

**STORMWATER POLLUTION PREVENTION MEASURES
FOR CONSTRUCTION**

OF

STEUBEN WIND PROJECT

TOWNS OF HARTSVILLE & HORNELLSVILLE, NEW YORK

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Diversion of surface water away from exposed soils provides the most economic and effective erosion control possible since it is more advantageous to control erosion at the source than to design controls to trap suspended sediment.

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1.0 INTRODUCTION

EC&R Northeast, LLC (the Project Owner) proposes to construct a wind-powered electrical generating facility in the Towns of Hartsville and Hornellsville, Steuben County, New York.

Prior to construction, the Project Owner will prepare a Stormwater Pollution Prevention Plan (SWPPP). The purpose of the SWPPP is to describe the erosion and sediment control practices that will be implemented during construction activities and the stormwater management practices that will be used to reduce the pollutants in stormwater discharges after the project construction has been completed.

This document will provide a preliminary summary of the project SWPPP.

In New York State, the primary objective of a SWPPP is to comply with the current State Pollution Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activities. This will be done by:

- Assessing the physical characteristics of the site to determine how it can be developed with the lowest risk of environmental damage.
- Minimize impacts by maintaining vegetative buffer strips between disturbed and adjacent areas.
- Provide an erosion and sediment control plan that emphasizes controlling runoff and stabilizing soil as its main component, and sediment control as a management practice. The reduction of soil loss reduces the risk of degrading natural resources.
- Manage the impact of stormwater runoff on the water quality of the receiving waters.
- Control of the increased volume and peak rate of stormwater runoff during and after construction.
- Operation and maintenance of erosion, sediment, and stormwater management practices during and after construction.

The SWPPP will be prepared in accordance with the following guidance documents:

- *New York State Standards and Specifications for Erosion and Sediment Control, (NYS Standards)*, New York State Department of Environmental Conservation, August 2005.
- *New York State Stormwater Management Design Manual*, New York State Department of Environmental Conservation, (NYSDEC), April 2008.

1.1 SWPPP Contents

The SWPPP will include the following required information:

1. Description of the project location, type and size.
2. Description of the erosion and sediment control practices, and where required, post-construction stormwater management practices that will be constructed.
3. Site map showing all facilities to be constructed, areas of disturbance, existing vegetation, water resources, existing and proposed grading, soil types, spoil and borrow areas, and stormwater discharge locations.
4. Description of the soils.
5. Construction phasing plan that includes sequencing of erosion and sediment control practices.
6. Erosion and sediment control plans and details.
7. Site map(s) showing the location, dimensions, material specifications, installation details, and operation and maintenance requirements for all erosion and sediment control and post-construction stormwater management practices and structures.
8. SWPPP Inspection schedule.
9. Waste management and spill prevention measures.
10. Description of any stormwater discharges anticipated at the site other than from construction activities.
11. Identification of erosion and sediment control and stormwater management practices that are not in conformance with NYS Standards and discussion that demonstrates that the alternate design(s) are equivalent to the Standards.
12. Detailed summary of engineering design criteria.

1.2 General Project Description

A maximum 200-foot radius area (2.9 acres) at each of the 36 proposed turbine sites will be disturbed to construct the wind turbines and monopole structures, including a foundation for the monopole structure and the surrounding construction and maintenance area. The foundation is anticipated to be one of two designs; either a concrete caisson or a spread footing (see Appendix A for typical details). It is currently anticipated that the spread foot foundation will be used. This foundation type is approximately 10 feet deep, approximately 50 to 60 feet in diameter, and requires approximately 300 cubic yards (cy) of concrete. Once the foundation concrete is sufficiently cured, the excavation area around and over it is backfilled with the excavated on-site material. The top of the foundation is a nominal 18-foot

diameter pedestal that typically extends 6 to 8 inches above grade and is surrounded by a 6-foot wide gravel skirt. In preparation for the installation of each turbine, a gravel crane pad approximately 100 feet by 60 feet will be constructed within the 200 foot radius disturbance area with a slope of 1% or less in each direction. Upon completion of wind turbine construction, the gravel crane pad will remain in place for future maintenance.

Additional facilities at the Steuben Wind Project include 10 miles of access roads initially constructed to a temporary width of 40 feet for construction, and then reduced to a permanent width of 20 feet for operations, approximately 25 miles of electric collection lines (it is currently anticipated that all collection lines will be buried), an interconnection substation, 10 acres total of staging area, and an operations and maintenance building.

Stormwater runoff from the access roads will sheet flow onto adjacent vegetated areas, or be conveyed through open roadside channels to stabilized outlets.

No construction activities will be conducted tributary to waters classified as AA and AA-s.

Land without existing impervious cover located where the USDA Soil Survey identifies the soil slope phase as E or F will not be disturbed.

1.3 Soil Resource Summary

Clay is composed of mineral soil particles less than 0.002 millimeter in diameter. *Silt* is composed of individual rock or mineral fragments that range in diameter from the upper limit of clay to the lower limit of very fine sand. *Sand* is composed of individual rock or mineral fragments in soils ranging from 0.05 to 2.0 millimeters in diameter.

Loam is a soil composed of sand, silt, and clay in relatively even concentration (about 40-40-20 percent concentration respectively). Different names are given to soils with slightly different proportions of sand, silt, and clay: sandy loam, silty loam, clay loam, sandy clay loam, silty clay loam, and loam. Loam soil retains nutrients well.

Channery soil contains thin, flat fragments of sandstone or siltstone, as much as 6 inches in length along the longer axis.

A *fragipan* is a loamy, brittle, subsurface layer of soil that is very low in organic matter and clay but is rich in silt or very fine sand. The layer seems to be cemented when dry, has a hard consistence, and has a high bulk density in comparison to the soil layers above it. Bulk density is a measure of the weight of the soil per unit volume. When moist, the fragipan tends to rupture suddenly if pressure is applied.

Till is unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

The following soils are likely to be present within the limits of the project.

- Alden silt loam: The Alden series consists of very deep, very poorly drained soils in depressions and low areas on upland till Plains. They formed in a silty local depositional mantle overlying till. Slope ranges from 0 to 3 percent. This soil is a member of hydrologic soil group D.

Most areas are wooded, with stands of alder, red and silver maple, green and black ash, hemlock, white cedar, willow, and elm. Some areas are cleared and are largely used for pasture. Some abandoned cleared areas are reverting back to shrubs.

A high water table limits its use.

- Arnot channery silt loam: Shallow, well drained and moderately well drained soils that formed in material derived from underlying, acidic, fine-grained sandstone. Topsoil thickness and depth to bedrock range from 10 to 20 inches. This soil is classified as hydrologic soil group C/D. These soils show little or no glacial till influence. Arnot soils generally have a high bearing capacity.

Mainly forested. Some areas remain in rough pasture and hay land. Native vegetation is oak, beech, sugar maple, black cherry, hemlock, and white pine.

Depth to hard bedrock can be the primary limitation of this soil.

- Chenango channery silt loam, fan: The Chenango series consists of very deep, well drained soils formed in water-sorted material on outwash plains and alluvial fans. These soils are included in hydrologic group A.

Most moderately sloping areas have been cleared. They are used mainly for growing hay, corn, and small grains, but vegetables and grapes are important locally. More sloping areas are used mainly for growing pasture and hay. Woodlots contain sugar maple, red maple, American beech, ash, hemlock, and white pine.

When located in alluvial fans, these soils are subject to flooding.

- Chippewa channery silt loam: The Chippewa series consists of very deep, poorly drained soils formed in till deposits from sandstone, siltstone, and shale rock fragments. These soils are in upland depressions. Depth to the top of the dense fragipan ranges from 8 to 20 inches. This soil is a member of hydrologic group D. Bedrock depth is greater than 60 inches.

Most areas are forested. Most cleared areas are pastured or are reverting to woodland. Natural vegetation is red and silver maple, white and black ash, swamp elm and hemlock.

A shallow depth to the saturated zone limits this soil.

- Hornell-Fremont silt loams and silty clay loams:
The Hornell series consists of moderately deep, somewhat poorly drained soils formed in till overlying shale or siltstone. They are nearly level to steep soils on bedrock-controlled uplands. Permeability is slow. Hornell soils are classified as hydrologic soil group D.

Cleared areas are used at low intensity levels for growing small grains, hay, potatoes, and pasture. Native vegetation is sugar maple, red maple, white ash, black cherry, oak, eastern hemlock, and eastern white pine.

The Fremont series consists of deep and very deep, somewhat poorly drained soils on uplands. The soils formed in till derived from soft shale, and some siltstone and

sandstone. They are on broad hilltops and hillsides. Saturated hydraulic conductivity is moderately high. Fremont soil is a member of hydrologic soil group C.

Most areas of Fremont soil have been cleared, and are used for growing corn, small grains, hay, pasture, and potatoes. Because the soils are slow to warm up in the spring due to wetness, many areas are reverting to woodland. Native vegetation is sugar maple, oak, white ash, yellow birch, hemlock, and white pine.

Depth to the saturated zone in upland sites and steep slopes on hillsides are the limitations of these soils.

- Kanona silty clay loam: The Kanona series consists of deep and very deep, somewhat poorly drained soils on uplands. These acidic soils formed in till derived from soft shale, and some siltstone. Kanona soils occupy the tops and sides of glaciated hills and till plains. Slope ranges from 0 to 20 percent. This soil is classified as hydrologic soil group D. Depth to bedrock is greater than 40 inches.

Small areas are used for hay and pasture. Most of the acreage of this soil has remained in, or is idle and reverting to, woodland. Native woody vegetation is red and sugar maple, white ash, black cherry, red oak, and white pine.

The apparent seasonal high water table is from 0.5 to 1.5 feet from November to May of normal years. This depth to the saturated zone is the primary limitation of this soil.

- Lordstown channery silt loam and the Lordstown-Arnot association: The Lordstown series consists of moderately deep, well drained soils formed in till material derived from siltstone and sandstone. Depth to bedrock ranges from 20 to 40 inches. Lordstown soils are classified as hydrologic soil group C.

They are nearly level to very steep soils on hillsides and hilltops in glaciated bedrock controlled uplands. Some cleared areas are in pasture or are used for hay, but mostly they are idle or have reverted to woodland or brush.

The Arnot series is described above. Steep slopes at some locations limits the use of Lordstown soils and of Lordstown-Arnot association soils.

- Mardin channery silt loam: The Mardin series consists of very deep, moderately well drained soils formed in loamy till. They are in glaciated uplands, mostly on broad hilltops, shoulder slopes and backslopes. Mardin soils are nearly level to very steep with slopes ranging from 2 to 25 percent. The Mardin soils have a dense fragipan at a depth of 14 to 26 inches below the soil surface. It is a hydrologic soil group C soil.

Most areas have been cleared and are used for producing silage corn, small grains, hay, and pasture. A significant acreage is idle or has reverting to brush and trees. Woodlots contain sugar maple, beech, white ash, black cherry, hemlock, and occasionally red oak and white pine.

A somewhat limited depth to the saturated zone due to the dense fragipan is the main limitation of this soil.

- Tuller channery silt loam: The Tuller series consists of shallow, somewhat poorly drained soils that formed in thin deposits of till over acidic sandstone, siltstone or shale bedrock. The Tuller soils occur dominantly on long, narrow areas on hillsides and flatter hilltops that are often bordered by bedrock outcrops. Slope ranges from 0 to 8 percent. Depth to bedrock ranges from 10 to 20 inches. Tuller soil is classified as hydrologic group D.

The primary land uses of Tuller soils are forest, idle or used for growing pasture and hay. The forest vegetation is dominantly maple, beech, elm, oak and hemlock.

The shallow bedrock depth and the resulting shallow saturated zone are the primary limitations of this soil.

- Volusia channery silt loam: Volusia soils occupy long uniform slopes and consist of very deep, somewhat poorly drained soils. These soils are on concave to level landscape positions in glaciated upland areas. The Volusia soils developed in firm basal till derived from siltstone, sandstone and brittle shale or slate. Slope ranges from 3 to 25 percent. A dense fragipan is at a depth of 10 to 22 inches below the soil surface. Depth to bedrock is greater than 60 inches. With slow internal drainage, this soil is a member of hydrologic soil group C.

Most areas of this soil have been cleared but some are now growing up with a cover of brush. Cleared areas are used for pasture or for growing hay, oats and corn for silage. Woodlots contain sugar maple, red maple, American beech, hemlock and associated species.

Depth to the saturated zone is the primary limitation of this soil.

1.4 NYS Historic Preservation Office Requirements

The SWPPP will include documentation that describes:

1. Information on whether the stormwater discharge or construction activities would have an effect on property that is listed or eligible for listing on the State or National Register of Historic Places.
2. Results of historic places screening-determinations conducted.
3. Where effects may occur, a description of measures necessary to minimize effects on historic places including any written agreements with governmental agencies having jurisdiction.

1.5 Roadway Reconstruction

It is expected that portions of the local road system will require reconstruction of intersections and culverts to accommodate the delivery of wind system components. Erosion and sediment control practices as discussed in Section 2 of this document will be provided. Post-construction stormwater management practices will be provided if required by NYSDEC regulations.

Culverts sized at the minimum for the 10-year 24-hour storm will be provided at all stream crossings within the project site.

1.6 Riparian Buffers

The ecosystem benefits of riparian areas will be preserved by protecting existing vegetation within 100 feet of the top of all stream banks. All temporary and permanent waterway crossings will meet the *NYS Standards* and US Forest Service guidelines.

2.0 STORMWATER MANAGEMENT PRACTICES

2.1 Erosion and Sediment Control

Erosion is the wearing away of the land surface as the result of uncontrolled wind and water energy. Sedimentation is the result of transport and deposition of eroded soil particles. Erosion and sediment control practices are classified as either vegetative or structural controls.

Vegetative erosion control is the system of seedbed preparation, soil amendments, plant selection, proper timing of planting, and mulching that will optimize the chances of successfully establishing vigorous, stable vegetation. Temporary seeding and mulching will be utilized on all areas that are anticipated to be exposed for more than 14 days. Where soil disturbing activity has been temporarily or permanently ceased, temporary or permanent soil stabilization measures will be installed within 7 days from the date that soil disturbance activity has ceased. Permanent stabilization will be performed as soon as possible after establishment of finished grade.

Structural erosion control practices may be either temporary or permanent. They are necessary when disturbed areas cannot be promptly stabilized with vegetation. Temporary practices are installed during construction and are removed after site stabilization has been completed. Permanent practices may be installed during or after construction, are an integral part of the project design, and continue to be operated and maintained when the project work has been completed.

The SWPPP will include an erosion and sediment control plan that details the location and necessary dimensions for vegetative and structural measures that will be used for each stage of the project. Retention of existing vegetation, stabilizing the land with plant materials, and the use of structural measures will be shown. Dewatering practices for use during installation of underground utilities will also be included.

Construction phasing notes that relate the establishment of vegetative and structural practices and their timing relative to other construction practices, and an inspection and maintenance plan will be provided for the site.

Erosion and sediment control measures will be inspected at least once every 7 days by a person knowledgeable in the principles and practices of erosion and sediment control until all

soil disturbance has ceased and a vigorous vegetative cover or equivalent stabilization measures have been established on all disturbed areas across the project site. Inspections will be in accordance with the 2008 SPDES General Permit for Stormwater Discharges from Construction.

Prior to beginning site preparation, the Project Owner will submit a Notice of Intent (NOI) in conformance with the current SPDES regulations and obtain authorization to commence construction activities from the NYSDEC Bureau of Water Permits in Albany.

Probable erosion and sediment control practices are discussed in the following subsections.

2.2 Vegetative Erosion and Sediment Control Measures

Factors such as soil texture and steepness affect slope stability. Topsoil will be stockpiled for reuse after site construction has been completed. Appropriate plants will be selected to meet the final slope and soil conditions for the site.

2.2.1. Temporary Seedings

Temporary seedings provide erosion control protection for an interim period. Temporary control is achieved by covering all bare ground areas that exist on the construction site.

Temporary seedings will be used where final grading is complete and it is necessary to wait for the optimal time to establish permanent vegetation, where a disturbed site is anticipated to be exposed for more than 14 days, when preparing for winter work shutdown, or when permanent seedings are expected to fail because of a mid-summer drought.

2.2.2 Permanent Seedings

Establishing perennial vegetative cover on disturbed slopes subject to erosion will reduce erosion and sediment transport. The seedbed will be prepared to promote good soil to seed contact, remove large stones and other debris from the surface, and amended with topsoil, fertilizer, and/or topsoil as necessary to promote prompt establishment of vigorous vegetation. Seed mixtures will be appropriate to the project site.

2.2.3 Vegetating Waterways

A natural or constructed drainage way, waterways are vegetated to safely convey excess surface runoff from construction sites without causing erosion. Waterways will be protected from erosion by vegetative means as soon after construction as practical. Jute mesh, other rolled erosion control products, or stone will be used as necessary to avoid center gullies.

2.2.4 Mulching

Hydromulch or clean (weed-free) cereal grain straw will be applied at rates recommended in the *NYS Standards* to provide initial erosion control while seeding becomes established. Mulch will also be used for temporary stabilization during the dormant season (non-growing months).

All mulch placed atop permanent seedings, on slopes steeper than 3:1, will be anchored with a biodegradable rolled erosion control product installed according to manufacturer's directions.

2.2.5 Protecting Vegetation During Construction

Existing vegetation determined to be important for erosion control, water quality protection, wetland protection and wildlife habitat will be preserved by limiting soil disturbance near such vegetation and by clearly delineating the limits of construction in the field. Limiting large areas of disturbance, and grading and stabilizing large areas of disturbance in stages will be adopted during development of this wind power project.

2.3 Structural Erosion and Sediment Control Measures

Temporary structural measures are used during construction to prevent offsite sedimentation. The permanent structures are used to convey surface water to a stable outlet; they will remain in place and continue to function after the completion of construction.

Runoff control structures will be the first items constructed when grading begins and will be stabilized and fully functional before downslope land disturbance takes place. Sediment trapping devices will be stabilized and fully functional before upslope land disturbance takes place. Sheet flow runoff will be treated with silt fence and vegetative buffer strips. The

structural measures will be maintained so that they remain effective in their pollution control function.

2.4 Temporary Structural Measures

2.4.1 Temporary Swale

A temporary excavated drainage way, temporary swales, prevent runoff from entering disturbed areas by intercepting and diverting it to a stabilized outlet or to intercept sediment-laden water and divert it to a sediment trapping device.

2.4.2 Water Bar

A ridge, or ridge and channel, constructed diagonally across a slopping road or utility right-of-way subject to erosion, a water bar is constructed to limit the accumulation of erosive velocity water by diverting surface runoff at pre-designated intervals.

2.4.3 Silt Fence

The purpose of installing silt fence is to reduce runoff velocity and effect deposition of the transported sediment load. A temporary barrier of geotextile fabric installed on posts placed on the contour across a slope, silt fence is used to intercept sediment laden runoff from small drainage areas of disturbed soil. Silt fence installation, including its placement at intervals along a slope, will be installed as recommended by *NYS Standards*. The area below the silt fence should be stable therefore it is recommended that silt fence be placed at least 10 feet below the toe of slope to allow for maintenance and material roll down.

2.4.4 Check Dam

Constructed of well graded hard durable stone, 2-9 inches in size (NYSDOT Light Stone Fill), check dams are small barriers placed across a drainage way that reduce erosion in a drainage channel by restricting the velocity of flow in the channel. Check dams are spaced as necessary in the drainage way so that the crest of the downstream dam is equal to the elevation of the toe of the upstream dam. The maximum height of check dams will not be greater than 2 feet, with the center of each check dam at least 9 inches lower than the abutments which extend to natural ground elevation at the top of the drainage way slope.

Check dams will be anchored in the channel by a cutoff trench 1.5 feet wide x 6 inches deep that has been lined with geotextile. The area below check dams will be stabilized with stone or vegetation to resist erosion. Check dams will be inspected after runoff events to correct any damage to the downstream channel, to replace missing stones, and to remove accumulated sediment above the check dam as needed.

Check dams may be left in place permanently if they do not present a hazard to vehicles on adjacent roads.

2.4.5 Turbidity Curtain

A turbidity curtain is placed vertically in a water body constructed of geotextile fabric with floats attached along its top edge (in certain instances) and weights along its bottom edge. It is used to prevent the migration of silt from a work site located only where construction in the wet (water body) is anticipated. Typical uses of a turbidity curtain are culvert installations anticipated where the stream would not be bypassed or wetland crossings where there is flowing water. For this Project, it is recommended that turbidity curtains be installed in shallow water by staking rather than using a floatation system. In all installations, the bottom of the turbidity curtain will be weighted to achieve closure against the bed of the water body. Turbidity curtain installation will be such that it effectively resists and compensates for water currents. It is not recommended that a turbidity curtain will be placed across a waterway. Turbidity curtain is a temporary practice that will generally be in use at a location for less than a month.

2.4.6 Sediment Trap

A temporary sediment control device formed by excavation and/or embankment to intercept sediment laden runoff and retain the sediment. Stone outlet and grass outlet sediment traps will be located so that they can be installed prior to grading within the drainage way they are designed to protect. The outlet from sediment traps will be designed, constructed and maintained so that sediment does not leave the trap and that erosion does not occur at or below the outlet. Sediment traps will also be placed adjacent to dewatering activities associated with turbine foundation construction, and will be constructed so that their outlet discharge is directed to a stable swale or roadside ditch. Sediment traps will be designed and detailed as required by *NYS Standards*.

2.4.7 Stabilized Construction Entrance

In accordance with *NYS Standards* the stabilized construction entrance is located where traffic will leave the project site to a public right-of-way. Stabilized construction entrances, at a minimum, consist of a pad of clean #2 stone at least 6 inches thick and placed upon a suitable geotextile per the *NYS standards*. They will be maintained in a condition that will substantially reduce and prevent significant tracking of sediment outside the Project Area. Provisions will be made to drain runoff off the construction entrance to a stable location away from the public right-of-way.

2.4.8 Stabilized Equipment Staging Area

Located where the Contractors will stockpile materials and park equipment, stabilized staging areas will consist of, at a minimum, clean #2 stone at least 6 inches thick and placed upon a suitable geotextile. The staging areas will be constructed such that runoff is directed to a stable outlet.

2.4.9 Construction Road Stabilization

Stable construction roads will be located to reduce erosion potential, minimize impact on existing site resources, and allow operations to be conducted in a safe manner.

2.4.10 Temporary Access Waterway Crossing

Constructed to provide a safe and environmentally responsive access across a waterway for construction equipment. They will be used for the shortest practical timeframe, and will be removed when the need for their use is completed. Their design and construction will be based upon waterway geometry and the aquatic habitat.

2.4.11 Sump Pit for Temporary Dewatering

A temporary pit that is constructed during excavation and dewatering activities, sump pits will be used as necessary to trap and filter water prior to pumping it to a stable discharge area.

Wastewater, from project activities and dewatering, will be routed to a stable vegetated area or structure outside the ordinary high water line to allow removal of fine sediment and other contaminants.

The stable outlet area or structure must be appropriate to filter sediment, able to withstand the velocity of the discharged water to prevent erosion, sized and operated such that pumped water will flow through a sediment removal device. Sediment should be settled prior to discharge. The flow path should be protected to prevent mobilization of additional sediment.

If the collected water is contaminated with oil, grease, or other petroleum products, an oil/water separator or collection and transport offsite will be used.

2.4.12 Perimeter Dike/Swale

The purpose of a perimeter dike/ swale is to prevent off-site storm runoff from entering a disturbed area and to prevent sediment laden storm runoff from leaving the construction site. It may be used on slopes up to 8 percent and will have a stable outlet, such as a sediment basin.

2.4.13 Brush Barrier

A temporary sediment barrier constructed at the perimeter of disturbed areas of less than 1/4 acre from materials obtained from clearing and grubbing the site. This practice does not replace a sediment trap.

During clearing and grubbing operations, equipment can push or dump the mixture of limbs, small vegetation, and root mat along with minor amounts of soil and rock into windrows along the toe of a slope where erosion and accelerated runoff are expected. The brush barrier can then be covered with filter fabric (Ten Cate Mirafi 140N or approved equal) to increase the brush barrier's filtering capacity.

It is recommended that the barrier height not be taller than 2 to 3 feet and the width of its base should be over 5 feet, but less than 10 feet. When the barrier is no longer needed, the fabric will be removed to allow natural vegetation to be established inside the barrier. The barrier will rot away over time.

2.4.14 Pipe Slope Drain

Used where concentrated flow from surface runoff must be conveyed down a slope of 3 percent or greater in a manner that prevents erosion. A pipe slope drain will consist of an earth dike at the entrance to a pipe extending from the top to the bottom of a slope. The maximum allowable drainage area will be 3.5 acres. The pipe will outlet across a stone outlet into an appropriately sized sediment trap.

2.5 Permanent Structural Measures

2.5.1 Diversion

A drainage way is a supporting ridge on its lower side that is constructed to intercept and convey runoff to stable outlets at non-erosive velocities. Diversions will only be constructed below stabilized or protected areas and on slopes less than 15%. They will be sized to convey the peak runoff from a ten year storm event.

2.5.2 Grass Waterway

Used where added vegetative protection is need to control erosion resulting from concentrated runoff. The grass waterways will be constructed wide and shallow and will convey runoff without causing damage from erosion. Each waterway will have a stable outlet. Where base flow is continuous, the channel will have a stone center.

2.5.3 Culvert Installation

Culverts will be installed in the dry or in isolation from the stream flow by the installation of a bypass flume or culvert, or by pumping the stream flow around the work area. Exceptions may be granted if installing the culvert in the flowing stream reduces siltation or turbidity. The bypass reach will be limited to the minimum distance necessary to complete the project. Fish stranded in the bypass reach will be safely removed to the flowing stream.

Permanent access roads across sensitive sites will employ management strategies and field techniques that protect the riparian area's attributes.

Culverts replaced within the public right-of-way will be sized according to the requirements of the agency of government having jurisdiction.

2.5.4 Stone Lined Waterway

Where grass waterways would be inadequate due to high flow velocities, stone lined waterways will provide for the passage of concentrated runoff without damage from erosion or flooding. Stone lining will be constructed where steep grades, wetness, prolonged base flow, seepage or piping would cause erosion. Stone lined waterways are also used where damage from use by animals, pedestrians, or vehicles preclude the use of grass waterways or adjacent structures require that the design flows be carried within a swale of limited space.

2.5.5 Rock Outlet Protection

A section of rock protection placed at the outlet of culverts or channels. The outlet protection will be designed and constructed to reduce the depth, velocity, and energy of water so that the flow will not erode the downstream receiving reach.

2.5.6 Landgrading

Where the existing land surface is reshaped according to project plans, a grading plan will be provided that shows existing and proposed contours, practices necessary for erosion control, slope stabilization, safe passage and disposal of runoff water, and the phasing of these practices.

2.5.7 Surface Roughening

After finished grade is established, the bare soil surface will be roughened by tracking perpendicular to the slope with construction equipment to aid the establishment of vegetative cover from seedings by reducing runoff velocities and increasing infiltration.

2.6 Stormwater Management Practices

Where necessary to comply with SPDES regulations, post-construction stormwater management practices will be installed that provide both water quality treatment and longevity in the field acceptable to NYSDEC.

2.6.1 Open Stormwater Channels

Vegetated open channels (swales) that are explicitly designed to capture and treat the stormwater quality volume within dry or wet areas created by check dams constructed within the channel. The water quality volume represents approximately 90% of the annual runoff from a site that carries most of the accumulated pollutants. Dry swales are preferable. Wet swales will be used only in areas with high groundwater tables. These open stormwater channels will be designed in accordance with the NYS Stormwater Design Manual.

2.7 Operation and Maintenance of Erosion and Sediment Control and Stormwater Management Practices

All erosion and sediment control and stormwater management practices will be constructed and operated in accordance with their design and maintained to assure continued performance of their intended function and to prevent sediment-laden runoff from leaving the site during construction. Vegetative practices will be fertilized, limed, and mowed to maintain a dense protective vegetative cover.

Runoff control measures such as grass waterways, perimeter dikes/swales, water bars, check dams, pipe slope drains, sump pits, and rock outlet protection, will be the first items constructed when grading begins, and will be completely functional before downslope land disturbance begins. All temporary and permanent structural measures will be stabilized before being considered functional.

After runoff control structures are operational and sediment control measures are in place, clearing and grading on the rest of the site will begin.

During construction, all practices will be inspected at least every seven calendar days. If it is anticipated that more than 5 acres will be disturbed at one time, prior permission will be obtained from the NYSDEC and all practices will be inspected twice every seven calendar days if more than 5 acres is disturbed at any one time.

Vegetative and structural measures will be maintained as required by the *New York Standards*, and the New York State Stormwater Management Design Manual. The

inspection and maintenance requirements for the various practices anticipated are outlined in the following table.

Practice	Recommended Maintenance	Recommended Frequency
Temporary & Permanent Seeding and Straw Mulching	Re-seed areas failing to establish 80% cover within one month. If re-seeding is not effective, use sodding and/or erosion control blankets. Eroded areas shall be corrected, re-planted, and irrigated as required.	Weekly & After Storms
Preserving Natural Vegetation	Inspect flagged areas to make sure flagging has not been removed. If tree roots have been exposed or injured, recover and/or seal them.	Daily
Protecting Vegetation during Construction	If fence has been damaged or visibility reduced, it shall be repaired or replaced immediately and visibility restored.	Daily
Temporary Swale	During growing season, inspect grass after rainstorms. Remove accumulated sediments. Inspect outlets to prevent scouring and erosion.	Weekly & After Storms
Water Bar	Periodically inspect for erosion and sediment. Check outlet areas and make repairs as needed to restore operations.	Weekly & After Storms
Silt Fence	Repair damaged fencing. Intercept concentrated flows & reroute. Remove sediment when its depth exceeds six inches. Replace deteriorated fencing material. Dispose of used fencing off-site.	Weekly & After Storms
Check Dam	Remove sediment when sump is half-full. Check and repair erosion around edges of dams. Make sure prefabricated sections are secured.	Weekly & After Storms

Practice	Recommended Maintenance	Recommended Frequency
Turbidity Curtain	Inspect and repair or replace. Check anchorage. Remove floating debris. Remove accumulated silt, if necessary, in a direction away from the protected water body.	Daily
Sediment Trap	Remove sediment when it reaches a depth of 1-foot. Repair damage to embankments and slopes.	Weekly & After Storms
Stabilized Construction Entrance and Equipment Staging Areas	Crushed stone shall be added when needed. If entrance or yard are not working to keep streets clean, then install wheel wash and sweep streets.	Daily
Construction Road Stabilization	Topdress with new stone as needed. Check adjacent ditches for erosion and sedimentation. Maintain adjacent vegetation in a healthy, vigorous condition.	Weekly & After Storms
Temporary Access Waterway Crossing	Remove and dispose of trapped sediment and debris. Sediment shall be disposed of and stabilized outside the waterway flood plain.	Weekly & After Storms
Sump Pit	Protect from damage	Weekly
Topsoil Stockpile Stabilization	Stabilize areas that have eroded.	Weekly & After Storms
Diversion	During growing season, inspect grass after rainstorms. Remove accumulated sediments. Inspect outlets to prevent scouring and erosion.	Weekly & After Storms
Grass Waterway	During growth period, inspect grass after rainstorms. Remove accumulated sediments. Inspect outlets to prevent scouring and erosion.	Weekly & After Storms
Stone Lined Waterway	Maintain to prevent	Weekly & After

Practice	Recommended Maintenance	Recommended Frequency
	undermining or deterioration. Vegetation next to stone lining should be maintained in good condition to prevent scouring if the stone lining is overtopped.	Storms
Rock Outlet Protection	Inspect for signs of scour beneath the rock and for dislodged rock.	Weekly & After Storms
Land Grading	Keep benches free of sediment; stabilize areas that have eroded.	Monthly & After Storms
Surface Roughening	Stabilize areas that have eroded.	Monthly & After Storms
Open Stormwater Channels	Remove sediment build-up within the bottom of the swale when 5" deep.	Monthly during Construction.
	Maintain a grass height of 4 to 6 inches in dry swales.	Annually thereafter.

3.0 CONSTRUCTION ACTIVITIES

Construction of the wind power project will likely include improvements to some local roads, construction of site roads, installation of electrical distribution facilities, and construction of the wind turbines and their foundations.

Site improvements will proceed in an organized manner to prepare and accommodate the anticipated number of vehicles that will use the site roads.

Excess excavated materials not used as fill will be disposed of in a manner that will not result in erosion and adverse impacts upon surface water and wetland quality. The manner in which the soil is disposed of will include applicable stormwater management practices.

Prior to the start of construction activity, the Project Owner will identify the contractors and subcontractors that will be responsible for installing, constructing, repairing, inspecting, and maintaining the erosion and sediment control and post-construction stormwater management practices included in the SWPPP.

Each of the identified contractors and subcontractors who engage in activities that disturb soil will identify at least one trained individual from their company that will be responsible for

implementation of the SWPPP. Each contractor or subcontractor responsible for implementation of the SWPPP will sign a copy of the SWPPP certification before they commence construction activity.

3.1 Construction Phasing Schedule

A schedule that establishes the construction sequence of vegetative, permanent and temporary structural erosion and sediment control practices, and their timing relative to other construction activities will be included. Phasing of the access road, utility, crane pad and component lay-down area construction will likely be in a manner that facilitates the construction of the individual wind turbine sites. A preliminary construction phasing schedule is included below.

1. Obtain all applicable permits
2. Participate in a pre-construction meeting at least one week prior to the beginning of earthwork operations to discuss and provide Contractor certifications for the Stormwater Pollution Prevention Plan.
3. Flag the work limits.
4. Install vegetation protection.
5. Install stabilized construction entrances.
6. Install stabilized equipment storage areas.
7. Construct stabilized construction roads.
8. Construct all erosion and sediment control practices. Immediately stabilize with vegetation.
9. Construct all sediment traps. Immediately stabilize with vegetation.
10. Stabilize culvert outfalls with rock outlet protection.
11. Construct post-construction stormwater management facilities. Immediately stabilized with vegetation.
12. Allow vegetation to become established.
13. Commence rough grading. Stockpile topsoil and excess excavated earth materials.
14. Apply temporary seed and mulch to all topsoil and excess excavated earth stockpiles. Surround stockpiles with silt fence.
15. Construct stabilized access roads and install utility cables.
16. Excavate and construct turbine foundations. Stabilize as indicated in the contract drawings.
17. Construct crane pads and component lay-down areas. Stabilize as indicated in the contract drawings.
18. Construct turbines.
19. In areas where soil disturbance activity has temporarily ceased, seed and mulch must be applied within 7 days from the date the soil disturbance activity ceased.
20. In areas where soil disturbance activity has permanently ceased, fine grade, and permanently seed with the appropriate seed mixtures.
21. Construct interconnection substation and the operations and maintenance building.
22. Tie into undisturbed ground such that water drains away from the public right-of-way without damage to the project infrastructure and adjacent private and public property. The maximum slopes at these locations will be 4:1 (run: rise).

23. Remove temporary erosion and sediment control practices when the site is stabilized.

3.2 Disturbance Limits

Construction activity will not disturb greater than 5 acres of soil at any one time without prior written permission of the NYSDEC. In order to be authorized to disturb more than 5 acres of soil at any one time, the following requirements will be met:

- a. A qualified inspector shall conduct at least two site inspections every 7 days. The inspections must be separated by a minimum of 2 days.
- b. Where soil disturbance activity has been temporarily or permanently ceased, temporary and/or permanent soil stabilization measures must be installed within 7 days from the date the soil disturbance activity ceased.
- c. Preparation of a phasing plan that defines maximum disturbed area per phase and shows the required cuts and fills.
- d. Installation of any additional site-specific practices needed to protect water quality.
- e. Document the NYSDEC approved plans and practices as revisions to the project SWPPP.

4.0 SITE WASTE MANAGEMENT AND SPILL PREVENTION

All potential pollutants other than sediment will be handled and disposed of in a manner that does not cause contamination of stormwater. The following non-sediment pollutants may be present during construction activities.

1. Petroleum products including fuel, lubricants, hydraulic fluids, and concrete-form oils
2. Concrete
3. Asphalt
4. Paints
5. Fertilizers
6. Herbicides and pesticides

These materials, and other materials used during construction with the potential to impact stormwater, will be stored, managed, used, and disposed of in a manner that minimizes the potential for releases to the environment and especially to stormwater.

Emergency contacts for the project will be posted at the project office and will be included in the project SWPPP.

4.1 General Materials Handling Practices

The following general practices will be used throughout the project to reduce the potential for spills.

Potential pollutants will be stored and used in a manner consistent with the manufacturer's instructions in a secure location. Hazardous material storage areas will not be located near water courses or storm drain inlets and will be equipped with covers, roofs, and secondary containment to prevent stormwater from contacting stored materials. Chemicals that are not compatible (such as sodium bicarbonate and hydrochloric acid) will be stored in segregated areas so that spilled materials cannot combine and react.

Material disposal will be in accordance with the manufacturer's instructions and all applicable local, state, and federal regulations.

Materials no longer required for construction will be removed from the site as soon as practicable.

Adequate garbage, construction waste, and sanitary waste handling and disposal facilities will be provided to the extent necessary to keep the site clear of obstruction and stormwater management practices clear and functional. All agencies or government having jurisdiction will approve off-site spoil areas.

4.2 Specific Materials Handling Practices

All pollutants, including waste materials and demolition debris, that occur on-site during construction will be handled in a way that does not contaminate groundwater or stormwater.

All chemicals including liquid products, petroleum products, water treatment chemicals, and wastes stored on site will be covered, contained and protected from vandalism.

Planned or scheduled routine maintenance and repair of all equipment and vehicles involving oil changes, hydraulic system drain down, de-greasing operations, fuel tank drain down and removal, and other activities that may result in the accidental release of contaminants, will be conducted off-site. Materials spilled will be cleaned up immediately and properly disposed of.

Wheel wash water will be settled and discharged on site by infiltration.

Application of agricultural chemicals, including fertilizers and pesticides, will be conducted in a manner and at application rates that will not result in loss of chemicals to stormwater runoff. Manufacturers' recommendations will be followed for application rates and procedures.

Materials that modify pH will be managed to prevent contamination of runoff and stormwater collected on site. The most common sources of pH-modifying materials are bulk cement, cement dust, fly ash, new concrete washing and curing waters, waste streams generated from concrete grinding and sawing, exposed aggregate processes, and concrete pumping and mixer washout waters.

Detergents will be used only as recommended, and their use will be limited to stabilized areas that drain to municipal sanitary sewers or that drain into temporary containers that can be transported to and properly discharged at a wastewater treatment plant.

4.3 Spill Response

The primary objective in responding to a spill is to quickly contain the material(s) and prevent or minimize its migration into the groundwater and into stormwater runoff and conveyance systems. If the release has impacted water resources, it is critical to contain the released materials and the contaminated water and prevent their release into receiving waters.

If a spill of pollutants threatens groundwater or stormwater at the site, the spill response procedures outlined below will be implemented in a timely manner to prevent the release of pollutants.

The site superintendent will be notified immediately when a spill, or the threat of a spill, is observed. The superintendent will assess the situation and determine the appropriate response.

If spills represent an imminent threat of entering the receiving waters, facility personnel will respond immediately to contain the release and notify the superintendent after the situation has been stabilized.

Spill kits containing materials and equipment for spill response and cleanup will be maintained at the site. Each spill kit will contain oil absorbent pads, oil absorbent booms, 55-gallon drums, 9-mil plastic bags, and personal protective equipment including gloves and goggles.

If an oil sheen is observed on surface water (e.g., sediment traps, grass swales), absorbent pads and/or booms will be applied to contain and remove the oil. The source of the oil sheen will also be identified and removed or repaired as necessary to prevent further releases.

The site superintendent, or his designee, will be responsible for completing the spill reporting form and for reporting the spill to the appropriate state or local agency. A form will be provided in the project SWPPP.

Facility personnel with primary responsibility for spill response and cleanup will receive training from the site superintendent. This training will include identifying the location of spill kits and other spill response equipment and the use of spill response materials.

Spill response equipment will be inspected and maintained as necessary to replace any materials used in spill response activities.

4.4 Spill Notification Procedure

In the event of a spill, the appropriate notification(s) consistent with the following procedures will be made:

Any spill of oil which 1) violates water quality standards, 2) produces a “sheen” on a surface water, or 3) causes a sludge or emulsion must be reported immediately by telephone to the **NYSDEC Spill Hotline: 1-800-457-7362.**

Any oil, hazardous substance, or hazardous waste release must be reported immediately by telephone to the NYSDEC Spill Hotline: 1-800-457-7362.

Any spill of oil or hazardous substance to waters of the state must be reported immediately by telephone to the NYSDEC Spill Hotline: 1-800-457-7362.

Any release of a hazardous substance that may be a threat to human health or the environment must be reported to the NYSDEC Spill Hotline: 1-800-457-7362.

4.5 Nutrient Management

Fertilizer and limestone soil amendments will be applied at appropriate rates as determined by soil tests or at rates indicated for Permanent Critical Area Plantings in the *NY Standards*.

Soil amendments will be incorporated into the upper 2 to 4 inches of soil where feasible. Soil amendments will not be applied within 15 feet of drainage ways.

Soil erosion control practices that prevent soil amendments from being carried offsite will be established prior to the application of soil amendments.

5.0 SITE INSPECTION AND MAINTENANCE

5.1 Project Management

Implementation of the SWPPP is the responsibility of the Owner and the Contractor. Communication between all parties performing work on the site is essential for proper implementation of the SWPPP. The Contractor and all Subcontractors involved with site work will be familiar with the SWPPP and their responsibilities under the plan.

The Contractor will obtain written authorization from the NYSDEC and the Owner's Representative to allow the disturbance of five (5) acres or more of soil at any one time during the construction process.

From the beginning of construction until its completion, the stormwater treatment system will remain operational to purify stormwater impacted by construction activities.

Activities such as grading and trenching in areas directly adjacent to a drainage way during rainstorms could easily result in sediment-contaminated stormwater discharging from the site. This work will be performed during dry weather and/or with the appropriate erosion and sediment control practices.

The Contractor's superintendent and project manager will be familiarized with the major

elements of the plan. The Contractor will provide construction workers and others at the site with appropriate training information at the conclusion of “tailgate” safety meetings or on an as-needed basis. All Contractors providing services on the project that may cause stormwater pollution will be given a copy of the SWPPP and appropriate training regarding stormwater pollution prevention. Subcontractor oversight to ensure compliance with the SWPPP will be provided by the Contractor’s superintendent or project manager. Informal, on-the-job training should be the first level of communication followed by on site observation of training compliance.

SWPPP inspections will be the responsibility of the Owner’s Representative. Spill reports will be completed and submitted by the Contractor.

The SWPPP will be revised and updated to address changes in site conditions, new or revised government regulations, and additional on-site stormwater pollution controls.

5.2 Construction Site Inspection

The SWPPP will be prepared in accordance with all applicable requirements and a completed Notice of Intent (NOI) will be submitted to the NYSDEC Bureau of Water Permits in Albany.

Before construction activities begin, authorization to discharge under the current SPDES General Permit for Construction Activity will be obtained.

A licensed professional engineer, landscape architect, certified professional in erosion and sediment control, or other individual endorsed by the NYSDEC who is knowledgeable in the principles and practices of erosion and sediment control will be employed by the Project Owner to conduct an assessment of the site prior to the commencement of construction. This qualified inspector will verify that appropriate erosion and sediment control practices as described in the SWPPP and as required by the Permit for Stormwater Discharges from Construction Activities have been installed and implemented to ensure that the site is properly prepared for construction of the wind power facilities to commence.

During construction, when soil disturbance activities are on-going, the qualified inspector will conduct a site inspection at least once every seven days. When soil disturbance activities are underway and authorization has been received from NYSDEC to disturb more than five

acres of soil, the qualified inspector will conduct at least two site inspections every seven days. When only two inspections are performed every seven days, the inspections will be separated by a minimum of two days.

5.3 Construction Site Record Keeping

A copy of the current SPDES General Permit for Construction Activity, NOI, NOI Acknowledgement Letter, SWPPP, and inspection reports will be maintained in a secure location on-site that is accessible during working hours to an individual performing a compliance inspection.

Construction site inspection reports will be maintained on site. They will document the following information:

1. Description of the weather and soil conditions;
2. Condition of the runoff at all points of discharge from the construction site, including discharges of sediment.
3. Identification of all erosion and sediment control practices that need repair or maintenance;
4. Identification of all erosion and sediment control practices that have not been installed correctly or are not functioning as designed and need to be reinstalled or replaced;
5. Corrective actions that must be taken to install, repair, replace or maintain erosion and sediment control practices and to correct deficiencies identified with the post-construction stormwater management practices.
6. Site maps that indicate the following:
 - a. All areas expected to undergo initial disturbance or site work within the next 14 days;
 - b. All disturbed areas that have received temporary or permanent stabilization;
 - c. All disturbed areas that have not undergone active site work during the previous 14-day period.
 - d. Location of erosion and sediment control practices required by the former and projected site disturbance activities.
 - e. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and NYS technical standards

Within one business day of the completion of a SWPPP inspection, the qualified inspector will notify the Project Owner and the appropriate contractor of any corrective action that needs to be taken. The inspector will sign all inspection reports.

6.0 TERMINATION OF PERMIT COVERAGE

After all construction activity identified in the SWPPP has been completed, the Project Owner will have a qualified inspector perform a final site inspection. If the following conditions have been met, the qualified inspector will sign the NYSDEC certification statements “Final Stabilization” and “Post-Construction Stormwater Management Practice” contained within the Notice of Termination (NOT):

1. All areas of disturbance have achieved final stabilization,
2. All temporary structural erosion and sediment control measures have been removed, and
3. All post-construction stormwater management practices have been constructed in conformance with the SWPP and are operational.

The Project Owner will ensure that the necessary post-construction stormwater management maintenance procedures and practices are in place as required by NYSDEC.

When the above conditions have been met, the Project Owner will be eligible to terminate coverage under the current SPDES General Permit for Stormwater Discharges from Construction. Within 14 days of becoming eligible, the Project Owner will provide the necessary certifications and information to submit a completed Notice of Termination (NOT) to the NYSDEC Bureau of Water Permits in Albany.

7.0 REFERENCES

New York State Standards and Specifications for Erosion and Sediment Control, (NYS Standards), New York State Department of Environmental Conservation, August 2005.

New York State Stormwater Management Design Manual, New York State Department of Environmental Conservation, (NYSDEC), April 2008.

Soil Survey, Natural Resources Conservation Service, United States Department of Agriculture. Official Soil Series Descriptions [Online WWW]. Available URL: <http://soils.usda.gov/technical/classification/osd/index.html>. [Accessed November and December 2008]. USDA-NRCS, Lincoln, NE.

The Missouri Cooperative Soil Survey. [Online WWW]. Available URL: <http://www.soilsurvey.org/index.asp>. (Accessed December 2008.) USDA-NRCS, Columbia, MO