Construction Management Work Plan for the Installation of Solar Array

for

Village of Brockport
Landfill Solar Project

6791 East Canal Road
Town of Sweden, Monroe County, New York

September 2019
Revised October 2019

HUNT 3211.002

HUNT E|A|S
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A. Project Description

HUNT Engineers, has reviewed the New York State Department of Environmental Conservation (NYSDEC) Environmental Conservation Law Subpart 360-2.15 for Landfill Closure and Post-Closure Criteria and is hereby issuing this Construction Management Work Plan for the Installation of Solar Array (Work Plan) to the Brockport Landfill – Site No. 8-28-038. Per NYSDEC's request, a Site Management Plan (SMP) will also be developed and finalized following the construction of the solar array to update and replace the Post-Closure Monitoring and Maintenance Operations Manual prepared by Malcolm Pirnie, Inc., last revised in April 2001.

The project is located at 6791 East Canal Road in the Town of Sweden, Monroe County, New York. The parcel is identified as tax parcel 069.04-1-3. The site is approximately 36-acres and contains two disposal areas. The proposed project is located on the main disposal area which is located in the central portion of the site and comprises approximately 17.5-acres. A secondary disposal of approximately 2-acres is located in the southern portion of the site.

Sustainable Energy Developments, Inc. (SED) d/b/a GreenSpark Solar is proposing to install a 480 kW AC solar project on the main disposal area of the landfill. The proposed solar array footprint is approximately 2.2-acres as shown on C2.0 – Site Improvement Plan (Appendix A). The system would consist of approximately 1,872 Hanwha 345-watt modules on a ballasted ground mount system, with 8 inverters. There will be no penetration to the land due to the ballasted system. The system will be directly interconnected to the local National Grid distribution grid. All energy produced will be credited to the Village of Brockport, who will be buying the solar power generated via credits on their National Grid bill.

The project includes construction and maintenance of solar array, as follows:

- The solar array will be placed over 2.2-acres of the top of the capped landfill, in areas with slopes not exceeding 7%;

- Prior to placement of the array, ground vegetation will be mowed as close to the ground as possible. Mowing between rows is to be done with equipment and procedures that limit the ability for stone to be thrown towards the solar panels and equipment. Example precautions are mowing at a higher deck height, using mulching attachments and mowers that utilize cross-cutting blades;

- Low ground pressure equipment (less than 1,000 pounds per square foot, or PSF) will be used to distribute solar array materials across the site (defined by the NYSDEC as the area within the perimeter fence). Moreover, crane mats will be used for access to and transportation around the construction site to avoid unnecessary impacts to the landfill cap;

- Approximately 203 solid concrete ballast blocks with pre-assembled solar racking will be placed on top of crushed stone, meeting the imported materials exemption

requirement of DER-10, in rows running east-west. Each block will be 9.5 feet long x 2.08 feet wide x 1.5 feet thick in size (See Solar Racking Structural Design);

- 1,872 solar photovoltaic panels (PV modules) will be attached to the racking. Each module measures 78.5 inches in length and 39.4 inches in width (See Solar Racking Structural Design);

- The PV modules will be tilted at a nominal 25-degree angle from horizontal and will face south with an actual azimuth of 180 degrees, with the lower edge of the modules a minimum of 3'-2" above the surface, and the upper edge at a minimum of 8' feet above surface (See Solar Racking Structural Design). No special snow removal precautions, procedures or equipment are required for the array. The PV panels are black and will aid in melting snow. A minimum height of 3'-2" above the surface was chosen as a balance between making the modules higher and having more structural engineering (heavier ballasts) or being lower and having more snow impacts to production. The project owner assumes there will be no required snow removal during project operation;

- Electrical power from the solar array will be conveyed from the PV modules to the electrical equipment via the following methods:

    - Outdoor rated electrical conductors bundled and affixed to the array racking;
    - Enclosed conductors in schedule 80 PVC conduit supported by the array racking;
    - Enclosed conductors in surface mounted schedule 80 PVC conduit affixed to ballast blocks continuously supported by 4 inches of washed stone and a geotextile between the stone and ground surface;

- Electrical power will be conveyed from the electrical equipment to the National Grid utility grid via conductors enclosed in surface mounted schedule 80 PVC conduit while on the landfill site and will transition to a direct bury cable once clear of the site (See Civil and Electrical Design);

- The design and installation of the PVC conduit and fittings shall comply with NEC standards. The PVC joints shall be visually inspected on a regular basis to identify potential deterioration due to weathering, temperature fluctuations, settlement, and associated stresses. If deterioration is found, appropriate action will be taken to repair the joints.

- The Village of Brockport will maintain the existing fencing and other barriers to prevent access to the landfill, and all designated points of entry will be labeled and equipped with locking gates that will be secure when the operators are not on-site. Areas of the landfill with existing fencing and areas not contained by the existing fence will be posted with signage alerting to the potential dangers of entering the solar array area.

B. Project History

The Village of Brockport is the owner of the 17.5-acre inactive, capped landfill which is located on the property referenced above. The property is bordered by undeveloped lands to the east, south and west and one residential property to the north of the site.

The main disposal area was used as a municipal waste landfill by the Village from about 1950 to 1984. The landfill was closed and covered in late 1984. Construction of a new landfill cap in compliance with 6NYCRR Part 360, consisting of an impermeable 40-mil geomembrane liner, an 18-inch barrier protection layer and a 6-inch layer of topsoil, was completed in October 1999.

C. Geotechnical Limitations

Foundation Design, P.C., performed geotechnical analyses based on the initial conditions of the landfill in order to determine maximum allowable loading on the capped portion of the landfill during construction and operation. This analysis has been included as Appendix C. The landfill cap consists of 6 inches of topsoil over 18 inches of barrier protection material, a geonet drainage mat, a 40-mil liner, and then an additional thickness of cap material over the landfill debris/waste. Comparison of the as-built and current topography indicates that the landfill has not undergone any settlement since it was capped in 1999. Likewise, the regularly scheduled maintenance review by the design engineer has not indicated settlement. The geotechnical engineer has suggested that a monitoring program be initiated during the first few years of operation of the solar array in order to track the amount of settlement that may occur.

During yearly O&M visits for the solar project the entire array and equipment located on the landfill Site shall be inspected for settling and movement. The solar project racking itself will be a very clear qualitative indicator of any settlement that may occur within the array footprint. During these visits:

- Areas of significant movement shall be remediated quickly to avoid unnecessary stress on the equipment and connectors.
- When movement is noted it shall be documented with pictures prior to remediation and reported to the NYSDEC.
- Areas of water pooling or drainage issues shall be documented and reported to the NYSDEC.

For design purposes, the geotechnical engineer has recommended utilizing an allowable soil capacity of 600 pounds per square foot (PSF) for static loads (the arrays, and electrical equipment as named elsewhere in this document). The recommended allowable soil capacity of 1000 PSF is for transient loads such as construction equipment.

D. Landfill Cap Disturbance Overview

All disturbance of the landfill site shall be limited to the proposed installations on top of the vegetative support layer of the site. No excavations or other penetrations shall be performed into the vegetative support layer without separate written approval from the NYSDEC. There will be no penetrations of any kind to the impermeable layer of the site. The soil cover integrity, slopes, drainage structures, and gas venting structures will be maintained during the period of solar panel installation and in accordance with the existing Post-Closure Monitoring and Maintenance Plan, as required by the NYSDEC. Sustainable Energy Developments, Inc. D.B.A. GreenSpark Solar, Hunt Engineers and Architects, and Foundation Design, P.C., states that the proposed construction and operation of the solar array on the closed landfill will not pose significant risks to human

health and the environment. Sustainable Energy Developments, Inc., is responsible to ensure that all necessary precautions are taken to protect the health and safety of workers and the general public during both construction and maintenance of the solar array. Around the perimeter of the landfill is a stone lined drainage channel and represents the limits of the geomembrane barrier and the overlying geo-composite drainage layer. The actual footprint of the landfill may extend beyond the line of drainage channel, and extra precautions will be taken in order to limit soil disturbance surrounding it. No standing water has been observed in the drainage channels on the landfill cap. The purpose of this channel is to collect stormwater and appropriately drain it off the landfill cap while minimizing erosion. If erosion or sedimentation is experienced during construction, non-staked hay bales will be temporarily installed to prevent potential sedimentation from accumulating or running off into the existing channel.

E. Construction Site Preparation

Prior to the commencement of construction activities, the entire solar array area will be mowed, and all landfill gas vents, landfill gas monitoring wells (if applicable), and other existing, above-ground structures on the site (defined by the NYSDEC as the area within the perimeter fence) shall be flagged for visibility. Additionally, protective barriers will be placed around structures as needed to prevent damage by vehicles accessing the site. And finally, those gas vents in close proximity to the array shall be checked for the presence of significant concentrations of methane gas. In the unlikely event that significant levels are detected, appropriate modifications to the gas vent or array layout will be made through consultation with the NYSDEC and the design engineer, if required.

Only low ground-pressure equipment of 1000 PSF or less ground pressure will operate on the site, for the delivery of materials, including array racking, photovoltaic modules, and electrical equipment. The array racking will be preassembled off the landfill site as much as is practical before being set in place, in order to minimize disturbance to the Site. The worst case compression load from a single ballast and racking system is: 11200-lbs, having a ground surface area of 19.76 square feet (9.5 feet long by 2.08 feet wide), resulting in a surface pressure of 570 PSF, not including the weight of cable and conduit which is estimated to add less than 10-lbs per ballast (See Brockport Solar Racking Structural Design).

The ballast blocks will be transported from the stockpile area and placed using low-ground pressure tracked equipment. The proposed equipment includes the use of Kubota Multi-terrain loaders. The ballasts will be placed using two (2) of the loaders working in tandem to distribute the load. This will result in a surface pressure of 530 PSF. Delivering the stone base material to the cap will also be completed using the Kubota loaders. The maximum bucket size for the loader is 25 CF. When fully loaded with crushed stone, the surface pressure is 900 PSF. Equipment Loading Calculations are included in Appendix D.

PV modules within the array will be arranged in strings of 18 modules connected in series; groups of 13 strings will connect to each of 8 inverters. Electrical transmission wiring from the modules will be bundled and mounted to the racking assemblies when travelling along array rows, and along messenger cable systems within cable saddles when travelling between rows to the inverters. The 8 string inverters will be mounted just North of the Northernmost row of modules. Electrical transmission from the inverters will

go via 4-inch schedule 80 PVC conduits to the adjacent 800A AC Panel. From the AC Panel, electric transmission will be in first on surface mounted 4-inch schedule 80 PVC conduits while on the Site, and transition to underground once beyond the site and via direct burial rated cables. All surface mounted conduit will be continually supported on an average of 4-inches of #1 and #2 stone placed on a geotextile between the stone and ground surface. Surface mounted conduit will be additionally secured to concrete pavers at regular intervals, not to exceed 10 feet. All surface mounted conduit will be marked with appropriate flagging and/or labeling to indicate its location and potential for danger. From there conductors will go approximately 850 feet north, outside of the fenced area, and immediately adjacent the access road to the point of interconnection with the electric utility company.

All solar photovoltaic racking assemblies and above-ground wiring will be held at a minimum of 3 feet away from any landfill gas (LFG) venting systems. The inverters will be Chint Solar Power, CPS 60kW inverters. The inverters and other electrical equipment on the site area not expected to accumulate landfill gas within the boxes during construction and operation of the solar array. Array grounding and lightning protection will be achieved through the use of separate array bonding jumpers and grounding conductors tied to the service entrance grounding electrodes. The service entrance grounding electrodes will be located off the site at the earliest convenient location roughly SE of the equipment pad. Grounding conductors will be over-sized to overcome any conductor resistance resulting from the longer off-site runs.

F. Construction Site Inspections

The project will be supervised by a professional engineer licensed in the state of NY at key intervals during the construction of the solar array. The professional engineer will be responsible for ensuring construction activities do not exceed the maximum PSF limits set forth by the Geotechnical review or otherwise compromise the integrity of the landfill site, and do not adversely affect the existing landfill stormwater control systems, monitoring wells, and landfill gas (LFG) ventilation systems. The proposed intervals are as follows:

1. At the start of civil works construction, when geotextile and gravel is moved from the off-site staging area to the on-site area of the solar field.
2. At the start of structural works when racking and solar module components are moved from the off-site staging area to the on-site solar field.
3. At the transport and placement of main electrical equipment.
4. And finally, at the completion of construction of the solar field to perform a final inspection for completeness per specifications.

Following NYSDEC approval of this Work Plan, construction activities will commence following the construction schedule provided in Appendix B. After commencement of construction, a written progress update shall be submitted to the NYSDEC by the fifteenth (15th) of each month until completion of the project, at which point required NYSDEC reporting requirements will follow the finalized and approved SMP.

The NYSDEC shall be notified immediately in the case of any development during construction that warrants a request to modify this Work Plan and/or the approved Post-Closure Monitoring and Maintenance Plan. No deviation from the approved Work Plan without the specific prior written approval of the NYSDEC shall occur.

The NYSDEC shall be notified immediately if any leachate, waste, gas seepage, or conditions which may affect the integrity of the landfill are observed during construction. Care and protective measures shall be taken to protect the integrity of the landfill cover and all other structures associated with the landfill. Any repair of the landfill cover shall be carefully monitored and inspected, and documentation of this work shall be recorded and submitted with the construction certification report.

The construction certification report shall be submitted to the NYSDEC within 45 days after the completion of construction for approval and file record. At a minimum, the report shall include certified completed as-built drawings including, among other things, notation of any deviations from the approved drawings, the results of all construction, quality assurance and quality control testing, including documentation of any failed test results, statements of all retesting performed, daily reports from the engineer, and color photographs of major project features. If any damage is observed during the intervals proposed the professional engineer will immediately notify the NYSDEC and provide a written plan and schedule for any repairs needed. Upon the completion of the solar array the professional engineer will provide the NYSDEC with a signed and sealed certification report certifying the project was performed in accordance with this Workplan.

G. Operation Maintenance Procedures and Contact Information

During solar array operation, the landfill site will be mowed by the Village of Brockport on a semi-annual basis, as needed to control the growth of grasses and woody vegetation. In addition to regular maintenance of the landscape conditions at the physical project site, there will be a comprehensive Site Management Plan, one section of which will focus on maintaining the solar PV asset. At a minimum, this SMP will include an annual preventative maintenance visit that focuses on complete visual inspection of the entire array, inverter locations, interconnection, combiner boxes, and all wiring and conduit runs to confirm adequate integrity system wide. Any potential corrections needed will be noted and flagged for near term correction. As part of this program, there will also be an electrical testing component to verify overall system operations and production. Any anomalies will be noted and flagged for near term correction. A detailed report will be issued to the system owner and NYSDEC outlining system status, all key findings, and list any minor corrections performed at the project site. Additionally, a list of any prescriptive measures recommended to be undertaken will be provided to the system owner. It is expected that a comprehensive SMP will be in effect for the duration of the project life cycle. A copy of the SMP for maintaining the solar PV asset will be finalized following construction and provided to the NYSDEC, as well as copies of the detailed reports issued to the system owner.

Contact information for responsible personnel is below:

Village of Brockport:
Margaret Blackman, Mayor
127 Main St
Brockport, NY 14420
P: (585) 637-5300

GreenSpark Solar:
Kevin Schulte, Chief Executive Officer
318 Timothy Lane
Ontario, NY 14519-8958
P: (585) 265-2384

HUNT Engineers:
Daniel P Yanosh Jr, PE
4 Commercial Street
Rochester, NY 14617
P: (585) 327-7950

Leader Professional Services, Inc:
Matt Drury, PE, Senior Project Manager
271 Marsh Road, Suite 2
Pittsford, NY 14534
P: (585) 248-2413

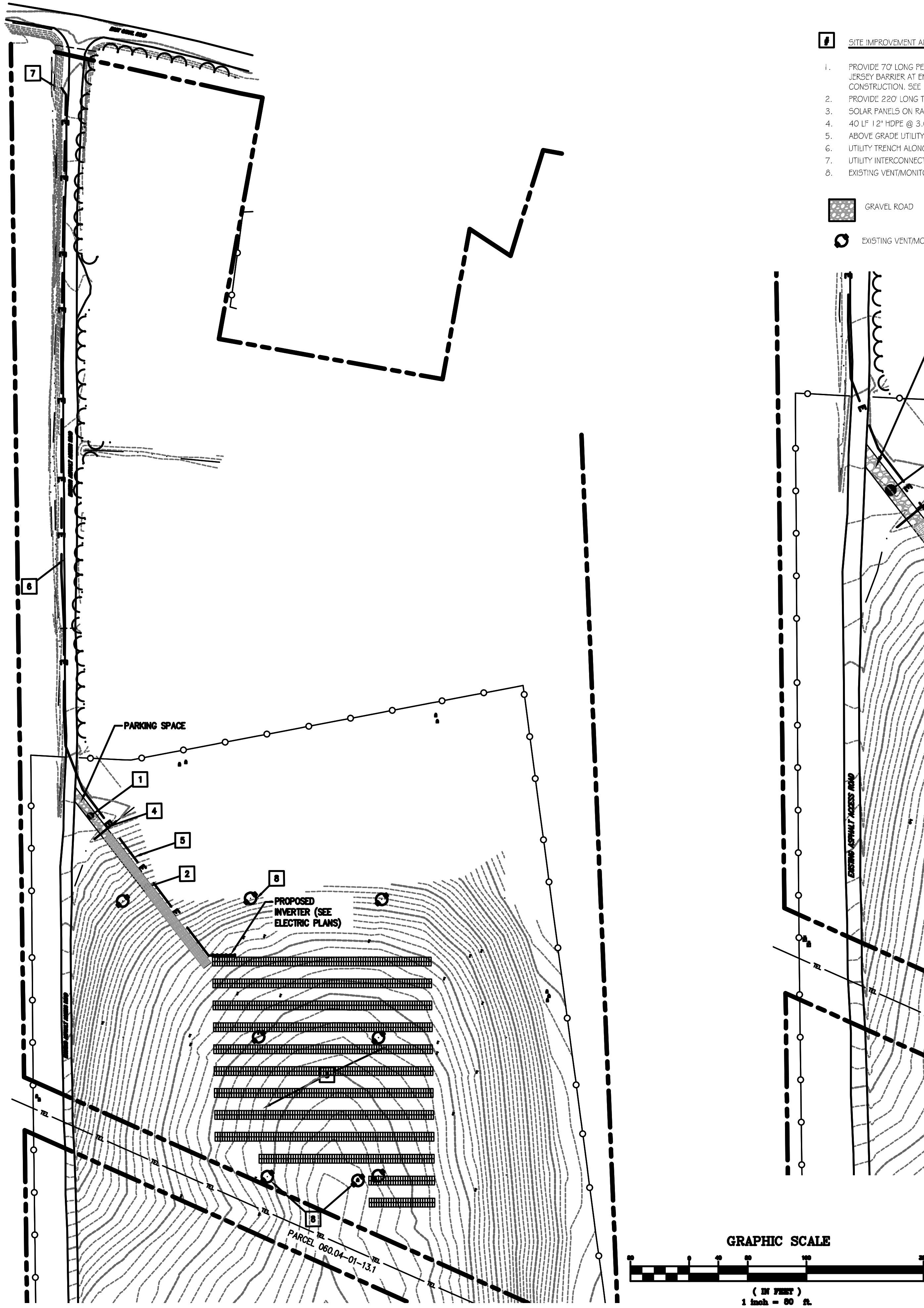
H. Health and Safety Considerations

During the construction and operation of the solar system, site access will be limited to authorized personnel only. The main point of ingress will continue to be fenced off with a locked gate. Areas surrounding the landfill with more of a “natural barrier” not blocked by a fence will be clearly posted with warning signs identifying that there are hazards on the site and only authorized personnel are allowed to enter. Authorized personnel is to include contractors and inspectors required for the construction process, the engineering firm in charge of ongoing monitoring, Village of Brockport personnel performing the ongoing mowing and grounds maintenance and NYSDEC personnel. All electrical infrastructure not inside of the authorized personnel only area will meet standard code requirements for publicly accessible areas. The bulk of electrical infrastructure outside of the authorized personnel only area will be pole mounted making it further inaccessible to the general public.

With the addition of the solar system to the landfill, additional hazards that authorized personnel entering the site should be aware of include:

- Tripping hazards related to equipment, racks, surface mounted conduits and stone coverage that were not previously at the site.
- Solar racking structures immediately adjacent to the access roads
- Access to high voltage PV-Wire rated conductors within the array footprint, although all electrical connections and terminations are made within electrical enclosures, and actual exposure to current is limited to those engaged in the service or repair of the electrical equipment.

APPENDIX A
C2.0 – Site Improvement Plan



SITE IMPROVEMENT AND DEMOLITION NOTES:

1. PROVIDE 70' LONG PERMANENT GRAVEL ROAD. PROVIDE MOVABLE JERSEY BARRIER AT END OF DRIVE UPON COMPLETION OF CONSTRUCTION. SEE DETAIL 1/C3.0.
2. PROVIDE 220' LONG TEMPORARY HDPE MAT ACCESS.
3. SOLAR PANELS ON RACKS BY OTHERS.
4. 40 LF 12" HDPE @ 3.0%. SEE DETAIL 3/C3.0.
5. ABOVE GRADE UTILITY LINE. SEE ELECTRIC PLANS FOR DETAIL.
6. UTILITY TRENCH ALONG EXISTING ACCESS ROAD. SEE DETAIL 3/C3.0.
7. UTILITY INTERCONNECTION. SEE ELECTRIC PLANS.
8. EXISTING VENT/MONITORING WELL TO REMAIN AND BE PROTECTED.

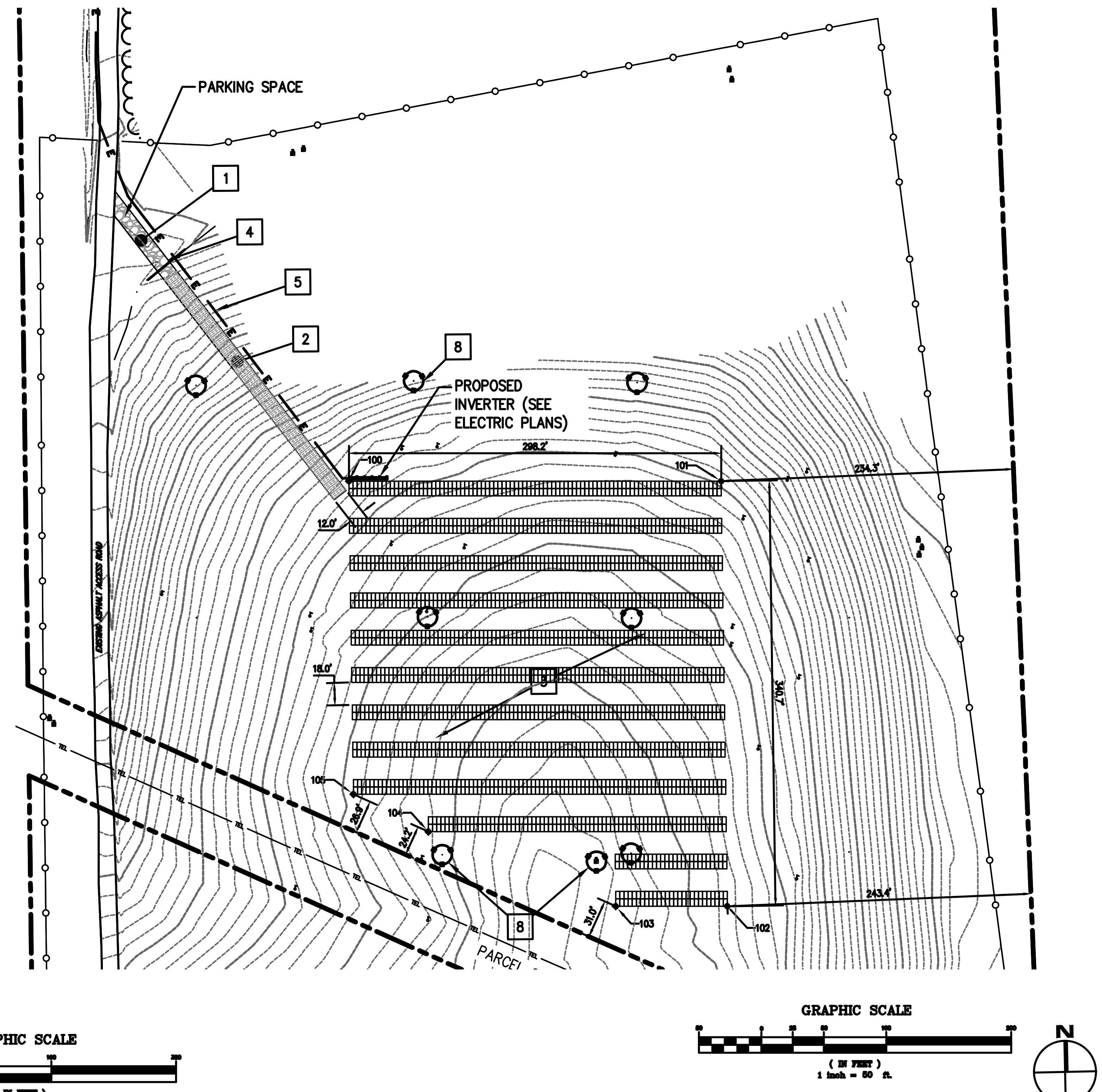
GRAVEL ROAD

HDPE MAT ACCESS

EXISTING VENT/MONITORING WELL

Point Table

Point #	Northing	Easting	Description
100	1170309.35	1327390.46	CORNER OF ARRAY
101	1170309.35	1327688.65	CORNER OF ARRAY
102	1169968.70	1327693.61	CORNER OF ARRAY
103	1169968.70	1327604.18	CORNER OF ARRAY
104	1170028.47	1327454.16	CORNER OF ARRAY
105	1170058.36	1327394.06	CORNER OF ARRAY



STATE OF NEW YORK — LICENSED PROFESSIONAL ENGINEER

DRAWN BY :	AAM
CHECKED BY :	DPY
DATE :	05/29/19
SCALE :	AS SHOWN

Copyright: 2019

#	DATE:	DESCRIPTION OF REVISION:	BY:
1	9/12/19	NYSDEC SUBMITTAL	DPY
2			
3			
4			
5			
6			
7			

"Unauthorized Alteration Or Addition To Plans Bearing A Licensed Engineer's Or Architects Seal, Is A Violation Of Section 7209 Of The New York State Education Law."

HUNT ENGINEERS | ARCHITECTS | SURVEYORS
100 Hunt Center, Horseheads, New York 14845 P: 607-358-1000 F: 607-358-1800
Offices: Rochester | Horseheads | Towanda

SITE IMPROVEMENT & LAYOUT PLAN

BROCKPORT LANDFILL SOLAR ARRAY

GREENSPARK SOLAR

EAST CANAL ROAD, TOWN OF SWEEDEN, NY

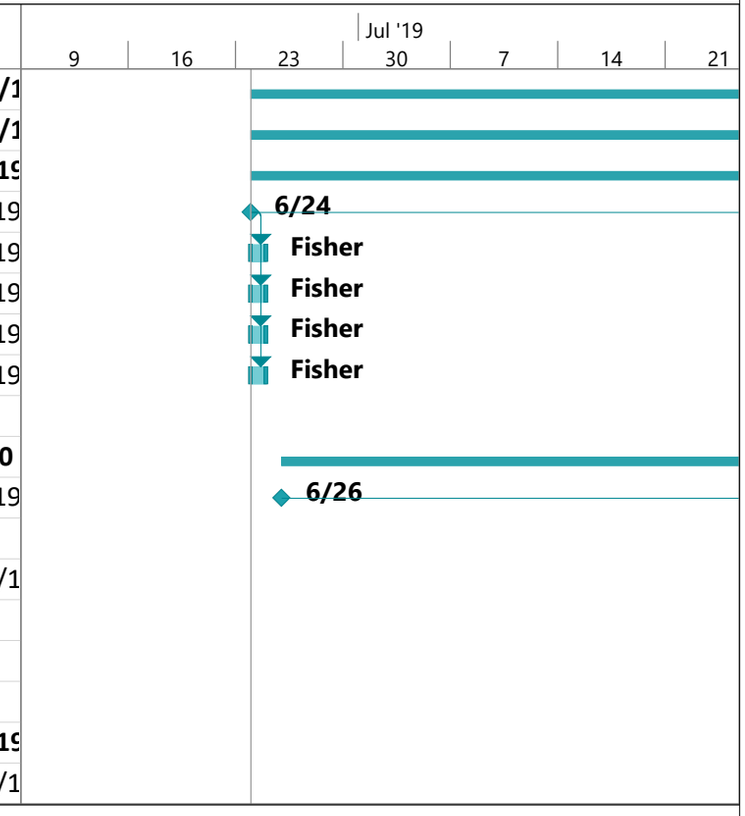
C2.0

PROJECT NO: 3211.002

APPENDIX B
Construction Schedule

GREENSPARK SOLAR

ID	Task Mode	Task Name	Duration	Start	Finish
1		**Village of Brockport Solar 1, LLC**	**89 days**	**Wed 8/21/19**	**Mon 12/23/1**
2		**Construction**	**51 days**	**Mon 10/14/1**	**Mon 12/23/1**
3		**Survey**	**1 day**	**Mon 8/26/19**	**Mon 8/26/19**
4		Mobilization & Orientation	0 days	Mon 6/24/19	Mon 6/24/19
5		Access Road	1 day	Mon 6/24/19	Mon 6/24/19
6		Racking	1 day	Mon 6/24/19	Mon 6/24/19
7		Inverter Racks	1 day	Mon 6/24/19	Mon 6/24/19
8		Lease Boundary	1 day	Mon 6/24/19	Mon 6/24/19
9		DEC Submission	1 day	Fri 9/13/19	Fri 9/13/19
10		**Civil & Site Work**	**67 days**	**Mon 10/14/1**	**Tue 1/14/20**
11		Mobilization & Orientation	0 days	Wed 6/26/19	Wed 6/26/19
12		Access Road Repair	1 day	Fri 12/6/19	Fri 12/6/19
13		Site Mowing/ By Town	1 day	Mon 10/14/1	Mon 10/14/1
14		Agricultural Fence - Gate Repair	1 day	Fri 9/20/19	Fri 9/20/19
15		Tree Planting - NA			
16		Pollinator Seeding & Stabilization/NA			
17		**Mechanical & Structural**	**18 days**	**Mon 10/14/1**	**Wed 11/6/19**
18		Mobilization & Orientation	0 days	Mon 10/14/1	Mon 10/14/1

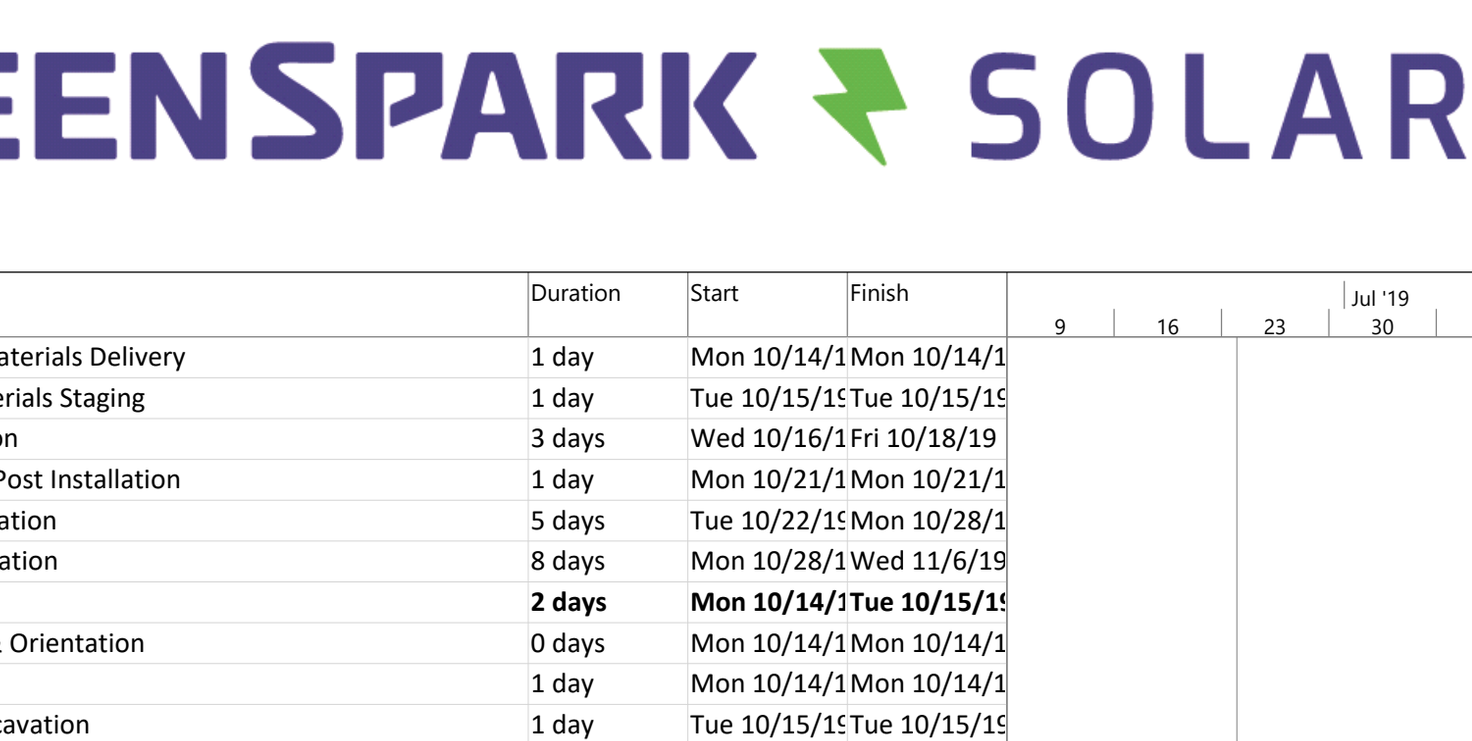


Project: 2019.08.23 Brockport C
Date: Mon 9/16/19

Task	Inactive Task	Manual Summary Rollup	External Milestone
Split	Inactive Milestone	Manual Summary	Deadline
Milestone	Inactive Summary	Start-only	Progress
Summary	Manual Task	Finish-only	Manual Progress
Project Summary	Duration-only	External Tasks	

GREENSPARK SOLAR

ID	Task Mode	Task Name	Duration	Start	Finish
19		RBI Racking Materials Delivery	1 day	Mon 10/14/1	Mon 10/14/1
20		Layout & Materials Staging	1 day	Tue 10/15/19	Tue 10/15/19
21		Post Installation	3 days	Wed 10/16/1	Fri 10/18/19
22		Inverter Rack Post Installation	1 day	Mon 10/21/1	Mon 10/21/1
23		Racking Installation	5 days	Tue 10/22/19	Mon 10/28/1
24		Module Installation	8 days	Mon 10/28/1	Wed 11/6/19
25		**Electrical Civil**	**2 days**	**Mon 10/14/1**	**Tue 10/15/19**
26		Mobilization & Orientation	0 days	Mon 10/14/1	Mon 10/14/1
27		DC Excavation	1 day	Mon 10/14/1	Mon 10/14/1
28		AC/Service Excavation	1 day	Tue 10/15/19	Tue 10/15/19
29		Transformer Vault Installation	0 days	Wed 10/16/1	Wed 10/16/1
30		MV Excavation	0 days	Mon 9/30/19	Mon 9/30/19
31		**Electrical**	**15 days**	**Mon 10/28/1**	**Fri 11/15/19**
32		Mobilization & Orientation	1 day	Mon 10/28/1	Mon 10/28/1
33		Inverter Rack Build Out	3 days	Tue 10/22/19	Thu 10/24/19
34		DC Conduits	5 days	Tue 10/8/19	Mon 10/14/1
35		DC Wire Pulls	5 days	Tue 10/15/19	Mon 10/21/1
36		Module Series Connection	2 days	Thu 11/7/19	Fri 11/8/19

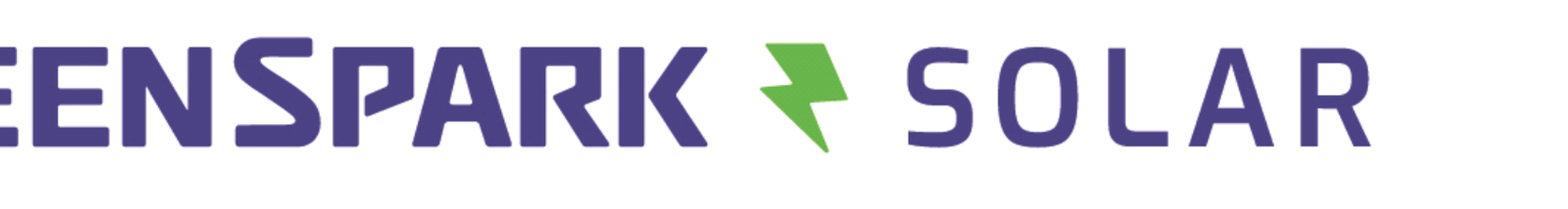


Project: 2019.08.23 Brockport C
Date: Mon 9/16/19

Task
Split
Milestone
Summary
Project Summary
Inactive Task
Inactive Milestone
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only
Finish-only
External Tasks
External Milestone
Deadline
Progress
Manual Progress

GREENSPARK SOLAR

ID	Task Mode	Task Name	Duration	Start	Finish
37		DC Wire Management	3 days	Mon 11/11/1	Wed 11/13/1
38		DC Terminations (Field)	2 days	Thu 11/14/19	Fri 11/15/19
39		Inverters Installed	3 days	Fri 10/25/19	Tue 10/29/19
40		DC Terminations (Inverters)	2 days	Tue 10/22/19	Wed 10/23/1
41		AC Conduits	3 days	Fri 10/11/19	Tue 10/15/19
42		AC Wire Pulls	2 days	Wed 10/16/1	Thu 10/17/19
43		AC Terminations (Inverters)	2 days	Fri 10/18/19	Mon 10/21/1
44		Panelboard Installed	2 days	Wed 10/30/1	Thu 10/31/19
45		AC Terminations (Combiner Panel)	1 day	Fri 10/18/19	Fri 10/18/19
46		Service Conduits	1 day	Fri 10/11/19	Fri 10/11/19
47		Service Wire Pulled	1 day	Mon 10/14/1	Mon 10/14/1
48		Service Terminations (Combiner Panel)	1 day	Tue 10/15/19	Tue 10/15/19
49		Disconnect Installed	2 days	Mon 11/4/19	Tue 11/5/19
50		Service Terminations (Disconnect)	1 day	Wed 11/6/19	Wed 11/6/19
51		MV Direct Burry Wire	5 days	Mon 8/5/19	Fri 8/9/19
52		MV Terminations (Disconnect)	1 day	Mon 8/12/19	Mon 8/12/19
53		DAS & Weather Station	4 days	Thu 11/7/19	Tue 11/12/19
54		**Utility**	**6 days**	**Mon 11/18/1**	**Mon 11/25/1**



Project: 2019.08.23 Brockport C
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Task
Split
Milestone
Summary
Project Summary
Inactive Task
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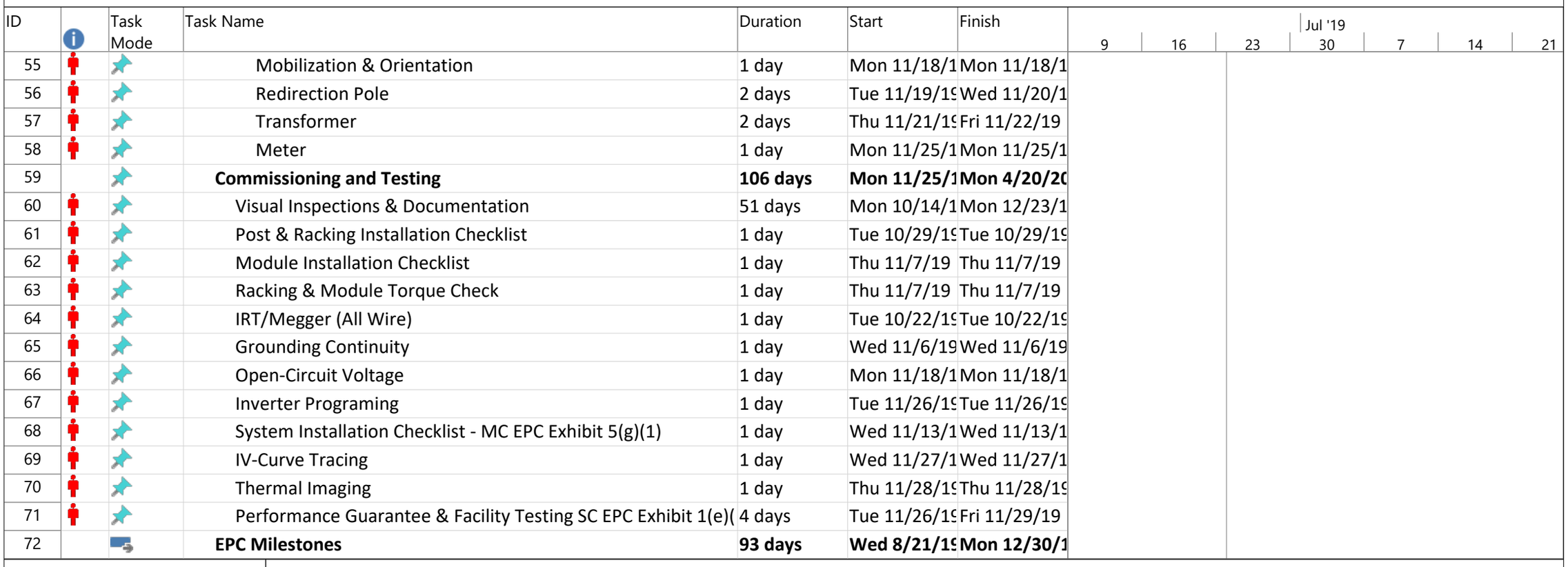
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only
Finish-only
External Tasks
External Milestone
Deadline
Progress
Manual Progress

GREENSPARK SOLAR

ID	Task Mode	Task Name	Duration	Start	Finish
55		Mobilization & Orientation	1 day	Mon 11/18/1	Mon 11/18/1
56		Redirection Pole	2 days	Tue 11/19/19	Wed 11/20/1
57		Transformer	2 days	Thu 11/21/19	Fri 11/22/19
58		Meter	1 day	Mon 11/25/1	Mon 11/25/1
59		**Commissioning and Testing**	**106 days**	**Mon 11/25/1**	**Mon 4/20/20**
60		Visual Inspections & Documentation	51 days	Mon 10/14/1	Mon 12/23/1
61		Post & Racking Installation Checklist	1 day	Tue 10/29/19	Tue 10/29/19
62		Module Installation Checklist	1 day	Thu 11/7/19	Thu 11/7/19
63		Racking & Module Torque Check	1 day	Thu 11/7/19	Thu 11/7/19
64		IRT/Megger (All Wire)	1 day	Tue 10/22/19	Tue 10/22/19
65		Grounding Continuity	1 day	Wed 11/6/19	Wed 11/6/19
66		Open-Circuit Voltage	1 day	Mon 11/18/1	Mon 11/18/1
67		Inverter Programing	1 day	Tue 11/26/19	Tue 11/26/19
68		System Installation Checklist - MC EPC Exhibit 5(g)(1)	1 day	Wed 11/13/1	Wed 11/13/1
69		IV-Curve Tracing	1 day	Wed 11/27/1	Wed 11/27/1
70		Thermal Imaging	1 day	Thu 11/28/19	Thu 11/28/19
71		Performance Guarantee & Facility Testing SC EPC Exhibit 1(e)(	4 days	Tue 11/26/19	Fri 11/29/19
72		**EPC Milestones**	**93 days**	**Wed 8/21/19**	**Mon 12/30/1**

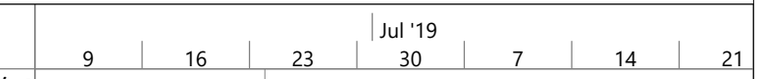


Project: 2019.08.23 Brockport C
Date: Mon 9/16/19

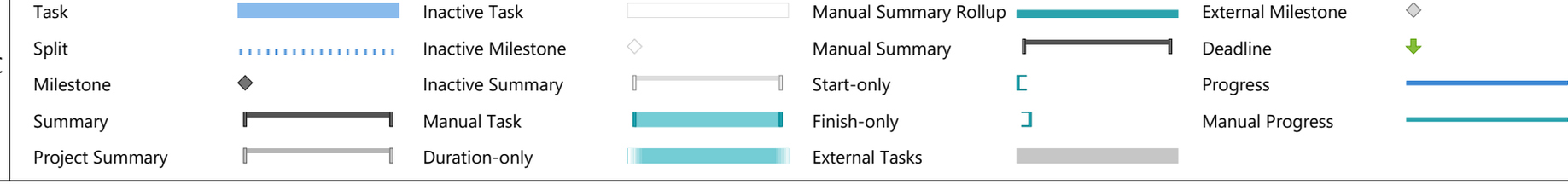
Task
Split
Milestone
Summary
Project Summary
Inactive Task
Inactive Milestone
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only
Finish-only
External Tasks
External Milestone
Deadline
Progress
Manual Progress

GREENSPARK SOLAR

ID	Task Mode	Task Name	Duration	Start	Finish
73		Notice to Proceed	0 days	Wed 8/21/19	Wed 8/21/19
74		Equipment Order	0 days	Mon 9/16/19	Mon 9/16/19
75		Mechanical Completion	0 days	Fri 12/6/19	Fri 12/6/19
76		Substantial Completion	0 days	Mon 12/23/1	Mon 12/23/1
77		Final Completion	0 days	Mon 12/30/1	Mon 12/30/1
78		**Major Materials Deliveries**	**45 days**	**Thu 9/5/19**	**Wed 11/6/19**
79		RBI Racking	0 days	Mon 10/14/1	Mon 10/14/1
80		Inverters	0 days	Mon 10/7/19	Mon 10/7/19
81		Modules	0 days	Thu 9/5/19	Thu 9/5/19
82		Transformer Vault	0 days	Mon 9/30/19	Mon 9/30/19
83		Data Acquisition System	0 days	Mon 10/28/1	Mon 10/28/1
84		Transformer	0 days	Mon 11/4/19	Mon 11/4/19
85		**Inspections & Approvals**	**20 days**	**Thu 11/14/1**	**Wed 12/11/1**
86		Electrical Service Inspection	0 days	Mon 11/18/1	Mon 11/18/1
87		Electrical PV Inspection	0 days	Mon 11/18/1	Mon 11/18/1
88		Owners Representative Inspection	0 days	Thu 11/14/1	Thu 11/14/1
89		Witness Test	10 days	Mon 11/18/1	Fri 11/29/19
90		Permission to Operate	5 days	Mon 12/2/19	Fri 12/6/19



Project: 2019.08.23 Brockport C
Date: Mon 9/16/19



APPENDIX C
Geotechnical Evaluation

Foundation Design, P.C.
SOIL • BEDROCK • GROUNDWATER

September 10, 2019

Hunt Engineers and Architects
4 Commercial Street
Suite 300
Rochester, New York 14614

Attention: Daniel P. Yanosh, Jr., P.E.

Reference: Solar Panel Array Foundations
6791 East Canal Road, Brockport New York
Geotechnical Review/Consultation, 4591.0

Dear Mr. Yanosh:

This letter summarizes our review/consultation concerning the referenced solar array project. The project will consist of installing twelve rows of solar panels across the north end of the landfill surface. The intention of the design, from a geotechnical standpoint, is to have very little additional impact on the landfill such that the liner system is not compromised. Keep in mind that the following analysis and recommendations are intended to limit the risk of significant settlement. We cannot predict with normal engineering accuracy how the landfill material will behave under new loads, or with time, as decomposition occurs.

We base this report on our review of available topographic and geologic mapping; Malcolm Pirnie *Brockport Landfill-Site No. 8-28-038 Post-Closure Monitoring and Maintenance Operations Manual* dated December 2000 Revised April 2001; a site walk in the Spring of 2019; and consultation with your staff. We have not seen any as-built records for the construction nor have we performed any subsurface exploration. We make no judgments about specific actual/installed conditions. Hunt retained Foundation Design, P.C. to provide the geotechnical services outlined in our

January 15, 2019 *Geotechnical Services Proposal, P4198.0R.* We intend the recommendations outlined in this report for use on this project exclusively.

The Brockport Landfill is located at 6791 East Canal Road in Brockport, New York. The Erie Canal lies north of East Canal Road, a Town brush dump site then railroad tracks lie to the south. Otis Creek is within the landfill bounds. Undeveloped land abuts the site to the east and west. Residential property lies to the north of the planned array. Overall, the landfill occupies about 36 acres. The solar array will be situated on the north end of the now closed landfill mound. The solar array will consist of twelve rows of solar panels lying in an east-west direction. Monitoring wells and a utility easement are within/near the development area.

Typically, solar arrays consist of solar panels mounted on a system of steel pipes that transfer the load to the ground surface in two rows of posts. Rather than extending the posts into the subsoil at the landfill, these loads will be supported/resisted by using a set of ballast trays attached to the 'outboard' side of the racks. The concrete ballast will be constructed of trays or baskets 9.5 feet long by 2.08 feet wide by 1.5 feet thick. Total loads are estimated at 0.57 ksf. These trays have a tributary area of about 19.76 square feet.

Based on the landfill closure plan, we believe a typical subsurface profile at the solar array location consists of 6 inches of topsoil over 18 inches of a barrier protection layer, a 40-mil low density geomembrane, landfill waste of varying thickness, native moraine deposits consisting of silt with portions of clay, sand and gravel, glacial till then bedrock. From Malcolm Pirnie's November 1, 1995 boring log LW-1 (elevation 561.39), the loose to firm waste fill is mixed with earth and has inconsistent N-values ranging from 6 to 20. The N-values within the native soils at this boring ranged from 15 to 20 and are described as moist to wet below elevation 535.6. The

lower, nearby 1995 borings indicate the bedrock is within 5 to 10 feet of the ground surface. Documentation of the installation of the landfill cap was unavailable to our office at the time of this report.

We reviewed two types of potential distress from the new construction. The first was localized and focused on the impact of the new surface load on the liner. The load on the liner is currently on the order of 2 psi and it is somewhat uniform. Adding the arrays will add approximately 1.5 psi of load at the liner elevation beneath the ballast trays. This value is well below the specified tensile strength of the liner. Again, this analysis does not account for the actual strength of the liner at this time, it addresses the 'designed condition'.

The second type of distress results from the reaction of the underlying landfill material. The landfill material currently experiences a surface load on the order of 2 psi at its upper elevation. Adding the solar array (and conservatively neglecting lateral load distribution), this value will increase to on the order of 4 psi or less than 600 psf. At a depth of ten feet, this additional load will be well distributed and decrease to approximately the same load as is currently present.

Detailed profiles of the landfill material are not available. The landfill material is on the order of twenty feet in thickness. Comparison of the 'as-built' and current topography indicates that the landfill has not undergone any significant settlement since it was capped in the 1990's. This leads us to expect that the landfill material is somewhat well compacted/consolidated and believe that it has some inherent stability at this time. Conditions in fill can vary dramatically, this judgment is based on current observations.

Based on this history, we expect that settlements from the new arrays will be fairly modest. While we do not want to imply precision to this value, we would be surprised if a large percentage of the arrays settled two inches in comparison to the adjacent landfill cap surface. For design purposes, utilize an allowable soil/cap bearing capacity of 600 psf for static loads. Recognize that some settlement will occur over time and so the solar arrays need to be adjustable in height/pitch and that the electrical cables between them need to be the same. We suggest a monitoring program during the first few years of operation to help track the amount of settlement that occurs and prevent this from becoming excessive in between servicing.

The NYS Building Code identifies various seismic design criteria for this project. We recommend using a Site Classification of D (Stiff Soil Profile). Based on the ASCE/SEI 7-16 guidelines, we recommend using the following seismic design parameters.

Table No. 1 – Seismic Design Parameters

Spectral Response Acceleration		Soil Factors		Design Spectral Response Acceleration	
S_S	S_1	S_{MS}	S_{M1}	S_{DS}	S_{D1}
0.168g	0.048g	0.268g	0.115g	0.179g	0.077g

We recommend that the liner/cap be protected from construction traffic. We recommend installing a gravel road consisting of a layer of Tensar BX 1100 geogrid and then eight inches of crusher-run stone. Some type of temporary mat system with similar stiffness/integrity would also be acceptable. Use this for the vehicular traffic anticipated from the bulk of the construction operations. Furthermore, limit construction equipment operations to avoid excessive speeds, abrupt starts/stops and focused, repetitive sharp turns. We recognize that construction loads may exceed the design values for short durations. For planning purposes we recommend limiting

construction loads to 7 psi (1,000 psf). Proactively review ongoing cover performance during construction to check for signs of settlement or instability.

Attached is a Geoprofessional Business Council paper entitled *Important Information about your Geotechnical Engineering Report*. This paper describes many of the risks inherent in geotechnical engineering and how, in light of those risks, we intend this evaluation to be used. We will continue to work cooperatively with the project principals and interested parties to achieve win/win solutions that benefit all.

This concludes our thoughts and recommendations on the project. Again, we have applied general geotechnical knowledge and principals to a non-standard set of conditions. Variation in field performance (from our predictions) should be expected.

Very truly yours,

FOUNDATION DESIGN, P.C.

James M. Baker, P.E.
President

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled.* No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be*, and, in general, *if you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying it. A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

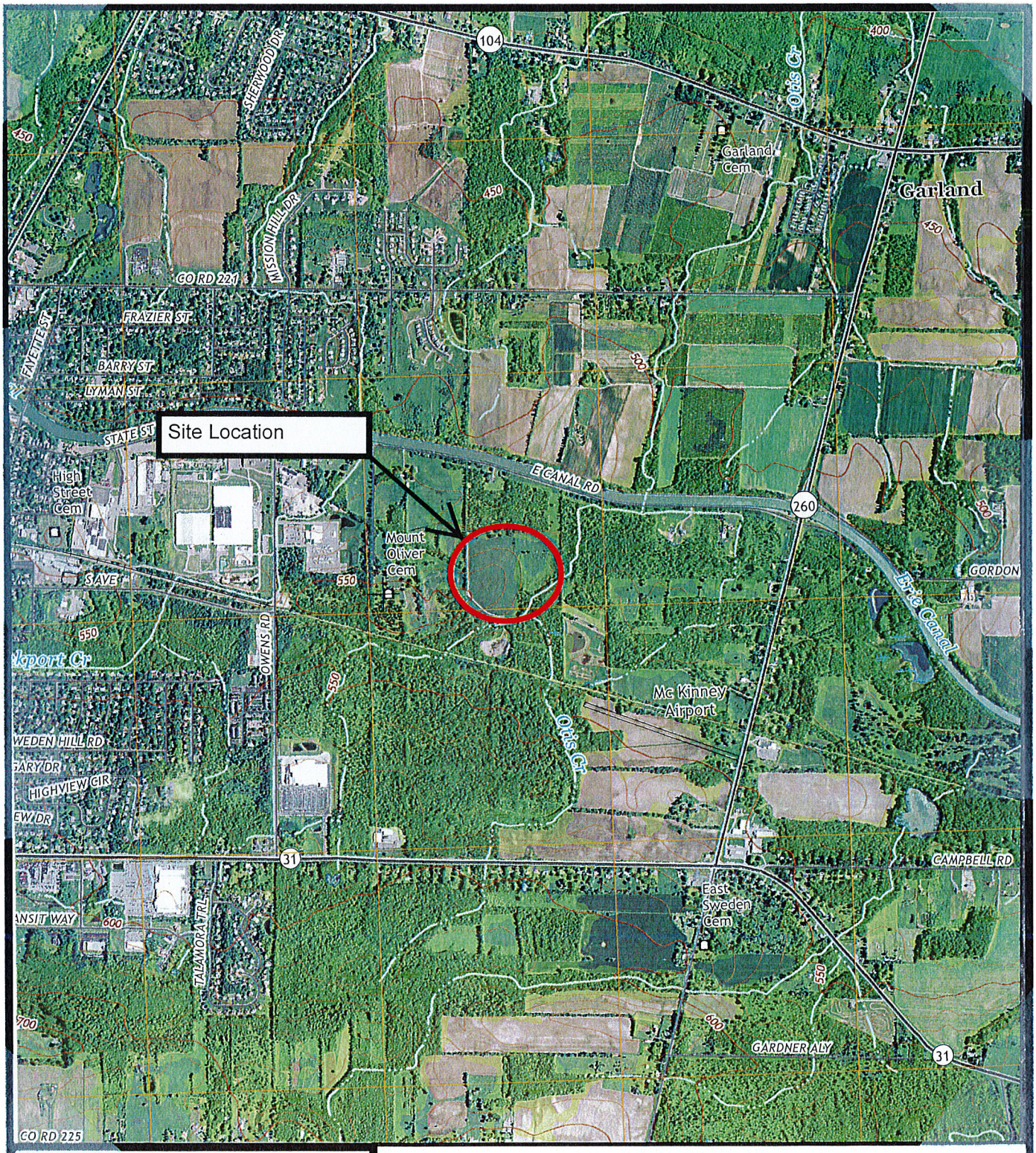
The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures*. If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old.*

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration.*** Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org



Foundation Design, P.C.

46A Sager Drive
Rochester, New York 14607
Phone (585) 458-0824
FAX (585) 458-3323

Brockport Solar Array
6791 East Canal Road, Brockport NY
General Location Plan
Adapted from: USGS topographic mapping
Brockport Quadrangle dated 2016

CHECKED BY:	JMB	Scale 1"= 2,000'	DATE: 09-09-19
DRAWN BY:	AMV		JOB NO.:4591.0

APPENDIX D
Equipment Loading Calculations

HUNT ENGINEERS | ARCHITECTS | SURVEYORS
hunt-eas.com
4 Commercial Street, Suite 300
Rochester, NY 14614-1008
100 Hunt Center
Horseheads, NY 14845-1019
1 Elizabeth Street, Suite 12
Towanda, PA 18848-1629

JOB BROCKPORT LANDFILL SOLAR
SHEET NO 1 OF 1
CALCULATED BY DPM DATE 10/15/19
CHECKED BY _____ DATE _____
SCALE _____

EQUIPMENT LOADING CALCULATIONS

KUBOTA SVL95-2S

TRACK SURFACE AREA = 16.13 SF

OPERATING WEIGHT = 11,574 lb ⇒ 717.6 PSF

LOADED W/ CONC. BALLAST = 17,090 lb ⇒ 1,059.5 PSF (SINGLE MACHINE)
(5,516 lb)
⇒ 529.8 PSF * (2 MACHINES)

LOADED W/ CRUSHED STONE = 14,574 lb ⇒ 903.5 PSF
(25CF = 3,000 lb)

* DISTRIBUTE LOAD EVENLY BETWEEN TWO (2) MACHINES.

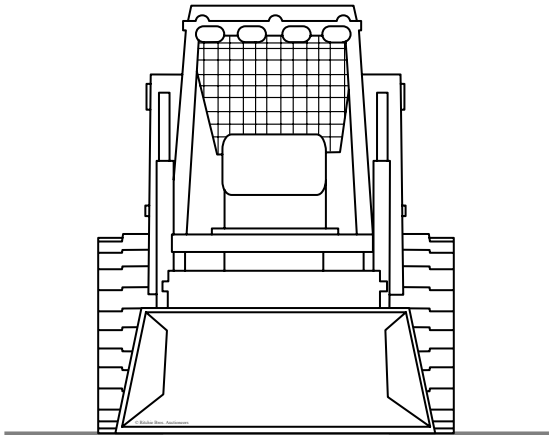
RITCHIE Specs

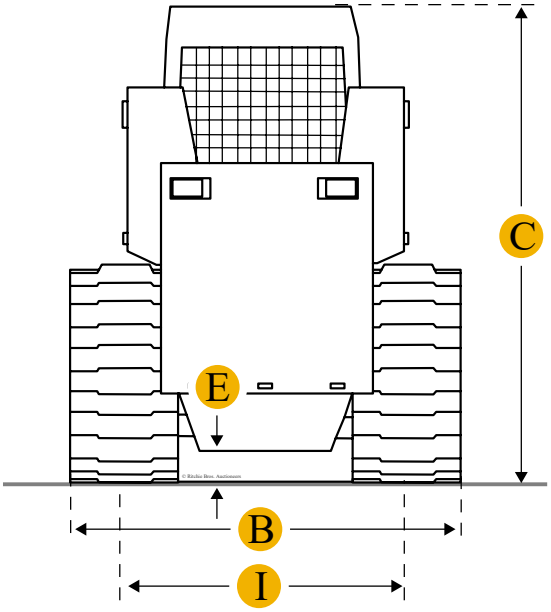
Search over equipment specs Search

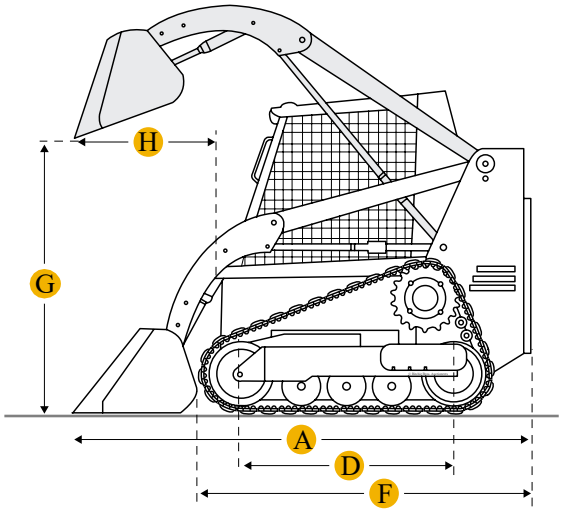
Equipment types | Manufacturers

Home

Kubota SVL95-2SHFC Multi Terrain Loader







Units Imperial | Metric

Dimensions

Dimensions

B	**Width Over Tracks**	1.48 ft in
C	**Height to Top of Cab**	6.95 ft in
E	**Ground Clearance**	11.54 in
D	**Length of Track on Ground**	5.47 ft in

Specifications

Engine

Fuel	Diesel
EPA	Tier 4 Final
Air filter type	Dual element
Cold Start aid	Standard
Number of Cylinders	4
Cooling method	Liquid
Engine Make	Kubota
Engine Model	V3800CR-TIE F4
Engine Type	Diesel
Injection pump type	Direct
Gross Power	96.4 hp
Power Measured @	2400 rpm
Displacement	230 cu in
Bore	4 in
Stroke	4.8 in
Oil Filter	Spin-on type
Model Name	SVL95-2SHFC
Aspiration	Turbocharged

Operational

Operating Weight	11574.1 lb
Fuel Capacity	28.8 gal
Hydraulic System Fluid Capacity	10.1 gal

Electrical

Lighting	2 Front & rear working
Block heater	Optional

Transmission

Maximum traction force	12178 lb
Ground Bearing Pressure	4.5 psi
Max Travel Speed	7.3 mph
Min Travel Speed	5 mph

Loader

Lift arm path	Vertical
Tipping Angle	3200 degrees
Bucket Breakout Force	7961 lb

Hydraulic

Maximum operating pressure	3553 psi
Pump Flow	40 gal/min

Brakes

Parking brake	Wet disc

Dimensions

Overall width	6.5 ft in
Angle of departure	31 degrees
Length of Track on Ground	5.5 ft in
Overall Length	154.7 in
Width Over Tracks	1.5 ft in
Height to Top of Cab	7 ft in
Ground Clearance	11.6 in

Compare similar models

Manufacturer / Model	Operating Weight
John Deere 329E	11510.4 lb
Terex PT100G	11462 lb
JCB 320T	11569.9 lb

Compare

Find Kubota SVL95-2SHFC Multi Terrain Loader for Sale

2018 KUBOTA SVL75-2 2 Spd Multi Terrain Loader

21

WESTLOCK, AB

See Kubota Multi Terrain Loader for sale on rbauction.com

See Kubota Multi Terrain Loader for sale on ironplanet.com

See Kubota Multi Terrain Loader for sale on mascus.com

`

Company

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rbassetsolutions.com

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Hyundai HL780-3A Wheel Loader

Volvo L90D Wheel Loader

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Bobcat S175 Skid Steer Loader

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