Solar Facility located on lands currently owned by Moreau Industrial Park, located at 2-6 Electric Drive, Moreau, New York. The parcels are located within the Industrial Park and should this project move forward, Nexamp will purchase the land from MIP, LLC.

The site includes a solar array, mounted using Single-Axis trackers on approximately 12.5 acres of cleared land. The system is accessed via a shared access road constructed by Bakers Falls Solar and is encompassed by an 8ft tall farm fence for security and wildlife management.

Nexamp will responsible for maintenance of the entire property and facility, including all easement areas and storm water control maintenance and improvements. The facility will be actively monitored 7 days a week, 365 days a year.

Access to the site will be through keyed entry and Knox boxes will be located at the facility entrance for emergency response purposes. Site access for vendors and/or town inspection officials will be coordinated by Nexamp Asset Management Services.

Parking during construction will be restricted to the temporary construction laydown area as shown in the Site Plan Designs submitted in July, 2026. Parking for maintenance personnel during the operations period will be restricted to the areas which will not interfere with emergency access if necessary.

Stakeholders and Responsibilities

	Role	Contact Information
Top Hat Energy, LLC	System Owner	Attn: Top Hat Energy, LLC 101 Summer St, Flr 2 Boston, MA 02110 Phone: 617.431.1440 Email: Legal@Nexamp.com
Nexamp Asset Management Services	System Operations Manager	Attn: Top Hat Energy Attn: Skip Provost 101 Summer St, Flr 2 Boston, MA 02110 Phone: 978.910.1503 Email: sprovest@nexamp.com
Town of Moreau – Code Enforcement	Town zoning Enforcement and Site Inspection	351 Reynolds Road, Moreau, NY 12828 Phone: 518-792-1030 ext. 5
Town of Moreau – Planning Board	Site Plan Jurisdiction	Town Planning Board 351 Reynolds Road, Moreau, NY 12828 Phone: 518-792-1030
Town of Moreau – Town Board	Decommissioning Bond Holder	Town Board 351 Reynolds Road, Moreau, NY 12828 Phone: 518-792-1030
National Grid	Utility Operator	Distributed Generation Office 300 Erie Boulevard West, Syracuse, NY, 13202 Phone: 1-800-642-4272

Services & Schedule

As one of the largest operators of Solar Farm facilities in New York State, Nexamp manages O&M activities on dozens of facilities across the state. Nexamp has prepared a standard annual service schedule as well as site-specific service items pertaining to the nuances of the Top Hat Energy site.

ANNUAL SCHEDULED MAINTENANCE

Nexamp's annual service schedules are intended to identify needs to preventative maintenance, and ensure our plants are physically and fiscally productive for 25 years or more. All facilities owned and/or managed by Nexamp are subject to the following annual maintenance schedule.

- Visually inspect all feeder terminations for corrosion.
- Visually check power terminations/connections including DC combiner boxes, DC and AC disconnects, inverters and PV modules and re-torque as necessary.
- Test ground continuity and correct any unsafe or abnormal issues.
- Check all fuses in inverters, combiner boxes, and disconnects (AC&DC).
- Test and record voltage and amperage of the arrays at the string level and provide data values in summary report.
- Inspect combiner boxes, disconnects (AC&DC), and inverters with an infrared camera to detect damage, hotspots, loose connections, etc.
- Check mechanical and structural integrity of the system.
- Inspect and clean inverter heat sinks and replace inverter air filters where applicable as necessary.
- Check and replace unserviceable or missing system labeling as necessary.
- Remove accumulated trash and debris. Check arrays for shading, including such shading caused by vegetation.
- Check modules for excessive dirt and debris.
- Module washing in accordance with manufacturer requirements
- Warranty and spare parts management
- Third party commissioning and performance testing
- Aerial infrared inspections, photography and analysis
- Provide documentation to include summary report of findings including actions taken and recommendations for additional maintenance or repairs.

REPAIR SERVICES

- Respond to alarms, alerts, and service requests pertaining to the Facility within 24 hours of such alarm, alert, or service request, as personnel safety and weather conditions permit.

- *Please note this does not pertain to emergency services, which are to be notified immediately in the case of an emergency. An emergency contact sign and knox box is located at the entrance of the facility.*
- Provide all warranty, spare parts and other repair or maintenance related activities on a time and materials basis.

SITE SPECIFIC ACTIVITIES

Site storm water controls maintenance and improvements – Quarterly or As Needed

- Swale Management and Maintenance
 - Swales will be inspected during every vegetation management visit, and quarterly by Nexamp Operation Management employees.
 - Mowing of swales will occur quarterly, or on an as needed basis. Vegetation in swales shall not exceed 16 inches in height.
 - Eroded swale boundaries or areas where sediment has accumulated as to render the swale ineffective will be repaired within 30-days of report or observation.
- Rain Garden Management & Maintenance
 - Rain Gardens will be inspected during every vegetation management visit, and quarterly by Nexamp Operation Management employees.
 - Eroded Garden boundaries or areas where sediment has accumulated as to render the garden ineffective will be repaired within 30-days of report or observation.
 - Should garden vegetation die, and inhibit effective drainage, vegetation will be replaced at the earliest feasible time, accounting for soil saturation and weather.
- Erosion Prevention and Soil Stabilization
 - The facility will be seeded prior to construction start, and immediately following the conclusion of construction. If during the following growing season, areas of bare earth are identified they will be seeded and stabilized within 30 days of identification or report.
 - Should areas of erosion occur between panel rows, or in areas of frequent runoff exposure, fissures will be filled, seeded and stabilized within 30 days of identification or report.
- Drain and Outlet Management and Maintenance
 - Drains, outlets and other sections of pipe such as culverts or yard drains will be routinely inspected and cleared of any vegetation or debris that could inhibit functionality.

- In areas where drains occur on land with higher than 5% slopes, stone will be routinely applied to drain outlets when areas of bare soil are present.
- Inspections and Maintenance
 - Inspection of the stormwater management system, including installed vegetated features will take place throughout the growing season.
 - Inspectors shall follow documentation and remediation protocols as outlined in NYSDEC Stormwater Management Design Manual inspection sheets included as an exhibit to this agreement.

Access Management and Repair – Quarterly or as needed

- Road inspections will occur with every visit by Nexamp Operations personnel, or third-party vendors.
- The access road, will be always kept in physical condition conducive to access by large scale emergency vehicles.
- Areas of erosion or wear that effect the consistency of the road surface or areas of ingress and egress to Lakeville Road that occur will be repaired within 30-days of identification or report.
- Full-scale Road resurfacing will be conducted as necessary, as indicated by annual reporting and inspection.
- Vegetation management of the road surface will occur quarterly or as needed, manual removal of vegetation will be applied in areas not conducive to grazing or machine removal.
- Broken equipment will be removed from the property as soon as mechanically possible in case of replacement. When broken equipment must remain on site, it shall not stay on the property for more than six months, and shall not be stored in such a manner as to produce any risks for contamination of soils and groundwater.

Vegetation Management – Quarterly or As Needed

Vegetation Management activities will be flexibly scheduled and performed to adjust for growth conditions. For the first three years, visits to the site will occur no less than 5-6 times during the Spring and summer months. After the first three years, landscaping maintenance will reduce to no less than 3-4 visits during the spring and summer months depending on vegetation growth. Inspection and maintenance of screening features shall take place by a licensed arborist.

- Ground-Level Vegetation
 - Ground level vegetation management will commence following the commercial operation date

- Ground cover will be left for 3-6 months of its first growing season to promote root growth and coverage. During this time, areas of stunted growth will be supplemented with further seeding and stabilization.
 - Ground-level vegetation management will be achieved using manual machine-operation by vendors, or through grazing operations managed by Nexamp partners. Grazing will be entertained following the first full growing season on the property. Grazing plans will be filed as an amendment to this plan upon commencement.
- Screening Management and Replacement
 - Inspection of screening will occur at every site visit by Nexamp Operations staff or Maintenance vendors.
 - Maintenance of screening and onsite vegetation will be performed by a company with a licensed arborist on staff.
 - Vegetative screening will be maintained throughout the life of the project. Standard maintenance includes watering*, treating for disease, fertilization and pruning when necessary.
 - Pest-resistant species have been utilized, and physical protection of vegetation will be installed when necessary.
 - Should vegetation show consistent signs of disease, drought or malnourishment following 3 months of identification and maintenance, plantings will be replaced at the earliest viable time, adjusting for soil saturation and seasonality.
 - Rain Garden Management & Maintenance
 - Prairie vegetation and wetland grasses present within the rain garden will remain untouched to promote soil health.
 - Should garden vegetation die, and inhibit effective drainage, vegetation will be replaced at the earliest feasible time, accounting for soil saturation and weather.

Plowing and Snow Removal – Seasonally or As Needed

- The access road, through utility disconnect poles, will be always kept in conditions conducive to access by large scale emergency vehicles.
- Plowing will occur following snow events of 10 inches or more during the winter season.

Reporting Procedures

Should town officials, residents or representatives find Nexamp's management of the facility unsatisfactory, Nexamp requests standardized notification of the conditions present, and a 30-day window to remedy the conditions to the town's standards. Nexamp proposes execution of items on an as needed, or as requested basis in addition to its scheduled maintenance procedures.

Should this plan change in any material way, including the addition of new activities or the cessation of activities listed, the project company must notify the Town of proposed changes.

Notifications shall be delivered digitally and in writing to all the following locations;

Nexamp Inc	Attn: Top Hat Energy 101 Summer St, Flr 2 Boston, MA 02110 Phone: 617.431.1440 Email: Legal@Nexamp.com
Nexamp Asset Management Services	Attn: Top Hat Energy Attn: Skip Provost 101 Summer St, Flr 2 Boston, MA 02110 Phone: 978.910.1503 Email: sprovost@nexamp.com
Town of Moreau – Building Office	Town Code Enforcement Officer 351 Reynolds Road, Moreau, NY 12828 Phone: 518-792-1030 ext. 5

All Notifications and Maintenance requests should be accompanied by descriptions of conditions and locations, photo documentation of items of concern, name, title, company, and contact information for the filing party, as well as the date and time of both observation and filing.

Top Hat Energy, LLC, as the owner and operator of the solar facility, hereby agrees to adhere to the included Operations and Maintenance Plan for the duration of the systems operation.

Top Hat Energy, LLC

By: _____

Name: _____

Title: _____

Date: _____

Town of Moreau

By: _____

Name: _____

Title: _____

Date: _____

Company Contacts

Nexamp Inc	Attn: Top Hat Energy 101 Summer St, Flr 2 Boston, MA 02110 Phone: 617.431.1440 Email: Legal@Nexamp.com
Nexamp Asset Management Services	Attn: Top Hat Energy Attn: Skip Provost 101 Summer St, Flr 2 Boston, MA 02110 Phone: 978.910.1503 Email: sprovest@nexamp.com

CHANGE LOG

7/3/2026	Initial Filing to Town	FB
9/29/26	Revised to address TDE Comments	FB

Appendix A: NYSDEC Stormwater Inspection Checklist

Infiltration Level 1 Inspection

The Level 1 Inspection focuses on the Drainage Area (IN1), Inlets (IN2), Infiltration Area (IN3), and Outlets (IN4). The purpose of an infiltration practice is to temporarily store collected runoff so that it can percolate into the underlying soil. Using this practice is dependent on having a good on-site soil that is capable of infiltrating the amount of runoff generated by the drainage area. The Level 1 Inspection should be conducted at least twice a year, especially in early spring, to ensure that the practice has survived the winter, particularly if there has been a significant amount of snow.

IN 1. Drainage Area

Description: The drainage area conveys runoff to and is uphill from the Infiltration cell. When it rains, water runs off and flows to the Infiltration cell and soaks into its underlying layers.

Instruction: Look for both pervious and impervious areas that are uphill from the Infiltration cell. Consult **Table 11.1.1** below.

Table 11.1.1 IN Drainage Area

Problem (Check if Present)		Follow-Up Actions
	☐ Bare soil, erosion of the ground (rills washing out the dirt)	☐ Seed and straw areas of bare soil to establish vegetation. ☐ Fill in erosion areas with soil, compact, and seed and straw to get vegetation established. ☐ If a rill or small channel is forming, try to redirect water flowing to this area by creating a small berm or adding topsoil to areas that are heavily compacted. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Large areas of soil have been eroded, or larger channels are forming. May require rerouting of flow paths.
☐ For Dry Wells: Leaves, sticks, or other debris in gutters and downspouts		☐ Remove all debris by hand. ☐ Other:
	☐ Piles of grass clippings, mulch, dirt, salt, or other materials	☐ Remove or cover piles of grass clippings, mulch, dirt, etc. ☐ Other:
	☐ Open containers of oil, grease, paint, or other substances	☐ Cover or properly dispose of materials; consult your local solid waste authority for guidance on materials that may be toxic or hazardous. ☐ Other:

IN 2. Inlets

Description: The inlets to an Infiltration practice are where water flows into the cell. Depending on the design, inlets can be:

- *Curb cuts or openings* in a parking lot or roadway
- *Downspouts* that deliver runoff directly from a rooftop to the Infiltration practice
- *Pipes or ditches* that carry water into the Infiltration practice from the drainage area
- *Flow directly over the land surface* (known as “sheetflow”), sometimes across a strip of rock or stone

Instruction: Look for all the places where water flows into the Infiltration practice. Consult **Table 11.1.2** below for possible problems.

Table 11.1.2 IN Inlets

Problem (Check if Present)	Follow-Up Actions
 ☐ Inlets are collecting grit and debris or grass/weeds are growing. Some water may not be getting into the Infiltration practice.	☐ Use a flat shovel to remove grit and debris (especially at curb inlets or openings). Parking lots generate fine grit that will accumulate at these spots. ☐ Pull out clumps of growing grass or weeds and scoop out the soil or grit that the plants are growing in. ☐ Remove any grass clippings, leaves, sticks, and other debris that is collecting at inlets. ☐ For pipes and ditches, remove sediment and debris that is partially blocking the pipe or ditch opening where it enters the Infiltration practice. ☐ Dispose of all material properly in an area where it will not re-enter the practice. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Inlets are blocked to the extent that most of the water does not seem to be entering the Infiltration practice.
☐ Some or all of the inlets are eroding so that rills, gullies, and other erosion is present, or there is bare dirt that is washing into the Infiltration practice.	☐ For small areas of erosion, smooth out the eroded part and apply rock or stone (e.g., river cobble) to prevent further erosion. Usually, filter fabric is placed under the rock or stone. ☐ In some cases, reseeding and applying erosion-control matting can be used to prevent further erosion. Some of these materials may be available at a garden center, but it may be best to consult a landscape contractor. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Erosion is occurring at most of the inlets and it looks like there is too much water that is concentrating at these points. The inlet design may have to be modified.

IN 3. Infiltration Area

Description: The infiltration area is the area that collects water and allows it to seep into the underlying soil. Some infiltration areas also have a vertical perforated pipe called an *observation well*, which is used to view the water level in the infiltration practice after a storm. If the infiltration practice is working properly, the water in the observation well should be completely drained down within 2 to 3 days of a storm. Depending on the design, the infiltration area can be covered with grass, gravel, or stone.

Instruction: Examine the surface of the infiltration area and the observation well. Consult **Table 11.1.3** below for possible problems. Note: The following Problem and Follow-Up Actions apply to infiltration practice pretreatment areas also.

Table 11.1.3 IN Infiltration Area

Problem (Check if Present)	Follow-Up Actions
 ☐ For grass-covered Infiltration practices: grass has grown very tall, (Photo credit: Stormwater Maintenance, LLC)	☐ Mow infiltration area at least twice per year. ☐ Other:
 ☐ For grass-covered Infiltration practices: sparse vegetation cover or bare spots	☐ Add topsoil (as needed), grass seed, straw, and water during the growing season to re-establish consistent grass coverage. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Sparse vegetation cover can be a sign that the infiltration area is not infiltrating at the proper rate and water is standing too long after a storm. The surface may be saturated or squishy, and the conditions do not enable grass to grow. This situation should be evaluated by a Level 2 Inspection and likely corrected by a qualified contractor.
☐ Minor areas of sediment, grit, trash, or other debris are accumulating on the surface.	☐ Use a shovel to scoop out minor areas of sediment or grit, especially in the spring after winter sanding materials may wash in and accumulate. Dispose of the material where it cannot re-enter the Infiltration practice. ☐ If removing the material creates a hole or low area, rake the surface smooth and level. ☐ Remove trash, debris, and other undesirable materials. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Sediment has accumulated more than 2-inches deep and covers 25% or more of the surface of the Infiltration area.

Table 11.1.3 IN Infiltration Area

Problem (Check if Present)	Follow-Up Actions
 ☐ There is erosion on the surface; water seems to be carving out rills as it flows across the surface of the Infiltration area or sinkholes are forming in certain areas.	☐ For minor areas of erosion, try filling the eroded areas with clean topsoil, sand, or stone (whatever the existing cover is). ☐ If the problem recurs, you may have to use larger stone (e.g., river cobble) to fill in problem areas. ☐ Other: ☐ Kick-Out to Level 2 Inspection: The problem persists or the erosion is more than 3-inches deep and seems to be an issue with how water enters and moves through the infiltration area. ☐ Kick-Out to Level 2 Inspection: The problem does not seem to be caused by flowing water but a collapse or sinking of the surface (e.g., "sinkhole") due to some underground problem.
 ☐ Observation well is damaged or cap is missing	☐ Kick-Out to Level 2 Inspection: Requires replacing pipes or caps.
 ☐ Water still visible in the observation well more than 72 hours after a rain storm. The Infiltration practice does not appear to be draining properly.	☐ Kick-Out to Level 2 Inspection: This is generally a serious problem, and it will be necessary to activate a Level 2 Inspection.

IN 4. Outlets

Description: Outlets are where water exits the surface of the infiltration area during larger storms when the underground infiltration reservoir fills up and the excess water needs somewhere to go. Note that not all infiltration practices will have an identifiable outlet if the design is for all the water to infiltrate into the ground. Outlets may be a berm, stone weir, or pipe.

Instruction: Locate and inspect all outlets. Consult **Table 2.11.4** below for possible problems.

Table 2.11.4 IN Outlets

Problem (Check if Present)	Follow-Up Actions
 ☐ Outlet obstructed with sediment, debris, trash, etc.	☐ Remove the debris and dispose of it where it cannot re-enter the infiltration area. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Outlet is completely obstructed; there is too much material to remove by hand or with simple hand tools.
☐ Rills or gullies are forming at outlet.	☐ For minor rills, fill in with soil, compact, and seed and straw to establish vegetation. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Rills are more than 2" to 3" deep and require more than just hand raking and re-seeding.

RWH 3. Outlets

Description: An above-ground rainwater harvesting tank usually has at least two outlets—one at the top of the tank where water overflows when the tank is full, and one near the bottom of the tank for delivering the stored water by gravity feed. Many filters also have an outlet pipe to divert the first flush of roof runoff away from the tank. Any overflow outlet that spills onto the ground should have sufficient erosion control (e.g., rock or stone pad) to prevent erosion of the ground.

Instruction: Examine the outlet pipe(s) and the point at which it overflows onto the ground. Consult **Table 2.3.3** below.

Table 2.3.3 RWH Outlets

Problem (Check if Present)	Follow-Up Actions
☐ Slow flow from outlet caused by faulty or clogged valve	☐ If clogging seems to be the problem, ream out sediment from valve if this can be done from exterior. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Valve needs to be replaced or cannot be cleaned out from outside of tank.
☐ Flow from outlet is backing up toward building foundation.	☐ Add flexible pipe to end of outlet pipe to divert flow further away and downhill from building.
☐ Erosion or drainage issues at outlet	☐ Add a gravel and/or stone pad to reduce the impact from the water flowing out of the outlet pipe during storms. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Rills have formed, erosion or drainage problems are more severe or cannot be resolved, or there is discoloration or other unusual conditions around the outlet.

2.4. Disconnection and Sheetflow

Components of Disconnection and Sheetflow

The intent of disconnection and sheetflow is for runoff from small areas of impervious cover to spread out evenly and dissipate in a grassy or vegetated area. It is a low-technology practice intended to reduce runoff at its source. Key components to inspect for Disconnection and Sheetflow include the following:

- D&S 1. Drainage Area
- D&S 2. Level Spreader/Energy Dissipator
- D&S 3. Treatment Area

Note: The category of Disconnection and Sheetflow includes:



Figure 2.4.1 Key Areas for Level 1 Inspection of Disconnection and Sheetflow with filter strip shown.

R. Winston, NCSU

- Rooftop Disconnection – Runoff from a small rooftop is directed to a relatively flat pervious area.
- Sheetflow to Filter Strip – Runoff from a small parking lot, sidewalk, or other small impervious surface is directed to a relatively flat, uniformly graded grassy area.
- Sheetflow to Riparian Buffers – Runoff from a small parking lot, sidewalk, or other small impervious surface is directed to a relatively flat, well-vegetated riparian area.

Disconnection and Sheetflow Level 1 Inspection

The Level 1 Inspection focuses on the Drainage Area (D&S 1), Level Spreader/Energy Dissipater (D&S 2), and Treatment Area (D&S 3). This inspection should be conducted twice per year, preferably in the spring and fall. If possible, inspect the practice during a storm in order to better see any active blockages, bypassing, or other problems.

D&S 1. Drainage Area

Description: The drainage area consists of rooftops and/or impervious surfaces such as parking lots, driveways, or sidewalks. Pervious areas such as lawns or forests may also be part of the drainage area.

Instruction: Visually inspect any surfaces in the drainage area. Consult **Table 2.4.1** below.

Table 2.4.1 D&S Drainage Area

Problem (Check if Present)	Follow-Up Actions
 ☐ Changes in flow; more runoff; runoff bypassing the practice	☐ For rooftop areas, make sure downspouts are still disconnected and conveying water into the treatment area. ☐ Look for and remove any “dams” of sediment and grass clippings that prevent water from entering the treatment area as sheet flow. ☐ Other:
 ☐ For parking lots in the drainage area—sediment, grass clippings, or other debris has accumulated at pavement edge.	☐ For small, isolated amounts of debris, sweep up by hand and dispose properly so that it will not be exposed to runoff. ☐ Other:
 ☐ For parking lots in the drainage area—dips or damage at pavement edge caused flow to concentrate.	☐ Kick-Out to Level 2 Inspection: Sediment is widespread and cannot be removed by manual sweeping.
	☐ Kick-Out to Level 2 Inspection: This will likely require special expertise to diagnose and fix pavement edge.

D&S 2. Level Spreader/Energy Dissipator

Description: Some disconnection and sheetflow practices have a structure in place to dissipate any concentrated runoff and turn it into sheet flow. This may consist of a stone or gravel spreader a concrete or wood level spreader, or other level and stable surface.

Instruction: Inspect the energy dissipator closely, during a rain event if possible. Consult the **Table 2.4.2** below.

Table 2.4.2 D&S Level Spreader/Energy Dissipator

Problem (Check if Present)	Follow-Up Actions
 ☐ Debris and/or sediment accumulated behind or around the level spreader.	☐ Remove debris and sediment by hand and ensure that the area behind the level spreader is relatively flat. Too much debris and sediment can cause runoff to bypass the level spreader structure. ☐ Other:
 ☐ Sinking, cracking, sloughing, or other structural problem makes the energy dissipator no longer level.	☐ For stone/gravel spreaders, add new material or rake out as needed to make it even. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Structural issues that cannot be easily fixed by hand

D&S 3. Treatment Area

Description: After runoff is dissipated as sheet flow, it enters the treatment area—a relatively flat grassy or vegetated area.

Instruction: Examine where flow enters the treatment area as well as the whole flow path. Look for signs of concentrated flow. Consult the table below.

Table 2.4.3 D&S Treatment Area

Problem (Check if Present)	Follow-Up Actions
☐ Trash and/or debris in the treatment area	☐ Collect trash/debris and dispose of properly.
 ☐ Grass filter strip has grown very tall, to the point that runoff cannot easily enter or is getting concentrated.	☐ Mow filter strip twice a year or more frequently in a residential yard.
☐ Sparse vegetation or bare spots	☐ For grassy areas, add topsoil (as needed), grass seed mulch, and water during the growing season to re-establish consistent vegetation cover. ☐ Other:
 ☐ Rills or gullies are forming in treatment area where flow has become concentrated	☐ For minor rills, fill in with soil, compact, and add seed and straw to establish vegetation. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Rills are more than 2" to 3" deep and require more than just hand raking and re-seeding.

2.5. Swales

Areas of Swales

- Key areas to inspect for swales include the following:
- SW 1. Drainage Area
- SW 2. Inlets
- SW 3. Swale Surface Area
- SW 4. Vegetation
- SW 5. Outlets

Note: The category of Swales includes:

- Vegetated Swale – shallow channel densely planted with variety of grasses, shrubs, and/or trees (also called bioswale or drainage swale)
- Wet Swale – a cross between a wetland and a swale, this linear system intercepts groundwater to maintain wetland vegetation

For the purposes of this chapter, the term “Swale” will be used to generally describe these practices.

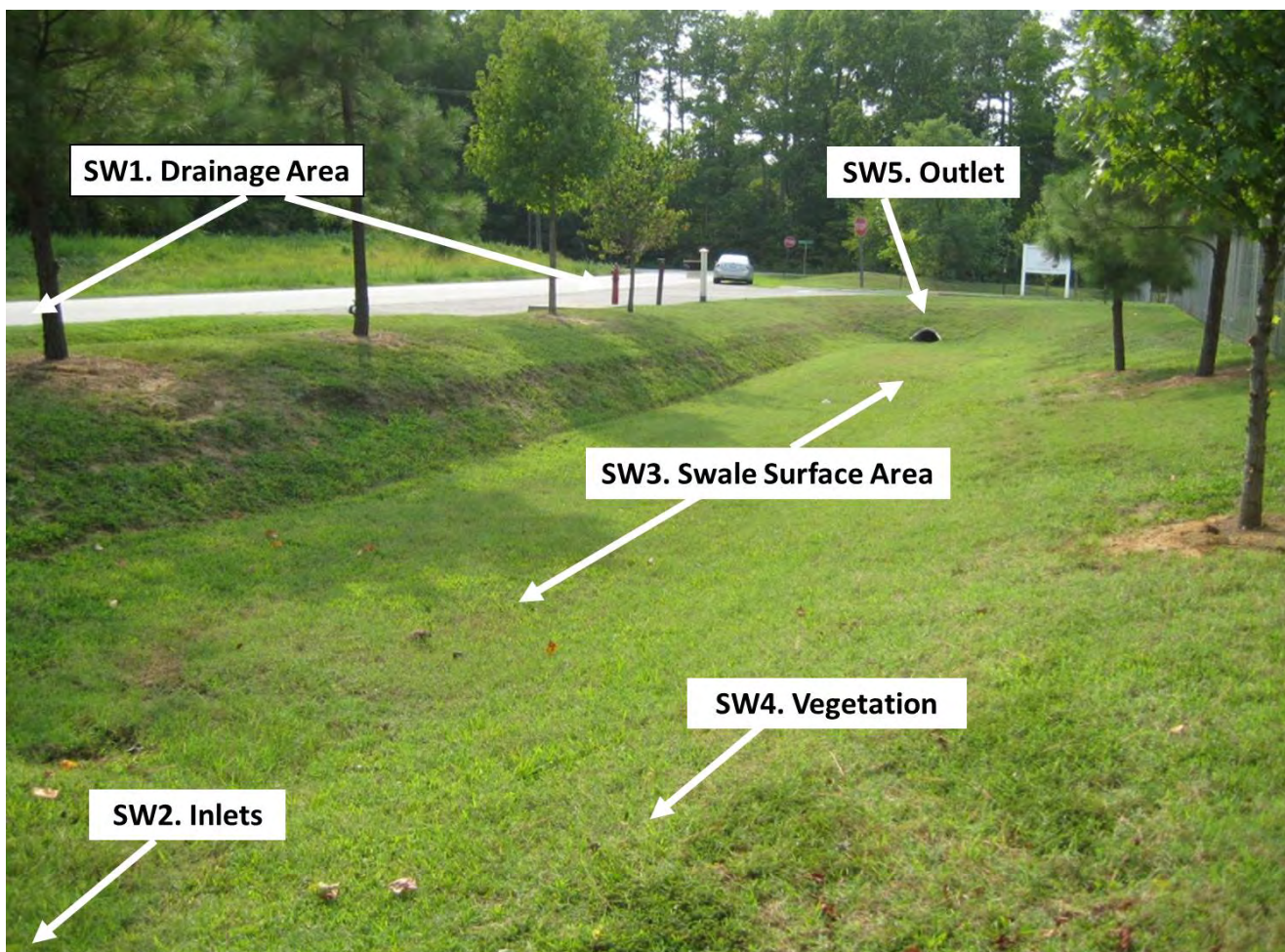


Figure 2.5.1 Key Areas for Level 1 Inspection of Swales Credit

Swale Level 1 Inspection

The Level 1 Inspection focuses on the Drainage Area (SW1), Inlets (SW2), Swale Surface Area (SW3), Vegetation (SW4), and Outlets (SW5). This inspection should be conducted on a regular basis, with an early spring inspection to ensure that the practice has survived the winter, particularly if there has been a significant amount of snow. An inspection during the growing season or in the early fall is also recommended to check on the health of vegetation.

SW 1. Drainage Area

Description: The drainage area sends runoff to and is uphill from the swale. When it rains, water runs off and flows to and along the swale.

Instruction: Look for areas that are uphill from the swale. Consult **Table 2.5.1** below.

Table 2.5.1 SW Drainage Area

Problem (Check if Present)	Follow-Up Actions
 ☐ Bare soil, erosion of the ground (rills washing out the dirt)	☐ Seed and mulch or sod areas of bare soil to establish vegetation. ☐ Fill in erosion areas with soil, compact, and add seed and straw to establish vegetation. ☐ If a rill or small channel is forming, try to redirect water flowing to this area by creating a small berm or adding topsoil to areas that are heavily compacted. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Large areas of soil have been eroded, or larger channels are forming. May require rerouting of flow paths
 ☐ Piles of grass clippings, mulch, dirt, salt, or other materials	☐ Remove or cover piles of grass clippings, mulch, dirt, etc. ☐ Other:
☐ Open containers of oil, grease, paint, or other substances	☐ Cover or properly dispose of materials; consult your local solid waste authority for guidance on materials that may be toxic or hazardous.
	Kick-Out to Level 2 Inspection: Grass on edge of pavement continues to die off for unknown reasons. Swale edge may need to be replaced with other materials (e.g., stone diaphragm).
☐ Grass dying at edge of road	☐ Seed and mulch; add topsoil or compost if needed. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Grass on edge of pavement continues to die off for unknown reasons. Swale edge may need to be replaced with other materials (e.g., stone diaphragm).

SW 2. Inlets

Description: The inlets to a swale are where water flows in. Depending on the design, water can flow in through:

- Ditch, pipe, or curb opening at top of swale: This is the most common approach, where water enters the swale at the top.
- Along the entire edge of the swale: If the swale is along a roadway or parking lot, water may enter along the long side of the swale through defined curb openings or simply by water flowing into the swale from the pavement edge (known as “sheetflow”).

Instruction: Stand in the swale and look for all the places where water flows in. Consult **Table 2.5.2** below for possible problems.

Table 2.5.2 SW Inlets

Problem (Check if Present)	Follow-Up Actions
☐ Inlets or the swale edge are collecting grit, grass clippings, or debris or have grass/weeds growing. Some water may not be getting into the swale. The objective is to have a clear pathway for water to flow into the swale.	☐ Use a flat shovel to remove grit and debris (especially at curb inlets or opening). Parking lots will generate fine grit that will accumulate at these spots. ☐ Pull out clumps of growing grass or weeds, and scoop out the soil or grit that the plants are growing in. ☐ Remove any grass clippings, leaves, sticks, and other debris that is collecting at inlets or along the edge of the swale where water is supposed to enter. ☐ For pipes and ditches, remove sediment and debris that is partially blocking the pipe or ditch opening where it enters the swale. ☐ Dispose of all material properly in an area where it will not re-enter the swale. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Inlets are blocked to the extent that most of the water does not seem to be entering the swale.
 ☐ Some or all of the inlets are eroding so that rills, gullies, and other erosion are present, or there is bare dirt that is washing into the swale.	☐ For small areas of erosion, smooth out the eroded part and apply rock or stone (e.g., river cobble) to prevent further erosion. Usually, filter fabric is placed under the rock or stone. ☐ In some cases, reseeding and applying an erosion control matting can be used to prevent further erosion. Some of these materials may be available at a garden center, but it may be best to consult a landscape contractor. ☐ Other:
	☐ Level 2 Inspection: Erosion is occurring at most of the inlets or along much of the swale edge. The inlet design may have to be modified.

SW 3. Swale Surface Area

Description: The swale surface area is the vegetated area where water flows during a storm and also the side slopes that slope down into the swale bottom. Depending on the design, the swale may also contain “check dams,” which are small dams made out of earth, stone, wood, or other materials. The check dams slow down and temporarily pond water as it flows down the swale.

Instruction: Examine the entire swale surface and side slopes. Consult **Table 2.5.3** below for possible problems.

Table 2.5.3 SW Surface Area

Problem (Check if Present)	Follow-Up Actions
☐ Minor areas of sediment, grit, trash, or other debris are accumulating in the swale.	☐ Use a shovel to scoop out minor areas of sediment or grit, especially in the spring after winter sanding materials may wash in and accumulate. Dispose of the material where it cannot re-enter the swale. ☐ If removing the material creates a hole or low area, fill with good topsoil and add seed and straw to re-vegetate. ☐ Remove trash, vegetative debris, and other undesirable materials. ☐ If the swale is densely vegetated, it may be difficult to do the maintenance; check for excessive ponding or other issues described in this section to see if the accumulated material is causing a problem. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Sediment has accumulated more than 3 inches deep and covers 25% or more of the swale surface. ☐ The source of sediment is unknown or cannot be controlled with simple measures.
 ☐ There is erosion in the bottom or on the side slopes. Water seems to be carving out rills as it flows through the swale or on the slopes.	☐ Try filling the eroded areas with clean topsoil, and then seed and mulch to establish vegetation. ☐ If the problem recurs, you may have to use some type of matting, stone (e.g., river cobble), or other material to fill in eroded areas. ☐ If the erosion is on a side slope, fill with soil and cover with erosion-control matting or at least straw mulch after re-seeding. ☐ Kick-Out to Level 2 Inspection: The problem persists or the erosion is more than 3 inches deep and seems to be an issue with how water enters and moves through the swale. ☐ Kick-Out to Level 2 Inspection: The problem does not seem to be caused by flowing water, but a collapse or sinking of the surface (e.g., “sinkhole”) due to some underground problem.
☐ Water does not flow evenly down the length of the swale, but ponds in certain areas for long periods of time (e.g., 72 hours after a storm). The swale does not seem to have “positive drainage.” Check during or immediately after a rain storm.	☐ If the problem is minor (just small, isolated areas), try using a metal rake or other tools to create a more even flow path; remove excessive vegetative growth, sediment, or other debris that may be blocking the flow. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Water ponds in more than 25% of the swale for three days or more after a storm. The issue may be with the underlying soil or the grade of the swale. ☐ Water ponds behind check dams for three days or more after a storm. Check dams may be clogged or not functioning properly.

Table 2.5.3 SW Surface Area

Problem (Check if Present)	Follow-Up Actions
☐ Check dams (if present): water is flowing around the edges of check dams, creating erosion or sinkholes on the uphill or downhill side, or the check dams are breaking apart or breaching.	☐ If the problem is isolated to just a few check dams, try simple repairs. ☐ It is very important for the center of each check dam (where most of the water flows) to be lower (by at least several inches) than the edges of the check dams where they meet the side slopes. Also, the check dams should be keyed into side slopes so water does not flow between the check dam and side slope. ☐ Use a level to check the right check-dam configuration, as noted above. Repair by moving around stone, filling and compacting soil, or adding new material so that water will be directed to the center of the check dam instead of the edges. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Many check dams are impacted and/or the problem seems to be a design issue with height, spacing, shape, or materials used to construct them.

SW 4. Vegetation

Description: The health of vegetation within the swale is perhaps the most critical maintenance item for the property owner or responsible party. Many vegetated swales become overgrown, and “desirable” vegetation becomes choked out by weeds and invasive plants. It is important to know what the swale is supposed to look like and what plants seem to be thriving or doing poorly. Periodic maintenance of vegetation will prevent larger problems that are more difficult and costly to manage.

Instruction: Examine the swale vegetation. Consult **Table 2.5.4** below for possible problems.

Table 2.5.4 SW Vegetation

Problem (Check if Present)	Follow-Up Actions
 ☐ Vegetation is too overgrown to access swale for maintenance activities	☐ Mow or bush-hog the path. ☐ Other:
 ☐ Vegetation requires regular maintenance: pulling weeds, removing dead and diseased plants, adding plants to fill in areas that are not well vegetated, etc.	☐ If you can identify which plants are weeds or not intended to be part of the planting plan, eliminate these, preferably by hand pulling. ☐ If weeds are widespread, check with the local stormwater authority and/or Extension Office about proper use of herbicides for areas connected with the flow of water. ☐ Even vegetation that is intended to be present can become large, overgrown, block flow, and/or crowd out surrounding plants. Prune and thin accordingly. ☐ If weeds or invasive plants have overtaken the whole swale, bush-hog the entire area before seed heads form in the spring. It will be necessary to remove the root mat manually or with appropriate herbicides, as noted above. ☐ Replant with species that are aesthetically pleasing and seem to be doing well in the swale. ☐ Other: ☐ Kick-Out to Level 2 Inspection: You are unsure of the original planting design or the vegetation maintenance task is beyond your capabilities of time, expertise, or resources. If you are unsure of the health of the vegetation (e.g. salt damage, invasives, which plants are undesirable) or the appropriate season to conduct vegetation management, consult a landscape professional before undertaking any cutting, pruning, mowing, or brush hogging.
☐ Vegetation is too thin, is not healthy, and there are many spots that are not well vegetated.	☐ The original plants are likely not suited for the actual conditions within the swale. If you are knowledgeable about plants, select and plant more appropriate vegetation (preferably native plants) so that almost the entire surface area will be covered by the end of the second growing season. ☐ Other: ☐ Kick-Out to Level 2 Inspection: For all but small practices (e.g., in residential yards), this task will likely require a landscape design professional or horticulturalist.

SW 5. Outlets

Description: These are where water leaves the swale when it fills up or where water reaches the downstream end of the swale. There may be a small stone apron or rock dam here or even an outlet grate.

Instruction: Examine outlets that release water out of the swale. Consult **Table 2.5.5** below for possible problems.

Table 2.5.5 SW Outlets

Problem (Check if Present)	Follow-Up Actions
☐ Outlet is obstructed with mulch, sediment, debris, trash, etc.	☐ Remove the debris and dispose of it where it cannot re-enter the swale. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Outlet is completely clogged or obstructed; there is too much material to remove by hand or with simple hand tools.

2.6. Tree Planting

Tree Planting Actions for Maintenance

Key actions to take for tree planting maintenance include the following:

- TP1. Watering
- TP2. Mulch
- TP3. Pruning
- TP4. Disease or pests

Note: This is a simple, “non-structural” practice and, as such, maintenance tasks are similar to any landscape maintenance. Tree planting can involve individual trees or more, such as reforesting a riparian buffer.

For this type of practice, inspection is part of maintenance to check on the health of the trees.

Tree Planting Level 1 Inspection

The Level 1 Inspection goes hand in hand with active maintenance and includes watering (TP1), mulching (TP2), and Pruning (TP3). Watering should occur during the growing season. Mulching and pruning occurs once a year in the spring and early spring, respectively.

TP 1. Watering

Description: Proper water management is perhaps the most crucial maintenance activity to ensure survival of newly planted trees. Watering is essential during periods of drought, while over watering can be fatal. Watering options include regular or soaker hoses, sprinklers, buckets, drip irrigation, or installation of larger capacity watering tanks for irrigation systems. Consult the maintenance plan for instructions on the timing, volume, and method of watering that is appropriate for the specific species of trees.

Instruction: Inspect the trees to determine whether they need watering. Consult **Table 2.6.1** below.

Table 2.6.1 TP Watering

Problem (Check if Present)	Follow-Up Actions
☐ Soil is not moist to the touch and/or it has not rained in a week, and leaves/needles are starting to appear wilted/dry.	☐ Water trees deeply and slowly near the base. Soaker hoses and drip irrigation work best for deep watering of trees and shrubs. ☐ Other:



Figure 2.6.1. Key Areas for Inspection and Maintenance for Tree Planting