Agricultural Soil Protection Plan

Gravel Pit Solar Project
Town of East Windsor, Connecticut

PREPARED FOR

Gravel Pit Solar, LLC
Gravel Pit Solar II, LLC
Gravel Pit Solar III, LLC
Gravel Pit Solar IV, LLC
1166 Avenue of the Americas 9th Floor
New York, NY 10036

PREPARED BY

100 Great Meadow Road Suite 200
Wethersfield, CT 06109

JULY 27, 2020

Table of Contents

1

Introduction

This Agricultural Soil Protection Plan (Plan) was prepared by VHB, in association with Gravel Pit Solar, LLC, Gravel Pit Solar II, LLC, Gravel Pit Solar III, LLC, and Gravel Pit Solar IV, LLC (collectively, Gravel Pit Solar) and their Contractor H2 Enterprises, LLC.

This Plan was developed to minimize potential project effects on agricultural fields within the Project Area that consist of soil map units designated as Prime Farmland or Farmland of Statewide Importance. This Plan includes measures that have been developed to maintain and/or improve the quality of soil resource to the extent practicable with the expectation that the site can be returned to row crop agricultural use at the end of project operation. One of the goals of this Plan is to improve and maintain soil health during the operational phase of the Project by sustaining soil functions including groundwater recharge, carbon sequestration, water quality, and minimizing soil loss due to erosion.

2

Baseline Inventory

Baseline inventory sampling and analysis will be conducted prior to the start of construction. The purpose of the baseline sampling is to identify and quantify the soil resources, increase reclamation success, and promote a healthy and sustainable vegetative community throughout the life of the project.

1. Available Natural Resources Conservation Service (NRCS) mapping were evaluated in the project Area by two soil scientists using soil augers and shovels. Brief descriptions confirming or describing variations from the named soil series in the published mapping were recorded and geocoded on cell phones using ArcGIS Collector® software.
2. The work generally confirmed the soil mapping with the exception that most of the areas mapped as slope phases of the Enfield silt loam were found to contain slightly more fine sand than allowed in the series and classified as Agawam. These soils are similar and difficult to separate accurately, so the published soil map units were confirmed with an acceptable inclusion of a similar soil. Inclusions of dissimilar soils such as such as Manchester loamy sand or Hartford sandy loam were each less than 10 percent of any given Enfield map unit.
3. Conduct baseline soil tests for soil fertility for macronutrients nitrogen (N), phosphorus (P,) and potassium (K), select micronutrients, organic matter, and pH of the composite samples collected from upper 8 inches of the soil profile. Soil analytical results are provided as part of the baseline study.
4. In addition to nutrient analysis, the soil texture of the samples was determined by the soil lab to verify texture by feel descriptions prepared in the field. Soil compaction was evaluated using a penetrometer to evaluate the upper six inches

and six to 18 inches of the soil profile to identify any layers restrictive to rooting or permeability of water.

3

Agricultural Soil Protection Practices

The Agricultural Soil Protection Plan prescribes best practices to protect farmland soil quality, and, where possible, improve measured soil quality (health) parameters compared to baseline conditions. Best practices include:

1. To the extent practicable, the solar facility will be developed without modifying grades within existing farm fields.
2. Notwithstanding the principle described above, parts of the facility which have been heavily eroded will be mitigated by grading and/or the installation of structural measures.
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 will avoid crossing farmland soils unless necessary.
6. When practical use lower ground pressure tracked equipment 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 will be limited in agricultural fields when soils are visibility saturated following heavy precipitation events.
9. Use perimeter roads around fields to avoid crossing fields with heavy equipment such as dump trucks or concrete trucks.
10. Cover crops and deep rooted perennial vegetation will be used to promote the development of soil structure and reduce compaction potential.

11. Soil amendments will be applied using the 4R's of nutrient management to ensure that surface and ground water resources are protected from nutrient degradation.
12. When trenches need to be installed across farmland, the topsoil will be segregated from the subsoil and substrata. When the trench is backfilled care will be taken to replace the topsoil back at the top of the trench

4

Maintain Vegetation Cover During Construction

Vegetative cover is important to promote soil health and minimize erosional losses. Maintaining healthy vegetative cover will help to reduce the proliferation of noxious and invasive weeds. The goals of maintaining vegetative cover are as follows:

1. Protect soils from erosional losses and promote soil health by establishing and maintaining a vegetated surface and healthy root zone during construction and throughout the operational phase of the project.
2. Increase organic matter content of the soil to improve soil structure, increase the pool of nutrients available for cycling, and promote long-term carbon sequestration.
3. During the construction phase temporary erosion control will be provided by mulching and the use of temporary vegetative cover. Temporary vegetation will be established to promote soil stabilization and to minimize erosion during the construction phase and long-term vegetative cover during the operational phase of the project. If temporary cover crops are to be used, the seed mixture will consist of annual grass(es) along with brassica species (e.g., *Raphanus sativus*). Grasses provide fibrous roots to secure the soil and the brassica species have tap roots to break up soil compaction and also suppress potential weedy species. Permanent seed mixes will incorporate native warm season grasses and legumes and common introduced cool season grasses. Nurse crops may be incorporated in the permanent crop seed mixtures. All seeds will be planted either using drill seeding or broadcast seeding or may be applied hydraulically with a hydroseeder based on time of the year, site conditions and/or seed mix requirements. Application rates for seed should follow the Vegetation Management Plan or may be amended by other NRCS guidance.

4. Soil amendments should be applied at agronomic rates based on soil tests and plant growth. Agronomic soil amendment application recommendations will be reviewed by a Certified Professional Agronomist[1] (CPAg).
5. When possible, seeding will be conducted during the seeding windows provided by the Connecticut Guidelines for Soil Erosion and Sediment Control. At times seeding may take place outside of optimal seeding windows however monitoring will be conducted to ensure if the seeding is not successful the area which failed will be reseeded during the next optimal seeding window.

[1] Certified by the American Society of Agronomy

5

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 in the spring and "touched up" as racking is installed. Establishment and continual success of a permanent vegetative cover is critical to a successful project. A properly designed and maintained vegetative cover will improve surface and ground water quality, the surrounding agricultural community, increase biodiversity, and improve on-site soil health. The goal of the permanent vegetation cover plan is to have a vegetative community that stabilizes the site to minimize erosion through ecological succession to permanent perennial vegetative community. The permanent vegetative community is designed to be sustainable with low maintenance and high ecological and agricultural significance.

1. The seed mix to consist of cool season grasses 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 mowing may be required initially to control undesirable species before they can become established.
3. After successful establishment of the permanent vegetative community, mowing may be required for general maintenance and potential weed and shrub control. Mowing will be limited and only used when necessary.

4. Mowing should not occur within 24 hours after a significant rainfall event when the soil would be susceptible to compaction.

6

Maintaining Soil Nutrient Status During the Operation Phase

The vegetative community is designed to follow a successional plan from nurse crops and permanent vegetative seedlings to an established stand of permanent vegetative community. Once the successional sequence is under way minor maintenance of the vegetative community will be conducted to ensure that a healthy and productive grassland ecosystem is maintained. All soil amendments will be applied through the 4R soil nutrient management system; Right Place, Right Time, Right Source, and Right Rate.

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 CPAg based on soil analytical results.

7

Other Practices

7.1 Temporary Roads

Existing roads will be utilized as much as possible for temporary access during construction. Temporary access roads that are not located along existing roads and that require heavy equipment to cross agricultural fields during construction or decommissioning will use the following practices:

1. Install geotextile matting designed for soil separation over the exposed topsoil[2] (or subsoil if topsoil is stripped) 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.

[2] Upper most layer of soil that is most suitable for a growth medium, which is generally the Ap and the A horizons in crop fields. Topsoil is measured by the layer containing the most valuable soil resources, which may include the A, Ap, AB, and E horizons, depending on soil characteristics.

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 typically will not exceed 12-inches depth except in bottoms where topsoil thickness can exceed 18 inches. The Project will salvage actual depths of topsoil, not to exceed 18 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 salvage thickness.
5. All topsoil material will be uniformly returned to restore the original topsoil salvage depth.
6. Where preparation for the array layout requires cut and fill for the soil section, to the extent practicable, topsoil stockpiling will remain on site.
7. Once reinstalled, the topsoil will be seeded and stabilized with mulch. Mulch may consist of straw, wood, or excelsior and secured to the soil surface by crimping, tackifying or appropriate netting. . Prior to mulching the site, appropriate nutrients and lime shall be added to the soil based on soil tests and agronomic recommendations.

7.3 Long-term Topsoil Preservation

In areas where topsoil is not returned to the constructed areas the topsoil will be managed on site to promote continued viability. The following protocols will be used to maintain a healthy and functioning topsoil.

1. Topsoil will be stored in windrows not to exceed five feet in height.
2. Windrows will be seeded with permanent vegetative seed mix.
3. Until vegetative community is established the topsoil windrows will be protected against erosion and sediment transport with appropriate BMPs.
4. Vegetative community on the soil windrows will be managed to promote desirable vegetative species and minimize undesirable weedy species infestations.
5. Windrows will be placed in locations that will limit the likelihood of vehicular traffic and degradation.

7.4 Decommissioning Compaction Testing and Remedial Action

1. After project decommissioning is complete and when the soil moisture is at or near field capacity soil strength measurements will be obtained with a soil penetrometer. Other soil strength or compaction measurements may be used if done in accordance with accepted standards such as ASTM or Methods of Soil analysis.

2. Representative soil compaction tests will be performed for each NRCS soil map unit identified within the decommissioned arrays in the agricultural fields. Soil compaction readings will be compared with adjacent farmland soils in the same soil map unit outside of the project limits.
3. Where representative subsoil compaction within the decommissioned array exceeds the adjacent farmland subsoil compaction, decompaction of the soil profile will be performed using appropriate agricultural equipment.
4. Decompaction will be performed during periods of relatively low soil moisture to ensure decompaction is successful.
5. Oversized stone/rock material (4-inches or greater) in greater quantities than adjacent undisturbed areas brought to the surface by this operation will be removed.

7.5 Decommissioning

A separate decommissioning plan has been prepared and provided to the CSC for decommissioning the entire project area at the end of the project life. This section only deals with agricultural soil managed during decommissioning which involves the removal of all infrastructure installed for the project down to a nominal depth of 2 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 soil activities are described below.

7.6 Decompaction

1. At decommissioning in agricultural fields where topsoil was stripped to install slabs, pads, or gravel access roads will be removed to expose the original subsoil.
2. This subsoil will then be decompacted 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, if in greater quantities than baseline conditions, 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 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.

7.7 Soil Testing After Decommissioning

1. Soil tests for the macronutrients nitrogen (N), phosphorus (P), and potassium (K), pH and organic matter content will be taken at a rate of one sample per 25 acres.