Agricultural Soil Protection Plan

Tobacco Valley Solar Project
Simsbury, Connecticut

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Introduction

The Agricultural Soil Protection Plan has been prepared to minimize project effects on portions of the agricultural fields within the Project Area that consist of soil map units designated as Prime Farmland or Other Farmland of Statewide Importance. These measures have been developed to maintain the quality of these resources to the extent practicable should the site be returned to agricultural management at the end of Project operation. Maintaining soil health provides benefits during the operational phase of the project by sustaining soil functions including groundwater recharge, water quality, and minimizing soil loss due to erosion.

This Plan was prepared by VHB, in association with DWW Solar II, LLC and their contractors: Swinerton Builders and Duraroot Environmental Consulting.

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Baseline Inventory

1. Site Specific Soil Map of the Project Area farm fields will be prepared and submitted to the CSC before construction activities occur in farm fields.
2. Map preparation will generally follow Standards and Procedures for Site Specific Soil Mapping in Rhode Island[1] with the connotative legend modified to describe drainage class and include attributes associated with topsoil thickness, and topsoil color.
3. Conduct baseline soil tests for macro and micro nutrients, organic matter content and pH of the topsoil. Test results will be provided with as part of the baseline study.

1 Stolt, Mark H. Final Draft October 2007. Standards and Procedures for Site Specific Soil Mapping in Rhode Island. University of Rhode Island Cooperative Extension.

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Agricultural Soil Protection Practices

The Agricultural Soil Protection Plan prescribes practices to avoid and minimize impacts to the quality of farmland soils. Impact avoidance and minimization measures include:

1. To the extent practicable, the solar farm will be developed without modifying grades within existing farm fields.
2. Notwithstanding this principle, severely eroded parts of the farm will be mitigated by grading and/or the installation of structural measures to control ongoing accelerated erosion.
3. Wherever possible, facility roads are laid out over existing farm roads.
4. Where possible, new facility roads that cross farmland are laid out to be useful for future farming needs.
5. While the entire site will need to be accessed during this installation of solar infrastructure, routine travel patterns should avoid crossing farmland soils unless necessary.
6. When practical use lower ground pressure tracked equipment or tractors and farm carts to haul construction materials across fields.
7. Vibration can cause compaction to penetrate deeper into the soil profile, operate track mounted pile drivers to disperse this force.
8. Construction equipment travel operation in agricultural fields will be suspended during and for 24 hours after rainfall events during which greater than 1-inch of rain falls within 24 hours.

9. Use perimeter roads around fields to avoid crossing fields with heavy equipment such as dump trucks or concrete trucks.

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Maintain Vegetation Cover During Construction

1. Protect soils from erosion losses and enhance fertility and soil structure using a cover crop sown prior to initiating land development.
2. A mix of annual rye grass and red clover is recommended for planting in early spring. If planting is to follow a crop in the fall either plant the permanent seed mix with a seed drill or provide a temporary cover crop of cereal rye and hairy vetch. If the cover crop is to be established during the growing season, quickly establishing buckwheat may be used. Application rates for seed should follow the Vegetation Management Plan or may be amended by other NRCS guidance.
3. Nutrients and lime should be added to the soil according the recommendations from soil tests taken in Task 1.1, all soil fertility recommendations should be reviewed by a Certified Professional Agronomist[2] (CPAg).
4. Maintain this cover crop during construction throughout the summer into the fall.
5. Install permanent seed at the start of spring construction or in the fall (refer to next section).

2 Certified by the American Society of Agronomy

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Establish and Maintain Permanent Vegetative Cover

If permanent seeding was not installed in the fall prior to the following spring construction start, it should be undertaken after racking is installed.

1. Seed mix to consist of cool season fescues noted for their hardiness and wide ecological amplitude and deeper rooted, short-stature, warm season grasses such as little bluestem (*Schizachyrium scoparium*) and purple love grass (*Eragrostis spectabilis*) and low growing nitrogen fixing forbs such as partridge pea (*Chamaecrista fasciculata*), red clover (*Trifolium pratense*) and trailing clover (*Lespedeza procumbens*) to sustain soil fertility.
2. During establishment frequent mowing may be required initially to control field weeds before they can set seed.
3. After successful establishment of the grasses and forbs, mowing frequencies may be reduced.
4. Mowing should not occur within 24 hours after a significant rainfall event when the soil would be susceptible to compaction.

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Maintaining the Soil's Nutrient Status During the Operation Phase

1. Fertilization needs will be low as little material will be taken from the fields and management in perennial grasses tightly cycles nutrients.
2. Once permanent cover is established, soil tests should be taken if plants show signs of nutrient stress.
3. Soil amendments should be applied according to the recommendations of the testing lab. The pH of the soil should be maintained between 5.5 to 8.0.

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Other Practices

7.1 Temporary Roads

For use when temporary access roads are required for heavy equipment to cross agricultural fields during construction or decommissioning:

1. Install geotextile matting designed for soil separation over the exposed topsoil (or if topsoil is stripped subsoil) surface prior to placing a 4-inch layer of processed stone for the road surface.
2. All such material for temporary access during construction or decommissioning will be removed upon completion of task.
3. Complete removal of the temporary access fill and geotextile are required upon completion of the project task(s) for which the road will be used.
4. The topsoil and subsoil should be decompacted by tillage after the roads are removed and seeded as described above.

7.2 Topsoil Removal and Windrow for Trenches and Slope Grading

1. When trenches are installed in agricultural soils, topsoil will be windrowed along the trench separately from subsoil/substrate stockpiles.

2. The depth of topsoil removal will include the entire A horizon down to the beginning of the B horizon. Generally, this will not exceed a 12-inch depth except in bottoms where topsoil thickness can exceed 24 inches.
3. During the trenching operation, site specific depths of topsoil stripping will be recorded by the environmental monitor.
4. Rough trench backfill and slope grading will be completed with subgrade materials at an elevation below the finished grade that matches the original topsoil thickness.
5. All topsoil material will be uniformly returned to restore the original topsoil depth.
6. Where preparation for the array layout requires cut and fill for the soil section, to the extent practicable, topsoil stockpiling will be located interior to the construction site rather than the margins.
7. Once reinstalled, the topsoil will be seeded and stabilized with mulch and tackifier applied by a hydro-mulcher or straw mulch either secured with coir or jute netting or crimped. Prior to mulching the site, appropriate nutrients and lime shall be added to the soil according to the results of soil tests.

7.3 Decommissioning

A separate Decommissioning Plan has been prepared as part of the D&M Plans provided to the CSC for decommissioning the entire Project area at the end of the Project life. This section only deals with agricultural soil manage during decommissioning which involves the removal of all infrastructure installed for the project down to a nominal depth of two feet below the finished grade. The goal is to return the site with soil quality comparable or better than the resource present at the beginning of the project. Decommissioning activities are described below.

7.4 Decompaction

1. At decommissioning in agricultural fields where topsoil was stripped to install slabs or gravel access roads, the slab or road will be removed to expose the original subsoil.
2. This subsoil will then be broken up by deep tillage using a deep-ripper or heavy-duty chisel plow when penetrometer readings exceed adjacent areas.
3. After the subsoil is decompacted, all stone and rock material four inches and larger in size that are at the surface shall be collected and disposed at the edge of the field away from wetlands.
4. Upon approval of the subsoil decompaction and the stone removal by the Inspector, the topsoil that has been maintained in vegetated windrows will be applied to match adjacent grades.
5. Agricultural land restoration will be completed when soils are not excessively wet, frozen, or incapable of vegetative stabilization.

7.5 Decommissioning Compaction Testing and Remedial Action

1. After project decommissioning is complete and during a period of relatively low soil moisture (e.g., at least 48 hours after a rainfall event during the growing season) subsoil compaction will be tested using a soil penetrometer or other soil strength/density measuring device.
2. Representative soil compaction tests will be performed for each soil map unit identified within the decommissioned arrays in the former agricultural fields. Soil compaction readings will be compared with farmland soils in the same soil map unit outside of the project limits.
3. Where representative subsoil compaction within the decommissioned array exceeds the baseline subsoil compaction, shattering of the soil profile will be performed using appropriate agricultural equipment.
4. Deep shattering will be applied during periods of relatively low soil moisture to ensure the desired mitigation and to prevent additional subsoil compaction.
5. Any oversized stone/rock material (4-inches or greater) brought to the surface by this operation will be removed.

7.6 Soil Testing After Decommissioning

1. Soil tests for the macronutrients N, P, and K, pH and organic matter content will be taken at a rate of one sample per 20 acres.