Decommissioning Plan – Saratoga Solar and Battery Storage Project
PSCW Docket #: 9816-CE-100
Wood County, Wisconsin

May 5, 2022

Prepared for:

Saratoga Solar Project, LLC
422 Admiral Boulevard
Kansas City, MO 64106

Prepared by:

Stantec Consulting Services Inc.
1165 Scheuring Road
De Pere, WI 54115

Stantec Project No: 193708352

JoAnne J. Blank
Senior Associate

Matthew Clementi, PE
Senior Project Engineer
Registration No. **29864**
State **Wisconsin**

Chris Pekar
Project Manager

Table of Contents

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

Saratoga Solar Project, LLC (Saratoga Solar) a subsidiary of Savion, LLC is proposing to construct the Saratoga Solar Project (the Project) in the Town of Saratoga, in Wood County, Wisconsin (Figure 1).

The Project facilities, as proposed, will occupy approximately 986 acres within the array fencelines. The Project will have a maximum nameplate generating capacity of up to 150.5 megawatts (MW) alternating current (AC) with a of 50 MW / 210 MW-hours (MWh) battery energy storage system (BESS). Major components of the Project include solar modules, tracking systems, BESS, power conversion systems (inverters), Project substation Operations and Maintenance (O&M) buildings), and a generation tie line.

Project construction is anticipated to begin in the second quarter of 2023 with a Commercial Operation Date in late 2024. This Decommissioning Plan (Plan) provides a description of the decommissioning and restoration phase of the Project.

This Plan includes an overview of the primary decommissioning Project activities: dismantling and removal of facilities, and restoration of land. A summary of estimated costs associated with decommissioning the Project is included in Section 4.0. Summary statistics and estimated costs are provided for a 150.5-MW Project array design with 50-MW BESS.

1.1 SOLAR FARM COMPONENTS

The main components of the Project include:

- Solar modules and above ground cabling
- Single-axis tracking system and steel support piles
- Inverter stations with transformers
- Site access and internal access roads
- Subsurface electrical cabling and conduits
- Perimeter fencing
- Project substation
- Generation tie-in transmission line
- Operations and Maintenance buildings
- Battery Energy Storage System

1.2 TRIGGERING EVENTS AND EXPECTED LIFETIME OF PROJECT

Project decommissioning will be triggered by the permanent cessation of operation of the Project. The Project will be considered to be abandoned if it is non-operational for a period of twelve (12) consecutive months.

If properly maintained, the expected lifetime of a utility-scale solar project is approximately 30-35 years, with an opportunity for a project lifetime of 50 years or more with equipment replacement and repowering. Depending on market conditions and project viability, the solar arrays may be retrofitted with updated components (e.g., modules, tracking system, etc.) to extend the life of the project. At the end of the Project's useful life, the panels and associated components will be decommissioned and removed from the Project site and the land will be restored in accordance with this Plan, or an updated decommissioning plan agreed to between the Project and applicable regulatory bodies prior to decommissioning.

Components of the solar facility that have resale value may be sold on the wholesale market. Components with no wholesale value will be salvaged and sold as scrap for recycling or disposed of at an approved offsite licensed solid waste disposal facility (landfill). The estimates provided in this Plan are based on the salvage value of the removed facilities. Decommissioning activities will include removal of the arrays and associated components as listed in Section 1.1 and described in Section 2.

1.3 DECOMMISSIONING SEQUENCES

Decommissioning activities will begin within 12 months of the Project ceasing operation and are anticipated to be completed within 12 months. Restoration of the Project may extend beyond 12 months to allow for successful revegetation and restoration of the site. The anticipated sequence of decommissioning and removal is described below; however, overlap of activities is expected.

- Reinforce access roads, if needed, and prepare site for component removal
- Install temporary silt fence and other best management practices (BMPs) to protect sensitive resources and control erosion
- De-energize solar arrays
- Remove panels and above ground wiring;
- Remove tracking and piles
- Remove inverters and transformers, along with support structures
- Remove electrical cables and conduits less than four feet (48 inches) below the surface
- Remove access and internal roads and grade areas, as needed, or agreed upon by landowners
- Remove substation and overhead tie-in transmission line, if decommissioned;
- Remove BESS
- Remove O & M buildings
- De-compact subsoils (as required)
- Restore and revegetate disturbed land to a condition suitable for agricultural use to the extent practicable.

2.0 PROJECT COMPONENTS AND DECOMMISSIONING ACTIVITIES

The solar facility and BESS components and decommissioning activities necessary to restore the Project area are further described within this section.

2.1 OVERVIEW OF SOLAR FACILITY

Saratoga Solar anticipates utilizing approximately 366,444 Talesun Bipro 540-watt, bifacial monocrystalline modules or other similar solar modules, with a total nameplate generating capacity of up to 197.88 MW Direct Current (DC), 150.5 MW_{AC}. The Saratoga Solar generating facilities will have a footprint of approximately 986 acres of land bounded by perimeter fencing. The proposed locations of the arrays are shown on Figure 1. The land within the Project footprint is predominantly agricultural land.

Collection cabling will be installed below the surface at a depth of at least three feet (36 inches) to remain in compliance with National Electrical Code (NEC). Foundations, steel piles, and electric cabling and conduit located up to and including four feet (48 inches) below the soil surface will be removed. Components and cabling deeper than four feet (48 inches) below the surface will be abandoned in place, except where specific contracts with landowners require removal to a greater depth. Access roads may be left in place if requested and/or agreed to by the landowner. Public roads damaged or modified during the decommissioning and reclamation process will be repaired upon completion of the decommissioning phase.

Estimated quantities of materials to be removed and salvaged or disposed of are included in this section. Most of the materials described have salvage value; although, there are some components that will likely have none at the time of decommissioning. All recyclable materials, salvaged and non-salvage, will be recycled to the furthest extent possible. All other non-recyclable waste materials will be disposed of in accordance with state and federal law in an approved licensed solid waste facility. Solar panels may have value in a resale market, depending on their condition at the end of the Project life. For purposes of this report, salvage values only, not resale, were considered, as this is the more conservative estimate strategy.

Table 1 presents a summary of the primary components of the Project included in this Plan.

Table 1 Primary Components of Solar Facility to be Decommissioned

Component	Quantity (approximate)	Unit of Measure
Solar Modules	366,444	Each
Tracking System (equivalent trackers)	4,698	Each
Steel Piles (including trackers and inverter stations)	52,182	Each
Inverters and Transformer Stations	42	Each

Component	Quantity (approximate)	Unit of Measure
Subsurface Electrical Cables and Conduits	50,160	Lineal Foot
Perimeter Fencing	39,600	Lineal Foot
Internal Access Roads	27,192	Lineal Foot
Operations and Maintenance Building	2	Each
Project Substation	1	Each
Overhead Transmission Line	500	Lineal Foot

2.2 SOLAR MODULES

Saratoga Solar is considering the Bipro TD7G72M bifacial monocrystalline modules (540 watt) from Talesun, or similar model, for the Project. Each module assembly (with frame) has a total weight of approximately 71.0 pounds (32.2 kg). The modules will be approximately 90 inches by 45 inches in size and are mainly comprised of non-metallic materials such as silicon, glass, composite film, plastic, and epoxies, with an anodized aluminum frame.

At the time of decommissioning, module components in working condition may be refurbished and sold in a secondary market yielding greater revenue than selling as salvage material.

2.3 TRACKING SYSTEM AND SUPPORT

The solar modules will be mounted on a single-axis tracking system, such as the Horizon model manufactured by NEXTracker. Each full-sized tracker is approximately 91 meters (299 feet) in length and will support approximately 78 solar modules. Smaller trackers will be employed at the edges of the layout or near inverters, to efficiently utilize available space. The tracking system is mainly comprised of galvanized and stainless steel; steel piles that support the system are assumed to be comprised of structural steel.

The solar arrays will be deactivated from the surrounding electrical system and made safe for disassembly. Liquid wastes, including oils and hydraulic fluids will be collected and properly disposed of or recycled according to regulations current at the time of decommissioning. Electronic components, and internal electrical wiring will be removed and salvaged. The steel piles will be completely removed from the ground during decommissioning.

The steel foundations, and steel components from the tracking system can be salvaged and sold to provide revenue to offset the decommissioning costs.

2.4 INVERTERS AND TRANSFORMERS

Inverters and transformers generally sit on small concrete footings or steel piles within the array. The inverters and transformers will be deactivated, disassembled, and removed. Depending on condition, the equipment may be sold for refurbishment and re-use. If not re-used, they will be salvaged or disposed of at an approved solid waste management facility.

2.5 ELECTRICAL CABLING AND CONDUITS

The Project's medium voltage electrical collection system will be installed approximately three feet (36 inches) below the ground surface. Cabling that is four feet or less in depth will be removed and salvaged, while cable greater than four feet in depth will be abandoned in place, except where specific contracts with landowners require removal to a greater depth.

2.6 PROJECT SUBSTATION

Saratoga Solar will include a Project substation as shown on the attached figures. The substation footprint will be approximately 250 feet by 250 feet and will contain within its perimeter, switches, breakers, the main power transformer, buss, control house and their associated footings. A short generation tie-in transmission line will connect the Project substation to the point of interconnection. The substation and transmission line will service Saratoga Solar and although they may be retained at the end of the Project life, estimated decommissioning costs have been included in this Plan.

2.7 OPERATIONS AND MAINTENANCE BUILDINGS

Saratoga Solar will utilize two O&M buildings within the Project site (one is assigned to the solar facility, and one assigned to the BESS facility). The structures will be prefabricated buildings connected to utilities. The placement of the structures on the site will be in conformance with local and state building codes and they will be removed during the decommissioning process.

2.8 PERIMETER FENCING, SITE ACCESS AND INTERNAL ROADS

The Project will include a security fence around the perimeter of each array site. The perimeter fence will be removed from the Project site during decommissioning.

Site access drives will allow access to the substation and solar facility from local roads. Internal access roads will be located within the array to allow access to the equipment. The access drives and internal roads will be approximately 16 feet wide and total approximately 27,192 lineal feet (5.15 miles). The internal access road lengths may change with final Project design. The site and substation access drives will be comprised of an 8-inch-thick layer of aggregate over a compacted subgrade. Internal access roads will be comprised of compacted native soil, reinforced by geotextile fabric, where necessary. The estimated quantity of site access drive and internal access road components is provided in Table 2.

Table 2 Typical Access Road Construction Materials

Component	Quantity	Unit of Measure
Geogrid	28,786	Square Yards
Base Course, aggregate, 8-inch thick (substation and site access drives)	2,051	Cubic Yards

Decommissioning activities include the de-compacting and regrading of the roads. It is conservatively assumed that six (6) inches of topsoil will be added to the existing soil on the site access drives and that internal access roads will be augmented with two (2) inches of topsoil. The road areas will be graded, de-compacted with deep ripper or chisel plow (ripped to 18 inches), backfilled with topsoil, as needed, and land contours restored for proper site drainage. This decommissioning estimate assumes that all internal roads will be restored; however, some landowners may wish to retain internal access roads.

2.9 BATTERY ENERGY STORAGE SYSTEM

The Project site will include a BESS located in the west-central portion of the Project near the proposed substation. Saratoga anticipates utilizing approximately 96 self-contained battery storage units with a total energy storage capability of approximately 50MW and 210 MWh. The BESS area encompasses approximately three acres of land bounded by perimeter fencing. Statistics and estimates provided in this Plan are based on the 2.752 MWh Sungrow Liquid Cooling Energy Storage System (ST2752UX-US). Eight (8) battery containers will be grouped together on a foundation with concrete piers. The units are mainly comprised of non-metallic materials such as Lithium-ion (Li-ion) batteries, silicon, glass, plastic, and epoxies. If decommissioned prior to the end of their useful life, the battery packs may have value in a resale market, depending on their condition.

Twelve (12) power conversion systems (inverter and transformer units) will be located adjacent to each BESS container unit on skid assemblies mounted on reinforced steel pile foundations. The transformers and associated equipment will be deactivated, disassembled, and removed at decommissioning. Depending on condition, the transformers may be sold for refurbishment and re-use. Collection cabling will be installed below the surface at an approximate depth of 36 inches (three feet). All above ground facilities and subsurface materials located less than four feet in depth will be removed and salvaged or disposed of in accordance with state and federal law at a licensed solid waste facility.

At the time of decommissioning the BESS and container units will be completely removed from the Project site. Unlike some BESS manufacturers, Sungrow does not currently have a program that accepts the responsibility of battery system disposal and recycling. Therefore, battery recycling, in addition to removal and shipping costs of the batteries, will be borne by the Project. Battery packs may have value for reuse if decommissioned during the early stages of Project operation; however, the resale or salvage value is difficult to predict and will be dependent on the age of the batteries at that time. Recovery programs to extract valuable materials such as nickel, cobalt, copper, aluminum, steel, and lithium from the systems are expanding and improving at a rapid rate. A conservative cost to cover shipping and recycling of the used batteries is included in the BESS estimate (Table 4).

3.0 LAND USE AND ENVIRONMENT

3.1 SOILS AND FARMLAND

The proposed solar facility is predominantly located on land currently dominated by pine plantation with some agricultural land use in the eastern portion of the Project. Areas of the Project that were previously utilized for agricultural purposes will be restored to a condition suitable for agricultural use. Non-agricultural areas will be seeded with vegetation comparable to what was present during the life of the solar facility and in compliance with regulations in place at the time of decommissioning.

3.2 RESTORATION AND REVEGETATION

Project areas that have been excavated and backfilled will be graded as previously described to restore land as required by the landowner and regulatory commitments. Soils compacted during decommissioning activities will be de-compacted, as necessary. Disturbed areas will be returned to crop production or seeded with vegetation comparable to that present during the life of the solar project. Work will be completed to comply with the conditions agreed upon by Saratoga Solar, the Town of Saratoga and Wood County or as directed by other federal, state, and local regulations in effect at the time of decommissioning.

3.3 SURFACE WATER DRAINAGE AND CONTROL

Surface water conditions at the Project site will be reassessed prior to the decommissioning phase. Saratoga Solar will obtain the required water quality permits, if needed, before decommissioning of the Project. Construction stormwater permits will also be obtained, and an Erosion Control and Stormwater Management Plan will be prepared describing the protection needed to reflect conditions present at that time. BMPs may include: construction entrances, temporary seeding, permanent seeding, mulching (in non-agricultural areas), erosion control matting, silt fence, filter berms, and filter socks.

3.4 MAJOR EQUIPMENT REQUIRED FOR DECOMMISSIONING

The activities involved in decommissioning the Project include removal of the above ground components of the Project: solar modules, racking, tracking system, foundations and piles, inverters, transformers, BESS units, access roads, perimeter fencing, Project substation, and electrical cabling and conduits (to a minimum depth of four feet below the surface). Restoration activities include de-compaction of subsoils and re-grading project areas that have been excavated or backfilled.

Equipment required for the decommissioning activities is similar to what is needed to construct the solar facility and may include, but is not limited to: small cranes, low ground pressure (LGP) track mounted excavators, backhoes, LGP track bulldozers, LGP off-road end-dump trucks, front-end loaders, deep rippers, water trucks, disc plows and tractors to restore subgrade conditions, and ancillary equipment. Standard dump trucks may be used to transport material removed from the site to disposal facilities, if necessary.

4.0 DECOMMISSIONING COST ESTIMATE SUMMARY

Expenses associated with decommissioning the Project will be dependent on labor costs at the time of decommissioning. For the purposes of this report late-2021 to early-2022 market values were used to estimate labor expenses. Fluctuation and inflation of the labor costs were not factored into the estimates.

4.1 DECOMMISSIONING EXPENSES

Project decommissioning will incur costs associated with disposal of components not sold for salvage, including materials which will be disposed of at a licensed facility, as required. Table 3 summarizes the estimated decommissioning costs associated with the major components of the Project's solar facilities. The total estimated decommissioning cost includes backfilling, grading and restoration activities as described in Section 2.

Table 3 Estimated Decommissioning Expenses – Solar Facilities

Activity	Unit	Number	Cost per Unit	Total
Overhead and management (includes estimated permitting required)	Lump Sum	1	$613,000	$613,000
Solar modules; disassembly and removal *	Each	366,444	$4.40	$1,612,354
Tracking System disassembly and removal (equivalent full trackers) *	Each	4,698	$625	$2,936,250
Steel pile/post removal	Each	52,182	$9.70	$506,165
Transformers and inverters	Each	42	$1,820	$76,440
Subsurface medium voltage cable	Linear Feet	50,160	$0.83	$41,633
Perimeter fence removal	Linear Feet	39,600	$2.80	$110,880
Access road excavation and removal	Lump Sum	1	$66,600	$66,600
Topsoil replacement and site rehabilitation	Lump Sum	1	$449,200	$449,200
O&M Building (Prefabricated)	Lump Sum	1	$10,000	$10,000
Project Substation	Lump Sum	1	$300,000	$300,000
Overhead transmission tie-in line	Lump Sum			$20,250
Total estimated gross cost to decommission solar facilities				**$6,742,772**

*Cost of equipment removal would be higher if retaining for resale rather than salvage; however, the increased revenue would offset the added costs.

Table 4 summarizes the estimated decommissioning costs associated with the major components of the Project's BESS facilities. The total estimated decommissioning cost includes backfilling, grading and restoration activities as described in Section 2, as well as packaging, shipping, and recycling of batteries,

Table 4 Estimated Decommissioning Expenses – BESS Facilities

Overhead and management (BESS removal activities)	Lump Sum	1	$34,000	$34,000
Battery pack, container, and foundation removal	Each	96	$1,995	$191,520
Inverter/transformer stations with foundations	Each	12	$1,710	$20,520
O&M Building (Prefabricated)	Lump Sum	1	$10,000	$10,000
BESS perimeter fence removal	Linear Feet	1,382	$3.00	$4,146
Access road and yard removal	Lump Sum	1	$39,450	$39,450
Site restoration (remove fill, grading and revegetation)	Lump Sum	1	$71,900	$71,900
Total estimated cost for removal and restoration of BESS facilities				**$371,536**
Estimated cost for preparing, packaging, and shipping batteries to recycling facilities				**$1,218,500**
Total estimated cost to recycle batteries				**$3,044,800**
Total estimated cost to decommission and recycle BESS facilities				**$4,634,836**

4.2 DECOMMISSIONING REVENUES

Revenue from decommissioning the Project will be realized through the sale of the solar facility components and construction materials. As previously described, the value of the decommissioned components will be higher in the early stages of the Project and decline over time. Resale of components such as solar panels is expected to be greater than salvage (i.e., scrap) value for most of the life of the Project.

Solar modules, the substation, and other solar plant components may be sold within a secondary market for re-use. A current sampling of reused solar panels indicates a wide range of pricing depending on age and condition ($0.10 to $0.30 per watt). Future pricing of solar panels is difficult to predict at this time, due to the relatively young age of the market, changes to solar panel technology, and the ever-increasing product demand. A conservative estimation of the value of solar panels at $0.10 per watt would yield $19,788,000. Increased costs of removal, for resale versus salvage, would be expected in order to preserve the integrity of the panels; however, the net revenue would be substantially higher than the estimated salvage value.

The resale value of components such as trackers, may decline more quickly; however, the salvage value of the steel that makes up a large portion of the tracker is expected to stay at or above the value used in this report.

The market value of steel and other materials fluctuates daily and has varied widely over the past five years. Salvage value estimates were based on an approximate five-year-average price of steel and copper derived from sources including on-line recycling companies and United States Geological Survey (USGS) commodity summaries. The price used to value the steel used in this report is $241 per metric ton; aluminum at $0.40 per pound; silicon at $0.40 per pound and glass at $0.05 per pound. The main component of the tracking system and piles is assumed to be salvageable steel.

Solar panels are estimated to contain approximately 75 percent glass, 8 percent aluminum and 5 percent silicon. A 50 percent recovery rate was assumed for aluminum and all panel components, due to the processing required to separate the panel components. Alternative and more efficient methods of recycling solar panels are anticipated before this Project is decommissioned, given the large number of solar facilities that are currently being developed. Table 5 summarizes the potential salvage value for the solar array components and construction materials. No salvage or resale revenue is assigned to the BESS.

Table 5 Estimated Decommissioning Revenues (Solar Component Salvage Value Only)

Item	Unit	Salvage Price per Unit	Units per Item	Total Salvage Price per Item	Number of Items	Total
Solar Array Components						
Panels - Silicon	Pounds per Panel (Item)	$0.40	1.8	$0.72	366,444	$263,840
Panels - Aluminum	Pounds per Panel (Item)	$0.40	2.8	$1.12	366,444	$410,417
Panels - Glass	Pounds per Panel (Item)	$0.05	26.6	$1.33	366,444	$487,371
Tracking System and Posts	Tons per $MW_{[DC]}$	$241	32.0	$7,712	197.88	$1,526,051
Buried Cable – Aluminum	Number per Foot			$0.150	50,160	$7,524
Project Substation						
Substation Components (steel and transformers)	Total	$50,000	1	$50,000	1	$50,000
Total Potential Revenue						**$2,745,203**

* Revenue based on salvage value only. Revenue from used panels at $0.10 per watt could raise $19,788,000 as resale versus the estimated salvage revenue.

4.3 DECOMMISSIONING COST SUMMARY

Table 6 provides a summary of the net estimated cost to decommission the Project, using the information detailed in Sections 4.1 and 4.2. Estimates are based on late-2021 to early 2022 prices, with no market fluctuations or inflation considered.

Table 6 Net Estimated Decommissioning Summary

Item	Cost/Revenue
Decommissioning Expenses (Solar Project)	**$6,742,772**
Decommissioning Expenses (BESS Project)	**$4,634,836**
Total Decommissioning Expenses	**$11,377,608**
Potential Revenue – salvage value of panel components and recoverable materials	**$2,745,203**
Net Decommissioning Cost	**$8,632,405**

Figure 1 Site Location Map

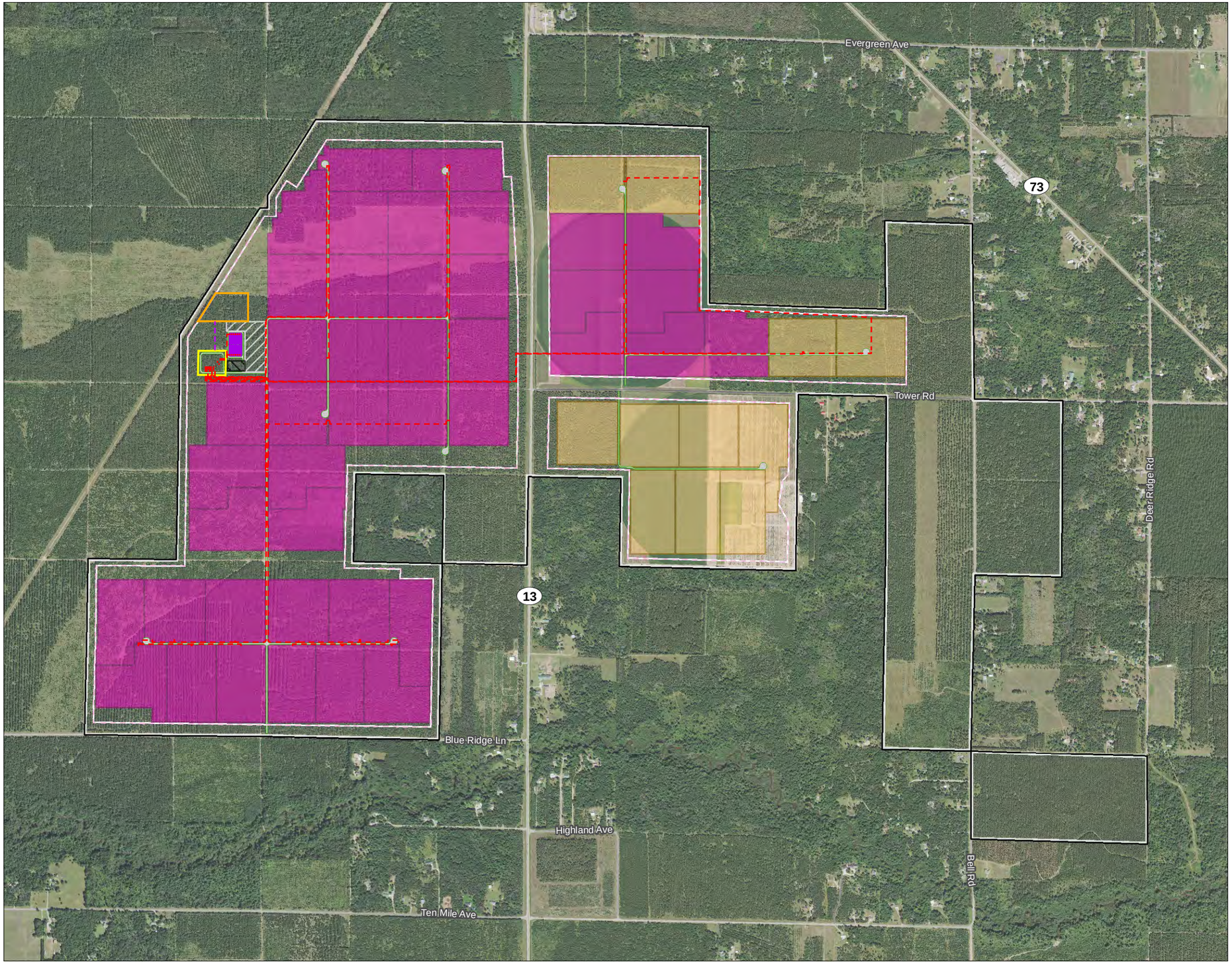

Figure No.

1

Title

Project Map
Decomissioning Plan

Client/Project 193708352

Saratoga Solar Project, LLC
Saratoga Solar Project

Project Location
T. of Saratoga
Wood County, WI

Prepared by CA on 2022-04-08
TR by JH on 2022-04-08
IR by CP on 2022-04-08

N

0 750 1,500 Feet
(At original document size of 11x17)
1:18,000

Legend

- Project Area
- Generator Tie Line
- Collection System
- Access Road
- Boundary Fence
- Solar PV Array Area - Primary
- Solar PV Array Area - Alternate
- Project Substation
- Switchyard
- Battery Energy Storage System
- O&M Area
- Laydown Yard

Notes
1. Coordinate System: NAD 1983 HARN Wisconsin TM
2. Data Sources: Stantec, Saratoga Solar Project, LLC, WisDOT, WDNR
3. Background: 2020 NAIP

Stantec

V:\1937\Active\193708352\03_data\gis_cad\gis\mxds\Decomissioning_Plan\fig1_decomissioning_plan_193708352.mxd Revised: 2022-04-08 By: carmer