Appendix E

Vegetation Management Plan

Byron Solar Project

Dodge and Olmsted counties, Minnesota

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Byron Solar Project

Vegetation Establishment and Management Plan

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Abbreviations and Definitions

VMP	Vegetation Establishment and Management Plan
Carbon Sequestration	Natural or artificial process by which carbon dioxide is removed from the atmosphere and held in solid or liquid form.
Project Area	Land area controlled by the Developer with a purchase or lease.
State Trunk Highway	Regional state highway route.
DC	Direct Current
AC	Alternating Current
kV	Kilovolt
USGS	U.S. Geological Survey
MNDNR	Minnesota Department of Natural Resources
ECS	Minnesota Ecological Classification System
NHD	National Hydrography Dataset
VMU	Vegetation Management Unit
AIMP	Agricultural Impact Mitigation Plan
SPA	Solar Permit Application
Seedbed	Upper soil layers where seed is present.
Soil Compaction	Soils that have been compacted by surface pressure and weight.
Soil Decompaction	Methods to loosen compacted soils.
BMPs	Best Management Practices
Drain Tile	Underground drainage system for water removal.
Monitoring	Observational and parametric assessment of site conditions.

Contents

Vegetation Establishment and Management Plan Overview

The Project vegetation establishment and management goals and objectives are as follows:

- Establish and create pollinator habitat using native species.
- Improve water infiltration and uptake through evapotranspiration.
- Carbon sequestration using native prairie species including grasses.
- Successfully implement establishment and long-term management using mowing, herbicides, grazing, treatment of encroaching woody vegetation, and other adaptive approaches.

Site Description

Project Description

Byron Solar Project, LLC (Byron Solar or Applicant), a wholly owned subsidiary of EDF Renewables, Inc. (EDFR), proposes to construct and operate an up to 200 megawatt (MW) photovoltaic (PV) solar energy generating facility and associated systems (Solar Facility). In addition, the Applicant is proposing to construct a 345 kilovolt (kV) high voltage transmission line and associated facilities (HVTL or Transmission Line) to interconnect the Solar Facility to the transmission grid.

The proposed Solar Facility and HVTL (together, Project) are planned to be constructed in the townships of Mantorville and Canisteo in Dodge County, Minnesota, and Kalmar Township in Olmsted County, Minnesota (**Figure 1**). Construction is proposed to begin in 2023 with commercial operation by the end of 2024.

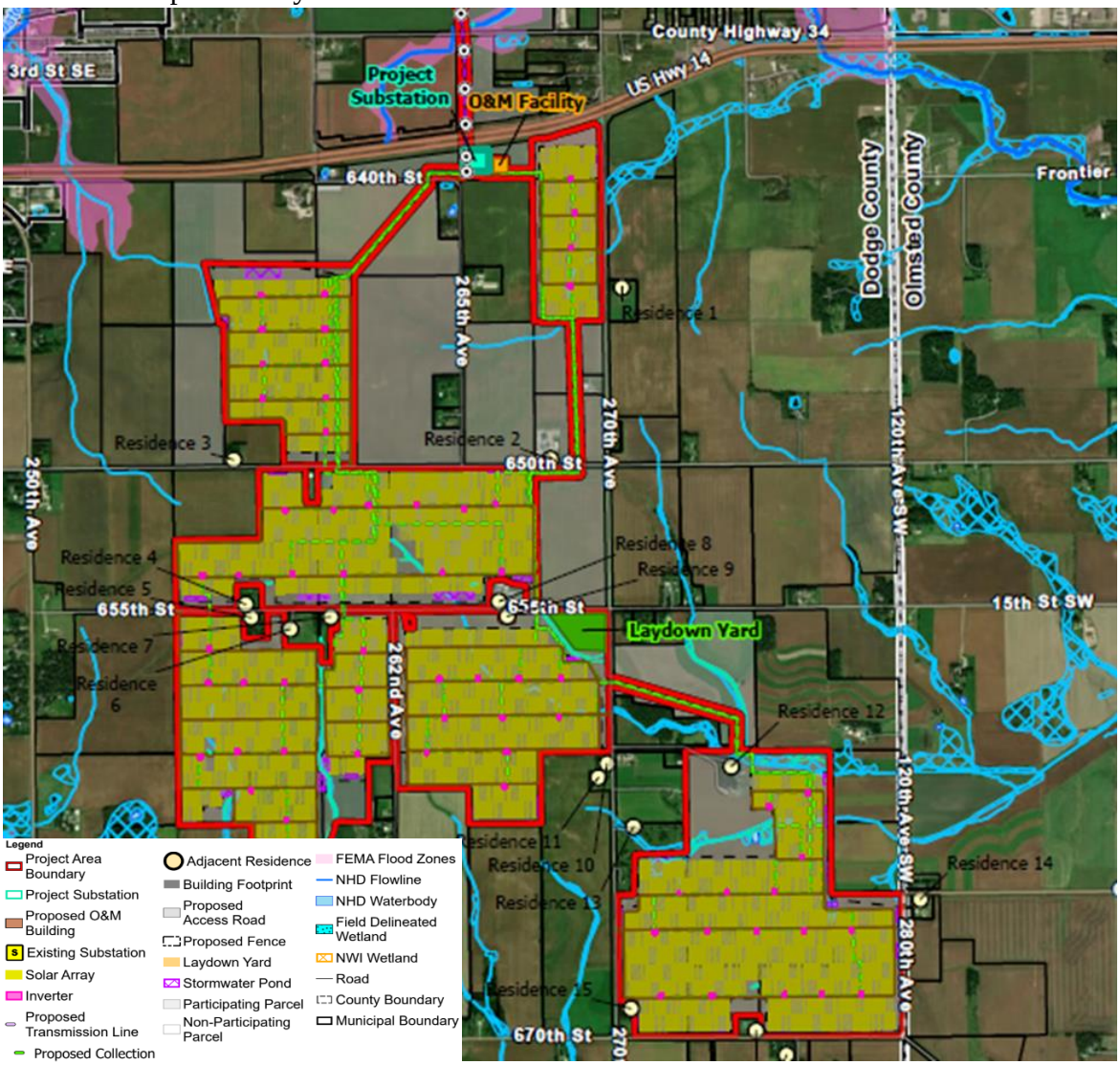

Figure 1. Project location and preliminary layout.

Solar Facility

The proposed Solar Facility consists of solar panels mounted on galvanized steel and aluminum racking systems installed on driven piles or ground screws for the foundations. A linear ground-mounted single-axis tracking system will allow the solar panels to track the sun from east to west maximizing energy production. Solar panels will be accessible via a network of gravel access roads for maintenance purposes, and the portions of the facility occupied by equipment will be surrounded by security fencing. Stormwater from the site will be managed through a series of planned stormwater ponds.

The Solar Facility is situated on approximately 1,801 acres of predominantly agricultural land and refers to all land within the Solar Facility boundary under agreement with a landowner. References to "Preliminary Development Area" refers to portions of the Solar Facility hosting solar equipment (1,552.6 acres), defined as areas within the proposed fence as shown on **Figure 1**. The remaining 248.4 acres are not hosting solar equipment and are considered undeveloped land. The Applicant also has lease agreements with landowners whose parcels extend beyond the Solar Facility boundary. Combined with the Solar Facility, this area is referred to as the Land Control Area.

Energy from the solar panels will be directed through an underground electrical collection system to inverters where the power is converted from direct current (DC) to alternating current (AC) power. A new Project Substation will be constructed as part of the Solar Facility and will be located just south of U.S. Highway 14 near 640th St/265th Ave in Dodge County.

HVTL

The proposed HVTL route begins at the new Project Substation then travels generally north and east for approximately three miles to connect to the existing Southern Minnesota Municipal Power Agency (SMMPA) Byron Substation in Olmsted County (**Figure 2**). Two medium power transformers located near the center of the proposed Project Substation will step-up the power generated from the Solar Facility from 34.5 kV to 345kV. From the Project Substation, the HVTL will carry power to the Byron Substation located immediately adjacent to the eastern end of the Transmission Line where it will connect to the energy grid.

Figure 2. HVTL proposed route map.

References to the "HVTL Proposed Route" within this Application refers to the 3-mile 345 kV Transmission Line. EDF has acquired a 150-foot wide permanent right-of-way to support the path of the 345 kV Transmission Line. EDF has secured 100 percent of the total necessary private easements from landowners for the 52.7 acres of right-of-way required for the Proposed Route.

Surrounding Land Use

The Project is located within a rural landscape, and the primary land use in the Project Area is agricultural (96.9 percent) followed by herbaceous/hay/pasture (1.6 percent), developed lands (1.5 percent), and the remaining identified land uses include a minor amount of deciduous forest (0.1 percent) (USGS, 2016).

Table 1 summarizes the land use types within the Project. Most of the agricultural land in the Project Area is subject to row-crop agriculture, such as corn and soybeans. Developed land within the Project Area generally consists of public roads, namely U.S. Highway 14, County Road 15, County Road 6, 280th Street, 650th Street, 655th Street, and 262nd Avenue. The small area (28.8 acres) of herbaceous/hay/pasture lands within the Project Area is associated with roadside ditches and unnamed streams. The minor amount of deciduous forest identified in the Project Area is associated with the rural homestead and agricultural buildings in the southeastern portion of the Project Area.

Table 1. Land use within the Project Area (in acres).

Land Use Type	Acres in Project Area	Percent of Total Acreage
Agricultural	1,795.6	96.9
Herbaceous/Hay/Pasture	28.8	1.6
Developed	27.3	1.5
Deciduous Forest	1.9	0.1
Total	**1,853.7**	**100.0%**

Vegetation

Most of the Solar Facility is within the Rochester Plateau Subsection of the Paleozoic Plateau Section of the Eastern Broadleaf Forest Province. The northern portion of the Solar Facility and the Proposed Route are within the Oak Savanna Subsection of the Minnesota and Northeastern Iowa Morainal Section of the Eastern Broadleaf Forest Province (MNDNR, 1999). The Rochester Plateau Subsection consists of a series of Des Moines lobe end moraines and is a gently rolling glacial till plain covered by loess (MNDNR, 2021b). Presettlement vegetation was tallgrass prairie and bur oak (*Quercus macrocarpa)* savanna. Most of the Oak Savanna Subsection is rolling plain of loess-mantled ridges over sandstone and carbonate bedrock and till. Pre-European settlement vegetation was dominated by bur oak savanna interspersed with tallgrass prairies and maple (*Acer* spp.) -basswood (*Tilia* spp.) forests (MNDNR, 2021c).

The Project is located within a rural landscape, and therefore the primary land use in the Project Area is agricultural (96.9 percent). The remainder of the Project Area consists of hay/pasture and herbaceous lands (1.6 percent) and a small amount of developed lands (1.3 percent). The remaining identified land uses include a minor amount of deciduous forest, comprised of less than 0.1 percent. Forested land within the Project Area is located along hedge rows and farmsteads. The wetlands that were identified within the Project Area are seasonally flooded basins, fresh wet meadows, sedge meadow and open water pond. The waterways are intermittent and perennial streams. No native prairies or sensitive plant species were identified within the Solar Facility or the along the HVTL route during routine field surveys.

Soils

The soils in the Project Area identified in the field during the geotechnical investigations consist of topsoil overlying primarily lean clay with varying amounts of sand (glacial till). Sand content in the clay was highly variable with up to 50 percent in some samples. Cobbles and boulders were not encountered when drilling in the glacial till deposits, but isolated obstacles could still be encountered.

Soils listed as predominantly hydric are scattered throughout the Project Area. No soils are classified as all hydric within the Project Area. Wetlands are associated with some of these areas, however other areas appear to be effectively drained by agricultural practices. There are no known springs or seeps within the Project Area. Soil resources within the Project Area are shown in **Table 2** and are classified as predominantly moderate for erodibility.

Table 2. Project Area soils.

Map Unit	Soil Name	Drainage Class	Wind Erodibility	Hydric Class[1]	% Hydric	Acres
M511A	Readlyn silt loam, 1 to 3 percent slopes	Somewhat poorly drained	Moderate Erodibility	Predominantly non-hydric	5	437.16
M506B	Kasson silt loam, 2 to 6 percent slopes	Moderately well drained	Moderate Erodibility	Non-hydric	0	368.11
M515A	Tripoli clay loam, 0 to 2 percent slopes	Poorly drained	Moderate Erodibility	Predominantly hydric	90	253.82
M507A	Marquis silt loam, 1 to 3 percent slopes	Moderately well drained	Moderate Erodibility	Non-hydric	0	231.44
M518B	Clyde-Floyd complex, 1 to 4 percent slopes	Poorly drained	Moderate Erodibility	Partially hydric	60	178.17
M526B	Winneshiek silt loam, 2 to 6 percent slopes	Well drained	Moderate Erodibility	Non-hydric	0	106.44
M517A	Clyde silty clay loam, 0 to 3 percent slopes	Poorly drained	High Erodibility	Predominantly hydric	95	74.85
M508A	Oran silt loam, 1 to 4 percent slopes	Somewhat poorly drained	High Erodibility	Predominantly non-hydric	5	73.74
M526C2	Winneshiek silt loam, 6 to 12 percent slopes, moderately eroded	Well drained	Moderate Erodibility	Non-hydric	0	40.25
1027A	Coland-Spillville, complex, 0 to 2 percent slopes, flooded	Poorly drained	Moderate Erodibility	Partially hydric	55	11.89
M509C2	Mantorville loam, 6 to 12 percent slopes, moderately eroded	Well drained	High Erodibility	Non-hydric	0	10.56
M527D2	Nasset-Winneshiek complex, 12 to 18	Well drained	High Erodibility	Non-hydric	0	8.44

Table 2. Project Area soils.

Map Unit	Soil Name	Drainage Class	Wind Erodibility	Hydric Class[1]	% Hydric	Acres
	percent slopes, moderately eroded					
N578B	Barremills silt loam, drainageway, 1 to 5 percent slopes, occasionally flooded	Well drained	High Erodibility	Non-hydric	0	3.20
M509B	Mantorville loam, 2 to 6 percent slopes	Well drained	High Erodibility	Non-hydric	0	2.09
M523C2	Bassett-Kasson complex, 6 to 12 percent slopes, eroded	Moderately well drained	Moderate Erodibility	Non-hydric	0	0.74
Total						**1,801.0**

[1] Partially hydric soil means that at least one major component of the soil unit is rated as hydric, and at least one other major component is not rated hydric. Predominantly hydric soil means components that comprise 66 to 99 percent of the map unit are rated as hydric.

Soil types crossed by the Proposed Route are silt and clay loams that range from poorly drained to well-drained as shown in **Table 3**.

Table 3. Soils crossed by the Proposed Route.

Map Unit	Soil Name	Drainage Class	Wind Erodibility	Hydric Class[1]	% Hydric	Acres
M511A	Readlyn silt loam, 1 to 3 percent slopes	Somewhat poorly drained	Moderate Erodibility	Predominantly non-hydric	5	12.53
N555B	Tama-Dinsmore complex, 2 to 6 percent slopes	Well drained	Moderate Erodibility	Non-hydric	0	8.71
M507A	Marquis silt loam, 1 to 3 percent slopes	Moderately well drained	Moderate Erodibility	Non-hydric	0	8.02
M518B	Clyde-Floyd complex, 1 to 4 percent slopes	Poorly drained	Moderate Erodibility	Partially hydric	60	6.22

Map Unit	Soil Name	Drainage Class	Wind Erodibility	Hydric Class[1]	% Hydric	Acres
M515A	Tripoli clay loam, 0 to 2 percent slopes	Poorly drained	Moderate Erodibility	Predominantly hydric	90	5.93
176	Garwin silty clay loam	Poorly drained	High Erodibility	Predominantly hydric	95	3.54
285B	Port Byron silt loam, 2 to 6 percent slopes	Well drained	Moderate Erodibility	Non-hydric	0	3.02
N514B	Joy-Ossian, occasionally flooded, complex, 1 to 5 percent slopes	Somewhat poorly drained	Moderate Erodibility	Predominantly non-hydric	25	2.27
285C	Port Byron silt loam, 6 to 12 percent slopes, moderately eroded	Well drained	Moderate Erodibility	Non-hydric	0	0.94
285A	Port Byron silt loam, 0 to 2 percent slopes	Well drained	Moderate Erodibility	Predominantly non-hydric	5	0.85
203	Joy silt loam, 1 to 4 percent slopes	Somewhat poorly drained	Low Erodibility	Predominantly non-hydric	5	0.61
493C	Oronoco loam, 6 to 12 percent slopes	Well drained	Moderate Erodibility	Non-hydric	0	0.03
Total						**52.7**

[1] Partially hydric soil means that at least one major component of the soil unit is rated as hydric, and at least one other major component is not rated hydric. Predominantly hydric soil means components that comprise 66 to 99 percent of the map unit are rated as hydric.

Prime Farmland

The Project is sited on approximately 1,256 acres of prime farmland, 52.5 acres of farmland of statewide importance, 2.3 acres of prime farmland if protected, and 522.6 acres of prime farmland if drained. Nearly all of the Project is located on prime farmland/prime farmland if drained.

Solar Facility

As shown in **Table 4**, approximately 1,079.8 acres of prime farmland, 420.8 acres of prime farmland if drained, and 43.5 acres of farmland of statewide importance are located within the Preliminary Development Area.

Table 4. Prime Farmland soils within the Preliminary Development Area.

Farmland Classification	Acreage	Percent of Preliminary Development Area
Prime Farmland	1,079.8	70.0%
Prime Farmland if Drained	420.8	27.0%
Prime Farmland if Protected from Flooding	0.0	0.0%
Farmland of Statewide Importance	43.5	3.0%
Not Prime Farmland	8.4	1.0%
TOTAL	**1,552.6**	**100%**

Note: The total shown in this table may not equal the sum of addends due to rounding.

HVTL Proposed Route

As shown in **Table 5**, approximately 52.7 acres of soils crossed by the Proposed Route are classified as "Prime Farmland." Of this, 33.8 acres are prime farmland, 15.7 acres are prime farmland if drained, and 2.3 acres are considered prime farmland if protected from flooding or not frequently flooded during the growing season, and 1.0 acre classified as farmland of statewide importance within the Proposed Route.

Table 5. Prime Farmland soils crossed by the HVTL Proposed Route.

Farmland Classification	Acreage[1]	Percent of HVTL area
Prime Farmland	33.8	64.0%
Prime Farmland if Drained	15.7	30.0%
Prime Farmland if Protected from Flooding	2.3	4.0%
Farmland of Statewide Importance	1.0	2.0%
TOTAL	**52.7**	**100%**

1 The Proposed Route includes the 150 foot right-of-way (75 feet on both sides of the transmission line centerline) for a total of 52.7 acres. Construction is anticipated to impact only 25 feet on both sides of the transmission line centerline for a total of 17.4 acres. The remaining 35.3 acres allows for design flexibility, provides space to maneuver construction vehicles, provides for Minimum Vegetation Clearance Distances per NERC Reliability Standards, and provides a buffer for line sway on windy days.

Note: The total shown in this table may not equal the sum of addends due to rounding.

Topography

The Preliminary Development Area is comprised of slightly rolling hills with elevation ranging between 1,252 – 1,301 feet (**Figure 3**). To the south and southeast, the Preliminary Development Area slopes downgradient towards Salem Creek and Cascade Creek respectively.

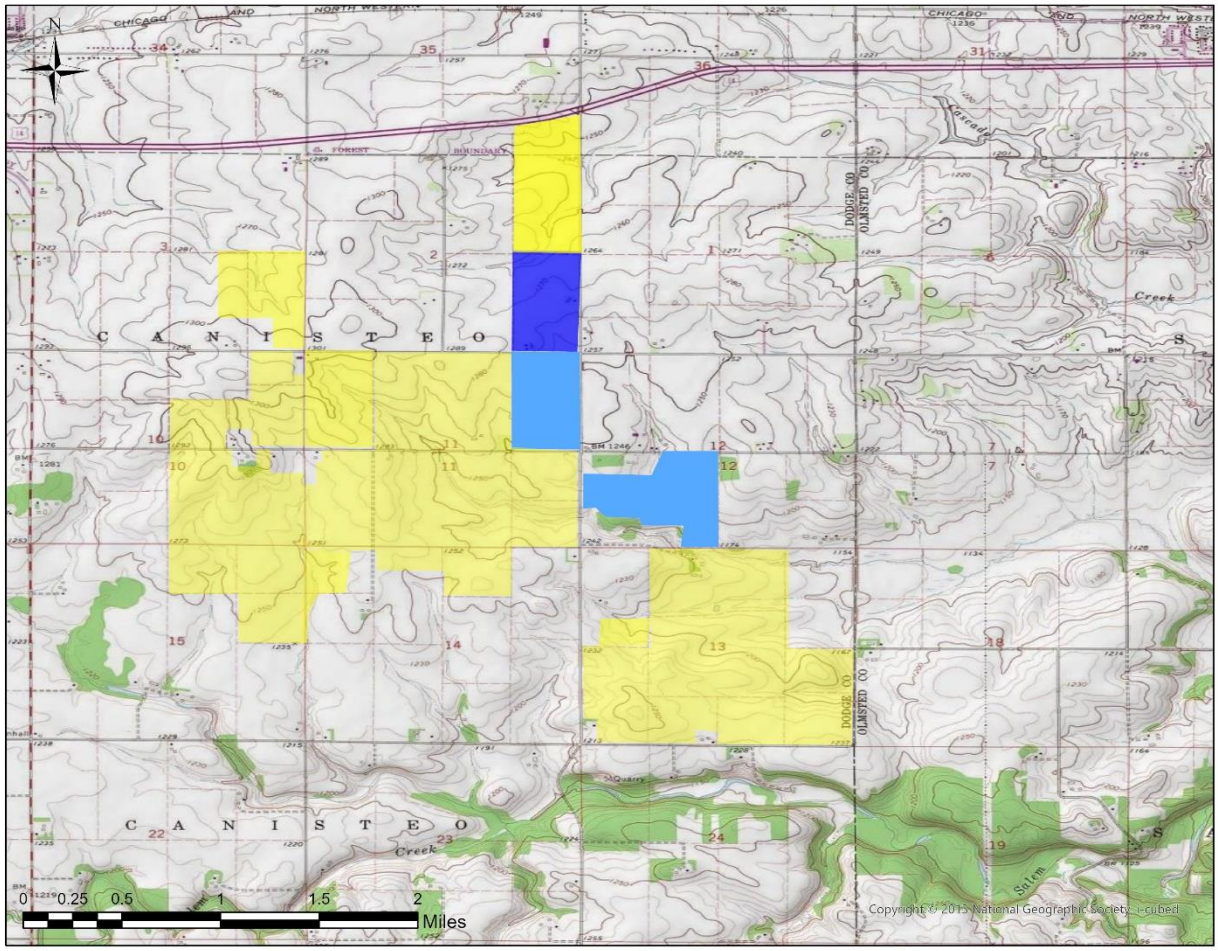

Figure 3. Preliminary Development Area topography.

Hydrology

The Project is located in the Zumbro River Watershed Basin (MNDNR, 2019b). According to the National Hydrography Dataset (NHD), ten watercourses and one waterbody are within the Solar Facility. The Transmission Line route includes four NHD flowlines that includes Cascade Creek and unnamed tributaries to Cascade Creek. No waterbodies were identified within the Proposed Route. No MNDNR PWI watercourses were identified within the Solar Facility or Proposed Route.

Other surface water resources within 1 mile of the Solar Facility and Proposed Route include five MNDNR Public Watercourses located to the south, east and northwest. No rivers or lakes were identified, and no designated trout streams, MN DNR Public Waters Inventory (PWI) basins, or MNDNR-designated shallow lakes or calcareous fens were identified within the Project Area or along the Proposed Route. No impaired waterbodies were identified within the Project Area or Proposed Route right-of-way. Two impaired waterbodies are located within the 1-mile buffer. Additional details on impaired waterbodies are presented in section 6.6.5.3.

A desktop historical aerial photo review was conducted to identify wetlands and watercourses within the Project Area in accordance with the July 1st, 2016 Minnesota BWSR/USACE-accepted protocol for conducting off-site wetland determinations, *Guidance for Offsite Hydrology/Wetland Determinations*. The potential for wetlands within the Project Area was further evaluated by reviewing other desktop resources (i.e., recent aerial photography, hydric soils map units, LiDAR, and digital elevation models). 45 suspect wetlands were desktop delineated totaling 81.9 acres. Desktop delineated suspect wetlands comprise approximately 5 percent of the Project Area and transmission line corridor. The desktop analysis was used to support field delineation efforts.

Jurisdictional field delineations of the Project Area and Proposed Route right-of-way were conducted the week of October 26, 2020 and April 26, 2021 (**Table 6**). Twenty-five wetlands totaling 22.10 acres, one pond totaling 0.30 acre, and five watercourses totaling 1.58 acres (0.59 linear mile) were delineated. Many of the suspect wetland areas identified during the desktop mapping exercise were determined to be drained.

Table 6. Field delineated wetlands and watercourses.

Feature ID	Feature Type	Mapped Type	Acres
Wetlands			
WB-01	Seasonally Flooded Basin	PEM1Af	0.11
WB-02	Fresh Wet Meadow	PEM1B	4.26
WB-03	Fresh Wet Meadow	PEM1B	0.02
WB-04	Fresh Wet Meadow	PEM1B	0.01
WB-05	Sedge Meadow	PEM1B	2.00
WB-06	Fresh Wet Meadow	PEM1B	0.05
WB-07	Fresh Wet Meadow and Sedge Meadow	PEM1B	2.48
WB-08	Fresh Wet Meadow	PEM1B	0.66
WB-09	Seasonally Flooded Basin	PEM1Af	0.44
WB-10	Seasonally Flooded Basin	PEM1Af	0.14

Feature ID	Feature Type	Mapped Type	Acres
WB-11	Seasonally Flooded Basin	PEM1Af	0.08
WB-12	Seasonally Flooded Basin	PEM1A	0.34
WB-13	Seasonally Flooded Basin	PEM1A	0.01
WB-14	Fresh Wet Meadow	PEM1B	4.31
WB-15	Seasonally Flooded Basin	PEM1Af	2.07
WB-16	Seasonally Flooded Basin	PEM1A	0.08
WB-17	Fresh Wet Meadow	PEM1B	1.69
WB-101	Fresh Wet Meadow/Shallow Marsh	PEM1B/PEM1C	0.47
WB-102	Seasonally Flooded Basin	PEM1Af	0.13
WB-103	Fresh Wet Meadow	PEM1B	2.04
WB-104	Seasonally Flooded Basin	PEM1Af	0.26
WB-105	Seasonally Flooded Basin	PEM1Af	0.22
WB-106	Seasonally Flooded Basin	PEM1Af	0.13
WB-107	Seasonally Flooded Basin	PEM1Af	0.07
WB-108	Seasonally Flooded Basin	PEM1Af	0.05
P-01	Shallow Open Water	PUBGx	0.30
Total			**22.40**
Watercourses			
WC-01	Perennial	R2UBH	1.48
WC-02	Perennial	R2UBH	0.01
WC-03	Intermittent	R4SBC	0.05
WC-04	Intermittent	R4SBC	0.02
WC-05	Perennial	R2UBH	0.02
Total			**1.58**

Given the large area of the Project, mapped delineated wetlands and watercourses are shown in the Wetland Delineation Report (Westwood, 2021) provided in the **Attachments**.

Agricultural drainage features include….. [obtain tile and ditch mapping from County].

Vegetation Management Units (or Areas)

At least five management units are expected within the Project Area as follows:

- Array Vegetation Management Unit
- Perimeter Vegetation Management Unit
- Stormwater Retention Vegetation Management Unit
- Screening Vegetation Management Unit
- HVTL Proposed Route Vegetation Management Unit

The Project Area is currently comprised of cultivated cropland subjected to rotational planting. The primary crops are corn and soybeans. The drainages are tree lined, and surrounding farmsteads are enclosed with windbreaks comprised of trees and shrubs. Existing highway and gravel road rights-of-way are vegetated with grass cover.

The largest Vegetation Management Unit (VMU) will be the vegetation established in the solar panel mounted arrays and access roads within the fencing, designated as the Array VMU. Array VMU seed mix installations will be contingent on soil wetness, as well as vegetation growth form characteristics (i.e. height). The following Minnesota State Seed Mixes (formerly BWSR/MnDOT mixes) will be considered for installation in the Array VMU:

- Dry Prairie General (Mix 35-221)
- Mesic Prairie General (35-241)
- Mesic Prairie Southeast (35-641)
- Low Growing Solar Array South and West (Pilot Mix)

Depending on the amount of direct sunlight at a given spot, some of these mixes may be modified with a higher proportion of shade tolerant species.

The Stormwater Retention VMU will address the stormwater retention basins located inside the fencing which are expected to be dry infiltration basins. The Dry Swale/Pond (33-262) seed mix will be installed in dry infiltration basins. If stormwater basins require a more wet tolerant mix, the Stormwater South and West (33-261), Wet Meadow South and West (34-271), and Wet Prairie (34-262) seed mixes could be considered.

Areas immediately located outside of the fencing will be planted with the same seed mixes as the Array VMU to buffer weed and woody species encroachment inside of the array fencing.

Management of the Array and Stormwater Basin VMU’s will be achieved using integrated site management that could include:

- Grazing
- Mowing and haying.
- Spot herbicide applications

If site screening is included, a Screening VMU will be incorporated in this section. The Screening VMU could include native tree and shrub species plantings, ideally using evergreen species for year-round screening effectiveness.

Vegetation within the HVTL Proposed Route VMU will be determined through the Solar Permit Application process.

Management of seeded areas of the perimeter fencing could also include mowing and herbicides.

Vegetation Management Objectives

Long-term Management Objectives (5 years after establishment through the end of the permit)

The long-term Project vegetation establishment and management goals and objectives are as follows:

- Establish and create pollinator habitat using native species across all VMUs.
- Improve water infiltration and uptake through evapotranspiration.
- Carbon sequestration using native prairie species including grasses.
- Successfully implement establishment and long-term management using mowing, herbicides, grazing, treatment of encroaching woody vegetation, and other adaptive approaches.
- All VMU's will be subject to adaptive management to maximize establishment success.
- The level of effort for monitoring is anticipated to include maintenance inspections using qualitative assessment methods.

Short Term Objectives (Establishment through year 5)

The short-term Project vegetation establishment and management goals and objectives are as follows

1. Cover crops will provide immediate soil stabilization and provide protective cover for establishing planted seed.
2. Mowing and grazing may be used as an establishment management method, as well as a weed control option.
3. Spot herbicide applications will be used to control weeds and woody species encroachment.
4. Broadcast seeding will be used for supplemental seeding of bare areas and areas not meeting performance criteria.
5. Annual monitoring followed with establishment maintenance activities will be conducted during the first five years of the project after seeding/planting. The monitoring analyses will be based on target goals and performance criteria including percent cover, composition of forbs and grasses, flowering periods, and seasonality.
6. All VMU's will be subject to adaptive management to maximize establishment success.

Preventing Soil Compaction

All post grading and construction soils will be subjected to soil decompaction using a soil ripper or till implement prior to any seeding or planting.

Establishment and Management Prescriptions

Site Preparation

Site preparation will be consistent with the Agricultural Impact Mitigation Plan (AIMP - Westwood, 2021) provided in the Solar Permit Application (SPA). This includes referencing the site conditions related to soils, drainage, and existing agricultural land uses as will as the construction sections of the AIMP. The AIMP construction sections address site clearing and vegetation removal, earthwork, and construction of roads, substation interconnection, solar arrays, and stormwater facilities. The AIMP summarizes planned construction activities, equipment, standards and practices, and adaptive methods related to site development.

Schedule and sequencing the installation of native vegetation will be addressed in this Plan using a Gantt Chart prepared after completion of the construction schedule. The chart will incorporate the AIMP and construction activities to provide a detailed vegetation installation timeline, milestones and dates, and coordination points with the construction contractor. Vegetation installation activities will be timed and sequenced with the construction schedule to ensure that site preparation and seeding activities occur at the appropriate times and steps in coordination with the construction contractor.

Soil and subsoil handling best management practices (BMPs) will be implemented during grading and trenching. This could include separating and temporarily stockpiling excavated or cut topsoil. Followed with reapplication of topsoil prior to seeding. Other BMPs could include temporary erosion control measures such as:

- Stockpiling and separating subsoils.
- Temporary cover crops.
- Erosion control blankets in sensitive areas.
- Silt fencing installations.
- Temporary drainages, checks, and runoff diversions.

Soil compaction will be prevented by utilizing construction BMPs that reduce compaction and mechanically treat any soils compacted during construction. Soil decompaction will occur prior to seed installation using soil decompaction ripper or tiller equipment. Soil compaction will be measured before and after decompaction treatment for quality control purposes prior to seed installation.

Seedbed preparation will follow soil decompaction by first subjecting the soils to a roller or a disc to level the soil surface. The seed will then be installed using a seed drill. As a less preferred alternative, a broadcast seeder could also be used if it is subsequently subjected to a trample grazing event.

Weeds that invade during construction will be subjected to herbicide treatments using an adaptive management approach contingency. Otherwise, seed installation should immediately follow soil decompaction and roller discing so the cover crop can quickly establish to minimize weed infestation.

All seed mixes will include a rapidly establishing temporary cover crop, such oats, annual rye, or a mixture of annual grasses. Selection of cover crop seed will be dependent on seasonal timing, weather conditions, and construction schedule to maximize effectiveness. For example, oats perform better as a cover crop when planted in the spring and early summer. Whereas annual rye is better suited for late summer through early winter plantings.

Seeding and Planting

The following ***seed mixes*** will be considered for Project installation.

- Dry Prairie General (Mix 35-221)
- Mesic Prairie General (35-241)
- Mesic Prairie Southeast (35-641)
- Low Growing Solar Array South and West (Pilot Mix)
- Dry Swale/Pond (33-262)
- Stormwater South and West (33-261)
- Wet Meadow South and West (34-271)
- Wet Prairie (34-262)

Seed mixes will include the following specifications:

- At least 40 percent of the seed mix species will be comprised of 20 or more perennial forbs.
    - At least three forb species that bloom in each bloom period; Early (April-May), Mid (June-August), and Late (August-October).
- Seven or more species of grasses/sedges with a minimum of two bunchgrass species.
- Seed mixes will fulfill the various plant guilds: cool season grasses; warm-season grasses; sedges/rushes; legume; and non-legume forbs.
- Include a wide representation of plant families.
- Applied at a minimum rate of 40 pounds per acre or greater.
- Could include customization of mixes favoring shorter stature growing plants that won't hinder solar operations.

Typically, seed mixes are "over-specified" with an abundance of species that enable these criteria to be easily met. This includes using application rates that are slightly higher than 40 percent.

Seed mix species specification sheets are provided in the Attachments section of this document. ***Note that these mixes could be revised and potentially customized after completion of the grading and final design plans***. Based on seasonality and availability, seed mixes could also be subject to species substitutions. This will result in site specific seed mixes that meet the goals and objectives.

Pesticide drift will also be addressed in greater detail when final design plans are completed. Pesticide drift management will address prevailing wind direction, topography, orientation, and array positioning. Drift minimization could include screening with evergreen trees or shrubs, establishing buffers and setbacks, and, most important and effective by communicating with neighboring landowners and farmers. Ultimately, protecting the native vegetation at Louise Solar from pesticide drift will depend on applicators on adjacent land properly controlling their pesticide application and preventing pesticide from drifting into the project area.

Array and border area planting timing will be contingent on the completion of site grading, trenching, and installation of the panel mounting equipment. In general, seeding can occur during any time of the year with the exception of winter months when soils are frozen. Optimal times include early summer (early June) when soil temperatures are warm for rapid seed germination, or in the fall (September – early November) prior to freeze up. Seed installed in the fall will be subjected to winter dormancy curing. Seed installed in the spring will be subjected to winter dormancy by the retail seed provider. All seed mixes will include a temporary cover crop to stabilize soils and provide protection for the young native plants to become established.

The arrays will be seeded using a seed drill implement. Seed drilling can either occur prior to or after the installation of the solar array equipment. A follow-up broadcast seeding event typically occurs later in the season to distribute seed to areas disturbed by construction and other activities. Seeded areas will be immediately followed with the installation of straw mulching using a mulch blower implement.

Stormwater detention area planting will be contingent on stormwater detention area design specifications. These specifications will include recommended plant materials, seeding rates/metrics, and installation methods.

Establishment Management and Maintenance

Vegetation establishment management and maintenance will follow an integrated approach. The five-year post installation establishment period will include establishment mowing events. Timed appropriately to manage weeds and promote native plant establishment. Grazing can also be used during the establishment period, but is more typically used during the management period starting in year five. Haying can occur during the establishment and management periods as a means to remove mowed vegetation to avoid smothering native vegetation and weed infestations.

Mowing and grazing are also effective weed and woody species control measures. Woody species will be controlled using spot herbicide treatments including and target spectrum herbicides (e.g. woody species herbicide). Spot herbicide treatments can also be used to control herbaceous weeds using a broad or narrow spectrum herbicide.

Vegetation management equipment and implements will be cleaned of potential weed and invasive species reproductive parts prior to entering the Project Area. Similarly, equipment will be cleaned after all work events in the Project Area. Cleaning can either occur off-site at a designed cleaning station or facility, or a cleaning station constructed in the Project Area. Cleaned equipment should always be inspected to ensure removal of all vegetative matter.

Vegetation Monitoring and Adaptive Management

Monitoring is sub-divided into "construction monitoring" and "establishment management monitoring." While the details of monitoring will be contingent on the conditions set forth by the Minnesota Public Utilities Commission (PUC) permit approval and an Agricultural Impact Mitigation Plan, a general prescription of the assumed monitoring plan is as follows.

Vegetation will be monitored annually during the five-year establishment period. A monitoring plan will be prepared with projected outcomes and performance metrics. Annual monitoring will use quantitative and qualitative methods to measure and assess vegetation establishment progress. Monitoring will also identify maintenance and management needs for follow-up resolution. Quantitative approaches include using releve plot transect sampling in permanent or randomly selected locations in the Project Area. Qualitative methods include visually determining aerial cover, evaluating plant vigor or stress, identification of bare spots and weeds, and other non-parametric approaches. Permanent photo-stations will be established to show progress over time.

Annual monitoring will include a minimum of two field monitoring events, in June and September. Each monitoring event will be followed with a set of maintenance and management recommendations for follow-up action. Records of all maintenance and management actions will be saved and included in an Annual Monitoring Report completed after the September monitoring event by January 31 of following year. The Report will address adaptive management strategies and applications, vegetation performance, and management results. The contents and reporting metrics will be based on projected outcomes and related PUC permit conditions.

Annual Reporting

An annual report will be submitted by January 31 each year describing the following:

1. A summary of site conditions and management activities to meet management objectives by management area/unit.
2. Description of adaptive management actions implemented to meet management objectives.
3. Description of management challenges (unanticipated weather events, staffing, etc.).
4. Discussion of specific management challenges faced by the project during the reporting year.
5. Updates to this Vegetation Management Plan, if any, and a summary of related agency coordination.

References

Westwood, 2021. Application to the Minnesota Public Utilities Commission for a Site Permit for the Byron Solar 200 MW Large Electric Generating Facility and 345 kV High Voltage Transmission Line Project. MPUC Docket Number: IP-7039/WS-20-647. July 9, 2021.

Westwood, 2021. Agricultural Impact Mitigation Plan for the Byron Solar Site. Appendix in the Byron Solar 200 MW Large Electric Generating Facility and 345 kV High Voltage Transmission Line Project Permit Application. June 17, 2021.

Westwood, 2021. Wetland Delineation Report for the Byron Solar Project. June 7, 2021.

List of Maps and Tables

Attachments

Seed Mix Specification Sheets

Wetland Delineation Report

Mesic Prairie General 35-241

Common Name	Scientific Name	Rate (kg/ha)	Rate (lb/ac)	% of Mix (% by wt)	Seeds/ sq ft
big bluestem	*Andropogon gerardii*	2.24	2.00	5.48%	7.35
side-oats grama	*Bouteloua curtipendula*	1.79	1.60	4.39%	3.53
kalm's brome	*Bromus kalmii*	0.56	0.50	1.37%	1.47
nodding wild rye	*Elymus canadensis*	1.31	1.17	3.20%	2.23
slender wheatgrass	*Elymus trachycaulus*	1.12	1.00	2.73%	2.53
switchgrass	*Panicum virgatum*	0.07	0.06	0.17%	0.32
little bluestem	*Schizachyrium scoparium*	1.79	1.60	4.39%	8.82
Indian grass	*Sorghastrum nutans*	2.24	2.00	5.48%	8.82
prairie dropseed	*Sporobolus heterolepis*	0.08	0.07	0.18%	0.39
Total Grasses	**11.21**	**10.00**	**27.39%**		**35.46**
blue giant hyssop	*Agastache foeniculum*	0.07	0.06	0.15%	1.82
lead plant	*Amorpha canescens*	0.07	0.06	0.15%	0.25
common milkweed	*Asclepias syriaca*	0.04	0.04	0.10%	0.06
butterfly milkweed	*Asclepias tuberosa*	0.04	0.04	0.10%	0.06
Canada milk vetch	*Astragalus canadensis*	0.07	0.06	0.17%	0.39
white prairie clover	*Dalea candida*	0.07	0.06	0.17%	0.44
purple prairie clover	*Dalea purpurea*	0.21	0.19	0.51%	1.03
Canada tick trefoil	*Desmodium canadense*	0.07	0.06	0.18%	0.13
stiff sunflower	*Helianthus pauciflorus*	0.07	0.06	0.17%	0.09
ox-eye	*Heliopsis helianthoides*	0.15	0.13	0.34%	0.29
rough blazing star	*Liatris aspera*	0.03	0.03	0.08%	0.18
great blazing star	*Liatris pycnostachya*	0.03	0.03	0.09%	0.13
wild bergamot	*Monarda fistulosa*	0.07	0.06	0.17%	1.61
stiff goldenrod	*Oligoneuron rigidum*	0.07	0.06	0.17%	0.94
black-eyed susan	*Rudbeckia hirta*	0.35	0.31	0.86%	10.56
heath aster	*Symphyotrichum ericoides*	0.03	0.03	0.09%	2.30
smooth aster	*Symphyotrichum laeve*	0.07	0.06	0.17%	1.26
blue vervain	*Verbena hastata*	0.04	0.04	0.12%	1.50
hoary vervain	*Verbena stricta*	0.07	0.06	0.17%	0.64
golden alexanders	*Zizia aurea*	0.07	0.06	0.15%	0.23
Total Forbs	**1.68**	**1.50**	**4.11%**		**23.89**

Oats	*Avena sativa*	28.02		25.00	68.50%	11.14
Total Cover Crop	**28.02**		**25.00**		**68.50%**	**11.14**
Totals:	**40.91**		**36.50**		**100.00%**	**70.49**

Purpose: General mesic prairie mix for native roadsides, ecological restoration, or conservation program plantings.

Planting Area: Tallgrass Aspen Parklands, Prairie Parkland, and Eastern Broadleaf Forest Provinces. Mn/DOT Districts 2(west), 3B, 4, Metro, 6, 7 & 8.

Dry Prairie General

35-221

Common Name	Scientific Name	Rate (kg/ha)	Rate (lb/ac)	% of Mix (% by wt)	Seeds/ sq ft
big bluestem	*Andropogon gerardii*	0.78	0.70	1.92%	2.57
side-oats grama	*Bouteloua curtipendula*	3.36	3.00	8.22%	6.61
blue grama	*Bouteloua gracilis*	0.56	0.50	1.37%	7.35
kalm's brome	*Bromus kalmii*	0.82	0.73	2.00%	2.14
nodding wild rye	*Elymus canadensis*	1.12	1.00	2.74%	1.91
junegrass	*Koeleria macrantha*	0.28	0.25	0.69%	18.37
little bluestem	*Schizachyrium scoparium*	3.36	3.00	8.22%	16.53
Indian grass	*Sorghastrum nutans*	0.78	0.70	1.92%	3.09
prairie dropseed	*Sporobolus heterolepis*	0.13	0.12	0.34%	0.73
	Total Grasses	**11.21**	**10.00**	**27.42%**	**59.30**
blue giant hyssop	*Agastache foeniculum*	0.07	0.06	0.17%	2.07
lead plant	*Amorpha canescens*	0.10	0.09	0.26%	0.42
butterfly milkweed	*Asclepias tuberosa*	0.07	0.06	0.17%	0.10
Canada milk vetch	*Astragalus canadensis*	0.07	0.06	0.18%	0.40
bird's foot coreopsis	*Coreopsis palmata*	0.07	0.06	0.16%	0.21
white prairie clover	*Dalea candida*	0.07	0.06	0.15%	0.39
purple prairie clover	*Dalea purpurea*	0.21	0.19	0.51%	1.02
Canada tick trefoil	*Desmodium canadense*	0.07	0.06	0.18%	0.13
stiff sunflower	*Helianthus pauciflorus*	0.07	0.06	0.17%	0.09
rough blazing star	*Liatris aspera*	0.04	0.04	0.12%	0.25
wild bergamot	*Monarda fistulosa*	0.07	0.06	0.15%	1.42
stiff goldenrod	*Oligoneuron rigidum*	0.07	0.06	0.15%	0.83
large-flowered beard tongue	*Penstemon grandiflorus*	0.07	0.06	0.17%	0.32
black-eyed susan	*Rudbeckia hirta*	0.35	0.31	0.84%	10.32
gray goldenrod	*Solidago nemoralis*	0.04	0.04	0.10%	3.86
heath aster	*Symphyotrichum ericoides*	0.04	0.04	0.10%	2.58
smooth aster	*Symphyotrichum laeve*	0.07	0.06	0.17%	1.26
hoary vervain	*Verbena stricta*	0.15	0.13	0.34%	1.29
	Total Forbs	**1.68**	**1.50**	**4.09%**	**26.96**
Oats	*Avena sativa*	28.02	25.00	68.49%	11.13
	Total Cover Crop	**28.02**	**25.00**	**68.49%**	**11.13**
	Totals:	**40.91**	**36.50**	**100.00%**	**97.39**
Purpose:	General dry prairie mix for native roadsides, ecological restoration, or conservation program plantings.				
Planting Area:	Tallgrass Aspen Parklands, Prairie Parkland, and Eastern Broadleaf Forest Provinces. Mn/DOT Districts 2(west), 3B, 4, Metro, 6, 7 & 8.				

Dry Swale/Pond

33-262

Common Name	Scientific Name	Rate (kg/ha)	Rate (lb/ac)	% of Mix (% by wt)	Seeds/ sq ft
big bluestem	*Andropogon gerardii*	1.68	1.50	3.40%	5.50
American slough grass	*Beckmannia syzigachne*	1.68	1.50	3.42%	27.60
fringed brome	*Bromus ciliatus*	1.68	1.50	3.40%	6.05
nodding wild rye	*Elymus canadensis*	4.48	4.00	9.09%	7.64
slender wheatgrass	*Elymus trachycaulus*	4.48	4.00	9.10%	10.15
Virginia wild rye	*Elymus virginicus*	2.80	2.50	5.67%	3.85
switchgrass	*Panicum virgatum*	0.45	0.40	0.91%	2.05
fowl bluegrass	*Poa palustris*	1.79	1.60	3.64%	76.50
Indian grass	*Sorghastrum nutans*	1.68	1.50	3.40%	6.60
	Total Grasses	**20.74**	**18.50**	**42.03%**	**145.94**
marsh milkweed	*Asclepias incarnata*	0.07	0.06	0.13%	0.10
purple prairie clover	*Dalea purpurea*	0.10	0.09	0.21%	0.50
Canada tick trefoil	*Desmodium canadense*	0.10	0.09	0.21%	0.19
ox-eye	*Heliopsis helianthoides*	0.10	0.09	0.20%	0.20
black-eyed susan	*Rudbeckia hirta*	0.08	0.07	0.17%	2.49
blue vervain	*Verbena hastata*	0.11	0.10	0.23%	3.50
	Total Forbs	**0.56**	**0.50**	**1.15%**	**6.98**
Oats	*Avena sativa*	28.02	25.00	56.82%	11.14
	Total Cover Crop	**28.02**	**25.00**	**56.82%**	**11.14**
	Totals:	**49.32**	**44.00**	**100.00%**	**164.06**
Purpose:	Temporarily flooded swales in agricultural settings.				
Planting Area:	Tallgrass Aspen Parklands, Prairie Parkland, and Eastern Broadleaf Forest Provinces. Mn/DOT Districts 2(west), 3B, 4, Metro, 6, 7 & 8.				

33-261

Stormwater South and West

Common Name	Scientific Name	Rate (kg/ha)	Rate (lb/ac)	% of Mix (% by wt)	Seeds/ sq ft
big bluestem	*Andropogon gerardii*	2.24	2.00	5.72%	7.35
fringed brome	*Bromus ciliatus*	2.24	2.00	5.73%	8.10
bluejoint	*Calamagrostis canadensis*	0.07	0.06	0.18%	6.40
slender wheatgrass	*Elymus trachycaulus*	1.12	1.00	2.85%	2.53
Virginia wild rye	*Elymus virginicus*	1.68	1.50	4.28%	2.31
switchgrass	*Panicum virgatum*	0.43	0.38	1.07%	1.93
fowl bluegrass	*Poa palustris*	1.19	1.06	3.03%	50.70
Indian grass	*Sorghastrum nutans*	0.13	0.12	0.36%	0.55
prairie cordgrass	*Spartina pectinata*	0.43	0.38	1.07%	0.91
	Total Grasses	**9.53**	**8.50**	**24.29%**	**80.78**
awl-fruited sedge	*Carex stipata*	0.28	0.25	0.71%	3.10
dark green bulrush	*Scirpus atrovirens*	0.21	0.19	0.54%	31.70
woolgrass	*Scirpus cyperinus*	0.07	0.06	0.18%	39.00
	Total Sedges and Rushes	**0.56**	**0.50**	**1.43%**	**73.80**
Canada anemone	*Anemone canadensis*	0.08	0.07	0.19%	0.20
marsh milkweed	*Asclepias incarnata*	0.12	0.11	0.32%	0.20
leafy beggarticks	*Bidens frondosa*	0.12	0.11	0.31%	0.20
flat-topped aster	*Doellingeria umbellata*	0.07	0.06	0.17%	1.50
spotted Joe pye weed	*Eutrochium maculatum*	0.07	0.06	0.18%	2.19
autumn sneezeweed	*Helenium autumnale*	0.15	0.13	0.36%	5.97
obedient plant	*Physostegia virginiana*	0.08	0.07	0.21%	0.30
tall coneflower	*Rudbeckia laciniata*	0.08	0.07	0.21%	0.37
New England aster	*Symphyotrichum novae-angliae*	0.08	0.07	0.19%	1.56
blue vervain	*Verbena hastata*	0.06	0.05	0.15%	1.85
golden alexanders	*Zizia aurea*	0.22	0.20	0.56%	0.79
	Total Forbs	**1.12**	**1.00**	**2.85%**	**15.13**
Oats	*Avena sativa*	28.02	25.00	71.43%	11.14
	Total Cover Crop	**28.02**	**25.00**	**71.43%**	**11.14**
	Totals:	**39.23**	**35.00**	**100.00%**	**180.85**
Purpose:	Stormwater pond edges, temporarily flooded dry ponds, and temporarily flooded ditch bottoms.				
Planting Area:	Tallgrass Aspen Parklands, Prairie Parkland, and Eastern Broadleaf Forest Provinces. Mn/DOT Districts 2(west), 3B, 4, Metro, 6, 7 & 8.				

Wet Meadow South and West

34-271

Common Name	Scientific Name	Rate (kg/ha)	Rate (lb/ac)	% of Mix (% by wt)	Seeds/ sq ft
fringed brome	*Bromus ciliatus*	1.23	1.10	9.18%	4.45
bluejoint	*Calamagrostis canadensis*	0.06	0.05	0.41%	5.00
Virginia wild rye	*Elymus virginicus*	1.12	1.00	8.37%	1.55
rice cut grass	*Leersia oryzoides*	0.28	0.25	2.07%	3.10
tall manna grass	*Glyceria grandis*	0.17	0.15	1.26%	3.90
fowl manna grass	*Glyceria striata*	0.11	0.10	0.83%	3.30
fowl bluegrass	*Poa palustris*	0.39	0.35	2.88%	16.50
	Total Grasses	**3.36**	**3.00**	**25.00%**	**37.80**
bristly sedge	*Carex comosa*	0.24	0.21	1.78%	2.36
pointed broom sedge	*Carex scoparia*	0.06	0.05	0.43%	1.60
awl-fruited sedge	*Carex stipata*	0.19	0.17	1.40%	2.10
tussock sedge	*Carex stricta*	0.03	0.03	0.21%	0.50
fox sedge	*Carex vulpinoidea*	0.16	0.14	1.13%	5.00
path rush	*Juncus tenuis*	0.04	0.04	0.34%	15.00
dark green bulrush	*Scirpus atrovirens*	0.20	0.18	1.48%	30.00
woolgrass	*Scirpus cyperinus*	0.09	0.08	0.67%	50.00
	Total Sedges and Rushes	**1.01**	**0.90**	**7.44%**	**106.56**
marsh milkweed	*Asclepias incarnata*	0.27	0.24	2.03%	0.43
common boneset	*Eupatorium perfoliatum*	0.02	0.02	0.18%	1.30
grass-leaved goldenrod	*Euthamia graminifolia*	0.01	0.01	0.06%	1.00
spotted Joe pye weed	*Eutrochium maculatum*	0.02	0.02	0.18%	0.75
autumn sneezeweed	*Helenium autumnale*	0.03	0.03	0.23%	1.30
sawtooth sunflower	*Helianthus grosseserratus*	0.04	0.04	0.30%	0.20
great lobelia	*Lobelia siphilitica*	0.02	0.02	0.13%	2.90
blue monkey flower	*Mimulus ringens*	0.01	0.01	0.07%	6.80
Virginia mountain mint	*Pycnanthemum virginianum*	0.07	0.06	0.53%	5.10
giant goldenrod	*Solidago gigantea*	0.02	0.02	0.14%	1.50
eastern panicled aster	*Symphyotrichum lanceolatum*	0.03	0.03	0.22%	1.50
red-stemmed aster	*Symphyotrichum puniceum*	0.19	0.17	1.42%	5.00
tall meadow-rue	*Thalictrum dasycarpum*	0.01	0.01	0.12%	0.11
blue vervain	*Verbena hastata*	0.15	0.13	1.12%	4.61
bunched ironweed	*Vernonia fasciculata*	0.03	0.03	0.28%	0.30
Culver's root	*Veronicastrum virginicum*	0.01	0.01	0.12%	4.20
golden alexanders	*Zizia aurea*	0.28	0.25	2.06%	1.00
	Total Forbs	**1.23**	**1.10**	**9.19%**	**38.00**
Oats	*Avena sativa*	7.85	7.00	58.37%	3.12
	Total Cover Crop	**7.85**	**7.00**	**58.37%**	**3.12**
	Totals:	**13.45**	**12.00**	**100.00%**	**185.48**
Purpose:	Wet meadow / Sedge meadow reconstruction for wetland mitigation or ecological restoration projects				
Planting Area:	Tallgrass Aspen Parklands, Prairie Parkland, and Eastern Broadleaf Forest Provinces. Mn/DOT Districts 2(west), 3B, 4, Metro, 6, 7 & 8.				

BWSR DEPARTMENT OF TRANSPORTATION DEPARTMENT OF NATURAL RESOURCES

Wet Prairie

34-262

Common Name	Scientific Name	Rate (kg/ha)	Rate (lb/ac)	% of Mix (% by wt)	Seeds/ sq ft
big bluestem	*Andropogon gerardii*	1.12	1.00	6.89%	3.67
fringed brome	*Bromus ciliatus*	1.68	1.50	10.38%	6.08
bluejoint	*Calamagrostis canadensis*	0.04	0.04	0.27%	4.00
Virginia wild rye	*Elymus virginicus*	1.96	1.75	12.07%	2.70
tall manna grass	*Glyceria grandis*	0.17	0.15	1.02%	3.80
fowl manna grass	*Glyceria striata*	0.12	0.11	0.73%	3.50
switchgrass	*Panicum virgatum*	0.84	0.75	5.16%	3.85
fowl bluegrass	*Poa palustris*	0.22	0.20	1.39%	9.60
Indian grass	*Sorghastrum nutans*	0.56	0.50	3.44%	2.20
prairie cordgrass	*Spartina pectinata*	0.56	0.50	3.41%	1.20
	Total Grasses	**7.29**	**6.50**	**44.76%**	**40.60**
wooly sedge	*Carex pellita*	0.06	0.05	0.32%	0.47
tussock sedge	*Carex stricta*	0.02	0.02	0.17%	0.48
fox sedge	*Carex vulpinoidea*	0.11	0.10	0.66%	3.50
dark green bulrush	*Scirpus atrovirens*	0.11	0.10	0.72%	17.74
woolgrass	*Scirpus cyperinus*	0.03	0.03	0.18%	16.00
	Total Sedges and Rushes	**0.34**	**0.30**	**2.05%**	**38.19**
Canada anemone	*Anemone canadensis*	0.03	0.03	0.21%	0.09
marsh milkweed	*Asclepias incarnata*	0.09	0.08	0.55%	0.14
Canada tick trefoil	*Desmodium canadense*	0.56	0.50	3.41%	1.00
flat-topped aster	*Doellingeria umbellata*	0.06	0.05	0.34%	1.20
common boneset	*Eupatorium perfoliatum*	0.03	0.03	0.23%	2.00
grass-leaved goldenrod	*Euthamia graminifolia*	0.02	0.02	0.11%	2.00
spotted Joe pye weed	*Eutrochium maculatum*	0.04	0.04	0.30%	1.50
autumn sneezeweed	*Helenium autumnale*	0.06	0.05	0.35%	2.39
sawtooth sunflower	*Helianthus grosseserratus*	0.06	0.05	0.38%	0.30
great blazing star	*Liatris pycnostachya*	0.02	0.02	0.17%	0.10
great lobelia	*Lobelia siphilitica*	0.01	0.01	0.05%	1.40
blue monkey flower	*Mimulus ringens*	0.01	0.01	0.05%	6.40
Virginia mountain mint	*Pycnanthemum virginianum*	0.09	0.08	0.55%	6.50
red-stemmed aster	*Symphyotrichum puniceum*	0.09	0.08	0.56%	2.40
blue vervain	*Verbena hastata*	0.17	0.15	1.06%	5.25
bunched ironweed	*Vernonia fasciculata*	0.03	0.03	0.23%	0.30
Culver's root	*Veronicastrum virginicum*	0.02	0.02	0.14%	6.00
golden alexanders	*Zizia aurea*	0.28	0.25	1.76%	1.03
	Total Forbs	**1.68**	**1.50**	**10.45%**	**40.00**
Oats	*Avena sativa*	6.95	6.20	42.74%	2.76
	Total Cover Crop	**6.95**	**6.20**	**42.74%**	**2.76**
	Totals:	**16.25**	**14.50**	**100.00%**	**121.55**
Purpose:	Wet prairie reconstruction for wetland mitigation or ecological restoration.				
Planting Area:	Tallgrass Aspen Parklands, Prairie Parkland, and Eastern Broadleaf Forest Provinces. Mn/DOT Districts 2(west), 3B, 4, Metro, 6, 7 & 8.				