

Site

10' Index Contour

2' Intermediate Contour

Surface Elevation (ft)

- 970.1 - 980.0
- 980.1 - 990.0
- 990.1 - 1,000.0
- 1,000.1 - 1,010.0
- 1,010.1 - 1,020.0
- 1,020.1 - 1,030.0
- 1,030.1 - 1,040.0
- 1,040.1 - 1,050.0

Surface Flow

0 450 900

Feet

USDA NAIP Imagery, 2021

TOPOGRAPHY

Vegetation
Management Plan
Birch Coulee Solar LLC

FIGURE 3-7



3.6 Hydrology

The Site is located within the Minnesota River – Mankato Watershed (major watershed #28) and generally slopes southwest toward the Minnesota River. The DNR Public Water Inventory (PWI) does not identify any public watercourses or basins within the Site.

Non-public watercourses (4.25 acres) were identified within the Site, and generally align with the county-managed drainageways that eventually drain to Purgatory Creek (Figure 3-8).

The Renville County Drainage Department provides administration and maintenance services for 769 miles of open drainage channel and 1,368 miles of drain tile (reference (15)). This includes ditch channel maintenance, vegetation and brush control, tile repair, and buffer strip compliance.

County-managed waterways are shown on Figure 3-8. County Ditch 109A is an open ditch system that generally traverses through the Site from the northeast corner to the south. Judicial Ditch 14-23 is an open ditch system that traverses east/west along a southern boundary of the Site prior to becoming a part of County Ditch 109A. Renville County Drainage Department manages both ditches and their associated drain tiles within the Site Figure 3-8.

According to the U. S. Fish and Wildlife Service National Wetland Inventory (NWI) dataset, the wetlands mapped within the Site are associated with the watercourses/ditches and classified as riverine communities. Twenty-two water resources were delineated within the Site with 18 classified as wetlands (Figure 3-8). Most of the wetlands were in tilled agricultural fields. Of the 18 delineated wetlands, 15 were identified as seasonally flooded basins, two as saturated fresh (wet) meadows, and one as a temporarily flooded fresh (wet) meadow. Most of the agricultural fields were observed to have functioning drain tile present. The Birch Coulee Solar design as proposed would avoid permanently impacting delineated wetlands. For example, no constructed access roads are anticipated to be placed in wetlands.

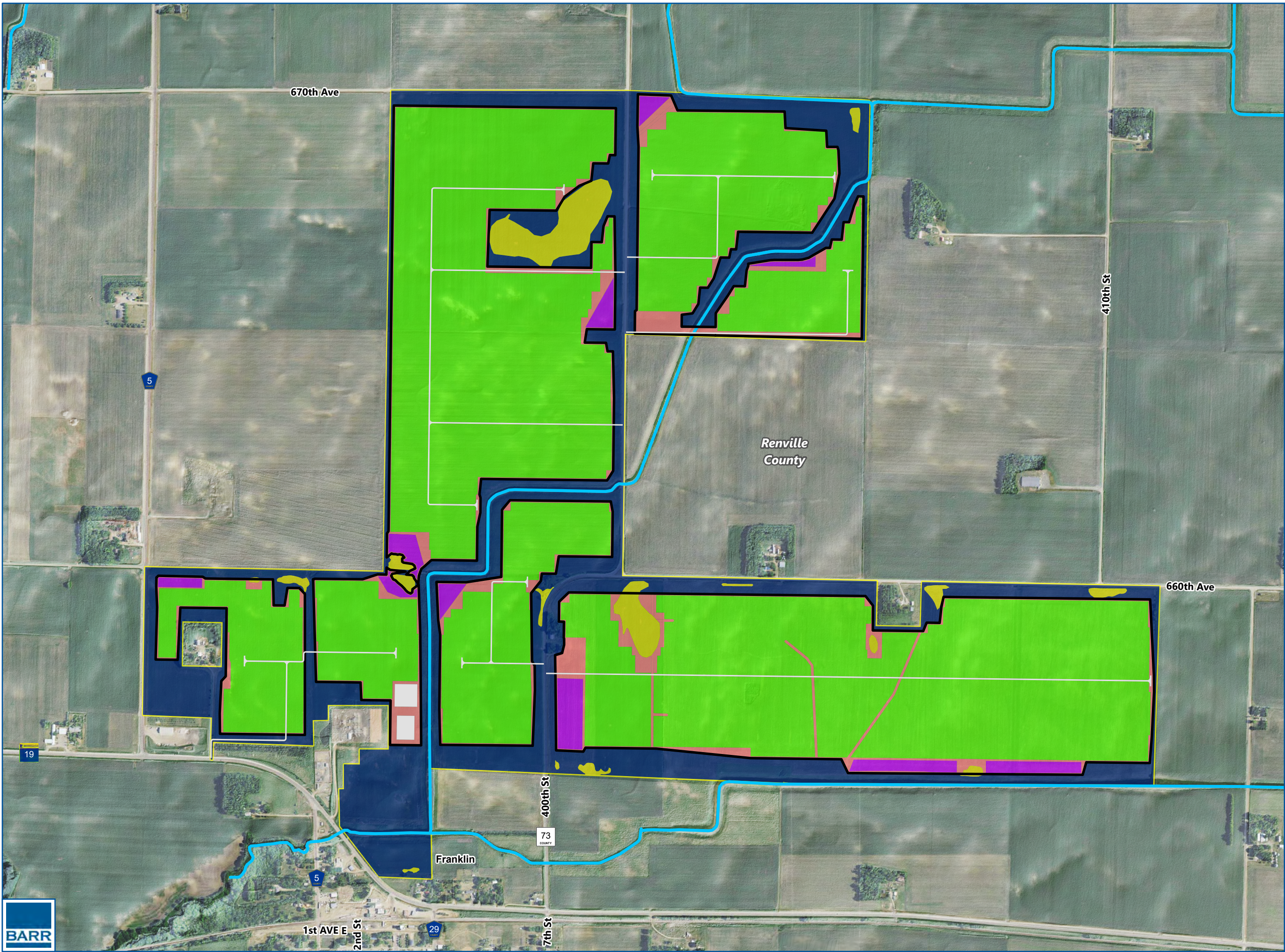


4 Vegetation Management Units

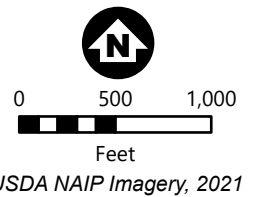
The Project layout includes several blocks of arrays that are divided by public roads, ditches, and infrastructure including access roads, collector lines, etc. Birch Coulee Solar will manage each of the blocks with the same goals and objectives and consist of the same Vegetation Management Unit (VMU) types as defined below. There are six different VMUs for this Project as shown in Figure 4-1 and described below.

1. **Array VMU** will be the array footprint including underneath panels and in array rows, and immediately surrounding equipment and roads within the arrays.
 - a. Seeded with diverse and short-statured native species that should remain shorter than 30 inches tall and will include grasses, sedges, and forbs.
 - b. Provide high-quality native prairie habitat and regularly maintain to prevent interference with operations, reduce thatch, and control undesirable plant species.
2. **Perimeter Short Native VMU** will be in areas outside the arrays but still within the fences in operational portions of the Site.
 - a. Seeded with diverse native species that should remain shorter than 4 feet tall and will include grasses, sedges, and forbs.
 - b. Provide high-quality native prairie habitat and maintain for control of undesirable species, to prevent interference with operations, and to reduce thatch.
3. **Perimeter Mixed Height Native VMU** will be primarily outside the fenced area and may include some areas within the fenced area separate from operational areas.
 - a. Seeded with diverse native species with some species taller than 4 feet and will include grasses, sedges, and a high diversity of forbs.
 - b. Provide high-quality native prairie habitat and maintain to prevent noxious and undesirable species with periodic maintenance to reduce thatch accumulation.
 - c. Birch Coulee Solar will exclude the 16.5-foot required buffer area adjacent to and on each side of county-managed drains (County Ditch 109A and Judicial Ditch 14-23 shown as “33-foot buffer area excluded from VMU” on Figure 4-1) from this VMU as required per the Buffer Ordinance (reference (16)). If reseeding is required, those efforts will be coordinated with the Renville County Drainage Department. Birch Coulee Solar will not assume responsibility for long-term management, monitoring, and restoration standards given that this buffer area is under the control of the Renville County Drainage Department.
4. **Stormwater VMU** will be in stormwater basins inside the fence throughout the Site.
 - a. Seeded with diverse native species with emergent wetland and sedge meadow species, and will include a very high diversity of grasses, sedges, and forbs.
 - b. Provide wetland habitat along with infiltration and stormwater retention functions and maintain to prevent noxious and undesirable species.

5. **Wetland VMU** (if needed) will be in existing delineated wetlands throughout the Site.
 - a. Wetlands are not expected to be disturbed during site construction. As such, they are being treated as a separate VMU until potential impacts are better understood (anticipated closer to 90% design). Any disturbed wetlands will be seeded with the same diverse native species as the Stormwater VMU. If no disturbance occurs, natural wetlands are not intended to be seeded or actively managed with the exception of the following bullet.
 - b. Maintain existing and/or seeded vegetation to prevent noxious and undesirable species. Vegetation management and/or reseeded may be completed in the wetland VMUs if noxious and undesirable species are present depending on the species and degree of establishment.
6. **Fenceline VMU** will be composed of non-native fescues that are low-growing and typically have low maintenance requirements as compared to standard turf grasses.
 - a. Mow and/or treat with herbicide as needed to control vegetation along the fences and to maintain a perimeter less susceptible to wildfire.



- Site
- Gravel
- Fenceline VMU
- Array VMU
- Perimeter Short Native VMU
- Perimeter Mixed Height Native VMU
- 33-foot buffer area excluded from VMU
- Stormwater VMU
- Wetland VMU



**MANAGEMENT
UNITS**
Vegetation Management Plan
Birch Coulee Solar LLC
FIGURE 4-1



5 Management Objectives

5.1 Native Vegetation VMU Objectives

Birch Coulee Solar will be managed with diverse, native vegetation except along the fence lines (Section 5.2). The objectives below apply to all areas with native vegetation.

Short-term objectives:

- Use appropriate BMPs and comply with the Construction Stormwater General Permit and Stormwater Pollution Prevention Plan (SWPPP).
- Carefully monitor construction activities including seeding and vegetation establishment.
- Minimize soil disturbance and compaction and employ soil handling best practices to avoid subsoil mixing.
- Properly prepare seedbeds (including decompaction, if needed) for those areas disturbed during construction.
- Install seed mixes with a high diversity of native grasses and forbs that will each include a minimum of:
 - 40 percent wildflower seed by number of seeds per square foot
 - 20 native species
 - 3 forbs that bloom in each portion of the growing season: early, mid, and late.

Long-term objectives:

- Successfully establish and maintain native vegetation to maintain ongoing certification through the BWSR Habitat Friendly Solar program.
- Maintain vegetation to prevent noxious weeds and other undesirable plants.
 - Noxious weeds will have no more than 5 percent cover within the Site.
 - Invasive species will not exceed 10 percent cover within the Site.
- Monitor annually to assess conditions and identify problems to be addressed through management activities.
- Complete the BWSR *Habitat Friendly Solar Site Assessment Form for Established Plantings* form every three years to retain Habitat Friendly status.

5.2 Non-Native Vegetation VMU Objectives

The Fenceline VMU is unique because Birch Coulee Solar wants to maintain a safety perimeter. The goal is to help protect the operational areas from wildfire and standardize maintenance along the fences where trees and vines may become established more easily and pose risks. Therefore, Birch Coulee Solar will

use a non-native and low growing grass seed mix to allow for more regular and/or aggressive maintenance if necessary. The short native and the mixed height VMUs will be managed separately from the Fenceline VMU.

The objectives below apply only to the Fenceline VMU.

Short-term objectives:

- Use appropriate BMPs and comply with the Construction Stormwater General Permit and Stormwater Pollution Prevention Plan (SWPPP).
- Carefully monitor construction activities including seeding and vegetation establishment.
- Minimize soil disturbance with minimal compaction and subsoil mixing.
- Install seed mixes with low-growing non-native fescue grasses that will allow for the unique maintenance needs along the fence line.

Long term objectives:

- Maintain vegetation to prevent noxious weeds and other undesirable plants, in particular woody species such as trees and vines that may compromise the fencing or access.
- Monitor annually to assess conditions and identify problems to be addressed through management activities.

6 Vegetation Establishment

The following vegetation establishment guidelines are recommendations for Site. These establishment guidelines focus on the first three years after construction is complete or until the vegetation meets the performance standards discussed in Section 8.1.

6.1 Contractor Qualifications

Birch Coulee Solar will require seeding contractors have at least 5 years of experience installing native seed including installation within solar array projects in Minnesota or the upper Midwest. Birch Coulee Solar will require vegetation management contractors have at least 5 years of experience maintaining native habitats. Birch Coulee Solar will select seeding and management contractor(s) prior to Project construction. Contractors will provide references demonstrating the ability to successfully perform the anticipated scope of work described herein for the Project. During construction, the Engineering, Procurement, and Construction (EPC) Environmental Manager will oversee the seeding and vegetation management contractors in consultation with Birch Coulee Solar. Birch Coulee Solar will oversee the contractor(s) during operation of the Project.

6.2 Site Preparation

Before and during grading activities, the contractor will install erosion and sediment controls in accordance with the Project SWPPP. Birch Coulee Solar will limit grading work to the degree feasible to minimize areas of disturbance and to reduce impacts to the existing topsoil.

6.2.1 Topsoil and Subsoil Handling

The contractor will segregate the uppermost 12 inches of topsoil during grading and redistribute it across graded areas. Where necessary, the contractor will aerate topsoil impacted by construction activities with chisel plows, rippers, or tillers depending on the depth and severity of the compaction. The contractor may disk topsoil to prepare a smooth, evenly textured soil surface.

6.2.2 Existing Vegetation Management

During construction, weed management will consist of a combination of herbicide applications and mowing to control noxious weeds and prevent the production of undesirable seeds.

If possible, Birch Coulee Solar may work with landowners to pre-treat areas with noxious and invasive species or other undesirable plants in the prior growing season. Tree clearing, grubbing and stump removal is not anticipated and will occur only where necessary.

Preparatory treatments may occur on existing undesirable vegetation within the Site if necessary. Mowing may occur to reduce the height of the vegetation or to prepare it for more effective herbicide applications. Herbicide application may occur before scheduled seeding, with an application of a non-specific herbicide to live vegetation and may include additional herbicides for species that may be present. Birch Coulee Solar may apply a second herbicide treatment to areas of undesirable vegetation still growing after the first herbicide application. The applicator will minimize drift by using appropriate equipment calibrated to the weather conditions at the time of treatment. Birch Coulee Solar will base periods between sprays or before seeding based on the minimum time expected for the residual time of the herbicide. Birch Coulee Solar will use Minnesota Department of Agriculture (MDA) licensed commercial applicators that will follow

manufacturer's directions, and application records maintained per state requirements. Before seeding, dead plant material may require removal to open the soil for future seeding.

6.2.3 Seedbed Preparation

Prior to application of the seed mixes, the contractor will prepare the seed bed to promote successful propagation and survival of the desired plants. Where necessary, decompaction or vegetation removal areas will be followed by disking to prepare a smooth and evenly textured soil surface. Birch Coulee Solar may seed some areas with previously existing vegetation with a no-till drill directly into the killed vegetation or stubble. As much as possible, areas that are not compacted will remain intact, without decompaction or tilling, to preserve soil structure.

6.3 Seeding

If possible, seeding will occur prior to construction to establish vegetation that will provide soil stability during construction activities, prevent erosion, and maintain a cleaner working area for the equipment. Construction will inevitably result in some disturbance to these seeded areas, which may require re-seeding after completion of the work in that area.

Seeding will occur using a Truax no-till drill or Trillion type seeder (or similar) specific to native seed mixes. Where drill-seeding is not practical due to site conditions including the presence of solar panels and posts, seed will be broadcast onto the soil surface using a Vicon seeder (or similar) and raked to provide good seed-to-soil contact.

The seeding contractor will calibrate and adjust seeding equipment beforehand to confirm the proper seeding rate and depth. Operators will confirm complete coverage during operation. The contractor will wash equipment before seeding work begins to reduce potential contamination from outside seed sources.

6.3.1 Cover Crop

During site construction, temporary cover crop seeding of soils left undisturbed for more than 14 days to reduce the risk of erosion may occur. Permanent seed mixes will include cover crops, at a reduced rate, during vegetation establishment. Cover crops are annual grass species that germinate and establish quickly, such as oats (spring or summer), annual rye (spring or summer), or wheat (fall).

6.3.2 Seed Mixes

Attachment 2 provides the seed mixes for the Project.

The native-dominated seed mixes have the following characteristics:

- Achieve or exceed the minimum score of 70 on the BWSR *Habitat Friendly Solar Site Assessment Form for Established Plantings* form to meet the standard.
- Composed primarily of native species, which are hardy and tolerate a wide variety of environmental conditions (drought, periods of excessive moisture, etc.)
- Contain a blend of grasses, sedges, and forbs to maximize adaptability to potential growing conditions, including shade-tolerant species for under panel areas and bunch-forming grasses for

habitat structure. The wetland VMU seed mix contains clump-forming sedges instead of the bunch-forming grasses.

- Demonstrate high diversity across plant families, including a minimum of 20 forb species (array mix) and up to 28 forb species (perimeter mix), several legume species, and at least three blooming species during each target season (spring, summer, and fall) to maximize habitat quality and pollinator benefit.
- Dominated by perennial species that greatly reduce the likelihood of re-seeding during the lifespan of the solar site.
- Adaptable to soil conditions present within the Site including species that can tolerate dry, mesic, and wet-mesic conditions. The wetland seed mix is adapted to wet soils.
- Array mix is designed with an average height range of 12-30" to avoid interfering with solar equipment.
- Include temporary cover crop to stabilize soils quickly.

The non-native fescue seed mix has the following characteristics:

- Composed of four fescue species including both bunch-forming and creeping types, to establish a thick turf with dense root structure that resists weed invasion and can spread to fill in bare or damaged areas.
- Remains short (8" maximum height) to avoid interference with fence infrastructure.
- Contains only cool-season fescue grasses which have low capacity for carrying fire, particularly during spring and fall when wildfire risk is highest, due to their active growth in those periods and low thatch production.
- Can mow and over-spray with herbicide (broad-leaf specific) at more frequent intervals than native-dominant seed mixes without damage to beneficial habitat, to allow for aggressive control of weeds and woody species.

As the primary land use surrounding the Site is agricultural, maintaining a specific chemical-free buffer zone is not feasible. The size and layout of the Site are such that pesticide drift from adjacent properties is expected to be minimal, given standard best practices for application methods. Regardless, Birch Coulee Solar will communicate with landowners adjacent to the Site to inform them of the intended Project status as pollinator-friendly habitat, and thus the importance of controlling pesticide drift from adjacent agricultural properties onto the Site.

6.3.3 Seed Substitutions

Availability of species in planned seed mixes is subject to change based on Project approval, construction timelines, and variability in supply. Birch Coulee Solar must approve any substitutions and they must remain consistent with the stated goals and objectives in this VMP. Suitability for substitutions will consider bloom season, phenology, sun exposure and soil preferences, height, cost, and native status.

6.3.4 Landscape Screening Areas

Birch Coulee Solar will continue to work with adjoining landowners to identify potential landscape screening needs and to implement such screening upon request, with a preference for native tree and shrub species.

7 Vegetation Management

The following are general best-practice standards for pollinator-solar vegetation management. Birch Coulee Solar anticipates actual maintenance will vary from these guidelines and will adapt to specific site conditions including panel height and site infrastructure, along with the presence and status of both seeded (desirable) and undesirable species across the Site. The Management Timeline (Table 7-1) begins at the time of seeding, which may vary in different areas or phases of the Project based on construction schedules.

Table 7-1 Expected Vegetation Establishment Sequencing

Expected schedule	Task	Notes
Year 0	1. Prior to construction, pre-seed with temporary seed mixed with permanent seed. 2. Seeding and re-seeding (as necessary) VMU mixes using no-till drill seeding equipment where feasible or broadcast seeding where drill seeding is infeasible.	Seeding efforts in array area, border VMUs, and stormwater VMU would occur outside of winter and severe weather months (July and August) unless conditions are favorable.
Years 0 -1	1. During construction, re-seed as necessary.	Follow year-long maintenance plan.
	2. Mow vegetation 2-3 times during growing season.	
Year 1	Tasks are the same as years 0-1	Follow year-long maintenance plan.
Years 2-5 Establishment	1. Mow 1-2 times during the growing season. 2. Selective spot herbicide treatments 1-2 times per growing season.	
Years 5+ Management	1. Targeted herbicide treatments 1-2 times per growing season as necessary. 2. Spot mowing or hand-cutting where needed. 3. Clearing thatch by mowing (dormant season) or haying or grazing (growing season).	

7.1 Management Timeline

Year 1 Maintenance - During the first year, mow vegetation in the seeded areas 2-3 times during the growing season as needed to prevent weed seed production, remove shading of small seedlings, and prevent shading of solar modules. Use herbicide minimally and only as a spot-treatment on aggressive perennial weeds and woody plants, with mowing as the primary method of controlling undesirable species.

Year 2 Maintenance – During the second-year, vegetation in the seeded areas will likely require mowing 1-2 times during the growing season to control annual weeds, promote good establishment of seeded species, and prevent shading of modules. Noxious, invasive, and woody plants may also require mowing to prevent seed development. Selective spot-herbicide treatment should begin during the second growing season for certain biennial and perennial noxious weeds and woody species. Herbicide treatment should occur 1-2 times during the summer/early fall and scheduled strategically around mowing to promote proper herbicide uptake on the target plants.

Year 3 Maintenance – During the third-year, vegetation in the seeded areas may require mowing 1-2 times during the growing season for control of tall-growing annual weeds, woody species, or

perennial/noxious weeds at risk of producing seed prior to herbicide application. Height-reduction mowing of the array area or portions thereof may be necessary in mid-summer to prevent shading of modules. Selective spot (or targeted) herbicide treatment should occur 1-2 times during the growing season for biennial/perennial invasive species, noxious weeds, and woody species, scheduled around the mowing schedule.

Year 4+ (Long-Term) Maintenance – During the long-term maintenance phase (year 4 onward assuming proper establishment in years 1-3) the vegetation management strategy will shift. The focus for established pollinator-solar sites is minimizing the impact on desirable plants while controlling noxious weeds and woody species and preventing shading of panels and vegetative interference with solar equipment. Mowing during the growing season will reduce as much as possible to preserve pollinator habitat, although it may still be necessary to address shading and weeds or woody species. Spot-mowing or hand-cutting to address specific problem areas will occur when feasible, rather than complete mowing of the array or entire Site. Targeted herbicide treatment should continue 1-2 times per year as necessary, to reduce populations of undesirable species which allows desirable native/pollinator species to flourish. Depending on conditions and vegetation management needs, clearing thatch within the Site may occur on a rotational basis (every 1-3 years) by haying, mowing, or grazing. Grazing or haying may occur during the growing season as applicable, whereas mowing specifically for thatch reduction should occur during the dormant season only (October through April).

7.2 Adaptive Management

Birch Coulee Solar will implement a variety of vegetation management techniques in the Site, based on the timeline in Section 7.1 and adjust according to recommendations from the vegetation management and monitoring contractor(s). Selected methods will provide the best control possible of noxious, invasive, and woody species while minimizing impacts on seeded species and confirming vegetation does not shade or interfere with solar modules and equipment.

Adaptive management describes an ongoing collaborative process between vegetation managers, vegetation monitors, and Birch Coulee Solar, to implement the most appropriate and effective maintenance techniques at the correct times. Adaptive management requires flexibility and good communication. Birch Coulee Solar may test management methods on small areas before implementing them more widely to better understand if those approaches are preferable for the specific site conditions.

Table 7-2 provides typical vegetation management services following an adaptive management approach. This level of maintenance represents the long-term phase as opposed to the more intensive management recommended during the first three years following seeding.

Table 7-2 Typical Adaptive Management

Timeframe	Adaptive Management Technique	Notes
Spring	Early season site assessment, planning, and reporting	Incorporate recommendations from previous year, as needed
Early Summer	First round of maintenance: mowing or grazing is typical	Spot-cutting preferred if possible
Early to Mid-Summer	Monitoring	Within 1-3 weeks of first maintenance service (mowing/grazing 1-2 weeks, herbicide treatment 2-3 weeks)
Mid-Summer	Second round of maintenance: herbicide treatment is typical	Targeted applications
Mid to Late Summer	Monitoring	Within 1-3 weeks of second maintenance service (mowing/grazing 1-2 weeks, herbicide treatment 2-3 weeks)
Late Summer to Fall	Third round of maintenance: mowing, spot cutting, herbicide treatment as needed	Mowing or spot cutting employed to remove shading/interference
Fall	End of season site assessment and reporting	Assess impact of techniques performed during the year; suggest adjustments if needed

7.3 Invasive Species Management

Birch Coulee Solar will control noxious, invasive, and undesirable plant species for the life of the Project as required for safe operation of solar equipment. Birch Coulee Solar will manage the species listed on the Minnesota State Noxious Weed List (reference (11)) per their designated category on the list at the time of the inspection, i.e., eradicate or control.

Birch Coulee Solar will control invasive plant species (references (12); (13)) to prevent or remove interference with solar equipment and maintain the health and quality of pollinator habitat and achieve performance standards (Section 8.1). Birch Coulee Solar may not achieve complete control certain invasive species such as reed canary grass and smooth brome, as those species are often extremely difficult to eradicate without extensive effort and collateral damage to desirable species. In addition, they are already abundant in the area, are not considered noxious weeds, and are not expected to negatively impact neighboring properties. Birch Coulee Solar will control reed canary grass within the Array VMU because it is likely to grow tall and interfere with solar panels.

Other undesirable species on solar projects are those which interfere with electrical equipment, shade panels, or damage fences or other infrastructure, particularly trees, shrubs, vines, and excessively tall and aggressive herbaceous species.

Birch Coulee Solar will require inspection and cleaning of vegetation management equipment prior to arrival at the Project to minimize the importation of invasive species. This consists of removing plants, seeds, mud, dirt clods, and animals by washing or blowing with compressed air as applicable. Birch Coulee Solar will send equipment that arrives at the Project that is not clean to an off-site location for cleaning and inspection before returning.

7.3.1 Herbicide Treatments

Herbicide treatments may include selective or non-selective herbicides, spot or broadcast applications, and pre-emergent applications. Treatments will control perennial noxious weeds and woody species which mowing does not effectively control alone. Herbicide treatment will reduce the populations of undesirable species, prevent the spread of weed seeds, and kill vegetation that may be encroaching on or shading solar modules and equipment.

For general weed and tree control in pollinator habitat, selective herbicides (formulated for specific plant groups) and spot application (applying directly to the foliage of target plants) are preferential over broadcast and non-selective applications. This will promote good control of undesirable species while minimizing off-target damage to desirable species. Broadcast applications may occur if there are large areas dominated by a single weed species or type, such as Canada thistle. In that scenario, Birch Coulee Solar will use the most selective herbicide, and limit the application to the minimum effective area or use proper timing to minimize non-target damage. If non-selective herbicides are necessary for certain weed species, such as hybrid or invasive cattails, Birch Coulee Solar will limit their use to the minimum effective area and method of application.

In addition to herbicide treatment for weeds, pre-emergent and non-selective herbicides application may occur on specific areas of the Site (around electrical equipment and along roads/gravel) to maintain bare ground. Herbicide treatments for bare ground include a chemical adjuvant to increase soil deposition/adsorption and prevent runoff.

7.3.2 Mowing

Mowing reduces vegetation height, prevents, or removes shading from solar modules, controls weeds and woody species, clears away dormant vegetation, and improves the aesthetics of a site.

Mowing may occur in the following areas: solar array area, open area(s) within fence, entrances around gates, and area(s) outside fence. Mowing implements include agricultural tractors with flail or rotary mower attachments, zero-turn mowers, robotic mowers, and/or other mechanical options (with Birch Coulee Solar approval). Flail mower implements mulch the cut material and avoid forming a mat of cut vegetation which could smother desirable plant growth. Where appropriate, mower height should be at least 8-10" from the ground to minimize damage to native plants.

Wet areas pose challenges for mowers because water restricts access and increases the risk of equipment damaging the soil and/or seeded plants through rutting. Therefore, mowing in wet areas should occur only when conditions are dry, or avoid altogether and replace with hand cutting/weed whipping if necessary.

Mowing native pollinator species more than once per month after establishment and/or too low (repeatedly less than 6") will damage or kill these species and reduce overall habitat quality.

7.3.3 Haying

Haying can reduce thatch buildup by the physical removal of vegetation from a site, particularly in the absence of fire. Most native species seeded on pollinator-solar sites evolved with a dependence on fire for clearing of dormant vegetation and cannot thrive long-term without that disturbance. Another important benefit of this service for solar arrays is reducing wildfire risk due to lower fuel loads in the dormant season.

Haying generally takes several steps including mowing, drying of the cut vegetation, windrowing the material, mechanical baling, and removal of the baled thatch material. This typically occurs with agricultural tractors and raking and baling implements scaled to fit within the solar site. The blades will be at a raised height of 4-6 inches to prevent scouring of the ground surface and avoid excessive damage to the native perennial species. Haying may occur almost any time during the growing season, most often in late summer and fall.

7.3.4 Weed Whipping

Weed whipping or manual trimming can remove excessive vegetation growth in areas that are difficult to access with mechanical mowing equipment. These areas may include:

- directly underneath solar panels,
- around pilings,
- underneath tracker drive shafts or above-ground cabling,
- around sensitive electrical equipment,
- around gates/entrances, along fence lines,
- in wet or steep areas,
- in areas with biologs (a form of perimeter control) or other BMPs, and
- around screening trees/shrubs.

7.3.5 Grazing

Grazing is an option to manage plant height and shading, reduce thatch, and provide weed control, while also maintaining pollinator habitat value. Grazing has the potential to reduce or eliminate the necessity for other vegetation management services such as mowing, haying, weed whipping, noxious weed herbicide treatments, and/or bare ground herbicide treatments. This is because sheep can easily access areas of solar sites where equipment cannot, removing vegetation around equipment, underneath panels, and along interior fence lines. Grazing is also the most effective method of reducing vegetative thatch buildup which reduces the risk and intensity of wildfires. Grazing animals are more ecologically appropriate and sustainable than mechanical cutting, enhancing the benefits of pollinator habitats by enhancing soil carbon and nutrients (reference (17)).

To provide uniform height and vegetation reduction across the site, grazing should occur at high animal stocking density (greater than 20 animal units per acre) for a short duration (1-2 weeks per deployment, no more than 4 weeks on a particular area). This method achieves a high-intensity graze event that clears or defoliates 70-90 percent of vegetation, mimicking the effect of fire. To maintain the diversity and health of native plant communities, grazing should not occur more than once during each growing season. Low-intensity grazing may occur in certain situations, particularly for dormant season thatch reduction or on sites with non-native vegetation.

7.3.6 Supplemental Seeding

Supplemental seeding may be necessary where vegetation establishment does not meet expectations of this VMP or regulatory requirements. Establishment failure can occur for a variety of reasons, including compacted soil conditions, flooding, drought, and extensive weed competition. Depending on the reason(s) for failure, Birch Coulee Solar may adjust species in the re-seeding mix to better accommodate growing conditions in the specific area.

If temporary disturbance is necessary after final construction (such as excavating or trenching for repairs or maintenance), Birch Coulee Solar will choose an appropriate seed mix for these areas.

If maintenance activities (such as travel paths) impact certain areas and initially seeded species fail to thrive, reseeding may occur with species that can tolerate a higher level of disturbance.

Seed selection and rate for any supplemental seeding will consider site conditions. Birch Coulee Solar will apply temporary cover crops, if necessary, according to the rate listed in the initial seed mixes (Attachment 2). The timing and method of supplemental seeding depends on each situation considering the conditions and scope.

7.3.7 Tree and Shrub Control

Woody species (trees, shrubs, and vines) are a concern on solar sites due to the potential for interference with electrical equipment, shading of modules, and damage to fences or other infrastructure. Woody species control can occur through a combination of mowing, manual cutting, and herbicide treatments. Birch Coulee Solar will use adaptive management to select methods with the least non-target impacts and the greatest success at control.

Mowing can temporarily cut back woody species in accessible areas, removing or preventing shading conditions on modules. However, cutting alone will not kill deciduous tree species and most will re-sprout afterwards. Foliar herbicide treatment can kill vines and small tree/shrub seedlings less than approximately 4' tall and ½" diameter, provided leaf surfaces have a coat of an appropriate herbicide applied at the correct rate. For tree and shrub seedlings larger than this size, the least-impactful and most-effective method of control is manual cutting with brush saws or chainsaws and then treating stumps with herbicide to kill the root system and prevent re-sprouting. Birch Coulee Solar will consider site conditions, infrastructure, and safety needs when selecting the method of control for woody species.

8 Vegetation Monitoring

Birch Coulee Solar will contract a qualified restoration ecologist to conduct vegetation monitoring and confirm this plan's goals are on track. Monitoring will evaluate the establishment of seeded species, identify invasive, noxious, and woody species presence, check for erosion or other Site issues, and determine vegetation maintenance needs and timing.

During years 1-3, monitoring visits will occur at regular intervals throughout the growing season, approximately May, July, and September/October to evaluate and adjust vegetation management strategies. After the early establishment period, monitoring visits will occur mid-summer (June/July) in coordination with vegetation management activities to provide an accurate assessment of the Site vegetation and timely recommendations for further management services.

Qualitative monitoring will occur during each monitoring visit beginning in Year 1. This will consist of a general review of the Site to document problem areas with noxious and invasive species, tree seedlings, erosion issues, etc. This information will direct vegetation management contractors to address each issue. Qualitative monitoring will continue for the duration of the Project to guide vegetation management decisions.

Quantitative monitoring will begin in Year 3 to evaluate vegetation establishment, and score site vegetation against the BWSR *Habitat Friendly Solar Site Assessment Form for Established Plantings* form. Quantitative monitoring will continue every third year thereafter for the duration of the Project, as required to maintain ongoing certification. Quantitative monitoring consists of timed-meander surveys within approximately 20 separate Assessment Areas (AAs) each no larger than 20 acres. The AAs will include at least 20 percent of the full Site. Each will be within a unique VMU. Within each AA, an ecologist will walk for 20 minutes and document all species encountered.

8.1 Performance Standards

At the end of the third full growing season, vegetative cover will be assessed to determine successful establishment.

Successful vegetation establishment means:

- The plantable area has at least 70 percent or more vegetative cover not including roads, etc.
- Each VMU (not including the Wetland VMU) with native vegetation meets the following:
 - Noxious weeds and invasive species will not exceed 10 percent cover.
 - At least 70 percent cover by native species
 - At least 15 native species have 1 percent or greater cover.
 - Forbs make up at least 15 percent cover.
 - At least 3 plants are present that bloom in early summer and 3 that bloom in late summer.
- Vegetative cover within the Wetland VMU will be determined closer to final design.

- Vegetative cover within the Fenceline VMU must have 80 percent cover by desirable species.
 - Noxious weeds will not exceed 5 percent cover.
 - Desirable species for this VMU are defined as species in the seed mix (fescues) as well as other herbaceous species that are not on the noxious weed lists.

Areas that fail to meet these performance standards require treatment to remediate issues. This may include additional management (mowing, herbicide treatment), additional qualitative monitoring, along with re-seeding if necessary. Birch Coulee Solar will continue extra monitoring visits and more intensive management of problem areas until they meet the vegetation establishment performance standards.

9 Reporting

The monitoring contractor will compile annual reports following the final monitoring visit each year and submit them to Birch Coulee Solar. These reports will include a summary of findings for both qualitative and quantitative monitoring, along with a summary of coordination with the vegetation management contractor.

The vegetation management contractor will compile annual reports at the end of each year and submit them to Birch Coulee Solar. These reports will consist of:

- a summary of current site conditions and any notable changes from the previous year
- a summary of management activities conducted during the year
- observed vegetation establishment success/progress towards performance standards
- a list of the noxious/invasive species present
- a map of the management units/locations identification of issues present, corrective actions recommended, and a schedule for implementation.

If vegetation management and monitoring are conducted by the same contractor, the annual monitoring and management reports may be combined into one report for submittal to Birch Coulee Solar.

Birch Coulee Solar will submit annual reports as required to the relevant local or state government agencies. These agency reports will include information listed above from the vegetation management report, along with qualitative monitoring results from the monitoring report.

In addition to annual reporting, the monitoring contractor will submit the BWSR *Habitat Friendly Solar Site Assessment Form for Established Plantings* at the end of Year 3 and every three years thereafter, to confirm ongoing compliance with the Habitat Friendly Solar program. Reporting includes completion of the form and photo documentation of site vegetation, to be submitted to BWSR or local government agencies if applicable.

10 References

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7. **Han, W., et al.** Making Cropland Data Layer data accessible and actionable in GIS education. *Journal of Geography*. 2014, Vol. 113, 3, pp. 129-138.
8. **Han, Weiguo, et al.** CropScape: A Web service based application for exploring and disseminating US conterminous geospatial cropland data products for decision support. *Computers and Electronics in Agriculture*. June 2012, Vol. 84, pp. 111-123.
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13. —. Invasive aquatic plants. *Aquatic Invasive Species*. [Online] [Cited: January 11, 2024.] <https://www.dnr.state.mn.us/invasives/aquaticplants/index.html>.
14. —. Native Plant Encyclopedia. [Online] [Cited: January 11, 2024.] <https://www.dnr.state.mn.us/rys/pg/encyclopedia.html>.
15. **Renville County, Minnesota.** Drainage. *Public Works*. [Online] [Cited: February 25, 2024.] https://www.renvillecountymn.gov/departments/public_works/drainage/index.php.
16. —. Buffer Ordinance: Buffer Law Implementation. [Online] November 28, 2017. [Cited: February 25, 2024.] <https://cms2.revize.com/revize/renvillemn/Ordinances/Buffer%20Ordinance%20-%20Adopted%2011-28-2017.pdf>.
17. **Towner, Elizabeth, et al.** Managed sheep grazing can improve soil quality and carbon sequestration at solar photovoltaic sites. December 13, 2022. AGU Fall Meeting 2021.



Attachments



Attachment 1

Habitat Friendly Solar Site Assessment Form for Project Planning





Habitat Friendly Solar Site Assessment Form for Project Planning

For Solar Companies, Local Governments and Other Partners to Meet Habitat Friendly Solar Standards

Updated 12-22-23

Note: The use of state developed [solar seed mixes](#) over 70% of the plantable area of a site will result in automatically meeting the standard.

- 1) **PLANNED PERCENT OF PLANTABLE AREAS WITHIN PROJECT FOOTPRINT DOMINATED BY NATIVE SPECIES COVER** (forbs, grasses, sedges, rushes, ferns). **PROJECTS MUST HAVE A GOAL OF AT LEAST 70% COVER OF NATIVE VEGETATION TO MEET HABITAT FRIENDLY SOLAR STANDARDS**

<input checked="" type="checkbox"/> 70-84%	+15 points		
<input type="checkbox"/> 85% and above	+20 points	Total Points	15

- 2) **PERCENT OF PROPOSED SITE VEGETATION COVER TO BE DOMINATED BY FORBS** (not grasses, sedges and rushes)

<input checked="" type="checkbox"/> 10-19%	+5 points		
<input type="checkbox"/> 20-29%	+10 points		
<input type="checkbox"/> 30-39%	+15 points		
<input type="checkbox"/> 40 and above	+15 points	Total Points	5

Note: Projects may have “array” mixes and diverse border mixes; forb dominance should be averaged across the entire site. The dominance should be calculated from total numbers of forb seeds vs. grass seeds based on seeds per square foot (from all seed mixes to be planted).

- 3) **PLANNED COVER DIVERSITY** (# of species in seed mixes; numbers from upland and moist soil mixes can be combined)

<input type="checkbox"/> 10-19 species	+5 points		
<input type="checkbox"/> 20-25 species	+10 points		
<input checked="" type="checkbox"/> 26-39 species	+15 points		
<input type="checkbox"/> 40 and above	+20	Total Points	15

- 4) **PLANNED SEASONS WITH AT LEAST THREE BLOOMING SPECIES** (check all that apply)

<input checked="" type="checkbox"/> Spring (April-May)	+4 points		
<input checked="" type="checkbox"/> Summer (June-August)	+3 points		
<input checked="" type="checkbox"/> Fall (September-October)	+3 points	Total Points	10

See BWSR [pollinator toolbox](#) about bloom season

- 5) **SITE PLANNING**

<input checked="" type="checkbox"/> Detailed establishment and management plan (see notes)	+20 points		
<input checked="" type="checkbox"/> Seed Mixes are composed of at least 40 seeds per square foot	+5 points		
<input type="checkbox"/> All seed genetic origin is within 200 miles of site (see notes)	+5 points		
<input checked="" type="checkbox"/> At least .5% milkweed cover within each seed mix	+5 points		
<input checked="" type="checkbox"/> Plant species with more than 3 flower colors in mixes (see notes)	+5 points	Total Points	35

- 6) **INSECTICIDE RISK**

<input type="checkbox"/> Planned on-site insecticide use (excluding buildings/electrical boxes, etc.)	-30 points		
<input checked="" type="checkbox"/> Communication with local chemical applicators/neighbors about need to prevent drift from adjacent areas.	+10 points	Total Points	10

GRAND TOTAL 90

Gold Standard 85+ points
Meets Standard 70 points

Project Name: Birch Coulee Solar
Project County: Renville County
Project Size: ~1,000 acres
Evaluation Date: DRAFT Feb 2024

See notes related to the questions on the back side of this form

Notes:

Estimates of percent “cover” should be based on “absolute cover” (the percent of the ground surface that is covered by a vertical projection of foliage as viewed from above).

All project plans must include detailed vegetation establishment and management specifications to ensure the success of projects (see sample specifications on [BWSR’s Habitat Friendly Solar Webpage](#)).

Seed mixes provided for projects need to show seeds per square foot for each species in the mix.

Question 1 - Native plant species provide benefits to a wide range of pollinators and other wildlife species. The [Minnesota DNR List](#) should be used to determine if a species is native. Native species include wildflowers, graminoids (grasses, sedges, rushes), shrubs and trees. The percent areal cover of native vs. non-native species should be estimated based on the seeds per square foot of all species to be used across all seed mixes. As non-native fescues tend to have a high seeding rate, but also small seeds with a lower germination success the number of fescue seeds per square foot in mixes can be decreased by half when calculating native species dominance of mixes. This should result in a more accurate representation of native dominance.

Question 2 - There is a focus on native forbs on this assessment form to maximize benefits to the approximately 500 species of native bees in Minnesota, honeybees and other pollinators. Forbs are (flowering plants that are not woody or graminoids such as grasses and sedges) and can include introduced clovers and other non-native species beneficial to pollinators. No noxious weeds or invasive plants can be included in the total.

Question 3 - Plant diversity adds to wildlife benefits, as well as the resiliency of projects. For this question, planned native and non-native species from all seed mixes can be combined for the total.

Question 4 - Having blooming species throughout the season helps support pollinator species. See BWSR’s [Pollinator Toolbox](#) for a listing of bloom seasons for species.

Question 5 - To meet requirements for a long-term management plan projects must provide information about:

- Timing of yearly inspections,
- A detailed native vegetation establishment plan with detailed instructions for contractors.
- A detailed maintenance schedule for the first three years of the project (establishment period) listing timing of establishment mowing/ trimming, spot herbicide application, prescribed grazing or other management actions.
- Proposed maintenance schedule for year four and beyond.
- List of weed species that may become problematic at the site and how they will be managed if needed.

All mixes being used for the project must include at least 40 seeds per square foot to receive points for the first category. Using seed with a genetic origin within 200 miles helps ensure that species will be adapted to site conditions and decrease the risk of introducing invasive species in seed mixes. Please refer to pages 7-8 of [BWSR’s Native Vegetation Establishment and Enhancement Guidelines](#) for more information about appropriate seed sources. To obtain points for including milkweed in projects mixes must contain at least .5% milkweed seed based on seeds per square foot, or a combination of seed and containerized plugs could be used with a plan to cover .5% of the ground surface with milkweed. Flower colors can include blue, pink, purple, yellow, white, orange, red, green and brown. The Minnesota Wildflowers website allows for searching species based on flower color [Minnesota Wildflowers Categorized by Color](#).

Question 6 - It is important that seeds treated with insecticides are not used at project sites and that insecticides are not being sprayed at the site. To meet requirements for communication/registration with local landowners/applicators about the need to prevent drift from adjacent areas, information provided can be in the form of email communication or copies of letters. Communication must be provided to all landowners adjacent to the property including municipalities.

Send completed forms, project plans, seed mixes (showing seeds per square foot for each species) and any communications with pesticide applicators to BWSR at Dan.Shaw@state.mn.us as well as any local government staff involved in reviewing the project.



Attachment 2

Seed Mixes



**Birch Coulee Solar
Array Mix
Renville Co MN**

% Grass Seeds:	49%
% Sedge Seeds:	7%
% Forb Seeds:	44%
Species Count:	31
Seeds/Sq. Ft:	68
Avg Height Range:	12-30"

	Scientific Name	Common Name	% of Mix	PLS lbs/ac	Bloom Season	Seeds/SF
Grasses:	Bouteloua curtipendula	Side-oats Grama	19.00	1.90		6.94
	Bouteloua gracilis	Blue Grama	4.00	0.40		5.88
	Bromus kalmii	Prairie Brome	5.00	0.50		1.47
	Elymus hystrix	Bottlebrush Grass	5.00	0.50		1.40
	Elymus trachycaulus	Slender Wheat Grass	5.00	0.50		1.27
	Elymus villosus	Silky Wild Rye	9.00	0.90		1.82
	Elymus virginicus	Virginia Wild Rye	7.00	0.70		1.08
	Schizachyrium scoparium	Little Bluestem	16.00	1.60		8.82
	Sporobolus compositus	Rough Dropseed	4.00	0.40		4.41
Sedges:	Carex brevior	Plains Oval Sedge	1.00	0.10		1.07
	Carex sprengei	Long-beaked Sedge	2.50	0.25		0.92
	Carex vulpinoidea	Fox Sedge	1.00	0.10		2.98
Forbs:	Achillea millefolium	Yarrow	0.20	0.02	Summer	1.29
	Agastache foeniculum	Fragrant Giant Hyssop	0.20	0.02	Summer	0.66
	Allium stellatum	Prairie Onion	0.50	0.05	Summer	0.20
	Anemone canadensis	Canada Anemone	0.50	0.05	Spring	0.15
	Aquilegia canadensis	Columbine	0.75	0.08	Spring	1.05
	Asclepias tuberosa	Butterfly Milkweed	0.30	0.03	Summer	0.05
	Chamaecrista fasciculata	Partridge Pea	4.60	0.46	Fall	0.46
	Dalea candida	White Prairie Clover	3.50	0.35	Summer	2.44
	Dalea purpurea	Purple Prairie Clover	6.00	0.60	Summer	3.31
	Drymocallis arguta	Prairie Cinquefoil	0.50	0.05	Summer	4.22
	Penstemon grandiflorus	Large-flower Penstemon	0.30	0.03	Spring	0.15
	Pycnanthemum virginianum	Mountain Mint	0.20	0.02	Summer	1.62
	Ratibida columnifera	Long-headed Coneflower	0.50	0.05	Summer	0.77
	Rudbeckia hirta	Black-eyed Susan	2.00	0.20	Summer	6.76
	Solidago missouriensis	Missouri Goldenrod	0.20	0.02	Fall	1.87
	Symphyotrichum oolentangiense	Sky-blue Aster	0.25	0.03	Fall	0.73
	Symphyotrichum lateriflorum	Calico Aster	0.40	0.04	Fall	3.67
	Verbena stricta	Hoary Vervain	0.40	0.04	Summer	0.41
	Zizia aptera	Heart-leaf Golden Alexanders	0.20	0.02	Spring	0.09



Birch Coulee Solar
Perimeter Short Native Mix (Inside Fence)
Renville Co MN

% Grass Seeds:	47%
% Sedge Seeds:	4%
% Forb Seeds:	50%
Species Count:	36
Seeds/Sq. Ft:	63
Avg Height Range:	12-36"

	Scientific Name	Common Name	% of Mix	PLS lbs/ac	Bloom Season	Seeds/SF
Grasses:	Bouteloua curtipendula	Side-oats Grama	20.00	1.80		6.58
	Bouteloua gracilis	Blue Grama	4.00	0.36		5.29
	Bromus kalmii	Prairie Brome	4.00	0.36		1.06
	Elymus canadensis	Canada Wild Rye	3.00	0.27		0.52
	Elymus trachycaulus	Slender Wheat Grass	7.00	0.63		1.60
	Elymus virginicus	Virginia Wild Rye	9.10	0.82		1.26
	Schizachyrium scoparium	Little Bluestem	17.00	1.53		8.43
	Sporobolus compositus	Rough Dropseed	5.00	0.45		4.96
Sedges:	Carex brevior	Plains Oval Sedge	1.50	0.14		1.44
	Carex molesta	Troublesome Sedge	1.00	0.09		0.83
Forbs:	Achillea millefolium	Yarrow	0.20	0.02	Summer	1.16
	Agastache foeniculum	Fragrant Giant Hyssop	0.40	0.04	Summer	1.19
	Allium stellatum	Prairie Onion	0.40	0.04	Summer	0.15
	Amorpha canescens	Leadplant	0.75	0.07	Summer	0.40
	Anemone canadensis	Canada Anemone	0.20	0.02	Spring	0.05
	Asclepias syriaca	Common Milkweed	1.50	0.14	Summer	0.20
	Asclepias tuberosa	Butterfly Milkweed	0.50	0.05	Summer	0.07
	Astragalus canadensis	Canada Milk Vetch	1.00	0.09	Summer	0.56
	Chamaecrista fasciculata	Partridge Pea	3.00	0.27	Fall	0.27
	Coreopsis palmata	Prairie Coreopsis	0.50	0.05	Summer	0.17
	Dalea candida	White Prairie Clover	4.00	0.36	Summer	2.51
	Dalea purpurea	Purple Prairie Clover	5.20	0.47	Summer	2.58
	Desmodium canadense	Showy Tick-trefoil	2.00	0.18	Summer	0.36
	Drymocallis arguta	Prairie Cinquefoil	0.75	0.07	Summer	5.70
	Heliopsis helianthoides	Common Ox-eye	1.50	0.14	Summer	0.31
	Monarda fistulosa	Wild Bergamot	0.50	0.05	Summer	1.16
	Penstemon grandiflorus	Large-flower Penstemon	0.40	0.04	Spring	0.19
	Pycnanthemum virginianum	Mountain Mint	0.30	0.03	Summer	2.18
	Ratibida columnifera	Long-headed Coneflower	0.75	0.07	Summer	1.04
	Rudbeckia hirta	Black-eyed Susan	2.00	0.18	Summer	6.08
	Solidago nemoralis	Gray Goldenrod	0.20	0.02	Fall	1.98
	Symphyotrichum laeve	Smooth Blue Aster	0.50	0.05	Fall	0.91
	Symphyotrichum oolentangiense	Sky-blue Aster	0.50	0.05	Fall	1.32
	Tradescantia bracteata	Long-bracted Spiderwort	0.20	0.02	Spring	0.07
	Verbena stricta	Hoary Vervain	0.75	0.07	Summer	0.69
	Zizia aptera	Heart-leaf Golden Alexanders	0.40	0.04	Spring	0.16



Birch Coulee Solar
Perimeter Mixed Height Native Mix (Outside fence)
Renville Co MN

% Grass Seeds:	50%
% Sedge Seeds:	2%
% Forb Seeds:	48%
Species Count:	40
Seeds/Sq. Ft:	60
Avg Height Range:	24-48"

	Scientific Name	Common Name	% of Mix	PLS lbs/ac	Bloom Season	Seeds/SF
Grasses:	Andropogon gerardii	Big Bluestem	7.00	0.63		2.31
	Bouteloua curtipendula	Side-oats Grama	15.00	1.35		4.93
	Bouteloua gracilis	Blue Grama	4.50	0.41		5.95
	Bromus kalmii	Prairie Brome	5.00	0.45		1.32
	Elymus canadensis	Canada Wild Rye	6.00	0.54		1.03
	Elymus trachycaulus	Slender Wheat Grass	5.00	0.45		1.14
	Elymus virginicus	Virginia Wild Rye	6.00	0.54		0.83
	Panicum virgatum	Switchgrass	3.00	0.27		1.39
	Schizachyrium scoparium	Little Bluestem	10.00	0.90		4.96
	Sorghastrum nutans	Indian Grass	7.00	0.63		2.78
	Sporobolus compositus	Rough Dropseed	3.50	0.32		3.47
Sedges:	Carex brevior	Plains Oval Sedge	1.00	0.09		0.96
Forbs:	Achillea millefolium	Yarrow	0.20	0.02	Summer	1.16
	Agastache foeniculum	Fragrant Giant Hyssop	0.40	0.04	Summer	1.19
	Allium stellatum	Prairie Onion	0.40	0.04	Summer	0.15
	Amorpha canescens	Leadplant	0.25	0.02	Summer	0.13
	Anemone canadensis	Canada Anemone	0.25	0.02	Spring	0.07
	Asclepias incarnata	Swamp Milkweed	0.50	0.05	Summer	0.08
	Asclepias syriaca	Common Milkweed	1.50	0.14	Summer	0.20
	Astragalus canadensis	Canada Milk Vetch	0.55	0.05	Summer	0.31
	Boltonia asteroides	False Aster	0.50	0.05	Fall	2.64
	Chamaecrista fasciculata	Partridge Pea	3.00	0.27	Fall	0.27
	Dalea candida	White Prairie Clover	4.00	0.36	Summer	2.51
	Dalea purpurea	Purple Prairie Clover	5.00	0.45	Summer	2.48
	Desmodium canadense	Showy Tick-trefoil	1.00	0.09	Summer	0.18
	Drymocallis arguta	Prairie Cinquefoil	0.30	0.03	Summer	2.28
	Eryngium yuccifolium	Rattlesnake Master	0.50	0.05	Summer	0.12
	Heliopsis helianthoides	Common Ox-eye	1.00	0.09	Summer	0.21
	Liatris pycnostachya	Prairie Blazing Star	1.00	0.09	Summer	0.36
	Monarda fistulosa	Wild Bergamot	0.50	0.05	Summer	1.16
	Penstemon grandiflorus	Large-flower Penstemon	0.50	0.05	Spring	0.23
	Pycnanthemum virginianum	Mountain Mint	0.40	0.04	Summer	2.91
	Ratibida pinnata	Yellow Coneflower	0.75	0.07	Summer	0.74
	Rudbeckia hirta	Black-eyed Susan	2.00	0.18	Summer	6.08
	Solidago rigida	Stiff Goldenrod	0.40	0.04	Fall	0.54
	Symphyotrichum laeve	Smooth Blue Aster	0.40	0.04	Fall	0.73
	Symphyotrichum oolentangiense	Sky-blue Aster	0.40	0.04	Fall	1.06
	Tradescantia bracteata	Long-bracted Spiderwort	0.20	0.02	Spring	0.07
	Verbena stricta	Hoary Vervain	0.70	0.06	Summer	0.65
	Zizia aurea	Golden Alexanders	0.40	0.04	Spring	0.15



**Birch Coulee Solar
Wetland Native Mix
Renville Co MN**

% Grass Seeds:	21%
% Sedge Seeds:	26%
% Forb Seeds:	53%
Species Count:	35
Seeds/Sq. Ft:	166
Avg Height Range:	36-60"

	Scientific Name	Common Name	% of Mix	PLS lbs/ac	Bloom Season	Seeds/SF
Grasses:	Andropogon gerardii	Big Bluestem	9.00	0.72		2.64
	Calamagrostis canadensis	Blue-joint Grass	0.30	0.02		2.47
	Elymus virginicus	Virginia Wild Rye	18.00	1.44		2.22
	Glyceria grandis	Reed Manna Grass	3.50	0.28		8.21
	Leersia oryzoides	Rice Cutgrass	10.00	0.80		9.99
	Panicum virgatum	Switchgrass	4.75	0.38		1.95
	Sorghastrum nutans	Indian Grass	16.00	1.28		5.64
	Spartina pectinata	Prairie Cordgrass	7.00	0.56		1.36
Sedges:	Carex hystericina	Porcupine Sedge	1.00	0.08		0.88
	Carex stipata	Awl-fruited Sedge	2.00	0.16		2.00
	Carex vulpinoidea	Fox Sedge	3.00	0.24		7.14
	Scirpus atrovirens	Green Bulrush	0.65	0.05		8.79
	Scirpus cyperinus	Woolgrass	0.50	0.04		24.98
Forbs:	Acorus americanus	Sweet Flag	1.00	0.08	Summer	0.19
	Asclepias incarnata	Swamp Milkweed	4.50	0.36	Summer	0.63
	Bidens cernua	Nodding Beggarstick	1.50	0.12	Summer	0.93
	Boltonia asteroides	False Aster	1.00	0.08	Fall	4.70
	Desmodium canadense	Showy Tick-trefoil	1.00	0.08	Summer	0.16
	Eutrochium maculatum	Joe-pye Weed	0.50	0.04	Summer	1.77
	Eupatorium perfoliatum	Boneset	0.75	0.06	Fall	5.51
	Helenium autumnale	Sneezeweed	0.75	0.06	Fall	2.87
	Liatris pycnostachya	Prairie Blazing Star	1.00	0.08	Summer	0.32
	Lythrum alatum	Winged Loosestrife	0.50	0.04	Summer	13.88
	Mimulus ringens	Monkey Flower	0.50	0.04	Summer	33.79
	Monarda fistulosa	Wild Bergamot	0.50	0.04	Summer	1.03
	Ratibida pinnata	Yellow Coneflower	1.50	0.12	Summer	1.32
	Silphium perfoliatum	Cup Plant	1.50	0.12	Summer	0.06
	Solidago rigida	Stiff Goldenrod	1.00	0.08	Fall	1.20
	Sparganium eurycarpum	Giant Burreed	2.00	0.16	Summer	0.03
	Symphyotrichum novae-angliae	New England Aster	0.75	0.06	Fall	1.45
	Thalictrum dasycarpum	Purple Meadow Rue	0.75	0.06	Summer	0.44
	Verbena hastata	Blue Vervain	2.00	0.16	Summer	5.47
	Vernonia fasciculata	Ironweed	0.30	0.02	Summer	0.21
	Veronicastrum virginicum	Culver's Root	0.50	0.04	Summer	11.75
	Zizia aurea	Golden Alexanders	0.50	0.04	Spring	0.16



Birch Coulee Solar
Fenceline Mix
Renville Co MN

Fescue lbs/ac:	200.00
Species Count:	4
Avg Height Range:	6-18"

Fescue:	Scientific Name	Common Name	% of Mix	PLS lbs/ac
	Festuca ovina	Sheep Fescue	25.00	50.00
	Festuca trachyphylla	Hard Fescue	25.00	50.00
	Festuca rubra commutata	Chewings Fescue	25.00	50.00
	Festuca rubra	Creeping Red Fescue	25.00	50.00