



222 South 9th Street
Minneapolis, MN 55402

Phone: 860.932.3086

E-mail: rodney.galton@ecosrenewable.com

April 28, 2022

Melanie A. Bachman
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: Petition NO. 1220 – Sheep Grazing Plan

Dear Melanie,

I am writing to request that the Connecticut Siting Council (CSC) allow as part of the D&M plan, the use of sheep to maintain the vegetation within the limits of the approved solar facility located at 1240 Voluntown Road, Griswold. Windham Solar LLC (Windham) has been operating and maintaining the facility in accordance with the approved D&M plan, however, in an effort to further utilize green methods it is our desire to implement a sheep grazing plan.

Windham has been working with Vineyard Sky Farms Corp. (VSF) to establish the assets and the plans to effectively maintain the solar facility. The VSF Livestock Manager has visited the site and has worked with several consultants to develop a meaningful and real grazing plan. A site specific grazing plan has been attached for review.

The utilization of sheep will aid Windham in our efforts to further benefit the environment by not relying on mechanical means to maintain the vegetation at the solar facility. Thank you in advance for considering this request.

Thank you,

A handwritten signature in black ink, appearing to read "Rodney A. Galton", is written over a large, stylized circular flourish.

Rodney A. Galton

Grazing Management Plan
1240 Voluntown Road Solar Site
Griswold, CT

Melissa Staebner
Asset and Livestock Manager
Vineyard Sky Farms
Melissa.Staebner@vineyardskyfarms.com

Voluntown Solar/Griswold, CT Grazing Plan Utilizing Sheep

Voluntown Solar is 12.8 acres fenced with a well-established forage base for 2 years.

Site Infrastructure (roadways, ponds, catch basins, steep slopes, and inverter areas) limit the actual grazing area to 8.5 acres.

Objective: Maintain desirable vegetative ground cover on the site in a condition that will reduce erosion, and limit storm runoff. Controlling the vegetative growth under and around the panels within the solar site will be done utilizing sheep. Sheep will effectively prevent panel shading, maintain diverse forage populations, improve opportunity for flowering forb and plants increasing pollination. Additionally, sheep will produce natural fertilization to improve organic matter.

Background Information/Considerations:

Coordinating and managing of solar grazing with sheep requires flexibility and adjustments to properly maintain an ecologically balanced living environment. For planning purposes and actual conditions may require changes or allowances to properly maintain a healthy environment, as well as maintain the health of the flock.

Soils, Site Characteristics, Ground Cover

Soils can vary widely within a solar site which impacts the potential production of available feed. Other conditions that can affect soils are drainage, compaction, root depth and organic matter.

- Soil Analysis was completed in November of 2020 to determine the health of the soil.
- Utilizing a soil consultant – liming and fertilizer was applied prior to the grazing season and after removal of the sheep as per the consultant's recommendations. Sites will be resampled every two years to address soil pH and other nutrient limitations.

Site characteristics are also considered before grazing including slope, topography, catch basins and ponds within the site. Areas with steep slopes, ponds and catch basins are subject to erosion and will not be grazed. Additionally, sheep will not have access to roadways, inverter, or transformer pads.

Ground cover is well established and rooted (approx. 2 years) and contains a mixture of orchard grass, red and white clover, fescue, rye grass, forbs and other herbaceous flowering and pollinator friendly plants (as per agronomist evaluation) November 2020. Ideal growing conditions in Connecticut would encompass a grazing season from late April through October but is dependent on temperatures, rainfall, and other weather issues. Additionally, forage production may vary within the site do to soil quality, drainage and other stressors which may limit the amount and quality forage production.

Grass Growth: The rate of growth and vegetative conditions will fluctuate during the growing season. Early spring generally provides lush new growth and an abundance of forage. During summer generally there is a slower regrowth because of excessive heat and lack of precipitation. Some plants and forage species can enter a dormant phase during a drought. These conditions will require flexibility and adjustments in stocking rates and or frequency of grazing areas with limitations. The Voluntown site has two separate areas referred to as the upper and lower side. The forage seeding was completed at different times so the lower side has a more established well rooted base (as per soil consultant). The upper side has a good cover and in time will be the same. Lime and fertilizer were applied in the spring and fall of 2021 as per recommendations of the Uconn Soil Analysis Laboratory (see attachments).

Rotational Grazing Management Plan

Utilizing rotational grazing on a solar site is an excellent method and practice to reduce soil erosion, increase moisture retention in the soil, and develops plant root systems thus improving the forage production and quality.

This system involves managing the solar site (farm) using portable fences and creating paddocks/smaller areas or units within the site. Sheep are confined to each paddock for a period, monitoring the plant height and grazing to insure that over grazing doesn't occur. The sheep are moved to a new paddock. The original paddock is in a rest period to regrow. This allows the regrowth and grass to recover – generally in spring the rest/recovery time is faster than in late summer and fall. Several major factors impact the length of time for regrowth including weather, soil condition and forage base. Depending on the size of paddock, stocking density and forage base will determine the rotation schedule. Rotations can range from daily to weekly depending on the site. The period is chosen by the flock manager after daily observations and inspections. The length of stay for the sheep within a paddock is basically determined by start and stop grazing heights of the plants and overall availability of forage and flock health. Daily monitoring is done for forage amount and quality, as well as flock health.

Fence – Vineyard Sky Farms has selected Premier Electro-Net Fence with a solar powered battery for creating the paddocks. The panel arrangements and infrastructure will dictate the paddock sizes and dimensions. Signage will indicate grazing sheep on exterior fencing and electric fence will be posted. Fence lines will be trimmed periodically to insure proper functioning. Fence lines will be walked daily to check security. Exterior fencing is eight feet tall chain link with a ground wire.

Water– Sheep will have access to clean fresh water daily via 50 gallon holding troughs. Water will be transported daily to the site from the barn via a 250-gallon tank.

Animal Health - Prior to taking the sheep to the site all sheep will be inspected for body condition and physical soundness. The following protocols will occur to insure proper transitioning to the solar site.

1. All sheep will transition to a limited grain diet and consume dry hay one week prior.
2. Make sure sheep are exposed to electric fence 2 weeks prior to site
3. Sheep will remain in the bedded pack to monitor health
4. Hooves will be trimmed 1 month prior to going to site
5. Sheep will be shorn 2 weeks prior to moving to the site
6. Vaccinations or booster shots will be given 1 month prior going to site
7. Fecal samples will be taken to determine if worming is necessary before going on site
8. Tail banding and castration of lambs will be done 6 weeks prior to going on site
9. Sheep will be weighed prior to day of transporting to site

On Site Sheep Monitoring

1. Daily monitoring and counting sheep numbers, visual evaluation of flock
2. Body condition scoring will be weekly to evaluate overall health and nutrition of flock
3. Water Check and Fill daily
4. Worming if indicated by fecal matter samples
5. Mineral supplement blocks placed strategically near water under cover replenish on an as need basis to ensure sheep are getting vitamin and minerals requirements

Grazing Sheep – Vineyard Sky Farms

Breed: Dorpers-require less feed to maintain condition, non-selective grazers able to do well in a range of different types and quality of feed, fast growth, strong instinct to flock when predators come.

Groups available for grazing – not all groups will graze at Windham

Description	Number of Ewes Available
Mature Ewes > 3 years old	21
Mature Ewes < 3 years old	24
Yearling Ewes	31
Lambs < 1 year	50-60

Voluntown/Griswold solar Site Stocking Rate

8.5 grazable acres X 4 adult sheep per acre = 34 total sheep

Stocking Rate - is the number of sheep per acre (grazeable) of the entire solar unit. A general rule of thumb is 4 ewes per acre, ewe/lamb pairs 3 per acre. Flock Managers need flexibility to manage the stocking rate and the rest periods between grazed paddocks.

These stocking rates are based on forage balance availability that has appropriate vegetative covers and species for sheep grazing, as well as good soil and drainage to endure the grazing season April-October.

**Early season when grass is growing fast adjustments will be made to stocking rate and forage management may be necessary. **

Paddock Identification and Size

Paddock Number	Description	Acres
1	Lower side – left of roadway	4
2	Upper side – right of roadway	4.5

Estimate the Forage Demand

The forage demand is the amount of forage weight on a dry matter basis (DM) required for the flock per day. Sheep consume in dry matter about 3.5% of their body weight per day.

Number of Adult Sheep 34 X150 (average lbs.) = X .035 = 178.5 lbs. daily flock requirement (Dorper weights may be higher). Groups with a higher avg. weight will be adjusted accordingly and may require more feed.

** Actual number of sheep on site and per paddock will be determined by visual evaluation and consultation with the soil/agronomy consultant. Forage evaluation, sampling will be done during the spring, summer and fall seasons.

Lime will be applied prior to the sheep grazing (early spring) and after the sheep come off (late fall) as per the soil consultant’s recommendation of 400lbs. of pelletized lime per acre.

The applications of lime will be to improve the soil pH which will help increase the availability of other nutrients to improve the sustainability of the forage.

Estimate the Forage Supply

Estimated forage supply is the amount of forage dry matter predicted to be available for grazing per acre. Numbers will fluctuate depending on season, rainfall, and other uncontrollable factors. The numbers presented are for broad planning purposes. Adjustment will be made evaluating and measuring sites at specific times and rotations.

Use 800 lbs. of DM/ac. Available unless forage is measured on site

Lower Side Paddock $800 \times 4.0 = 3200$ DM / 400 depending on avg. wt.

MAXIMUM DAYS = 8

Lower Paddock will be rotated every 8 days depending on stocking density.

More frequent rotation will have positive effects on the forage plant growth. Soil tests on the lower side have indicated a more desirable pH and more desirable forage base with a lower weed population. This lends itself to a longer period of grazing.

Sheep stocking rate will be adjusted based on continued measuring and evaluation of the forage growth.

Upper Paddock will be rotated every 8 days or have a higher stocking rate as it contains more acreage.

Soil tests on the upper side paddock have indicated a higher organic matter which will create a more desirable forage base. Visual evaluation concluded in fall of 2021 upper side had a lower weed population. This lends itself to a longer period of grazing. Additionally, more sheep could be placed

Depending on forage growth and availability of sheep, these paddocks will be sub divided during the early spring flush of grass growth and if forage availability increases during the grazing season.

The Voluntown /Griswold solar site lends itself to a viable solar grazing site. The overall site and infrastructure are adaptable to a rotational grazing system. Forage base and soil analysis have been completed and indicate a positive environment for producing a sustainable forage. The flock of Dorpers are known to be non-selective grazers and can adapt to a wide variety of forage and maintain body condition. Rotational grazing at this site will reduce the need for mechanical intervention and be an environmentally sound practice.

References and Consultants

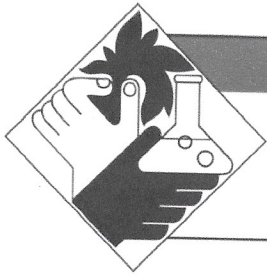
**University of Maine Cooperative Extension – Solar Farm Grazing Best Management Practices
(BMP) for Sheep – August 2021**

American Solar Grazing Association Member Webinars, solargrazing.org

Uconn Soil Nutrient Analysis Laboratory <http://www.soiltest.uconn.edu>

Helena Chemical Company – Andrew Hukowicz, Applicator/Seed Specialist

David Postemski – Crop and Soil Consultant – Lebanon, CT



UConn Soil Nutrient Analysis Laboratory

6 Sherman Place, Unit 5102, Union Cottage
Storrs, CT 06269-5102
860-486-4274
www.soiltest.uconn.edu

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COLLEGE OF AGRICULTURE,
HEALTH AND NATURAL
RESOURCES
PLANT SCIENCE AND LANDSCAPE
ARCHITECTURE

Soil Test Report

Order Number: 13561

Prepared For:

Melissa Staebner
104 Blue Hill Road
Bozrah, CT 06334

mjstaebner@gmail.com
336.469.3131

Sample Information:

Sample Name: GriswoldLower
Lab Number: 9273
Area Sampled:
Received: 11/12/2020
Reported: 11/18/2020

Results

Nutrients Extracted From Your Soil (Modified Morgan)

		Below Optimum	Optimum	Above Optimum	Excessive*
Calcium	> 4000 lbs/acre				
Magnesium	172 lbs/acre				
Phosphorus	460 lbs/acre				
Potassium	306 lbs/acre				

* Excessive only defined for Phosphorus (>40 lbs/acre)

Soil pH (1:1, H ₂ O)	7.0	<u>Element</u>	<u>ppm</u>	<u>Soil Range in CT</u>	
Est. Cation Exch. Capacity (cmole+/100g)	17.0	Boron (B)	0.5	0.1 - 2.0	
% Organic Matter	5.5	Copper (Cu)	0.1	0.3 - 0.8	
Buffered pH (Mod. Mehlich)	6.5	Iron (Fe)	2.3	1.0 - 40.0	
		Manganese (Mn)	4.7	3.0 - 20.0	
		Zinc (Zn)	3.3	0.1 - 70.0	
<u>Base Saturation</u>	<u>%</u>	<u>Suggested</u>	Sulfur (S)	54.2	10 - 100
Potassium	2	2.0 - 7.0	Aluminum (Al)	11.1	10 - 300
Magnesium	4	10 - 30	Est. Total Lead (Pb)	low	
Calcium	92	40 - 50			

Limestone & Fertilizer Recommendations for Grass Pasture - Maintenance

Limestone (Target pH of 6.6)	Nitrogen, N	Phosphorus, P ₂ O ₅	Potassium, K ₂ O
0 lbs / acre	50 lbs / acre	0 lbs / acre	60 lbs / acre

Comments:

Without manure, maintain in subsequent years by topdressing 40 - 60 lbs/A N, 20 - 30 lbs/A P₂O₅ and 30 - 40 lbs/A K₂O in early spring and again in early June.

LIMESTONE:

No limestone is necessary

Limestone & Fertilizer Recommendations for Grass Pasture - Intensively Managed

Limestone (Target pH of 6.6)	Nitrogen, N	Phosphorus, P ₂ O ₅	Potassium, K ₂ O
0 lbs / acre	100 lbs / acre	0 lbs / acre	80 lbs / acre



UConn Soil Nutrient Analysis Laboratory

6 Sherman Place, Unit 5102, Union Cottage
Storrs, CT 06269-5102
860-486-4274
www.soiltest.uconn.edu

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Soil Test Report

Order Number: 13561

Prepared For:

Melissa Staebner
104 Blue Hill Road
Bozrah, CT 06334

Sample Information:

Sample Name: GriswoldUpper
Lab Number: 9272
Area Sampled:
Received: 11/12/2020
Reported: 11/18/2020

mjstaebner@gmail.com
336.469.3131

Results

Nutrients Extracted From Your Soil (Modified Morgan)

		Below Optimum	Optimum	Above Optimum	Excessive*
Calcium	2259 lbs/acre				
Magnesium	103 lbs/acre				
Phosphorus	69 lbs/acre				
Potassium	187 lbs/acre				

* Excessive only defined for Phosphorus (>40 lbs/acre)

Soil pH (1:1, H ₂ O)	5.9	Element	ppm	Soil Range in CT
Est. Cation Exch. Capacity (cmole+/100g)	11.1	Boron (B)	0.3	0.1 - 2.0
% Organic Matter	5.7	Copper (Cu)	0.1	0.3 - 0.8
Buffered pH (Mod. Mehlich)	6.1	Iron (Fe)	4.9	1.0 - 40.0
		Manganese (Mn)	3.7	3.0 - 20.0
		Zinc (Zn)	1.7	0.1 - 70.0
Base Saturation	%	Suggested	Sulfur (S)	28.1
Potassium	2	2.0 - 7.0	Aluminum (Al)	61.1
Magnesium	4	10 - 30	Est. Total Lead (Pb)	low
Calcium	51	40 - 50		

Limestone & Fertilizer Recommendations for Grass Pasture - Maintenance

Limestone (Target pH of 6.6)	Nitrogen, N	Phosphorus, P ₂ O ₅	Potassium, K ₂ O
3,000 lbs / acre	50 lbs / acre	0 lbs / acre	80 lbs / acre

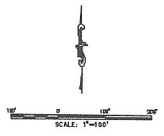
Comments:

Without manure, maintain in subsequent years by topdressing 40 - 60 lbs/A N, 20 - 30 lbs/A P₂O₅ and 30 - 40 lbs/A K₂O in early spring and again in early June.

Limestone & Fertilizer Recommendations for Grass Pasture - Intensively Managed

Limestone (Target pH of 6.6)	Nitrogen, N	Phosphorus, P ₂ O ₅	Potassium, K ₂ O
3,000 lbs / acre	100 lbs / acre	0 lbs / acre	100 lbs / acre

Attachment 3 Solar Grazing Paddocks
1240 Voluntown Road, Griswold, CT



VOLUNTOWN SOLAR
1219 & 1240 Voluntown Road
Griswold, CT 06351
**OVERALL
SITE PLAN**