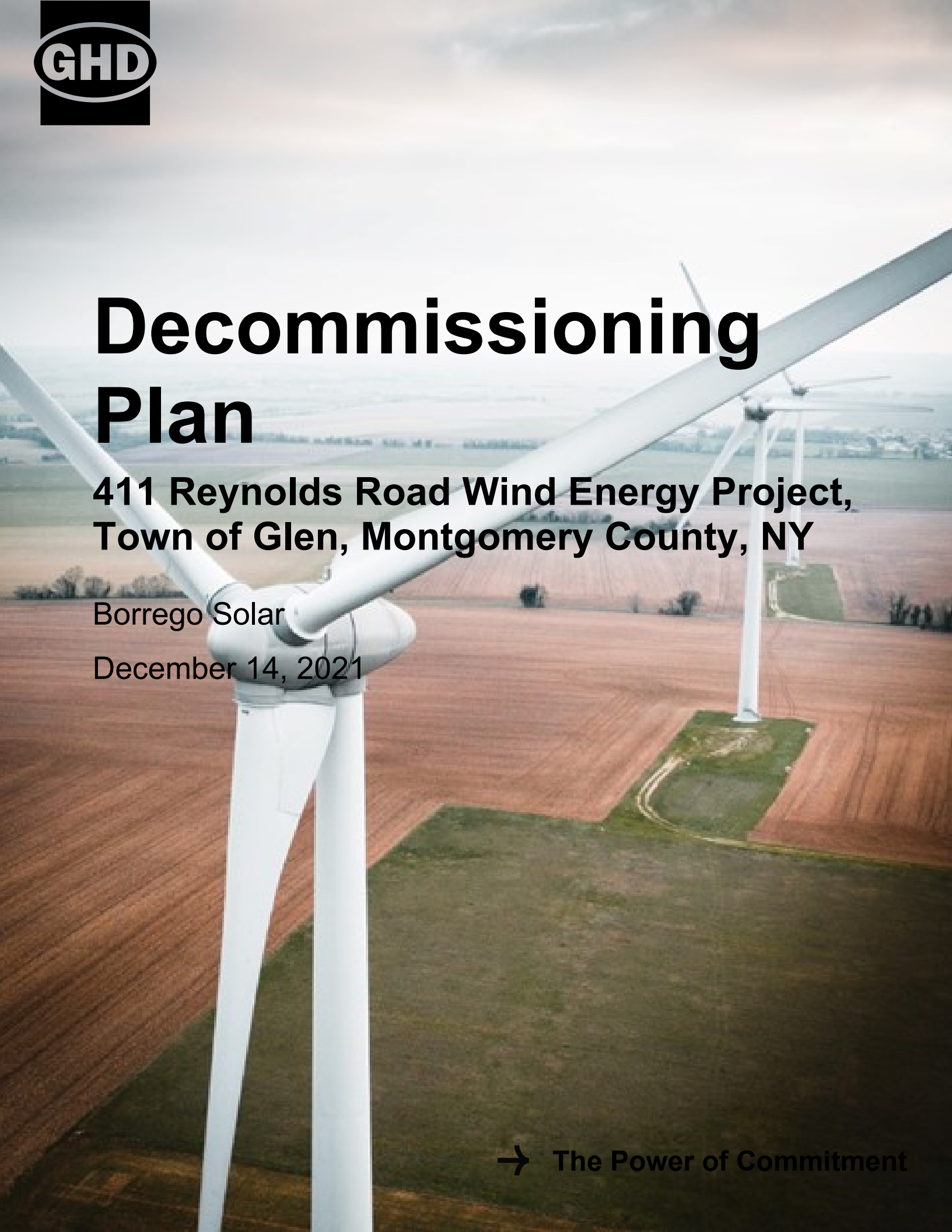

Decommissioning Plan

411 Reynolds Road Wind Energy Project, Town of Glen, Montgomery County, NY

Borrego Solar

December 14, 2021

→ The Power of Commitment

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1. 411 Reynolds Road Wind Project

1.1 Purpose of this report

This report summarizes the specific project components that will be removed, the costs associated with their removal and, where applicable, their associated salvage value. This report also provides overall unit costs (per turbine) for decommissioning the 411 Reynolds Road Wind Project (Project).

1.2 Scope and limitations

This report: has been prepared by GHD for Borrego Solar and may only be used and relied on by Borrego Solar for the purpose agreed between GHD and Borrego Solar as set out in our Master Services Agreement.

GHD otherwise disclaims responsibility to any person other than Borrego Solar arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

1.3 System Description

The proposed Project is a wind energy facility located in the Town of Glen, Montgomery County, New York. In general, the Project facilities will be comprised of one wind turbine, overhead and underground electrical collection system, access road, and associated facilities.

1.4 Decommissioning Sequence

Should the Project be decommissioned, the following facilities would require removal and the associated disposal of materials and equipment:

- Wind turbines
- Foundations
- Access roads
- Overhead and underground electrical system

2. Wind Turbines

2.1 Wind Turbine Decommissioning

Properly maintained wind turbines typically have a life expectancy of 20 to 25 years. At the end of the Project life, depending on market conditions and project viability, the wind turbines may be “re-powered” or upgraded with more efficient turbines and equipment. However, if not upgraded, or if the turbines are non-operational for an extended period of time (such that there is no expectation of their returning to operation), they will need to be decommissioned.

For the basis of this estimate, a Vestas Model V150, 4.3 MW turbine with a height of 120 meters (394 feet) was used for the calculation of unit weights for the salvage values of the equipment and materials. The turbine, along with the tower and associated components, will have resulting salvage values after decommissioning and removal of the units.

It is anticipated that decommissioning and removal of the wind turbine would consist of de-powering of the units and disconnection of electrical systems prior to removal of the turbine. A lattice boom crane would be required for disassembly of the tower, nacelle, blades, and components. A secondary crane would be required to move the components around the site and loading onto trucks for disposal. After the tower sections, hub, nacelle, and blades have been lowered to the ground, a supplemental labor crew would cut the steel sections to sizes that can be loaded on trucks for disposal or salvage depending on the component.

The major components of the wind turbines (tower, nacelle, hub, and blades) are modular items that allow for ease of construction and disassembly during decommissioning or replacement. The tower is comprised of approximately 275 tons (250 metric tons) of painted steel structure. The hub is comprised of approximately 35 tons (31.7 metric tons) of cast iron/steel. Both the tower and the hub have the potential to be salvaged for scrap value. The nacelle has an overall unit weight of approximately 120 tons (108.5 metric tons) and is constructed of a combination of steel, copper, composite materials, and various other materials. Portions of the components within the nacelle and generators, along with overhead aluminum wires, have the potential to be salvaged for scrap value.

Scrap metal prices historically fluctuate with existing market conditions. The current salvage value for scrap #1 heavy melt steel (HMS) is approximately $440.00 per US ton. Salvage values for #3 copper materials (CU 88 percent to 90 percent) currently average $7,680 per US ton ($3.84/lb.). Salvage values for aluminum wire currently average $1.07 per pound. The salvage unit values for scrap steel, copper and aluminum are estimated based on current commodity prices. The commodity market prices used in the above estimate were obtained from Scrap Monster and various other sources in August 2021 (August 2021 prices).

For the purpose of this decommissioning plan, it is assumed that the tower and nacelle will yield approximately 70 percent steel materials of which 75 percent of the available steel materials are adequate to process for salvage. Since the hub assembly is a cast iron/steel manufactured unit, it is anticipated that the hub assembly will yield 100 percent salvageable metallic materials. Copper salvage estimates were derived by assuming 10 percent of the total nacelle weight consists of copper bearing materials. Overhead aluminum power transmission wires would be salvaged. Since the construction of the rotor/blades are predominantly non-metallic materials (fiberglass reinforced epoxy and carbon fibers), no salvageable value for the rotor/blades were used in the decommissioning cost estimate. This is considered a conservative salvage estimate.

Based on the design of the wind farm incorporating one turbine, the total estimated steel salvage value for the tower, nacelle and hub assembly is estimated to be approximately $102,500. The total estimated copper salvage value is estimated to be approximately $92,160. The total estimated aluminum salvage value is estimated to be approximately $134.

Petroleum, oils and/or lubricants (POL) contained in the wind turbine nacelle would require the removal and off-Site disposal during wind turbine decommissioning. Using currently estimated disposal costs, the costs anticipated for removal of POL from the nacelle and associated hauling fees to an approved off-Site disposal location, would be approximately $1,000 for each wind turbine.

Based upon the anticipated total labor and equipment cost, including mobilization and demobilization, the estimated cost for dismantling of the turbines is outlined below. The cost estimate is based upon a two-day dismantling effort per turbine and includes costs for a lift crane, secondary crane, mobilization, demobilization, and associated labor costs. The estimate includes the costs associated with the transport of the turbine components from the Site to a recycling facility.

Table 2.1 Wind Turbine Decommissioning

Turbine Decommissioning	Unit Cost	Unit
Mobilization to Site – Assume 1 day	$32,100	Per Turbine
Turbine Removal/Dismantling	$53,200	Per Turbine
Load/Transport Turbine Parts for Recycling	$39,600	Per Turbine
Removal/Disposal of POL	$1,000	Per Turbine
Total Estimated Cost for Turbine Removal	$125,900	Total

3. Wind Turbine Foundations

3.1 Wind Turbine Foundation Decommissioning

The target removal depth of the foundation is required to be a minimum of 3 feet below grade for foundations located in non-agricultural lands and a minimum of 4 feet below grade for foundations located in active agricultural lands. For the purpose of this estimate, all foundations were calculated for removal to a depth of 4 feet to prevent interference with future farming activities. The estimated cost of removing each foundation includes the costs associated with mobilization, demolition, backfill and disposal of material, and final site restoration as shown in Table 3.1.

Table 3.1 Wind Turbine Foundation Decommissioning

Turbine Foundation Decommissioning	Unit Cost	Unit
Mobilization to Site – Assume 1 day	$9,500	Per Foundation
Concrete Demolition – Assume 3 days per Foundation	$12,800	Per Foundation
Disposal of Materials – Assume 1 day per Foundation	$13,500	Per Foundation
Total Estimated Cost for Foundation Removal	$35,800	Total

3.2 Wind Turbine Grounding System

The grounding system for each wind turbine consists of a grounding ring of copper cable that runs in a circle around the edge of the foundation near the foundation bottom. This ring connects several copper grounding rods driven into the ground around the perimeter of the foundation. A typical foundation is constructed so that the bottom of the spread footer is approximately 10 to 12 feet below grade (a typical depth used for example purposes only). The copper grounding ring would be approximately 12 feet below grade and the grounding rods would be installed so that their highest point is also 12 feet below grade. Because all of these components are more than 4 feet below grade, removal will not be required. Additionally, there is no recognizable benefit to removing these components. For these reasons, removal of the wind turbine grounding system is not part of this decommissioning plan.

4. Access Roads

4.1 Typical Access Road Construction Details

Based on preliminary data, a total of approximately 3,900 square yards of access road is included under this Project. The access road is approximately 1,750 feet long, 20 feet wide and 13 inches thick constructed of stone.

Typical access roads are constructed of a layer of geotechnical fabric and a final compacted course of gravel 13 inches in thickness. The actual details of construction have not been finalized at the time of this report and may be modified during final design of the Project.

4.2 Access Road Decommissioning

The decommissioning of the access road will involve the removal and transportation of the aggregate materials off site for separating the salvageable aggregate material. It is possible the local township may accept this material without processing for their use; however, for the purpose of this report, it is assumed that all materials will be removed and hauled to a reprocessing site within a 20-mile, round-trip distance of the wind turbine. The decommissioning procedure would consist of utilizing a dozer to remove the gravel layer along with an excavator to load the gravel onto trucks for delivery to a processing facility. The work will also include the removal and proper disposal of the geotextile fabric. It is assumed that a large amount of the geotextile will be removed along with the aggregate and sorted at the off-site processing area to be disposed of in a nearby landfill. The estimate of access road decommissioning costs considers the current cost of hauling and excavation. The following unit price costs were used in the preparation of this estimate:

– Geotextile fabric removal ($0.25 per square yard)
– Geotextile fabric disposal ($150.00 per cubic yard)
– Gravel aggregate removal and hauling ($18.00 per cubic yard)

The salvage value of the access road materials is based upon the following assumptions:

– 75 percent of the aggregate will be salvaged for reuse as aggregate base course gravel.
– Remaining material (25 percent) is suitable for general fill in non-structural fill areas.

Assuming the materials would be stockpiled at the process site and sold by the processor at a later date, the salvage values are as follows:

– Reprocessed aggregate to be used as base course ($8.00 per cubic yard)
– Remaining aggregate and sand to be used as general fill ($2.50 per cubic yard)

The only scenario that could offer a lesser cost to remove and salvage the aggregate would be disposal at a nearby site that needed inert fill. For the purposes of this estimate, no consideration has been given to this option since no suitable site has been identified for disposal of the material. The estimated costs for access road removal and disposal are presented in the Table 4.1.

Table 4.1 Access Road Decommissioning

Access Road Removal	Quantity	Unit Cost	Total Cost
Gravel Course Access and Utility Road Removed (CY)	1,425 CY	$18.00 /CY	$25,650
Geotextile Fabric Removal	3,900 SY	$0.25/SY	$975
Geotextile Fabric Disposal	3 CY ±	$150.00/CY	$450
Total			$27,075
Use			$27,100

Table 4.2 presents the estimated salvage values obtained from the removal (reclaimed) of aggregate materials.

Table 4.2 Aggregate Salvage Values Removed

Removed Aggregate Salvage Values	Quantity	Unit Salvage Value	Total Salvage Value
Gravel Aggregate Course (reused) (CY)	1,070 CY	$8.00/CY	$8,560
Aggregate (reprocessed as general fill) (CY)	355 CY	$2.50/CY	$888
Total			$9,448
Use			$9,500

5. Crane Pads

The crane pad will be constructed of gravel materials similar to the access road in the previous section and therefore, the quantities for decommissioning have been included above. All work for removal shall be conducted at the same time during decommissioning.

6. Overhead and Underground Electric

6.1 Wires and Poles Typical Installation

Power collection wires will be installed in a combination of underground and overhead on poles. Overhead will be removed during decommissioning, but because underground components are installed a minimum 4 feet below grade in agricultural areas, removal will not be required.

6.2 Overhead Wires and Poles Decommissioning

As a part of decommissioning of this project, all overhead wires will be removed and salvaged as necessary. Power poles will be cut off and removed off site for disposal or potential salvage during decommissioning of the project. For the purposes of this report, associated wire salvage values have not been included as they are negligible, and no salvage value was included for removed poles. The labor and equipment cost for the removal of poles and wires is estimated at $5,000.

7. Earthwork and Topsoil Restoration

Once all the aboveground improvements and access roads are removed, the remaining work to complete the decommissioning of the site will consist of backfilling and grading the disturbed areas including the turbine foundation site and access roads. It is assumed that some existing materials and topsoil will be available at the site and reused on the site for restoration. It is estimated that approximately 1,350 cubic yards of material will be imported from off-site sources to supplement the fill available on the site for final site restoration. The estimated decommissioning cost for earthwork restoration is presented in Table 7.1.

Table 7.1 Earthwork and Topsoil Restoration

Description	Quantity (CY)	Cost (per CY)	Total Cost
Earthwork Fill Materials	1,370	$13	$17,810
Topsoil Materials	260	$18	$4,680
Total			$22,490
Use			$22,500

8. Summary of Decommissioning Costs

This estimate was developed using the various cost resources listed below:

– R.S. Means
– GHD historical data
– Vendor quotes (where applicable)
– Current/historic commodity prices
– Estimator judgment

The following is a summary of the total cost of decommissioning the turbine:

Decommissioning Costs – 1 Each Vestas Model V150, 4.3 MW Wind Turbine	
Turbine Removal (included removal/disposal of POL in nacelle)	$125,900
Turbine Foundation Removal	$35,800
Access Road Removal	$27,100
Electrical Removal	$5,000
Earthwork and Topsoil Restoration	$22,500
Total Decommissioning Costs	**$216,300**
Salvage Value – Wind Turbine	
Steel Salvage Value	$102,500
Copper Salvage Value	$92,160
Aluminum Salvage Value	$134
Aggregate Salvage Value	$9,500
Total Salvage Value	**($204,294)**
Salvage Value Net Decommissioning Costs	
Total Value	$12,006
Value per Turbine Use	$12,100

An inflation rate of 2 percent applied to the decommissioning costs of $216,300 over 20 years results in a recommendation for decommission security bond of $321,559. The estimated costs associated with decommissioning and restoration will be evaluated by an independent licensed engineer retained by the Applicant on a cycle beginning after the operations date of the wind farm and will be reviewed every 5 years thereafter for the life of the wind farm. A report summarizing the results of each review will be submitted to the Town Board. Any adjustment in the security value recommended by the engineer's report will be made within 60 days of delivery of the report to the Town Board.