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**NYSDAM Guidelines for
Agriculture Mitigation**

Agricultural Mitigation for Windpower Projects

Revised 1-4-08

The following guidelines shall apply to construction areas for wind power construction projects impacting agricultural land. The project sponsor shall coordinate with the New York State Department of Agriculture and Markets (Ag. and Markets) to develop an appropriate schedule for inspections to assure that the goals of these guidelines are being met. The project sponsor shall hire an Environmental Monitor to oversee the construction and restoration in agricultural fields.

Siting Goals

Minimize impacts to normal farming operations by locating structures along field edges and in nonagricultural areas where possible.

Avoid dividing larger fields into smaller fields, which are more difficult to farm, by locating access roads along the edge of agricultural fields (hedgerows and field boundaries) and in nonagricultural areas where possible.

Locate access roads, which cross agricultural fields, along ridge tops and following field contours, where possible, to eliminate the need for cut and fill and reduce the risk of creating drainage problems.

All existing drainage and erosion control structures such as diversions, ditches, and tile lines shall be avoided or appropriate measures taken to maintain the design and effectiveness of the existing structures. Any structures disturbed during construction shall be repaired to as close to original condition as possible, as soon as possible, unless such structures are to be eliminated based on a new design.

Construction Requirements

The surface of access roads constructed through agricultural fields shall be level with the adjacent field surface.

Culverts and waterbars shall be installed to maintain natural drainage patterns.

All topsoil must be stripped from agricultural areas used for vehicle and equipment traffic and parking. All vehicle and equipment traffic and parking shall be limited to the access road and/or designated work areas such as tower sites and laydown areas. No vehicles or equipment will be allowed outside the work area without prior approval from the landowner and, when applicable, the Environmental Monitor.

Topsoil from work areas (tower sites, parking areas, "open-cut" electric cable trenches, along access roads) shall be stockpiled separate from other excavated material (rock and/or subsoil). At least 50 feet of temporary workspace is needed along "open-cut"

electric cable trenches for proper topsoil segregation. All topsoil will be stockpiled immediately adjacent to the area where stripped/removed and shall be used for restoration on that particular site. Topsoil stockpile areas shall be clearly designated in the field and on the on-site "working set" of construction drawings.

Electric interconnect cables and transmission lines installed above ground can create long term interference with agricultural land use. As a result, interconnect cables shall be buried in agricultural fields wherever practicable. Interconnect cables and transmission lines installed above ground should be located outside field boundaries wherever possible. When above ground cables and transmission lines must cross farmland, the project sponsor shall minimize agricultural impacts by using taller structures that provide longer spanning distances and shall locate poles on field edges to the greatest extent practicable. The line location and pole placements shall be reviewed with the Department and the Environmental Monitor prior to final design.

In cropland, hayland and improved pasture a minimum depth of forty-eight inches of cover will be required for all buried electric cables. In unimproved grazing areas and land permanently devoted to pasture, a minimum depth of thirty-six inches of cover will be required. In areas where the depth of soil over bedrock ranges from zero to forty-eight inches, the electric cables shall be buried entirely below the top of the bedrock or at the depth specified for the particular land use whichever is less. At no time will the depth of cover be less than twenty-four inches below the soil surface.

All excess subsoil and rock shall be removed from the site. On site disposal of such material may be allowed if approved by the landowner and the Environmental Monitor, with appropriate consideration given to any possible agricultural or environmental impacts.*

In pasture areas, work areas will be fenced to prevent livestock access, consistent with landowner agreements.

All pieces of wire, bolts, and other unused metal objects will be picked up and properly disposed of as soon as practical after the unloading and packing of turbine components so that these objects will not be mixed with any topsoil.*

Excess concrete will not be buried or left on the surface in active agricultural areas. Concrete trucks will be washed outside of active agricultural areas.*

(*Any permits necessary for disposal under local, State and/or federal laws and regulations must be obtained by the contractor, with the cooperation of the landowner when required.)

Restoration Requirements

Following construction, all disturbed agricultural areas will be decompacted to a depth of 18 inches with a deep ripper or heavy-duty chisel plow. In areas where the topsoil was

stripped, soil decompaction shall be conducted prior to topsoil replacement. Following decompaction, all rocks 4 inches and larger in size will be removed from the surface of the subsoil prior to replacement of the topsoil. The topsoil will be replaced to original depth and the original contours will be reestablished where possible. All rocks 4 inches and larger shall be removed from the surface of the topsoil. Subsoil decompaction and topsoil replacement should be avoided after October 1, unless approved on a site-specific basis by the landowner in consultation with Ag. and Markets. All parties involved should be cognizant that areas restored after October 1st may not obtain sufficient growth to prevent erosion over the winter months. If areas are to be restored after October 1st, necessary provision should be made to restore any eroded areas in the springtime, to establish proper growth.

All access roads will be regraded to allow for farm equipment crossing and to restore original surface drainage patterns, or other drainage pattern incorporated into the design.

All restored agricultural areas shall be seeded with the seed mix specified by the landowner, in order to maintain consistency with the surrounding areas.

All surface or subsurface drainage structures damaged during construction shall be repaired to as close to preconstruction conditions as possible, unless said structures are to be removed as part of the project design.

Following restoration, all construction debris will be removed from the site.

Two Year Monitoring and Remediation

The Project Sponsor will provide a monitoring and remediation period of no less than two years immediately following the completion of initial restoration. The two year period allows for the effects of climatic cycles such as frost action, precipitation and growing seasons to occur, from which various monitoring determinations can be made. The monitoring and remediation phase will be used to identify any remaining agricultural impacts associated with construction that are in need of mitigation and to implement the follow-up restoration.

General conditions to be monitored include topsoil thickness, relative content of rock and large stones, trench settling, crop production, drainage and repair of severed fences, etc. Impacts will be identified by the Environmental Monitor through on site monitoring of all agricultural areas impacted by construction and through contact with respective farmland operators and the Department of Agriculture and Markets.

Topsoil deficiency and trench settling shall be mitigated with imported topsoil that is consistent with the quality of topsoil on the affected site. Excessive amounts of rock and oversized stone material will be determined by a visual inspection of disturbed areas as compared to portions of the same field located outside the construction area. All excess rocks and large stones will be removed and disposed of by the Project Sponsor.

When the subsequent crop productivity within affected areas is less than that of the adjacent unaffected agricultural land, the Project Sponsor as well as other appropriate parties, will help to determine the appropriate rehabilitation measures to be implemented. Because conditions which require remediation may not be noticeable at or shortly after the completion of construction, the signing of a release form prior to the end of the remediation period will not obviate the Project Sponsor's responsibility to fully redress all project impacts.

Subsoil compaction shall be tested using an appropriate soil penetrometer or other soil compaction measuring device. Compaction tests will be made for each soil type identified on the affected agricultural fields. The subsoil compaction test results within the affected area will be compared with those of the adjacent unaffected portion of the farm field/soil unit. Where representative subsoil density of the affected area exceeds the representative subsoil density of the unaffected areas, additional shattering of the soil profile will be performed using the appropriate equipment. Deep shattering will be applied during periods of relatively low soil moisture to ensure the desired mitigation and to prevent additional subsoil compaction. Oversized stone/rock material which is uplifted to the surface as a result of the deep shattering will be removed.

NEW YORK STATE FARMLANDS

**SEEDING, FERTILIZING, AND LIME RECOMMENDATIONS
FOR GAS PIPELINE RIGHT-OF-WAY RESTORATION
IN FARMLANDS**

Rev. 6-15-2005

Provided by:

NYS Dept. of Agriculture and Markets
Division of Agricultural Protection and Development Services
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NEW YORK STATE FARMLANDS

SEEDING, FERTILIZER, AND LIME RECOMMENDATIONS FOR GAS PIPELINE RIGHT-OF-WAY RESTORATION IN FARMLANDS

This paper supplements the Department of Agriculture and Markets' publication, "Pipeline Right-of-Way Construction Projects: Agricultural Mitigation Through Stages of Project Planning, Construction/ Restoration and Follow-Up Monitoring (Rev. 11-97)." It is intended to familiarize the reader with varieties of seed mixes that are proven highly effective, in New York State farmlands affected by pipeline right-of-way construction, with full agricultural mitigation.

The paper lists several different seed mixes, for permanent cover, and provides other pertinent information including: temporary cover; the need for and use of soil nutrients; as well as follow-up monitoring and other useful notes. This paper is NOT intended as a guide to the sequential steps of disking and surface tillage for seedbed preparation and the sequence of liming, fertilizing, seeding, and mulching.

***** ALL SEEDING RATES BELOW ARE FOR DRILL SEEDER APPLICATION [PREFERRED METHOD].**

***** IF BROADCAST SEEDING IS USED, ALL SEEDING RATES [BELOW] MUST BE DOUBLED.**

A. Permanent Seeding Mixtures.

1.) Common for hayland planting:

- a.) Alfalfa 20# if seeded alone, or with one of the following cold season grasses: Timothy, or Orchard grass, or Bromegrass should be added if one of these grasses is desired by the farm operator, at the rate of 8# per acre. [*See "3) Quick Erosion Control" below.*]
- b.) Pardee Birdsfoot Trefoil 16# per acre, plus either: Timothy, or Orchard grass, or Bromegrass should be added [per farm operator's choice] at 6# per acre rate. [*See "3) Quick Erosion Control" below.*]
- c.) Medium Red Clover or Mammoth Red Clover 15# per acre, plus either: Timothy, or Orchard grass, or Bromegrass should be added [per farm operator's choice] at the rate of 6# per acre. [*See "3) Quick Erosion Control" below.*]

2.) Common for pasture planting:

- a.) Dutch White Clover 6# per acre; plus
Pardee Birdsfoot Trefoil 6# per acre; plus
Orchard grass 6# per acre
- b.) Note: Reed Canary Grass at the rate of 18# per acre is excellent hay or pasture grass for wetter soils. For hay, cut early. Do not use Reed Canary Grass in wetlands.
[See "3) Quick Erosion Control" below.]

3.) *Quick Erosion Control:*

For quick control of erosion when seeding the right-of-way: mix Annual Ryegrass as an additive into each of the Permanent Seeding Mixtures [see above]. Annual Ryegrass provides the quickest temporary cover against erosion [while the other plants are still in their slower/longer period of development]. Use approximately 6# or 7# per acre of the Annual Ryegrass when drill seeding the mix. Double the amount to 12# to 14# of Annual Ryegrass if broadcast.

THE DRILL SEEDING RATES [LISTED ABOVE] FOR DISTURBED PIPELINE RIGHT-OF-WAY ARE SLIGHTLY INCREASED OVER THE STANDARD RATES IN ORDER TO HELP COMPENSATE FOR THE LOWER THAN NORMAL GERMINATION RATES DUE TO:

- THE LOWERING OF NUTRIENTS AVAILABLE TO THE PLANTS AFTER PIPELINE CONSTRUCTION HAS DISTURBED TOPSOIL AND SUBSOIL.
- TIMING OF SEED MIX APPLICATION MAY BE IDEAL FOR SOME OF THE VARIETIES IN A MIX BUT ONLY MARGINAL FOR ONE OR MORE OTHERS.

Special situation seeding, at project's risk for pastureland only:

If the right-of-way's soil is restored by late September, a "risk" seeding can be applied between late September and the third week in October: Aroostook Winter Rye at 2 bu. or 112# per acre, mixed with: Pardee Birdsfoot Trefoil 16# per acre, Tall Fescue 20# per acre and Orchard Grass 8# per acre.

The Aroostook Rye provides winter cover, and portions of the high rate of Trefoil, Fescue, and Orchard Grass seed may stay dormant until the following spring season. If successful in coverage, the permanent seeding of respective pastures is complete. If not, the site must be reseeded.

B. Temporary Cover.

- 1.) For large-size pipeline right-of-way projects with a two-year plan, to construct one year and restore the following year.

a.) Topsoil berm

Topsoil stripping and stockpiling performed in late spring to mid summer – broadcast seed the entire topsoil berm with either Oats at 2 bu. [80#] per acre, or Aroostook Winter Rye at 2 bu. [112#] per acre in July-August. A light to moderate rate [about 1500 – 2000 #/acre] of weed-free straw mulch cover may be needed for retaining adequate summer soil moisture. *[For larger size topsoil berms, the temporary cover seeding may be more uniformly applied by “flattening” the top of the berm and using small, light equipment to drop and broadcast seed from the top, covering all surfaces of the berm.]*

b.) Exposed construction zone/subsoil

After backfilling, by or before late October, plant the exposed right-of-way subsoil to Aroostook Winter Rye at the rate of 3 bu. [168#] per acre with broadcast seeder; or 2 bu. [112#] if drill seeded. In preparation, the surface of the exposed subsoil is first scarified generally parallel with the slope’s contours and fertilized with 200# of 10-20-20 (N,P,K) per acre, for temporary winter cover to succeed, due to the subsoil compaction and its low fertility. Apply a light to moderate [not heavy] rate [about 1000 #/acre] of weed-free straw mulch over the temporary seeding.

Note that other temporary cover seedings, in addition to those noted above, may be used, pending on seasonal conditions and the mutual approval of the farmland operator and agricultural inspector.

- 2.) For any pipeline right-of-way project, large or small where a “winterized” right-of-way is necessary and a seeding with Aroostook Winter Rye can be applied before the end of October:
Topsoil berm and exposed, backfilled construction zone
Apply 3 bu. [168#] per acre, broadcast. Refer to Exposed construction zone above regarding scarification of surface and rate of straw mulch.
- 3.) For unavoidable, off-season construction [“mud and freeze-thaw” season construction], when topsoil is stripped after October, and effective, temporary cover seeding is impossible due to inherent climate factors: use a moderate rate of weed-free straw mulch cover over the topsoil berm. Establish and maintain all temporary erosion controls along the construction right-of-way corridor – throughout the off season construction – including but not limited to: outside perimeter runoff ditching; silt fencing; water bars and runoff drainage gaps through the topsoil berm and across right-of-way to prevent water ponding, berm saturation, and erosion.

C. Use Seed Inoculant.

- 1.) Remember to apply the appropriate variety of fresh inoculant to all legume seed before use [e.g.: alfalfa, birdsfoot trefoil, etc.]. *Even if the*

seed label says it is pre-inoculated, the viable seed in the batch could easily be two or more years old while the pre-inoculant is past its life. The certified seed itself may still be good, but non-responsive without the proper fresh inoculant applied at the time of seeding.

D. Fertilizer For Right-of-Way Reseeding:

Soil Testing. The fertilizer rates listed below are approximations. Prior to construction, before the topsoil is stripped, representative sampling is conducted: agronomic soil samples are obtained about 400 feet apart along the right-of-way, and submitted and laboratory tested for: pH; % organic material; cation exchange capacity, and N,P,K [Nitrogen, Phosphorus/*Phosphate*, and Potassium/*Potash*). The results are applied to determine the lime and fertilizer rate to apply for the respective soils and farms.

- 1.) "10-20-20" This means 10# of nitrogen, 20# of phosphorus, 20# of potash per 100# of fertilizer. Pending on test results, use 300# per acre. [This totals out to 30# of nitrogen, 60# of phosphorous, 60# of potash per acre.]
- 2.) "5-10-10" This means 5# of nitrogen, 10# of phosphorus, 10# of potash per 100# of fertilizer. Pending on test results, use 600# per acre. [This totals out to 30# of nitrogen, 60# of phosphorous, 60# of potash per acre.]

E. Fertilizer for temporary cover seeding of exposed right-of-way construction work surface.

Refer to "Temporary Cover" B. 1. b. Exposed construction zone/subsoil on page 2.

(Fertilizer is not recommended for temporary seed cover on the topsoil berm, but is strongly advised on the exposed subsoil surface.)

F. Fertilizer as a topdressing [follow-up additive] in haylands and pastures:

"16-8-8" This means 16# of nitrogen, 8# of phosphorous, 8# of potash per 100# of fertilizer. Use 200-300# per acre, depending on field conditions. This totals out to either:
32# of nitrogen, 16# of phosphorus, 16# of potash; or
48# of nitrogen, 24# of phosphorus, 24# of potash per acre.

G. Agricultural Lime.

See reference to Soil testing, for pH, in **D. Fertilizing For Right-of-Way Reseeding**, above.

- A minimum rate of 3 tons agricultural lime per acre for most permanent seedings in naturally low-lime soils [e.g.: Southern Tier/northern Allegheny Plateau]. A heavier amount will be applied if so indicated from pH test results. Use lower lime rate on naturally high-lime soils based on site specific soil pH test and farm record of recent lime application [e.g.: Central Plains/northern half of Finger Lakes Region].
- Pelletized and agriculture lime are rated the same in tons to be applied. Except pelletized is easier to handle and reacts to the soil quicker but it cannot be reduced in its amount. [Do not use "liquid lime" on agricultural land.]

H. Monitoring and Follow-Up.

- Restored right-of-way is monitored for not less than two years after initial restoration seeding is completed. The seeding is satisfactory if it produces equal to or better than the adjacent undisturbed planting. Seasonal surface soil moisture conditions will vary from year to year, and may be ideal to poor [excessively dry] for germination when pipeline project applies the seed. Seedings that are unsatisfactory due to lower plant population/poor plant health or overpopulation of weeds will be replanted.

For monitoring of crop productivity, refer to: "Special Crop Productivity Monitoring Procedures," a February 1993 paper, provided by the NYS Department of Agriculture and Markets.

I. Final Notes on Seedings.

- Always use certified seed for each variety used alone or in a mix.
- Always use a Brillon® drill seeder with rear cultipacker, or similar implement, for hayland and improved pasture seedings.
- Do not try to seed when the ground is wet.
- While Empire birdsfoot trefoil has been a traditional variety applied throughout the region, the more recently developed "Pardee" birdsfoot trefoil is widely applied with proven performance in soils with drainage limitations and even better in well-drained soils. The Pardee variety has improved winter survival over other varieties when properly planted.

- Remember to double the permanent seeding rates when using broadcast seeding due to the mortality rate.
- Perennial Ryegrass is not a favorite grass with farmers and is not recommended in seed mixes on agricultural right-of-way.
- Incorporate fertilizer and lime into the soil; and apply fine surface tillage/seedbed preparation practices
- Creeping Fescue is shade tolerant.

*New York State Department of Agriculture and Markets
Division of Agricultural Protection and Development Services*

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