



Decommissioning Plan

**CT Solar PDF LLC
Ground-Mount Solar Array
North Haven, CT**

June 2023

Prepared For:

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ATTACHMENTS

Attachment A – Site Location Map

Attachment B - Decommissioning Estimate

1.0 Background

On behalf of Nokomis Energy (Operator/Owner), Verdanterra has prepared this Decommissioning Plan (Plan) for the proposed *CT Solar PDF LLC project* (the Facility) located east and south of McDermott Road and north of Middletown Avenue (SR-17) in North Haven, CT 06473. The overall facility consists of a power generation facility producing 1.45-megawatt (MW) AC total combined from one (1) rooftop system, one (1) canopy system, and one (1) ground mount system surrounded by a 7-foot-tall chain link fence.

The intent of this Plan is to provide a general scope of decommission work as well as to act as a mechanism for decommissioning assurance within the Town of North Haven Planning and Zoning Commission. As a result, this decommissioning estimate has been prepared for the current site layout.

1.1 Facility Description

The proposed Facility will be constructed on a building rooftop, parking lot canopies proposed over an existing asphalt parking lot, and a vegetated area adjacent to the parking area with existing topography that is well suited for solar array development. Project components are planned to consist of the site features listed below:

- 868 linear feet of 7-ft high perimeter chain link fence.
- 4,004 photovoltaic (PV) solar modules (i.e., “panels”).
- 15 fixed tilt racking frames.
- Twenty-Nine (29) Sunny Tripower Core1 50-US Inverters.
- Two (2) transformers.
- Two (2) concrete equipment pads supporting the electrical equipment; and
- 923 feet of LV wiring, and 2,655 feet of MV collector line.

2.0 Decommissioning Activities

Facility decommissioning will consist of the following major steps:

- Dismantle and Demolish;
- Disposal and Recycle; and
- Site Restoration and Stabilization.

2.1 Dismantle, Demolish, and Disposal or Recycle

A significant portion of the photovoltaic system at the Facility will include recyclable or re-saleable components, which include copper, aluminum, galvanized steel, concrete, and PV modules. Due to their resale value, these components will be dismantled and disassembled rather than being demolished and disposed.

Prior to commencing decommissioning, the owner/operator will coordinate with the local utility company to determine schedule and procedure for disconnecting facility infrastructure from the point of interconnection. Once disconnection is completed, all facility electrical connections will be disconnected and tested to confirm the system is de-energized prior to starting removal.

All electrical connections to the PV modules will be cut and the modules will be removed from their framework by cutting or dismantling the bolted connections to the supports. Modules will then be removed. The interior materials of the PV modules are silicon-based and are not considered hazardous materials. In the event of a total module fracture during removal, these modules may be permissible for disposal at a licensed landfill. Decommissioning contractor will be responsible for assessing condition of PV modules and managing for proper disposal throughout removal procedure.

The photovoltaic module frame and racking system and all other metal project components, including driven support posts, perimeter fencing, and gates, will be demolished and removed from the site for recycling, salvage, or disposal.

Any aboveground utility poles owned by the Facility will be completely removed and disposed of off-site in accordance with utility best practices. All overhead electrical conductors will be removed from the PV equipment and terminated as required by the utility company. Underground conductors and circuits will be removed.

The transformers will be removed from their concrete pads. Their electronic components and internal cables will be removed. These components will be lowered to the ground where they will be transported whole for reconditioning and reuse or disassembled / cut into more easily transportable sections for salvageable, recyclable, or disposable components. Switchgears will be removed from their concrete pads and have no decommissioning value.

Concrete slabs used for transformers and other equipment will be broken and removed to the concrete base depth. Clean concrete will be crushed and disposed of off-site and/or recycled and reused either on or off-site. Excavations will be filled with subgrade material found on-site of quality and compacted density comparable to the surrounding area.

A final site walkthrough will be conducted to remove debris and/or trash generated within the site during the decommissioning process and will include removal and proper disposal of any debris that may have been wind-blown to areas outside the immediate footprint of the facility being removed.

2.2 Site Restoration and Stabilization

Solar facilities are largely pervious, vegetated surfaces. Decommissioning and removal of equipment will not result in excessive earth disturbance; however, some restoration and site stabilization will be required upon completion of work. The areas of the facility that are disturbed will consist of the array areas where construction vehicles travel, the corridors of the perimeter fencing, equipment pad areas, stormwater facilities, and underground electric lines. The site will be de-compacted by discing and mixing with suitable sub-grade materials selected to support revegetation and to match the existing soil types. Disturbed areas will be seeded with an appropriate local grass seed mix and topsoil if needed.

3.0 Permitting Requirements for Decommissioning

In addition to any decommissioning requirements listed in the conditions of the original project approvals, other permits for decommissioning activities may be required by state or local agencies. The decommissioning contractor shall be responsible for obtaining any required permits or approvals, at the time of decommissioning.

4.0 Schedule

Decommissioning, demolition, and dismantling of the facility is anticipated to be completed over a duration of approximately one month and is not intended to occur during the winter season or require multiple mobilizations.

5.0 Opinion of Probable Decommissioning Cost

A decommissioning cost estimate was prepared under the direction and supervision of a Professional Engineer registered in the State of Connecticut and is included as **Attachment B**. Assumptions and references applicable to each line item are listed as they are used.

6.0 Decommissioning Assurance

6.1 Form of Decommissioning Assurance

Financial security for decommissioning may be required if requested by the Town Planning and Zoning Commission prior to issuance of a building permit. The Owner/Operator will provide decommissioning assurance in an amount equal to the decommissioning cost estimate for the site included as Attachment B or as agreed between the Owner/Operator and the Town Planning and Zoning Commission. Decommissioning assurance shall be provided in a form acceptable to the Planning and Zoning Commission.

6.2 Amount of Decommissioning Assurance

The initial amount of the decommissioning assurance shall be determined concurrently with the design and engineering documents that will be submitted for building and electrical permits.

7.0 Use of Decommissioning Assurance

If the Owner/Operator fails to start decommissioning activities within six (6) months of discontinued operations, the Town shall have the right to undertake decommissioning activities and make a claim against the decommissioning assurance. In such circumstances, the Town shall have such access to the site as may be necessary to allow their qualified contractors to conduct decommissioning activities.

For purposes hereof the “date of discontinued operations” shall be defined as:

- The date of discontinued operations designated by the Owner/Operator in its notice to the Town; or
- In absence of such notice, the last day of a continuous period of six (6) months in which the facility has not operated and where such inactivity is not the result of a casualty, equipment problem, permitting matter, natural disaster, or financial matter that the Owner/Operator is in good faith attempting to remedy.

In the event the Town must carry out Decommissioning activities, it shall be entitled to indemnification from the Owner/Operator for expenses reasonably incurred in connection with decommissioning, net of any salvage value for the solar facility components.

8.0 Acknowledgement and Approval

The Town hereby acknowledges receipt of this Decommissioning Plan and affirms that the Plan (assuming establishment of the escrow fund agreed upon by the Planning and Zoning Commission and Nokomis Energy) satisfies the conditions of the applicable permit approvals relevant thereto.

Town of North Haven Planning and Zoning Commission

Date: _____

Signed:

Name:

Name:

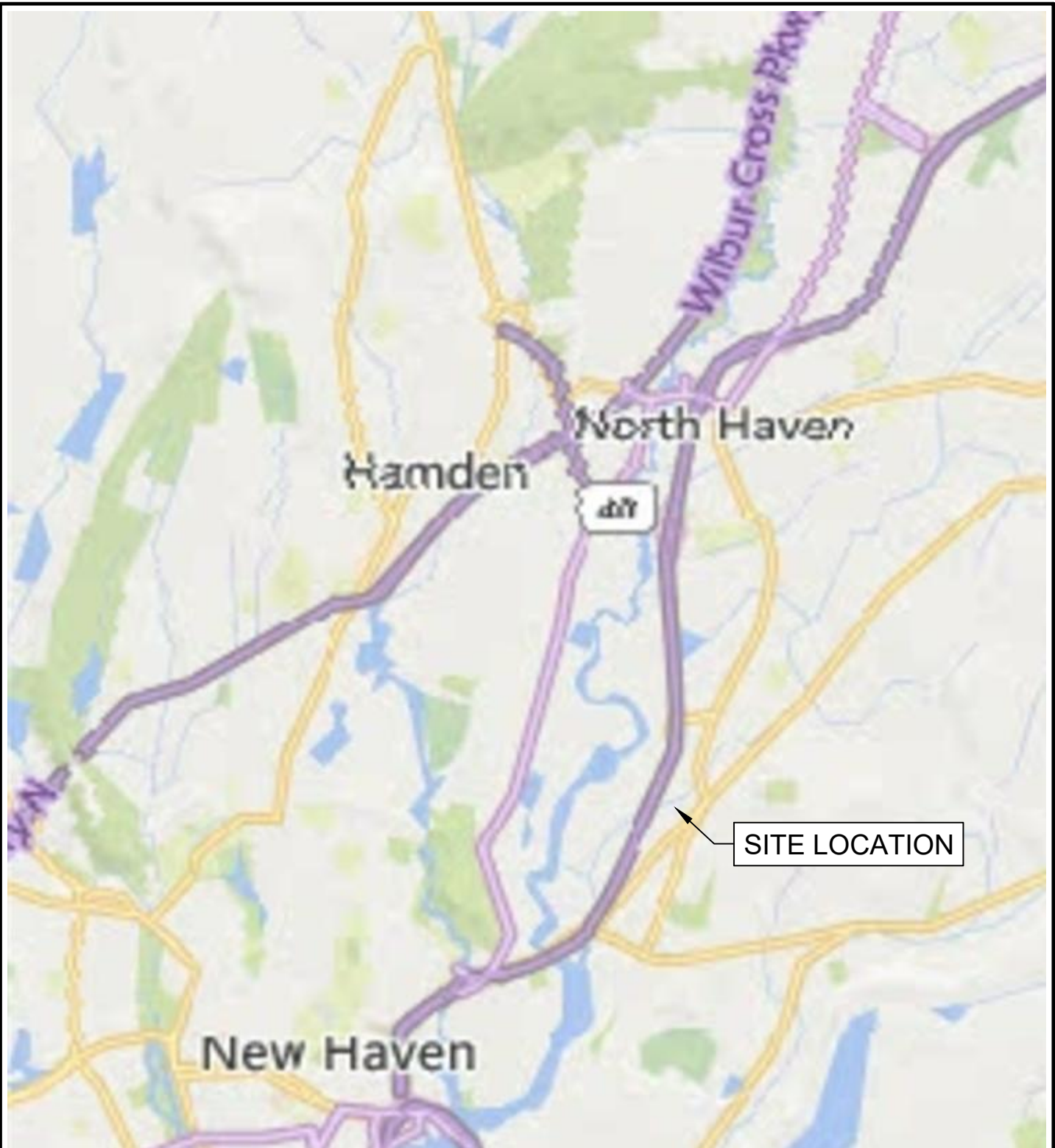
Name:

Name:

Name:

Name:

Attachment A: Site Location Map



Map Data Source: U.S. Geological Survey (USGS; <http://www.usgs.gov>)



Engineer



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Project Title

CT SOLAR PDF LLC

Drawing Description

LOCATION MAP

USGS Quadrangle: NORTH HAVEN, CT

Project Number: 07723003

Drawn By: SML

Checked By: SML

Scale: 1" = 2000'

Sheet Number:

FIGURE - 1

Attachment B: Decommissioning Estimate



**DECOMMISSIONING COST ANALYSIS
CT SOLAR PDF LLC**

	DESCRIPTION OF ITEM	QUANTITY	UNIT	UNIT COST	TOTAL COST (2023)	TOTAL COST (After 25 Years)**	LOGIC
I. DISASSEMBLY & DISPOSAL							
1	Disconnection of Electrical System	1	EA	\$ 1200.00	\$ 1,200.00	1,968.73	* Assumes one 10-hour day for 2 qualified linemen.
2	PV Modules - Ground Mount	396	EA	\$ 7.42	\$ 2,940.00	4,823.38	* Use Crew A-5 (2 Laborers; .25 Truck Driver; .25 Flatbed Truck) = \$1,470/day. Assume crews can remove approximately 200 panels/day.
	PV Modules - Canopy and Roof Mounted	3,608	EA	\$ 6.11	\$ 22,050.00	36,175.36	* Use Crew A-5 (2 Laborers; .25 Truck Driver; .25 Flatbed Truck) = \$1,470/day. Assume crews can remove approximately 240 panels/day.
	Crane Rental	2	DAY	\$ 1,500.00	\$ 3,000.00	4,921.82	Crane Rental and Operator = \$1,500/day
3	Inverter(s)	29	EA	\$ 101.38	\$ 2,940.00	4,823.38	* Use Crew A-5 (2 Laborers; .25 Truck Driver; .25 Flatbed Truck) = \$1,470/day. Assume crews can remove in 2 days.
4	Transformer(s)	2	EA	\$ 611.00	\$ 1,222.00	2,004.82	* Use Crew A-5 (2 Laborers; .25 Truck Driver; .25 Flatbed Truck) = \$1,470/day. Assume crews can remove in 1 day.
5	Racking Frame (Fixed Tilt)	15	EA	\$ 98.00	\$ 1,470.00	2,411.69	* Use Crew A-5 (2 Laborers; .25 Truck Driver; .25 Flatbed Truck) = \$1,470/day. Assume crews can remove in 1 day.
6	Racking Posts	22	EA	\$ 33.41	\$ 735.00	1,205.85	* Use Crew A-5 (2 Laborers; .25 Truck Driver; .25 Flatbed Truck) = \$1,470/day. Assume crews can remove in 1/2 day.
7	LV Wiring	923	LF	\$ 0.80	\$ 735.00	1,205.85	* Use Crew A-5 (2 Laborers; .25 Truck Driver; .25 Flatbed Truck) = \$1,470/day. Assume crews can remove in 1/2 day.
8	MV Wiring	2,655	LF	\$ 1.11	\$ 2,940.00	4,823.39	* Use Crew A-5 (2 Laborers; .25 Truck Driver; .25 Flatbed Truck) = \$1,470/day. Assume crews can remove all in 2 days.
9	Fence	868	LF	\$ 5.08	\$ 4,410.00	7,235.08	* Use Crew A-5 (2 Laborers; .25 Truck Driver; .25 Flatbed Truck) = \$1,470/day. Assume crews can remove approximately 290 LF/day.
10	Concrete Pads	6.1	CY	\$ 325.51	\$ 1,979.00	3,246.76	* Use Crew B-3B (2 Laborers; 1 Equip Oper; 1 Truck Driver; 1 Backhoe; 1 Dump Truck) = \$3,958/day. Assume crews can remove all in 1/2 day.
11	Gravel (Equipment pad)	4.5	CY	\$ 436.19	\$ 1,979.00	3,246.76	* Use Crew B-3B (2 Laborers; 1 Equip Oper; 1 Truck Driver; 1 Backhoe; 1 Dump Truck) = \$3,958/day. Assume crews can remove all in 1/2 day.
12	Utility Pole Removal	0	EA	\$ 1,000.00	\$ 0.00	0.00	Estimate includes labor and all required tools and vehicles.
				SUBTOTAL	\$ 47,600.01	78,092.86	
II. SITE RESTORATION							
13	Re-Seeding (infiltration trench, underground electric, and 50% of site)	0.5	AC	\$ 2,400.00	\$ 1,263.31	2,072.59	* Cost includes seed: 4-7 species (native types). Also with estimate is labor, spraying, disking, planting, and mulch (one man & machine).
14	Re-Grading (Includes infiltration trench and restoring gravel pad area)	4.5	CY	\$ 220.41	\$ 1,000.00	1,640.60	* (2 Laborers; 1 Truck Driver; 1 Dump Truck) = \$2,000/day. Assume 1/2 day.
				SUBTOTAL	\$ 2,263.31	3,713.19	
III. SALVAGE							
15	PV Modules	3,804	EA	\$ 3.00	\$ -11,411.40	-16,557.32	Assumed 95% Salvage
16	Inverter(s)	29	EA	\$ 16.00	\$ -464.00	-673.24	Rockaway Recycling
17	Transformer(s)	2	EA	\$ 300.00	\$ -600.00	-870.57	Rockaway Recycling
18	Racking Frame (Fixed Tilt)	750	LBS	\$ 0.09	\$ -67.50	-97.94	Scrapmonster
19	Racking Posts	1,663	LBS	\$ 0.09	\$ -149.69	-217.19	Scrapmonster
20	LV Wiring	600	LBS	\$ 1.50	\$ -899.73	-1,305.46	Scrapmonster
21	MV Wiring	5,151	LBS	\$ 0.75	\$ -3,863.03	-5,605.04	Scrapmonster
22	Fence	521	LBS	\$ 0.50	\$ -260.40	-377.83	Rockaway Recycling and others 0.6 lbs per linear foot. \$0.50 per lb.
				SUBTOTAL	\$ -17,715.74	-25,704.58	
				DEMOLITION COST	\$ 49,863.31	81,806.05	<u>Legend:</u> * = Costs derived from RS Means Heavy Site estimating manual
				SALVAGE VALUE CREDIT	\$ -17,715.74	-25,704.58	** = Assumes 2% annual increase in labor costs and 1.5% annual increase in salvage value
				AMOUNT OF DECOMMISSIONING ASSURANCE =	\$ 32,147.57	56,101.48	



DECOMMISSIONING QUANTITIES			
DESCRIPTION OF ITEM	UNIT	QUANTITY	NOTES
I. DISASSEMBLY & DISPOSAL			
1 Disconnection of Electrical System	LS	1	Standard
2 PV Modules	EA	4,004	Electrical Plan
3 Inverter(s)	EA	29	"
4 Transformer(s)	EA	2	"
5 Racking Frame (Fixed Tilt)	EA	15	CAD
6 Racking Posts	EA	22	CAD
7 LV Wiring	LF	923	Use Length of each array row x 1.2 for connections + motor wire length x 1.2 for connections
8 MV Wiring	LF	2,655	Use Length between farthest Inverter/Transformer pad to POI x 1.5 for connections
9 Fence	LF	868	L.F. of fence measure from CAD drawing
10 Concrete	CY	6.1	1 pad at 245 sf
11 Gravel (Equipment pad)	CY	4.5	Gravel at equipment pad = 245 sf. Quantity pulled from CAD
12 Utility Poles	EA	0	Electrical Plan
II. SITE RESTORATION			
13 Re-Seeding	AC	0.53	Use total disturbed area = infiltration trench, underground electric outside fence + 50% area within fence
14 Re-Grading	CY	5	Gravel at equipment pad
III. SALVAGE			
15 PV Modules	EA	3,804	95% of existing modules
16 Inverter(s)	EA	29	Re: CAD Drawing
17 Transformer(s)	EA	2	Re: CAD Drawing
18 Racking Frame (Fixed Tilt)	LBS	750	
19 Racking Posts	LBS	1,663	4" dia. Structural pipe = 10.8 lbs/ft. Avg. wt. per post = 75.6 lbs. Assume worst case with Sonotube below grade = no salvage value.
20 LV Wiring	LBS	600	Use 0.65 lbs/LF
21 MV Wiring	LBS	5,151	Use 1.94 lbs/LF
22 Fence (Agricultural)	LBS	521	Use 0.6 lbs/LF of fence