Appendix M

Prime Farmland Point of Interconnect GIS Analysis

Byron Solar Project

Dodge and Olmsted counties, Minnesota

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EDF Renewables, Inc. (EDFR) completed a detailed Geographic Information System (GIS) analysis for the Byron Solar Project to identify buildable land within 10 miles of a 345kV substation not encumbered by prime farmland. The analysis was completed for the entire state. The results of the analysis can be seen in the attached maps, and generally show that opportunities for solar development within 10 miles of a 345kV substation are extremely limited. There are almost no alternatives to the Byron Solar Project outside of perhaps Sherburne, Blue Earth and Chisago Counties. There are essentially no viable sites south of a line between Fergus Falls and the Twin Cities when prime farmland is excluded. Most potentially buildable locations north of that line would require clearing forests, would have lower solar irradiance, and a have a longer distance from load centers.

To complete this complex GIS analysis, EDFR first created a 10-mile buffer around each of the 345kV substations located within the state (Figure F-1) called Areas of Interest (AOI). Aside from two, available 345kV substations are located south of Alexandria. Within each AOI, EDFR identified buildable land within each 10-mile circle by using industry-standard best practices and solar design specifications. As shown in Figure F-2, EDFR first removed known constraints from the buildable area as identified in the following table. Note that the buildable area shown in Figure F-2 does not exclude prime farmland or farmland of statewide importance.

Constraint	Buffer Distance
Highways, Railroads, and Transmission	+ 100ft
Urban Areas and Building Footprints	+ 100ft
Densely populated areas (>1,000 population per square mile)	--
Hydrology features (NWI Wetlands, NHD Flowlines, and NHD Waterbodies)	+ 50ft
Pipelines	+ 30ft
Areas where slope of land > 12%	--
Protected Lands (“GAP Status” = 1,2 and/or Owner = NPS; highly protected lands)	--
Existing Power Plants	--
Wind Farm footprints per Ventyx (if wind turbine point coordinates not known)	+ 500ft
Wind Turbines location (if point coordinates known)	+500ft
Non-wind Facility: Approximated facility boundary for other existing generation	--

It should be noted that additional constraints likely exist that were not removed from the buildable land area. These constraints, as listed below, can also influence siting utility-scale solar projects and would be removed from a final project layout.

- FEMA flood zones
- Non-FEMA flood zones where expected 100 or 500year flow depths > 3'
- Heavily forested areas
- Other culturally sensitive areas
- Locations where other power plants are under development but not yet constructed (in MISO queue, in permitting, in land acquisition, etc.)

Following the identification of buildable constraints, EDFR then evaluated the AOIs for the presence of prime farmland and farmland of statewide importance. Figure F-3 demonstrates the paucity of lands across the state, and in proximity to a 345kV substation, that are absent of prime farmlands and farmlands of statewide importance.

EDFR then subtracted all classifications of prime farmland and farmland of statewide importance from the buildable land areas previously identified in Figure F-2. The result is shown on Figure F-4. The green areas on this map represent the remaining buildable land when prime farmlands are removed. It is clear that many of the remaining buildable areas are 1) not large enough to host the Byron Solar Project, and 2) are largely associated with waterways and drainages.

Figure F-5 shows the 10-mile buffer surrounding the Byron Substation and the proximity of the solar project to the Byron Substation and other substations in the region, North Rochester to the north, and Pleasant Valley to the south. Figure F-6 provides a close-up of the Byron Solar Project and the buildable lands layer without the exclusion of farmlands. It is notable that Byron, if not for the farmland issue, is located within a buildable area with few recognized constraints. Figure F-7 shows the Byron Solar Project and Byron Substation in relation to mapped prime farmland and farmland of statewide importance. As shown on the map, the only areas within 10 miles of the Byron Substation that are not prime farmland and farmland of statewide importance are primarily correlated with drainageways, streams, and rivers which are not suitable for solar development. Additionally, since many linear waterways are surrounded by trees, it is likely that siting solar in these areas would require significant tree removal. This is a consistent theme surrounding the North Rochester and Pleasant Valley substations as well.

The final Figure, F-8, depicts the remaining buildable land when constraints and prime farmlands are removed. The result is a map that demonstrates that there are no contiguous buildable land areas large enough in size to accommodate the Byron Solar Project within 10 miles of the Byron Substation.

Sources

AOI

1. Substations + 10-mile buffers
    a. ABB (aka Ventyx, Velocity Suite)
        i. 512 substations defined by ABB as within MN, In-Service, and operating at 115 – 345 kV

BLv01:

100-foot setbacks:

2. Highways (USCB, TIGER Lines)
3. Railroads (USCB, TIGER Lines)
4. Transmission Lines (ABB)
5. Building Footprints (Microsoft)
6. Urban Areas (ESRI)

50-foot setbacks:

7. Wetlands (USFWS, National Wetlands Inventory)
8. Waterbodies and Streams (USGS, National Hydrology Dataset)

30-foot setbacks

9. Pipelines (ABB)

BLv02 (excludes slope >12% from BLv01)

10. National Elevation Dataset, 2 arc-second resolution = ~60m resolution (USGS)

BLv03

11. Protected Lands; Protected Areas Database of the United States "PADUS" (USGS)
    a. "GAP Status" = 1,2 (highly protected lands)
12. Densely Populated Areas; ESRI Census Data Layer for Populated Areas
    b. People per Sq. Mile >= 1,000
13. Existing Power Plants
    c. Wind Farms
        i. ABB (boundaries + 500-foot buffer)
        ii. EDF (turbines + 500-foot buffer)
        iii. USGS (built turbines + 500-foot buffer)
        iv. US Wind Turbine Database (built turbines + 500-foot buffer)
    d. Non-Wind
        i. ABB (point locations + approximate footprint buffers)
            1. Solar = 10 acres / MWdc
            2. Others = quick visual footprint estimate for thermal/hydro/biomass/etc.

BLv04

14. Protected Farmland (USDA, Natural Resources Conservation Service)
    e. Prime Farmland (including all qualifiers such as "…if drained", "…if irrigated", "…if protected from flooding")
    f. Farmland of Statewide Importance (including all qualifiers such as "…if drained", "…if irrigated", "…if protected from flooding")

Forestland Land

15. LANDFIRE dataset on forest coverage (joint effort by USDA, DOI, and USGS)
    a. Filtered to "Forest Height of 0 to 50+ meters"

Byron Solar Project Location

In service Substations

500 kV and Above

Up to 345 kV

10 Miles Buffer

States

Roseau County

Forbes

Blackberry

Arrowhead

Alexandria

Quarry

Benton

West End

Becker

Sherburne County

Monticello (MN)

Chisago County

Lindstrom

Shafer

Bunker Lake

Elm Creek

Coon Creek

Dickinson

Tap

Plymouth

Kohlman Lake

Baytown

King

Parkers Lake

Terminal

Long Lake

Red Rock

Eden Prairie

Blue Lake (MN)

Inver Hills

Hampton Substation

Prairie Island

Chub Lake

Helena

Sheas Lake

Minnesota Valley

Hazel Creek

Lyon County

Cedar Mountain

Mankato Power

Wilmarth

North Rochester

Byron

Rochester

Pleasant Valley

Field

Lakefield Junction

Tap

Lakefield Junction

Nobles

Huntley

Adams

UNITED STATES

CANADA

North Dakota

Minnesota

South Dakota

Iowa

Wisconsin

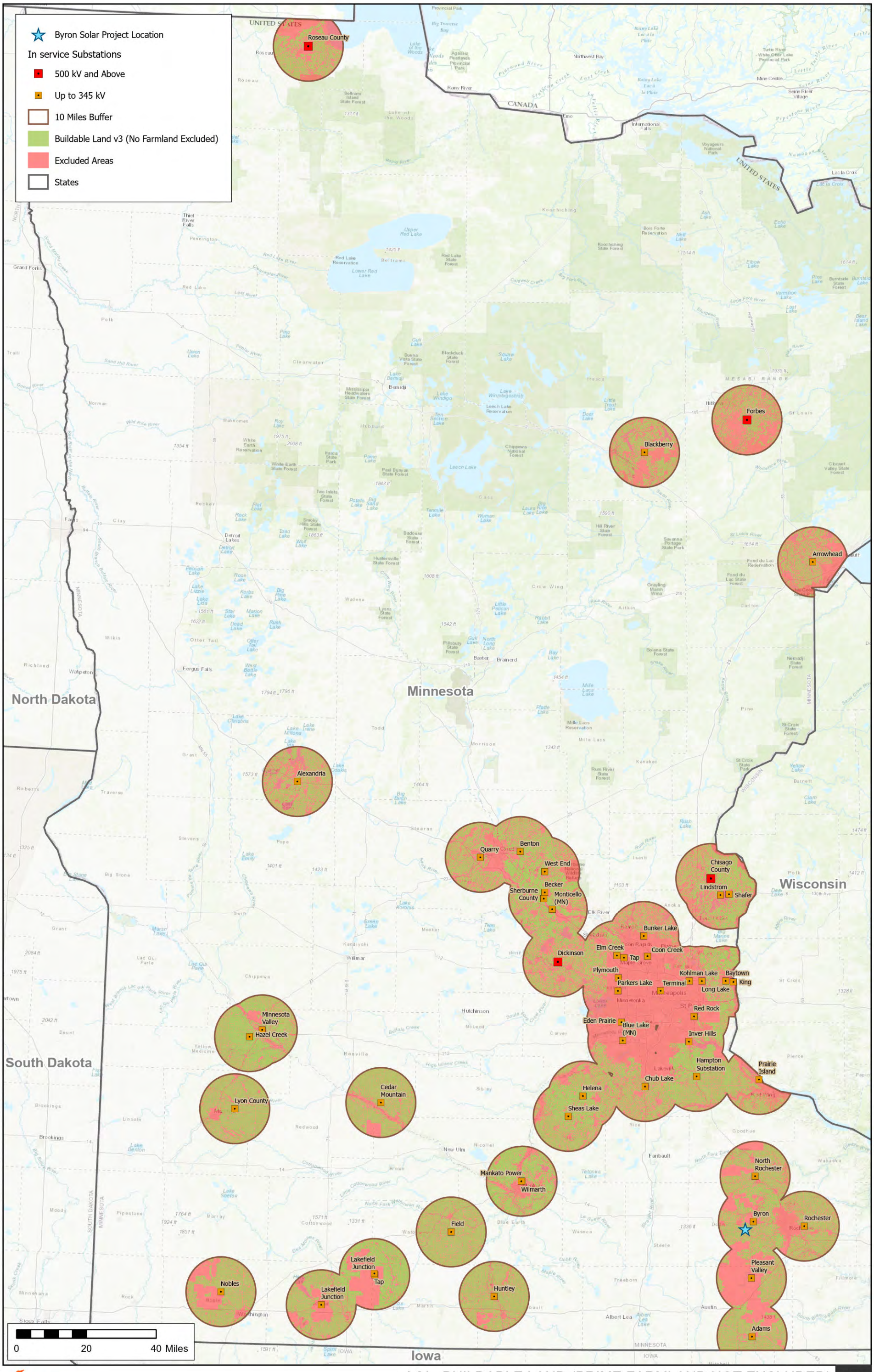
0 20 40 Miles

Source: EDF, Ventyx (ABB) 2021 | G:\Projects\USA_North\Byron_Solar\05_GIS\Byron_Solar.aprx | Layout: MapSeries_PermittingAnalysis | Map: MapSeries_Permitting_Analysis | Last Updated 6/7/2021 by careli.caballero

10 MILES BUFFER (345 KV SUBSTATIONS)

Byron Solar Project Analysis | Minnesota

F-1



Source: EDF, Ventyx (ABB) 2021 | G:\Projects\USA_North\Byron_Solar\05_GIS\Byron_Solar.aprx | Layout: MapSeries_PermittingAnalysis | Map: MapSeries_Permitting_Analysis | Last Updated 6/7/2021 by careli.caballero

AOI - BUILDABLE LAND (PRIME FARMLAND NOT EXCLUDED)

Byron Solar Project Analysis | Minnesota

F-2

Byron Solar Project Location

In service Substations

500 kV and Above

Up to 345 kV

10 Miles Buffer

Prime Farmland and Statewide Importance

States

Roseau County

Blackberry

Forbes

Arrowhead

Alexandria

Quarry

Benton

West End

Becker

Sherburne County

Monticello (MN)

Chisago County

Lindstrom

Shafer

Dickinson

Elm Creek

Tap

Bunker Lake

Coon Creek

Plymouth

Parkers Lake

Terminal

Kohlman Lake

Baytown

King

Long Lake

Red Rock

Eden Prairie

Blue Lake (MN)

Inver Hills

Hampton Substation

Prairie Island

Chub Lake

Helena

Sheas Lake

Minnesota Valley

Hazel Creek

Cedar Mountain

Lyon County

Mankato Power

Wilmarth

North Rochester

Byron

Rochester

Pleasant Valley

Adams

Field

Lakefield Junction

Tap

Lakefield Junction

Nobles

Huntley

UNITED STATES

CANADA

UNITED STATES

North Dakota

Minnesota

South Dakota

Iowa

Wisconsin

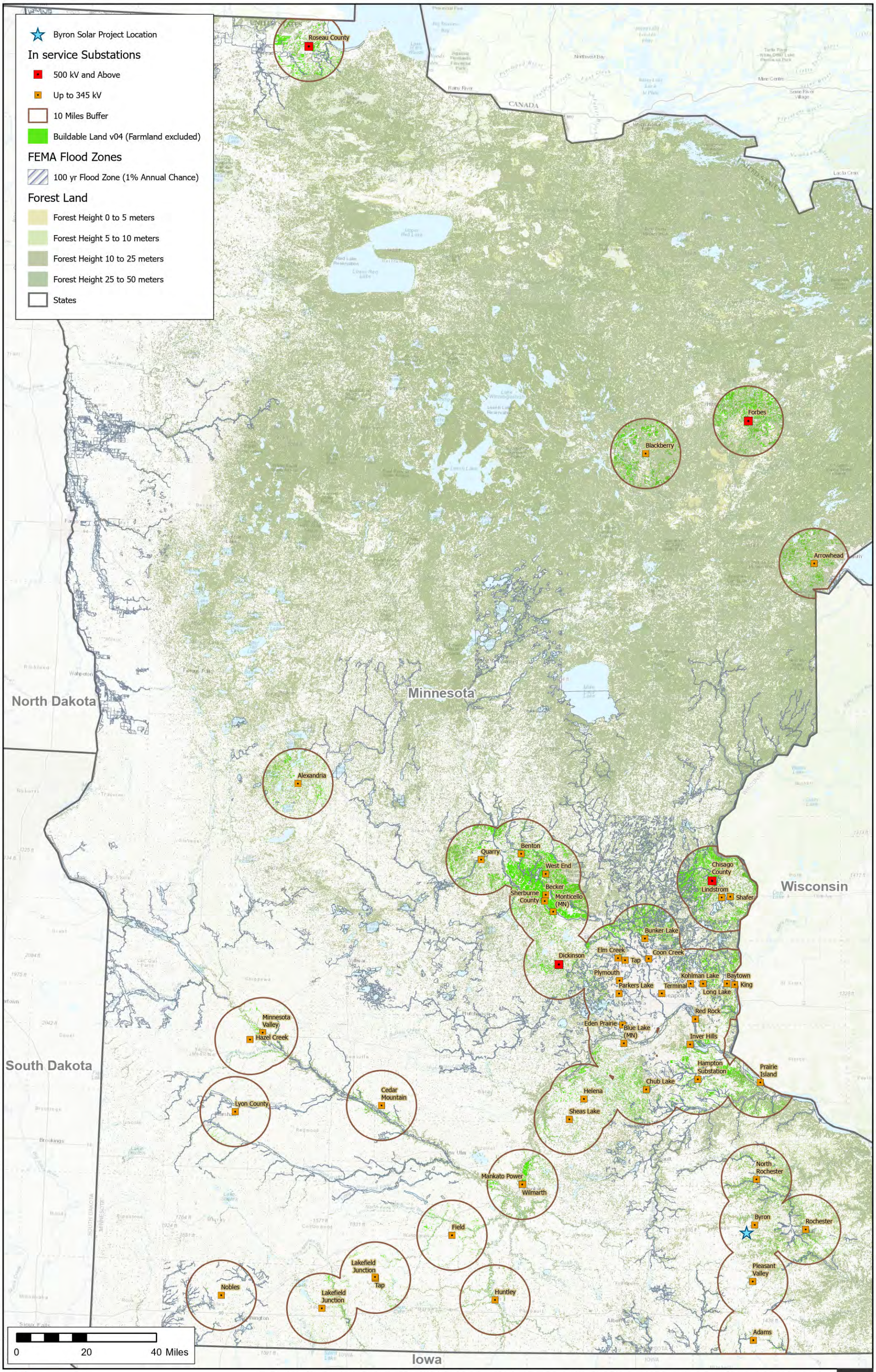
0 20 40 Miles

Source: EDF, Ventyx (ABB) 2021 | G:\Projects\USA_North\Byron_Solar\05_GIS\Byron_Solar.aprx | Layout: MapSeries_PermittingAnalysis | Map: MapSeries_Permitting_Analysis | Last Upcated 6/7/2021 by carell.caballero

AOI - PRIME FARMLAND AND FARMLAND OF STATE IMPORTANCE

Byron Solar Project Analysis | Minnesota

F-3

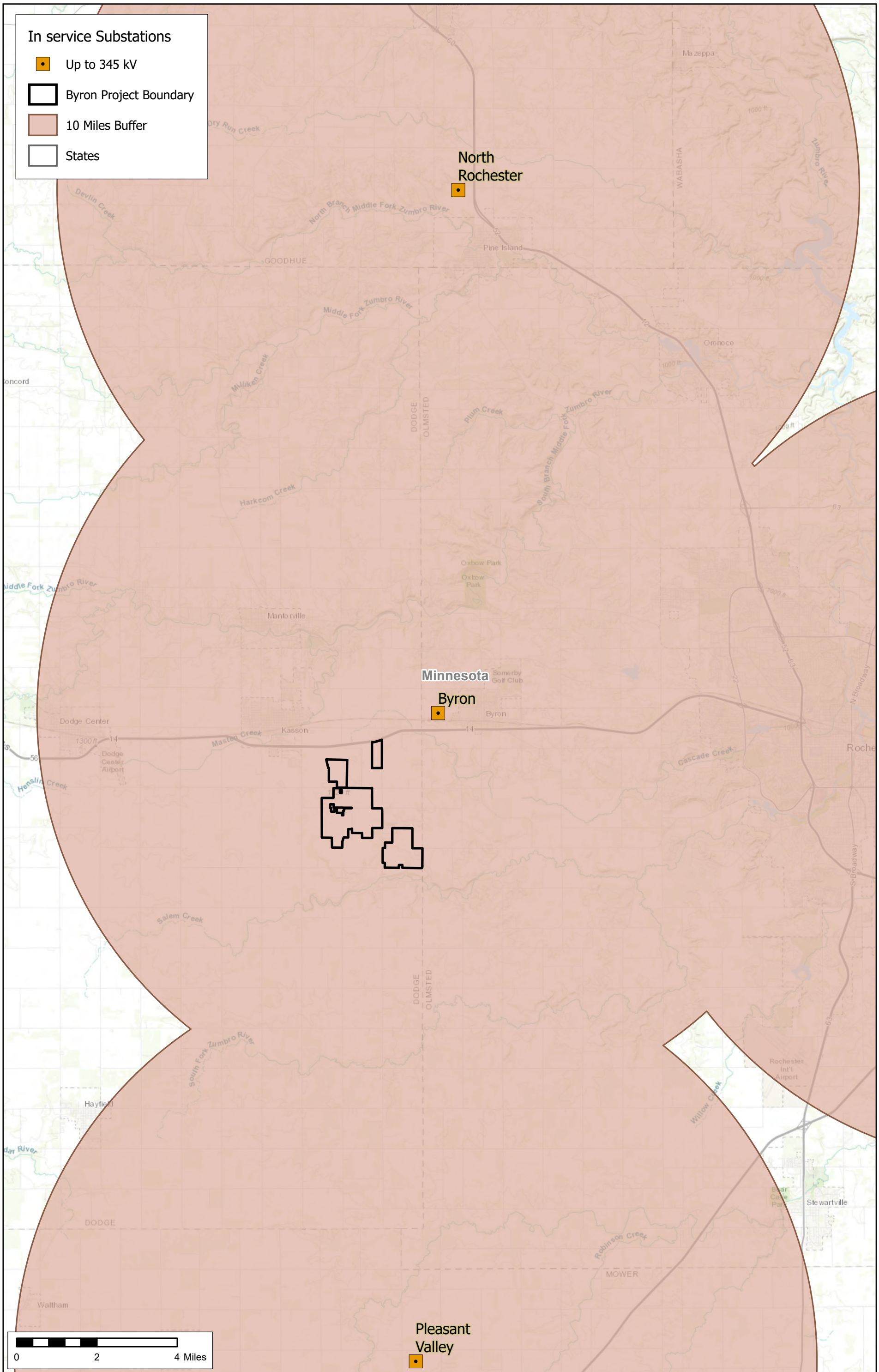


Source: EDF, Ventyx (ABB) 2021 | G:\Projects\USA_North\Byron_Solar\05_GIS\Byron_Solar.aprx | Layout: MapSeries_Permitting_Analysis | Map: MapSeries_Permitting_Analysis | Last Updated 6/17/2021 by careli.caballero

AOI - BUILDABLE LAND (PRIME FARMLAND AND STATE IMPORTANCE EXCLUDED)

Byron Solar Project Analysis | Minnesota

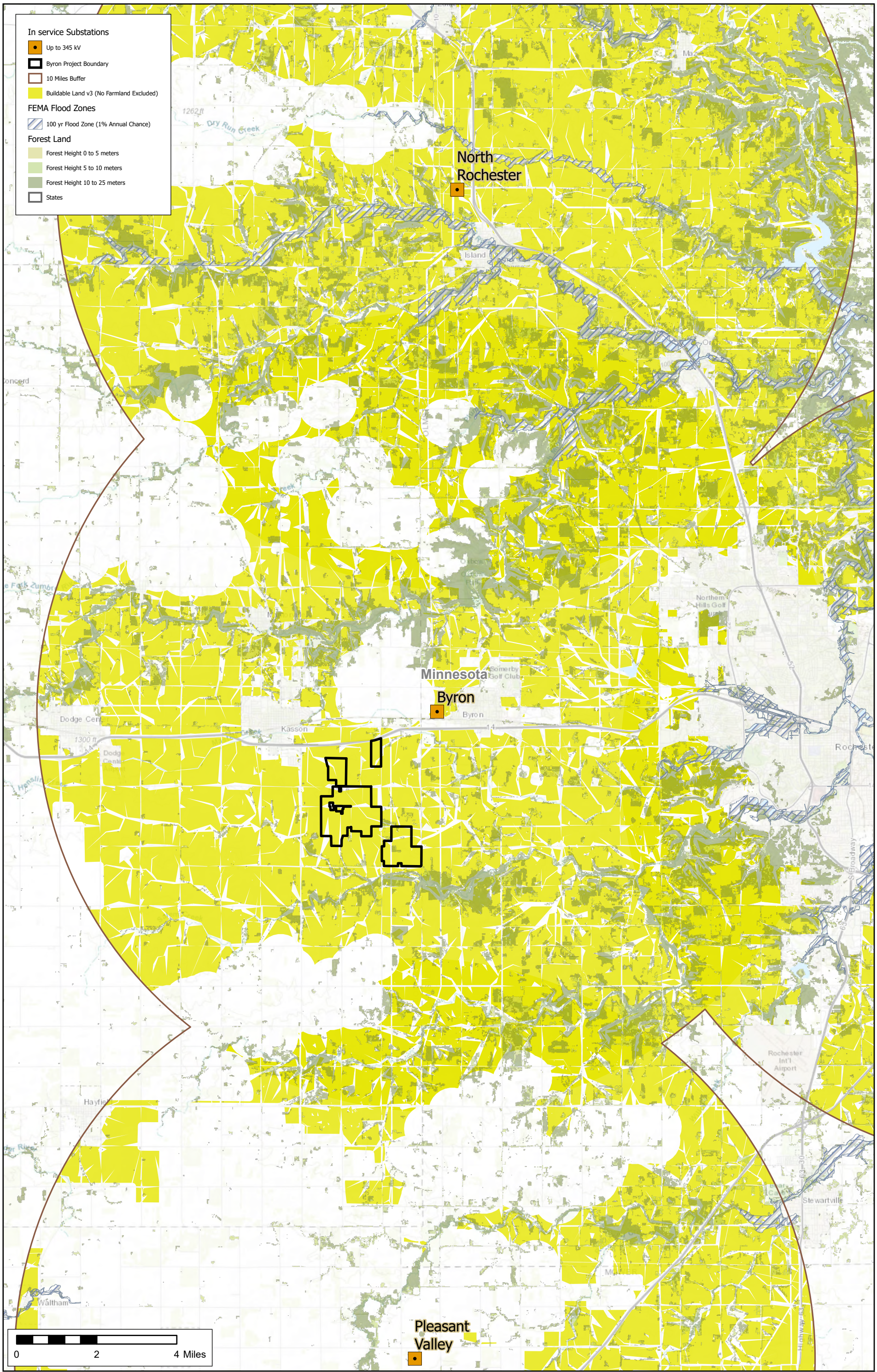
F-4



Source: EDF, Ventyx (ABB) 2021 | G:\Projects\USA_North\Byron_Solar\05_GIS\Byron_Solar.aprx | Layout: MapSeries_Permitting_Analysis | Map: MapSeries_Permitting_Analysis | Last Updated 6/8/2021 by careli.caballero

BYRON SUB - 10 MILES BUFFER

Byron Solar Project Analysis | Minnesota



Source: EDF, Ventyx (ABB) 2021 | G:\Projects\USA_North\Byron_Solar\05_GIS\Byron_Solar.aprx | Layout: MapSeries_PermittingAnalysis | Map: MapSeries_Permitting_Analysis | Last Updated 6/16/2021 by careli.caballero

BYRON SUB - BUILDABLE LAND (PRIME FARMLAND AND STATE IMPORTANCE NOT EXCLUDED)

Byron Solar Project Analysis | Minnesota