Vegetative Ground Cover, Management, and Weed Control

Findings and Recommendations
for the Prairie Solar Energy Project
Sidney, Illinois

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1.0 INTRODUCTION

1.1 Purpose and Scope

The purpose of this report is to identify and recommend vegetative ground cover, as well as maintenance and weed control appropriate to the site of the proposed Prairie Solar, LLC solar farm, located outside of Sidney, Illinois in order to offset disturbance to BEST PRIME FARMLAND as required by the Champaign County Photovoltaic (PV) Solar Farm requirements in the securing of a Special Use permit. Recommendations are based upon review of existing data, research, site inspection, and landowner interviews.

1.2 Project Site Location

The proposed Prairie Solar project site lies south and east of the Village of Sidney in Champaign County, Illinois. The project site is contained within an area bounded by the Norfolk Southern Railway tracks to the north, Sidney Township Road 2400E to the east, Sidney Township Road 800N to the south, and the Union Pacific Railway tracks to the west. See Figure 1: Proposed Project Location.

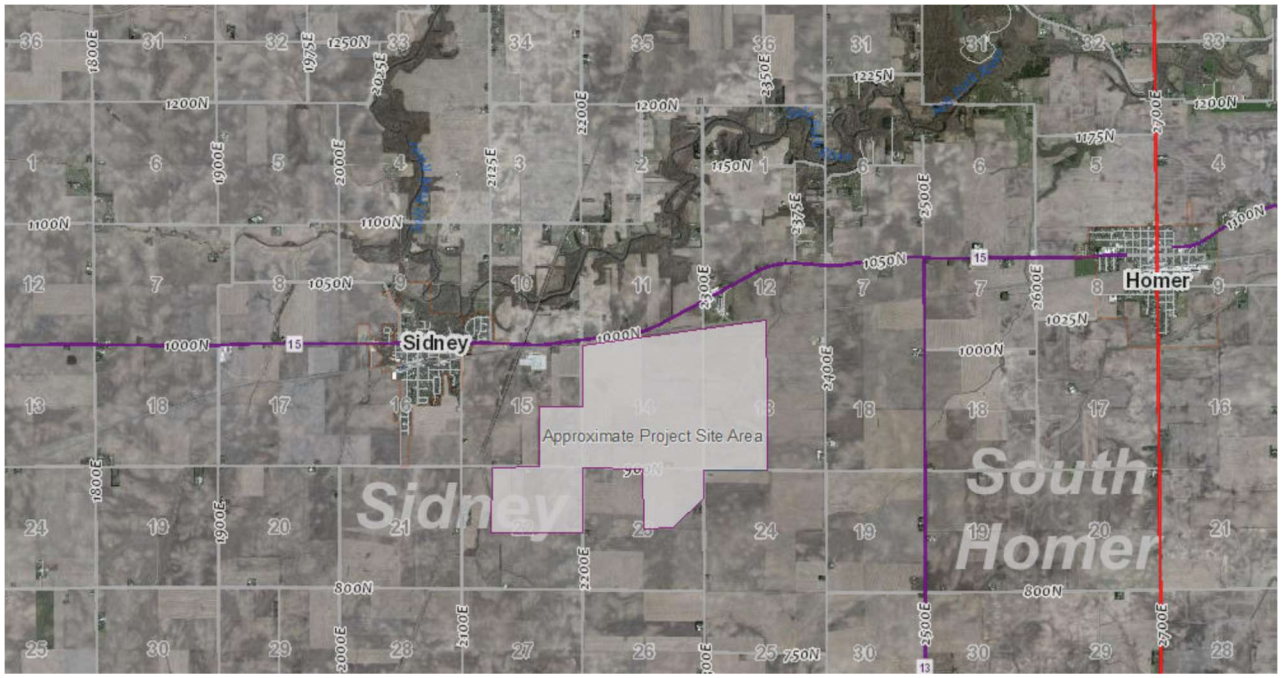

Figure 1: Proposed Project Location

1.3 Assessment of Site Conditions

The approximate 1200 acre site consists of mainly land in agricultural, row-crop use. The terrain is relatively flat. See Figure 2: Site Terrain. The black silty clay loam soils are 90% composed of Drummer (Illinois' state soil) and Flanagan soil types. A limited amount of native vegetation such as Indian Grass exists within the drainage ditch corridor.

1.4 Soil Samples

Soils samples were taken from five random areas encompassing the four cardinal directions of the proposed solar farm site. Results will be used to choose locally adapted seeds available at the time of project commencement to ensure vegetation success.

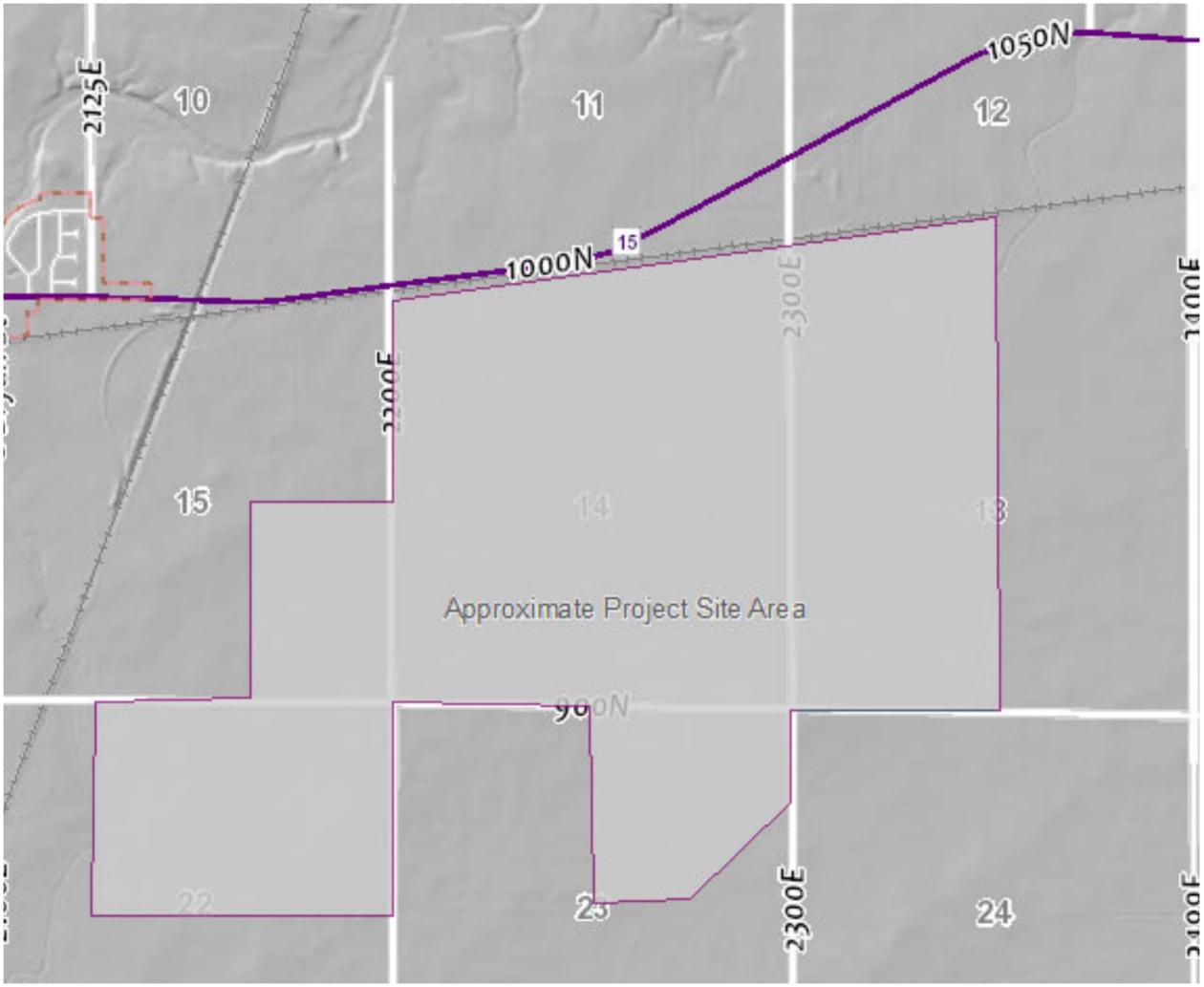

Figure 2: Site Terrain

1.3 Project Description

Prairie Solar LLC and BayWa r.e. proposes to develop a solar facility up to 150 MW in size, located on approximately 1,200 acres of leased land currently used predominantly for row crop.

The solar project will electricity generating equipment including photovoltaic solar panels mounted on a single-axis, rotating mount system which allows the panels to follow the sun daily from east to west. The racking is supported by pilings driven into the ground. The project site will also contain inverters and perimeter fencing. The photovoltaic solar panels will have an anti-reflection coating to minimize glare and any potentially related impacts to wildlife including birds and bats.

Cover vegetation will be utilized throughout the solar farm inside the perimeter fence. Outside the fence, vegetation associated with the project outside the fence includes only residential screening.

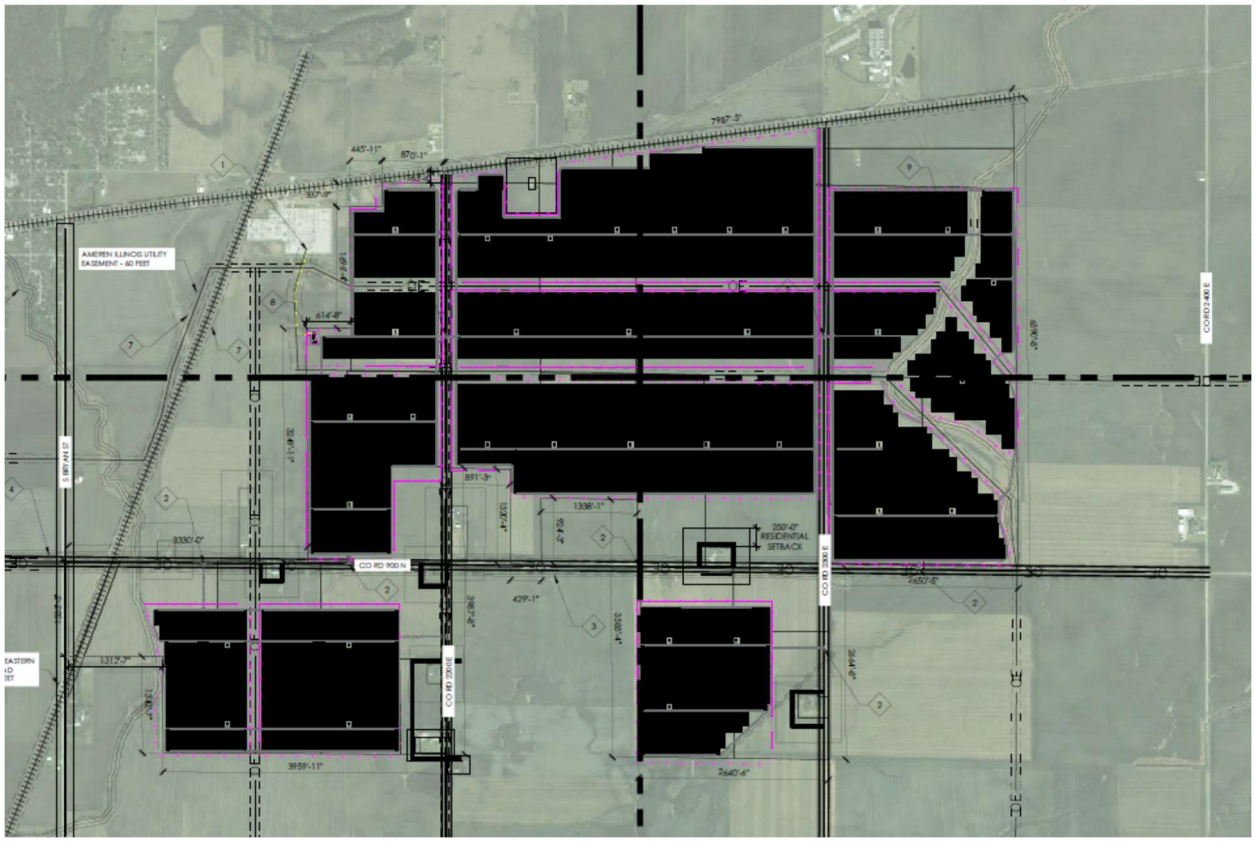

Figure 3: Proposed Site Plan

2.0 VEGETATION

2.1 Recommended Natives Species

Cover-cropping with short native grass species creates biomass both above and below ground and over time improves the integrity of the soil by

*controlling water run-off and erosion

* cultivating microbial matter

* slowing the movement of soil particles

* increasing organic matter

* improving water infiltration

* preventing soil compaction

Due to the unique circumstances of solar farms, short native prairie grasses ranging from 2 to 2.5 feet in height are recommended. Mowing will not affect the integrity of the native prairie grasses and is encouraged.

Seed mixes from native plant nurseries will be dependent on specific site soil and sun conditions. Most seed companies are willing to put together a seed mix that is suited for individual sites. Working with a reputable native seed company is important for the success of the prairie.

The following vegetation recommendations assume the use of single-axis, sun tracking systems, allowing for maximum daily sunlight exposure.

Recommended Shortgrass Prairie Grasses and Sedges*

Botanical name	*Common Name*	*Height*
Schizachyrium scoparium	Little Blue Stem	2-3 ft.
Bouteloua curtipendula	Side-oats Grama	2-2.5 ft.
Sporobolus heterolepis	Prairie Dropseed	2-3' ft.
Muhlenbergia racemosa	Upland Timothy	2' ft.
Carex brevoir	Plains Oval Sedge	1' ft.

Viability and height of grasses will vary due to soil and light conditions specific to each site area. A site and soil analysis is always recommended to determine the best species for the location.

*Height information above derived from *Illinois Wildflowers* (Hiltey) and Prairie Moon Nursery website: www.prairiemoon.com

2.2 Soil Samples

On October 14, 2018, soil samples were collected from five random locations throughout the proposed solar facility project area. The soil is being tested for the following characteristics:

1. pH
2. P
3. K
4. Organic material

In order to ensure productivity and maximum weed suppression of the above recommended ground cover vegetation, final selection of locally adapted seed available at the time of project commencement will be based on the soil sample findings.

2.3 Habitat

The above recommended native prairie grasses provide habitat for insects along with providing seeds that serve as food sources to small mammals, birds, reptiles, and amphibians. The establishment of a native grassland provides cover for birds and small animals to hide from predators. By reestablishing native prairies as a "cover crop" for solar farms, biodiversity is increased.

3.0 VEGETATION ESTABLISHMENT

3.1 Site Preparation

If the land had a corn crop last season, it is advantageous to continue with normal tillage practice to help reduce the corn stubble and establish a seedbed for spring native planting. Bean ground does not need to be tilled. Most agricultural land has been treated with herbicides on an annual basis, ensuring that the weed seed population is relatively under control. However, knowledge of the past herbicide treatment history of the farmland is helpful before planting the native cover crop.

1. Elimination of all existing plant material is the first step. This is accomplished by a series of herbicide sprayings. Well in advance of the project start date, apply a non-selective herbicide. If the site greens up, reapply until no living plants are present. An experienced, Illinois Licensed Applicator should always be employed in order to avoid overuse of herbicides.
2. Amendments to the soil such as PH, nutrient quantities, and organic matter, based on the soil samples, to the soil are to be made before the prairie planting begins, if desired.

3.2 Planting

Ideally, the site should be planted and somewhat established before construction begins, allowing the contractors to drive over new seedlings. Areas that become thinned or not established will be replanted. Native prairie grasses are resilient and given the opportunity, will take over the site and flourish.

1. Sow seeds as early as possible. Established plants will help prevent soil movement. Soil temperature is very important when planting native grasses. Soil temperatures of 60-65 degrees are usually reached around June. A September/October fall planting can be done weather permitting. Early seeding creates earlier ground cover and greater biomass, increasing weed suppression.
2. Using the no till method, plant grasses and nurse crop seeds with a fluffy seed drill. This method ensures the best seed to soil contact and increases germination ensuring the quick establishment of the site. Drilling, rather than broadcasting seeds provides for greater uniformity of the plants. Uniformity enhances weed control. Conventional planting practices such as plowing and disking allow for unwanted seeds in the germination zone, resulting in a flush of undesirable plants.
3. Plant a nurse crop with the native prairie grasses to control weeds and retain soil moisture. Oats is a recommended nurse crop for this function.

4.0 MAINTENANCE PLAN

After grasses have emerged, it is very important to monitor weekly for any broadleaf outbreaks. If an outbreak occurs, broadleaf herbicide must be applied, ideally at the third and fourth leaf stage to ensure a good kill on the broadleaf weeds.

During the first year, the growth of grasses occurs predominantly underground. About 80 percent of broadleaves can be controlled by mowing at a height of 10-12 inches, helping control broadleaves and other invasive species. The planting of multiple species naturally helps to control weeds and diseases. Although never maintenance free, once a prairie has been established for 3-5 years, it becomes easier to manage.

First 3-5 Years:

1. Inspect project site once to twice a month during the growing season (March – September) for broad leaf weeds.
2. Spot mow or spot spray with herbicide to control any broad leaf weeds as identified by maintenance or landscape inspection personnel.
3. Begin a complete mowing July 1st to prevent the release of mature seeds.

4. Depending on growth conditions, a second mowing later in the season may be required.
5. Drummer soil tends to maintain the water table close to the surface in areas with 0-2% slope. The project area may experience drainage issues during the period of vegetation establishment. Replant, if necessary.

5.0 WEED CONTROL

5.1 Illinois Noxious Weed Law 505 ILCS 100/

Section 3 of the Illinois Noxious Weed Law (505 ILSC 100/) states:

"Every person shall control the spread of and eradicate noxious weeds on lands owner or controlled by him and use such methods for that purpose and at such times as are approved and adopted by the Director of the Department of Agriculture"

5.2 Noxious Weed List

ILLINOIS ADMINISTRATIVE CODE

TITLE 8: AGRICULTURE AND ANIMALS
CHAPTER I: DEPARTMENT OF AGRICULTURE
SUBCHAPTER f: NOXIOUS WEEDS
PART 220 ILLINOIS NOXIOUS WEED LAW
SECTION 220.60 NOXIOUS WEEDS

Section 220.60 Noxious Weeds

The following plants within the sovereign territory of the State of Illinois are designated and declared noxious weeds:

a) Marihuana (Cannabis sativa L.);

b) Giant Ragweed (Ambrosia trifida L.) within the corporate limits of cities, villages, and incorporated towns;

c) Common Ragweed (Ambrosia artemisiifolia L.) within the corporate limits of cities, villages, and incorporated towns;

d) Canada Thistle (Cirsium arvense);

e) Perennial Sowthistle (Sonchus arvensis);

f) Musk Thistle (Carduus nutans);

g) Perennial members of the sorghum genus, including johnsongrass (Sorghum halepense), sorghum almum, and other johnsongrass X sorghum crosses with rhizomes; and

h) Kudzu (Pueraria labata).

(Source: Amended at 26 Ill. Reg. 14644, effective September 23, 2002)

5.3 Noxious Weed Control Plan

6. Train all maintenance personnel in addition to landscaping personnel to recognize any of the weeds designated as noxious by the State of Illinois. Early identification will minimize costs through early eradication thereby easily controlling potential spread of noxious vegetation. Since the project is not located within the corporate limits of a city, village, or incorporated town, Giant Ragweed and Common Ragweed are not considered noxious weeds in this setting.
7. Inspect project site once to twice a month during the growing season (March – September) for noxious weeds
8. Spot mow or spot spray with herbicide to control any noxious weeds identified by maintenance or landscaping personnel.
9. Begin a complete mowing July 1st to prevent the release of mature seeds.
10. Depending on growth conditions, a second mowing later in the season may be required.
11. Periodically, additional weeds are added to the Illinois Noxious Weed Law. Statutes should be reviewed yearly to ensure continued compliance with the law.

6.0 CONCLUSION

The soils within the project site were originally formed by prairies over thousands of years. They are beautiful soils with a high organic matter, great nutrient availability, and good water retention capacity. Taking land out of agricultural production is a topic of great public concern. The hosting of solar energy production facilities on agricultural land is not a permanent land use conversion.

By reestablishing native prairies as a "cover crop" for solar farms, biodiversity will be increased, organic matter intensified, and soil erosion prevented. Resting agricultural land with cover

crops remedies itself to a healthier state as the natural processes are reestablished. Over the life of the solar facility, the land will become healthier and rejuvenated for future generations of production agriculture.

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7.0 REFERENCES AND ADDITIONAL RESOURCES

Illinois Invasive Plant List. Center for Invasive Species and Ecosystem Health. https://www.invasive.org/species/list.cfm?id=152

Illinois Wildflowers. John Hilty. http://www.illinoiswildflowers.info/ (detailed, searchable website for native herbaceous plants in Illinois

Madson, John. 1993. *Tallgrass Prairie*. Nature Conservancy/Falcon Press

Magdoff, Fred and Van Es, Harold. 2009. *Building Soils for Better Crops.* nit Book Press