CHEBOYGAN COUNTY PLANNING COMMISSION

870 SOUTH MAIN ST. ▪ PO BOX 70 ▪ CHEBOYGAN, MI 49721
PHONE: (231) 627-8489 ▪ FAX: (231) 627-3646

CHEBOYGAN COUNTY PLANNING COMMISSION MEETING
WEDNESDAY, MARCH 18, 2020 AT 7:00 PM
ROOM 135 – COMMISSIONERS ROOM
CHEBOYGAN COUNTY BUILDING, 870 S. MAIN ST., CHEBOYGAN, MI 49721

AGENDA

CALL TO ORDER

PLEDGE OF ALLEGIANCE

ROLL CALL

APPROVAL OF AGENDA

APPROVAL OF MINUTES

SCHEDULED PUBLIC HEARINGS

1. **Orion Renewable Energy Group, LLC** – The applicant requests a Special Use Permit for a Level 3 Solar Energy System – Photovoltaic (SES-PV), per Sections 9.3.27 and 10.3.16 of the Zoning Ordinance for construction of a "solar farm"/utility-scale solar energy generating facility in Grant Township. The subject properties are zoned Agriculture and Forestry Management (M-AF) and Lake and Stream Protection (P-LS) and are located approximately 13 miles southeast of the City of Cheboygan, along N. Black River Road, south of Twin Lakes Road and bounded by Ross Road to the south and Page Road to the north, Chamberlin Road to the east and Trudeau Road to the west. The subject properties are in sections 4, 5, 6, 8 and 9 and encompass approximately 1,572 acres on 31 parcels, tax parcel id numbers:

1. 151-009-200-001-05
2. 151-006-100-004-00
3. 151-006-300-001-02
4. 151-006-100-005-00
5. 151-006-200-003-00
6. 151-006-200-005-00
7. 151-006-400-001-05
8. 151-008-400-003-00
9. 151-008-400-004-00
10. 151-008-100-004-00
11. 151-008-300-006-00
12. 151-008-300-007-00
13. 151-008-400-001-00
14. 151-008-200-001-02
15. 151-009-300-001-00
16. 151-009-100-003-00
17. 151-009-300-004-00
18. 151-009-400-004-00
19. 151-009-400-003-00
20. 151-009-200-001-07
21. 151-009-300-003-00
22. 151-009-100-004-03
23. 151-009-400-002-00
24. 151-009-200-002-00
25. 151-009-400-001-00
26. 151-009-200-003-00
27. 151-004-401-001-00
28. 151-005-100-001-00
29. 151-005-300-004-00
30. 151-005-300-008-00
31. 151-006-200-002-00

UNFINISHED BUSINESS

NEW BUSINESS

STAFF REPORT WITH UPDATE ON MASTER PLAN REVISION

PLANNING COMMISSION COMMENTS

PUBLIC COMMENTS

ADJOURNMENT

CHEBOYGAN COUNTY PLANNING COMMISSION

870 SOUTH MAIN ST., ROOM 103 ▪ PO BOX 70 ▪ CHEBOYGAN, MI 49721
PHONE: (231)627-8489 ▪ TDD: (800)649-3777

CHEBOYGAN COUNTY PLANNING COMMISSION MEETING & PUBLIC HEARING
WEDNESDAY, MARCH 4, 2020 AT 7:00 P.M.
ROOM 135 – COMMISSIONER'S ROOM - CHEBOYGAN COUNTY BUILDING

PRESENT: Bartlett, Freese, Kavanaugh, Borowicz, Croft, Ostwald, Lyon, Johnson, Delana

ABSENT: None

STAFF: Mike Turisk, Jen Merk

GUESTS: Eric Boyd, Cal Gouine, John Moore, Bob Lyon, Russell Crawford, Cheryl Crawford

The meeting was called to order by Chairperson Croft at 7:00pm.

PLEDGE OF ALLEGIANCE
Chairperson Croft led the Pledge of Allegiance.

APPROVAL OF AGENDA
The meeting agenda was presented. **Motion** by Mr. Borowicz, seconded by Mr. Kavanaugh, to approve the agenda as presented. Motion carried unanimously.

APPROVAL OF MINUTES
The February 5, 2020 Planning Commission minutes were presented. **Motion** by Mr. Kavanaugh, seconded by Ms. Lyon, to approve the meeting minutes as presented. Motion carried unanimously.

The February 19, 2020 Planning Commission minutes were presented. **Motion** by Mr. Borowicz, seconded by Ms. Lyon, to approve the meeting minutes as presented. Motion carried unanimously.

PUBLIC HEARING AND ACTION ON REQUESTS
No public hearings were scheduled.

UNFINISHED BUSINESS
Continued discussion regarding proposed Zoning Ordinance Amendment #155 relative to Nonconforming Buildings or Structures, Properties and Uses.
Mr. Turisk stated that a revised copy of Amendment #155 was distributed to the Planning Commission. Mr. Turisk stated that minor changes were made to the amendment based on a discussion with legal counsel. Mr. Turisk stated that the primary effort is to provide clarification and ease the standards for those wishing to maintain, convey or develop a nonconforming lot, continue a nonconforming use or expand a nonconforming building, etc. Mr. Turisk referred to Section 22.3.A and stated that the term "nonbearing" was deleted. Mr. Turisk referred to Section 22.3.E and stated that "or the cost of replacement" was added to the first sentence and "or replaced" was added to the second sentence. Mr. Borowicz stated that the cost to replace will automatically exceed 50%. Mr. Turisk stated that he will discuss this with legal counsel. Mr. Turisk stated that Section F was deleted because it is redundant. Mr. Freese noted that it is already included in Section D3. Mr. Turisk read and reviewed Sections 22.3.A and 22.3.D. Mr. Turisk stated that Section 22.3.D eliminates the need to submit a dimensional variance application for an addition to an existing structure that already encroaches in the setback so long as it does not encroach any further. Mr. Turisk stated that such an addition would maintain the same degree of nonconformity as already existed. Mr. Turisk stated that this development scenario would be approved as part of a zoning permit for an addition. Mr. Borowicz referred to Section 22.3.D and stated that this increases the extent of the nonconformity. Mr. Turisk stated that this situation would not increase the degree of nonconformity but it would increase the extent of the nonconformity. Mr. Turisk asked if the Planning Commission would like to keep 22.3.D.1 and 22.3.D.2 and delete 22.3.D.3. Mr. Freese stated that this is one of the reasons he requested that Article 22 be revised. Mr. Freese stated that the Zoning Board of Appeals has routinely granted variances in these types of situations. Discussion was held regarding Section 22.3.D.3 being deleted which would eliminate the need to apply for a variance. Mr. Freese stated that the nonconformity cannot be corrected whether this is allowed or not allowed. Mr. Kavanaugh stated that it could make it worse for someone who lives

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next door and had a view of a lake. Mr. Borowicz stated that it would be a problem for a lakefront setback if someone wants to widen an existing porch and prohibit the view of the lake. Mr. Borowicz and Mr. Kavanaugh agreed that this would only be an issue in the Lake and Stream Protection Zoning District. Mr. Delana stated an exception can be made for the Lake and Stream Protection Zoning District. Discussion was held regarding diagrams presented by Mr. Turisk. Mr. Freese suggested revising Section 22.3.D.3 be applicable for the front setback only in the Lake and Stream Protection Zoning District and Natural Rivers Protection Zoning District.

Mr. Turisk referred to Section 22.3.C and noted that if a nonconforming building that contains a nonconforming use is damaged or destroyed then this section would limit a rebuild to its original configuration and on its original foundation. Mr. Turisk asked if property owners should only be allowed to build to the original footprint or should they be allowed to expand under Section 22.3.D. Mr. Borowicz stated if a building is voluntarily removed by the property owner then the new building should conform to the Zoning Ordinance. Mr. Borowicz stated that it is different if the building is destroyed. Mr. Kavanaugh agreed with Mr. Borowicz. Mr. Freese stated that the property owner should not be able to rebuild if the structure is totally destroyed or voluntarily removed. Mr. Freese stated that it should be allowed to be rebuilt only if it is in compliance. Mr. Turisk stated this would be an opportunity to gain conformance. Mr. Delana noted that a basement may not be damaged. Discussion was held. Mr. Borowicz stated that if the building is voluntarily removed then the new building should conform to the Zoning Ordinance. Mr. Freese stated that if the building is completely destroyed, then the new building should conform to the Zoning Ordinance. Mr. Kavanaugh agreed with Mr. Freese.

Mr. Turisk referred to Section 22.3.F and stated that this section addresses replacing a nonconforming building or structure with another nonconforming building or structure. Mr. Turisk stated that this scenario would need to be approved by the Zoning Board of Appeals. Mr. Turisk stated that this would limit the opportunity to replace a particular nonconformity with a new nonconformity. Mr. Freese stated that actually addresses the use of the building or structure. Mr. Delana noted that "building or structure" should be deleted from all of Section 22.3.F. Mr. Turisk reviewed the process and the standards for the Zoning Board of Appeals to review the proposed new nonconforming use. Mr. Borowicz referred to 22.3.F.1.a and suggested replacing this section with "The proposed new nonconforming use, building, or structure would not create a greater nonconformity than previously existed on the property prior to the requested replacement." Mr. Freese stated that it could be a new use that is not listed in the Zoning Ordinance. Mr. Delana suggested changing "nonconformity" to "nonconforming use". Ms. Johnson and Mr. Borowicz stated that Section 22.3.F.1.a can be deleted based on the wording of Section 22.3.F.1.c. Ms. Johnson and Mr. Borowicz agreed that Section 22.3.F.1 pertains to nonconforming uses and not nonconforming buildings or structures. Mr. Freese stated that the point of Section 22.3.F is to allow a new nonconforming use that is better than the old nonconforming use. It was decided that Section 22.3.F.a is to be deleted and the Planning Commission will review Section 22.3.F at a future meeting.

Mr. Turisk referred to Section 22.4.A and noted that this section states that the owner of nonconforming lots may hold, develop, sell or convey them as separate nonconforming lots of record. Mr. Turisk stated that the nonconforming lots of record may be developed with the caveat that development comply with the Zoning Ordinance. Mr. Turisk noted that typically these types of lots are small and there are significant lot constraints due to their small size. Mr. Turisk stated that this is currently allowed as long as they comply with minimum setback requirements. Mr. Turisk stated that this section codifies the policy. Mr. Turisk read from Section 22.4.A "Provided, however, no dimensional variance shall be granted for such lot or parcel when the need for that dimensional variance would be eliminated by combining those contiguous lots, parcels, or portions of lots or parcels as an undivided lot or parcel for the purposes of this Ordinance under Subsection B, below." Mr. Turisk stated that Section 22.4.B clarifies that if combining nonconforming lots of record results in a conforming lot then that conforming lot may be developed as any other conforming lot in Cheboygan County and that development would need to comply with the minimum applicable dimensional requirements, namely building setbacks as measured from the exterior lot lines of the new lot. Mr. Turisk stated that if combining nonconforming lots of record does not create a conforming lot, then the newly created lot may be developed as any other nonconforming lot in Cheboygan County. Mr. Borowicz asked if he owns three lots and decides to sell all three lots, will the new owners be restricted. Mr. Freese stated no they are not restricted as they are individual lots. Ms. Johnson stated that it becomes a problem when you decide to develop the lot. Mr. Freese stated that if there are two lots that are 50ft. wide and a setback variance was requested for the center lot line, the Zoning Board of Appeals would look at this as if it was self-created because the applicant has the means to eliminate the need. Mr. Freese stated that this is one of the five standards that the Zoning Board of Appeals reviews. Ms. Johnson noted that many subdivisions in Cheboygan County have established lots that are 40ft., 50ft. and 60ft. wide. Ms. Johnson stated that even in these subdivisions, the property owners would have to comply. Ms. Croft stated that there are many subdivisions that were platted in the early 1900's and the lots are assumed to be legal lots. Ms. Croft stated that this amendment is saying that they are not legal lots because a variance would be necessary to build. Mr. Freese stated that individual lots, even though nonconforming, can be built on. Mr. Freese stated that if you own two lots you can't ask for a dimensional variance on the center lot line. Mr. Freese explained that a property owner who owns two 50ft. lots can build on

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one of the lots as long as he complies with the minimum setback requirements and that he can apply for a variance for any property line other than the common property line to both contiguous lots. Ms. Johnson stated that the amendment does not say that and read from Section 22.4.A "Provided, however, no dimensional variance shall be granted for such lot or parcel when the need for that dimensional variance would be eliminated by combining those contiguous lots, parcels, or portions of lots or parcels as an undivided lot or parcel for the purposes of this Ordinance under Subsection B, below." Discussion was held. Ms. Johnson stated that if a person owns two lots and wants to develop and sell the lots separately they are not able to do so. Ms. Johnson stated that this person is restricted because they own two lots. Mr. Delana stated that one lot would have to be sold. Mr. Borowicz stated that the property owner could sell one lot to someone that they know, request a variance and then buy the lot back after the variance is approved. Mr. Freese stated that you can do what you want on the two lots as long as you are not asking for a dimensional variance from the common line between the two lots. Ms. Johnson stated that she understands this but does not agree that a person would not be able to request a dimensional variance because he wants to develop two lots separately. Mr. Freese stated that this is not what is stated in the amendment. Mr. Borowicz agreed with Ms. Johnson. Mr. Kavanaugh suggested adding "shared property line" to Section 22.4.A to help make this section easier to understand. Mr. Freese stated that the wording is clear. Mr. Delana questioned if using the common lot line reference easier to understand. Mr. Turisk and Mr. Kavanaugh agreed that is easier to understand. Mr. Borowicz stated that there is no such thing as a need for a dimensional variance. Mr. Borowicz stated that there is a desire for a dimensional variance. Mr. Kavanaugh suggested reviewing with legal counsel the common line and the desire, instead of a need, for a variance.

NEW BUSINESS
No comments.

STAFF REPORT
Mr. Turisk stated that there will be a Risk Management Decision Making training that will be held from 6:00pm to 8:30pm on Tuesday, March 31, 2020 at the Littlefield Community Building in Alanson. Mr. Turisk asked that the Planning Commission members let him know if they will be available for this training. Mr. Turisk noted that the registration deadline is March 20, 2020

Mr. Turisk stated that the Planning Commission has also been invited to attend two Green Infrastructure workshops. Mr. Turisk stated that the first workshop will be held from 1:30pm – 4:00pm on March 23, 2020. Mr. Turisk stated that the second workshop will be held from 1:30pm – 4:00pm on April 24, 2020. Mr. Turisk stated that both workshops will be held at the Cheboygan Public Library. Mr. Turisk asked that the Planning Commission members let him know their availability for this training as soon as possible.

Mr. Turisk noted that binders have been distributed to the Planning Commission. Mr. Turisk stated that these binders include an application from Orion Renewable Energy for a project in Grant Township. Mr. Turisk explained that this will allow the Planning Commission more time to review the application as there is a lot of material to review. Mr. Turisk stated that the application has been forwarded to the appropriate agencies and property owners within 300ft. have been notified of the meeting and application. Mr. Turisk stated that public comments will be forwarded to the Planning Commission. Mr. Kavanaugh asked if this will be reviewed by legal counsel and if an engineer will review this application also. Mr. Turisk stated that legal counsel will attend the meeting on 03/18/20. Mr. Turisk stated that the Building Official has a copy of the application and he has a strong measure of expertise to review the technical aspects of this application. Mr. Turisk stated that he has not talked with administration yet about this application being reviewed by an engineer. Mr. Turisk stated that level of detail normally comes after the approval by the Planning Commission. Mr. Turisk stated that this is normally reviewed as part of the building permit application. Mr. Kavanaugh stated that we need someone that is experienced to review the application as there is a lot of technical information. Mr. Kavanaugh stated that he doesn't believe we should rely on people who are not experts. Mr. Borowicz stated that the technical aspect is not what the Planning Commission is reviewing. Mr. Kavanaugh stated that someone will also need to review the contracts and leases to make sure that applicant is responsible for the removal of all equipment from the site if the project ends. Mr. Turisk stated he will discuss the agreements with legal counsel. Mr. Turisk stated he will also discuss this with the applicant as they will incur the charge for the review by legal counsel. Mr. Freese stated that he believes that the Planning Commission will not be able to ask for the leases, however, there is a requirement to remove the material at the end of the life of the project and if one of the landowners requests certain things to remain then the Planning Commission may have a basis for asking for that portion of the lease. Mr. Freese stated that the applicant has provided portions of the lease for the Planning Commission to show that the land owners want certain things to remain. Mr. Freese stated that the Planning Commission should put tabs on specific sections in the binder. Mr. Freese noted that the applicant has requested a waiver on the scale of the drawings. Mr. Freese stated that they asked for 1 inch to 400 feet and none of the information that they provided is 1 inch.

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PLANNING COMMISSION COMMENTS
Mr. Kavanaugh asked for an update on Heritage Cove Farm. Mr. Turisk stated he does not have any information to report at this point.

PUBLIC COMMENTS
Mr. Moore referred to Section 22.3.F and noted that use should be separate from structure. Mr. Moore stated that the building is not going to change. Mr. Moore questioned how someone would determine that a use is less nonconforming. Discussion was held. Mr. Moore referred to Section 22.4 and noted that the Planning Commission is not considering a situation with a proposed private storage building on two larger parcels. Mr. Moore stated there is no need for a common line to be discussed. Mr. Moore noted that this section states that a dimensional variance can't be granted unless the parcels are combined. Mr. Freese stated that this is not a nonconformity. Discussion was held.

ADJOURN
Motion by Mr. Borowicz to adjourn. Motion carried. Meeting was adjourned at 8:36pm.

_____
Charles Freese
Planning Commission Secretary

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CHEBOYGAN COUNTY
PLANNING COMMISSION

Orion Renewable Energy Group, LLC

Exhibit List

1. Cheboygan County Zoning Ordinance
2. Cheboygan County Master Plan
3. Mailing List (8 Pages)
4. Email from Brent Shank, Cheboygan County Road Commission, dated March 9, 2020 (1 Page)
5. Staff Report (10 Pages)
6. Findings of Fact (14 Pages)
7.
8.
9.
10.
11.

Note: Planning Commission members have Exhibits 1 and 2.

ORION

RENEWABLE ENERGY GROUP LLC

Cheboygan County Planning Commission

PO Box 70
870 South Main St., Room 103
Cheboygan, MI 49721
(231)627-8489 (phone)
(231)627-3646 (fax)
www.cheboygancounty.net/planning

The Planning Commission meets the
1st and 3rd Wednesday of every month at 7:00 pm
in the Commissioner's Room (room #135)
of the Cheboygan County Building.
Date, time and location are subject to change.

All Site Plan Review applications will be reviewed administratively and will be placed on a Planning Commission agenda when deemed complete. The following items must be submitted to be reviewed by the Zoning Administrator:

1. Completed Site Plan Review Application with applicant and owner signatures (4 pages)
2. Completed Site Plan Requirement Checklist with signature (2 pages)
3. Site Plan
4. Warranty Deed or other proof of ownership
5. Certified property survey or dimensioned property land plat
6. Application Fee

Site Plan Review Application

APPLICANT'S INFORMATION AND INSTRUCTIONS

(KEEP FOR YOUR REFERENCE)

SITE PLAN REVIEW APPLICATION

Applications that do not meet the requirements can NOT be placed on the agenda

SUBMITTAL PROCEDURE

- SUBMIT THE COMPLETED APPLICATION 14-DAYS PRIOR TO THE MEETING AT WHICH IT WILL BE REVIEWED.
- SITE PLANS MUST BE COMPLETE, INCLUDING THE APPLICANT'S AND PROPERTY OWNER'S SIGNATURE. IF THE APPLICATION IS NOT COMPLETE IT WILL BE RETURNED TO THE APPLICANT WITH A LIST OF ITEMS THAT MUST BE COMPLETED. (PLEASE USE THE PROVIDED CHECKLIST)
- IT IS RECOMMENDED THAT THE APPLICANT SUBMIT ONE SITE PLAN FOR INITIAL REVIEW BY THE PLANNING/ZONING ADMINISTRATOR BEFORE SUBMITTING THE REQUIRED 15 COPIES. A DIGITAL COPY OR LEDGER-SIZED PAPER COPIES ARE RECOMMENDED.
- THE APPROPRIATE FEE LISTED BELOW MUST BE SUBMITTED WITH THE APPLICATION
  SPECIAL USE PERMIT - $225.00 SPECIAL USE PERMIT AMENDMENT - $150.00
  SITE PLAN REVIEW - $170.00 SITE PLAN REVIEW AMENDMENT - $110.00
- ONCE THE APPLICATION IS COMPLETE, THE REQUEST WILL BE PLACED ON THE NEXT POSSIBLE PLANNING COMMISSION AGENDA.

PARCEL SIGN

THE APPLICANT WILL PICK UP A SIGN FROM THE PLANNING AND ZONING DEPARTMENT 10 DAYS PRIOR TO THE MEETING AND POST IT ON THE SITE SO THAT IT IS VISIBLE FROM THE ROAD. THE SIGN MUST BE RETURNED TO THE PLANNING & ZONING DEPARTMENT NO LATER THAN 5 DAYS AFTER THE MEETING.

PLANNING COMMISSION PUBLIC HEARING PROCESS

THE PLANNING COMMISSION MEETS AT 7:00 PM. PLANNING DEPARTMENT STAFF WILL PROVIDE A BRIEF INTRODUCTION OF THE APPLICANT'S REQUEST TO THE PLANNING COMMISSION. THE APPLICANT OR THEIR REPRESENTATIVE WILL THEN COME FORWARD TO ANSWER QUESTIONS ASKED BY PLANNING COMMISSION MEMBERS, AND HELP EXPLAIN OTHER ITEMS AS NECESSARY.

WITHDRAWAL OF APPLICATIONS

APPLICATIONS MAY BE WITHDRAWN BEFORE OR DURING THE MEETING, HOWEVER EXPENDITURES HAVE ALREADY BEEN MADE ON BEHALF OF THE APPLICANT, AND NO PORTION OF THE FEE CAN BE REFUNDED. A LETTER WILL BE NECESSARY, STATING THAT THE APPLICANT HAS WITHDRAWN THE APPLICATION.

SITE PLAN REVIEW APPLICATION

SITE PLAN REQUIREMENT CHECKLIST

(TO BE SUBMITTED WITH APPLICATION AND SITE PLAN)

ALL ITEMS LISTED BELOW MUST BE SUBMITTED IN ORDER FOR THIS APPLICATION TO BE DEEMED COMPLETE. INCOMPLETE APPLICATIONS WILL NOT BE REVIEWED OR PROCESSED. EACH SITE PLAN SHALL DEPICT THE ITEMS LISTED BELOW, EXCEPT FOR THOSE ITEMS DETERMINED DURING THE PRE-APPLICATION CONFERENCE TO NOT BE APPLICABLE.

PLACE A CHECK MARK NEXT TO EACH REQUIREMENT TO SHOW THAT THE INFORMATION HAS BEEN SUPPLIED OR THAT A WAIVER IS BEING REQUESTED. IF A WAIVER IS BEING REQUESTED PLEASE NOTE ON THE NEXT PAGE THE REASON FOR THE WAIVER. SIGN AND DATE THIS CHECKLIST WHEN ALL ITEMS HAVE BEEN COMPLETED. PLEASE SUBMIT THIS CHECKLIST WITH YOUR APPLICATION.

INFORMATION SUPPLIED	WAIVER REQUESTED	REQUIREMENT
	X	a. North arrow, scale and date of original submittal and last revision. Site plan is to be drawn at a scale of 1 inch = 100 ft. or less.
X		b. Seal of the registered engineer, architect, landscape architect, surveyor, planner, or other site plan preparer. Location of proposed and/or existing property lines, dimensions, legal descriptions, setback lines and monument locations.
X		c. Location of existing and proposed public roads, rights-of-way and private easements of record and abutting streets.
X		d. Topography at maximum five foot intervals or appropriate topographic elevations to accurately represent existing and proposed grades and drainage flows.
X		e. Location and elevations of existing water courses and water bodies, including county drains and man-made surface drainage ways, stormwater controls, flood plains, and wetlands.
X		f. Location of existing and proposed buildings and intended uses thereof.
N.A.		g. Details of entryway and sign locations should be separately depicted with an elevation view.
X		h. Location, design, and dimensions of existing and/or proposed curbing, barrier free access, carports, parking areas (including indication of all spaces and method of surfacing), fire lanes and all lighting thereof.
X		i. Location, size, and characteristics of all loading and unloading areas.
N.A.		j. Location and design of all sidewalks, walkways, bicycle paths and areas for public use as approved by the Planning Commission.
X		k. Location of all other utilities on the site including but not limited to wells, septic systems, stormwater controls, natural gas, electric, cable TV, telephone and steam and proposed utility easements.
N.A.		l. Proposed location, dimensions and details of common open spaces and common facilities such as community buildings or swimming pools if applicable.

SITE PLAN REVIEW APPLICATION

SITE PLAN REQUIREMENT CHECKLIST

(TO BE SUBMITTED WITH APPLICATION AND SITE PLAN)

INFORMATION SUPPLIED	WAIVER REQUESTED	REQUIREMENT
X		m. Location and specifications for all fences, walls, and other screening features.
X		n. Location and specifications for all existing and proposed perimeter and internal landscaping and other buffering features.
X		o. Exterior lighting locations with area of illumination illustrated as well as the type of fixtures and shielding to be used.
N.A.		p. Location, size and specifications for screening of all trash receptacles and other solid waste disposal facilities.
X		q. Elevation drawing(s) for proposed commercial and industrial structures.
N.A.		r. Location and specifications for any existing or proposed above or below ground storage facilities for any chemicals, salts, flammable materials, or hazardous materials as well
N.A.		s. Floor plans, when needed to determine the number of parking spaces required.

PLEASE LIST THE REQUIREMENT FOR WHICH A WAIVER IS BEING REQUESTED. ALSO PROVIDE AN EXPLANATION/REASON FOR THE WAIVER REQUEST.

SECTION	REASON FOR WAIVER REQUEST
a.	**The Site Plan is produced at a scale of 1"=400' to better visualize the extent of the Project.**

AFFIDAVIT

I CERTIFY THAT ALL SITE PLAN REQUIREMENTS (A THROUGH S) ARE DRAWN ON THE SITE PLAN, ATTACHED TO THIS APPLICATION AND/OR I AM REQUESTING A WAIVER. I CERTIFY THAT ALL INFORMATION AND DATA ATTACHED TO AND MADE PART OF THIS SPECIAL LAND USE PERMIT APPLICATION ARE TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE.

Dank DiPaolo — SIGNATURE

02-13-2020 — DATE

CHEBOYGAN COUNTY
PLANNING & ZONING DEPARTMENT

870 S. MAIN ST., RM. 103 ▪ PO BOX 70 ▪ CHEBOYGAN, MI 49721
PHONE: (231)627-8489 ▪ FAX: (231)627-3646

SITE PLAN REVIEW APPLICATION

PROPERTY LOCATION

Address	*City / Village*	*Twp / Sec.*	*Zoning District*
See the Attached List of Parcels and Site Plan	**Grant Township**	**T36N, R01E Sec.4, 5, 6, 8 & 9**	**M-AF and P-LS**
Property Tax I.D. Number	*Plat or Condo Name / Lot or Unit No.*		

APPLICANT

Name	*Telephone*	*Fax*
Orion Renewable Energy Group, LLC	**(510)-267-8921**	**(510)-267-8911**

Address	*City, State & Zip*	*E-Mail*
155 Grand Ave., Suite 706	**Oakland, CA 94612**	**ahoffman@orionrewables.com**

OWNER *(If different from applicant)*

Name	*Telephone*	*Fax*
See the Attached List of Parcels and Site Plan		

Address	*City, State & Zip*	*E-Mail*

PROPOSED WORK

Type *(check all that apply)*

- ☐ New Building
- ☐ Addition
- ☐ Change in Use or Additional Use
- ☐ Reconstruction
- ☐ Relocated Building
- ☐ Sign, Type: _____
- ■ Other: **Level 3 SES-PV**

Building/Sign Information

Overall Length: **N.A.** feet
Overall Width: **N.A.** feet
Floor Area: **N.A.** sq. feet
Overall Building Height: **N.A.** feet Sign Area: **N.A.** sq. feet
Sign Height **N.A.** feet

PROPOSED USE *(check all that apply)*

- ☐ Single-Family Residence
- ☐ Duplex
- ☐ Multi-Family, # of units ___
- ☐ Expansion / Addition
- ☐ Garage or Accessory
- ☐ Storage
- ☐ Office
- ☐ Commercial
- ☐ Industrial
- ☐ Agricultural
- ☐ Institutional
- ☐ Utility
- ■ Other: Solar Energy System

Has there been a Site Plan or Special Use Permit approved for this parcel before? ☐ YES ■ NO

If YES, date of approval: _____ Approved Use: _____

Directions to site: The project is located approximately 13 miles southeast of Cheboygan, Michigan. The project area is located along North Black River Road and South of Twin Lakes Road.

CHEBOYGAN COUNTY
PLANNING & ZONING DEPARTMENT

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1. Describe all anticipated activities (e.g. type of business, hours of operation, number of employees, etc). Attach additional sheets if needed.

   The proposed photo-voltaic solar energy facility will produce clean, cost-effective power for export to the electricity to the grid. The Applicant may sell power to investor-owned or public electric utilities in the Midcontinent Independent System Operator (MISO) market. Project Operation and Maintenance (O&M) activities will be minimal compared to those conventional power plants. Operational activities are limited to monitoring the Project's performance, conducting maintenance for on-site equipment and responding to utility needs for performance adjustments.

2. Site Plan Standards.

PLEASE EXPLAIN HOW YOUR REQUEST MEETS EACH OF THE FOLLOWING STANDARDS

a. The site plan shall be designed so that there is a limited amount of change in the overall natural contours of the site and shall minimize reshaping in favor of designing the project to respect existing features of the site in relation to topography, the size and type of the lot, the character of adjoining property and the type and size of buildings. The site shall be developed so as not to impede the normal and orderly development or improvement of surrounding property for uses permitted in this Ordinance.

   The majority of the existing natural topography will remain unchanged and no significant grading is anticipated.

b. The landscape shall be preserved in its natural state, insofar as practical, by minimizing tree and soil removal, and by topographic modifications which result in smooth natural appearing slopes as opposed to abrupt changes in grade between the project and adjacent areas.
   Minimum earth disturbance is proposed to preserve the grades and slopes.

c. Special attention shall be given to proper site drainage so that removal of storm waters will not adversely affect neighboring properties.

   The project shall be designed to and obtain a permit from Michigan's EGLE Part 91, Soil Erosion and Sedimentation Control Program.

d. The site plan shall provide reasonable, visual and sound privacy for all dwelling units located therein. Fences, walls, barriers and landscaping shall be used, as appropriate, for the protection and enhancement of property and for the privacy of its occupants.

   See the attached Site Plan. Sufficient landscaping shall be provided. Existing native vegetation shall be utilized and supplemented where necessary.

CHEBOYGAN COUNTY
PLANNING & ZONING DEPARTMENT

870 S. MAIN ST., RM. 103 ▪ PO BOX 70 ▪ CHEBOYGAN, MI 49721
PHONE: (231)627-8489 ▪ FAX: (231)627-3646

e. All buildings or groups of buildings should be so arranged as to permit emergency vehicle access by some practical means.

Adequate site access will be provided by site access roads.

f. Every structure or dwelling unit shall have access to a public street, walkway or other area dedicated to common use.

N.A.

g. For subdivision plats and subdivision condominiums, there shall be a pedestrian circulation system as approved by the Planning Commission.

N.A.

h. Exterior lighting shall be arranged as follows:

i. It is deflected away from adjacent properties.

Lighting will be shielded and directed downward where needed

ii. It does not impede the vision of traffic along adjacent streets.

Lighting will be shielded and directed downward where needed

iii. It does not unnecessarily illuminate night skies.

Lighting will be shielded and directed downward where needed

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i. The arrangement of public or common ways for vehicular and pedestrian circulation shall respect the pattern of existing or planned streets and pedestrian or bicycle pathways in the area. Streets and drives which are part of an existing or planned street pattern which serves adjacent development shall be of a width appropriate to the traffic volume they will carry and shall have a dedicated right-of-way equal to that specified in the Master Plan.
N.A.

j. Site plans shall conform to all applicable requirements of state and federal statutes and the Cheboygan County Master Plan, and approval may be conditioned on the applicant receiving necessary state and federal permits.
The Project shall obtain all necessary permits prior to construction.

3. Size of property in sq. ft. or acres: 1,572 acres

4. Present use of property:

   Agricultural

5. Does the proposed use of the property include or involve either:
   - Junk or salvage yard (Section 3.6) ☐ YES ■ NO
   - Mineral extraction (Section 17.17) ☐ YES ■ NO

   If YES, this application must include a written plan as described in the Zoning Ordinance.

6. Attach a copy of Warranty Deed or other proof of ownership.

7. Attach a copy of certified Property Survey or dimensioned property land plat.

AFFIDAVIT

The undersigned affirms that the information and plans submitted in this application are true and correct to the best of the undersigned's knowledge.

Applicant's Signature [signature] **Date** 2/13/2020

Does the property owner give permission for County zoning officials to enter his or her property for inspection purposes?

☒ **Yes** ☐ **No**

Owner's Signature See attached lease documents **Date**

CHEBOYGAN COUNTY
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SITE PLAN REVIEW APPLICATION

FOR PLANNING/ZONING DEPT. USE ONLY		
Date Received:	2.14.2020	Notes: SUP APP FEE ONLY.
Fee Amount Received:	$225.00	
Receipt Number:	7181	
Public Hearing Date:	3.18.2020	

Planning/Zoning Administrator Approval:

Signature: [signature] Date: 2.28.2020

Cheboygan County Planning Commission

PO Box 70
870 South Main St., Room 103
Cheboygan, MI 49721
(231)627-8489 (phone)
(231)627-3646 (fax)
www.cheboygancounty.net/planning

The Planning Commission meets the
1st and 3rd Wednesday of every month at 7:00 pm
in the Commissioner's Room (room #135)
of the Cheboygan County Building.
Date, time and location are subject to change.

All Special Use Permit applications will be reviewed administratively and will be placed on a Planning Commission agenda when deemed complete. The following items must be submitted to be reviewed by the Zoning Administrator:

1. Completed Special Use Permit Application with applicant and owner signatures (4 pages)
2. Completed Site Plan Requirement Checklist with signature (2 pages)
3. Site Plan
4. Warranty Deed or other proof of ownership
5. Certified property survey or dimensioned property land plat
6. Application Fee

Special Land Use Permit Application

SPECIAL LAND USE PERMIT APPLICATION

APPLICANT'S INFORMATION AND INSTRUCTIONS

(KEEP FOR YOUR REFERENCE)

Applications that do not meet the requirements can NOT be placed on the agenda

SUBMITTAL PROCEDURE

- SUBMIT THE COMPLETED APPLICATION 30-DAYS PRIOR TO THE MEETING AT WHICH IT WILL BE REVIEWED.
- SITE PLANS MUST BE COMPLETE, INCLUDING THE APPLICANT'S AND PROPERTY OWNER'S SIGNATURE. IF THE APPLICATION IS NOT COMPLETE IT WILL BE RETURNED TO THE APPLICANT WITH A LIST OF ITEMS THAT MUST BE COMPLETED. (PLEASE USE THE PROVIDED CHECKLIST)
- IT IS RECOMMENDED THAT THE APPLICANT SUBMIT ONE SITE PLAN FOR INITIAL REVIEW BY THE PLANNING/ZONING ADMINISTRATOR BEFORE SUBMITTING THE REQUIRED 15 COPIES. A DIGITAL COPY OR LEDGER-SIZED PAPER COPIES ARE RECOMMENDED.
- THE APPROPRIATE FEE LISTED BELOW MUST BE SUBMITTED WITH THE APPLICATION
  SPECIAL USE PERMIT - $225.00 SPECIAL USE PERMIT AMENDMENT - $150.00
  SITE PLAN REVIEW - $170.00 SITE PLAN REVIEW AMENDMENT - $110.00
- ONCE THE APPLICATION IS COMPLETE, THE REQUEST WILL BE PLACED ON THE NEXT POSSIBLE PLANNING COMMISSION AGENDA.

PARCEL SIGN

THE APPLICANT WILL PICK UP A SIGN FROM THE PLANNING AND ZONING DEPARTMENT 10 DAYS PRIOR TO THE MEETING AND POST IT ON THE SITE SO THAT IT IS VISIBLE FROM THE ROAD. THE SIGN MUST BE RETURNED TO THE PLANNING & ZONING DEPARTMENT NO LATER THAN 5 DAYS AFTER THE MEETING.

PLANNING COMMISSION PUBLIC HEARING PROCESS

THE PLANNING COMMISSION MEETS AT 7:00 PM. PLANNING DEPARTMENT STAFF WILL PROVIDE A BRIEF INTRODUCTION OF THE APPLICANT'S REQUEST TO THE PLANNING COMMISSION. THE APPLICANT OR THEIR REPRESENTATIVE WILL THEN COME FORWARD TO ANSWER QUESTIONS ASKED BY PLANNING COMMISSION MEMBERS, AND HELP EXPLAIN OTHER ITEMS AS NECESSARY.

WITHDRAWAL OF APPLICATIONS

APPLICATIONS MAY BE WITHDRAWN BEFORE OR DURING THE MEETING, HOWEVER EXPENDITURES HAVE ALREADY BEEN MADE ON BEHALF OF THE APPLICANT, AND NO PORTION OF THE FEE CAN BE REFUNDED. A LETTER WILL BE NECESSARY, STATING THAT THE APPLICANT HAS WITHDRAWN THE APPLICATION.

SPECIAL LAND USE PERMIT APPLICATION

SITE PLAN REQUIREMENT CHECKLIST

(TO BE SUBMITTED WITH APPLICATION AND SITE PLAN)

ALL ITEMS LISTED BELOW MUST BE SUBMITTED IN ORDER FOR THIS APPLICATION TO BE DEEMED COMPLETE. INCOMPLETE APPLICATIONS WILL NOT BE REVIEWED OR PROCESSED. EACH SITE PLAN SHALL DEPICT THE ITEMS LISTED BELOW, EXCEPT FOR THOSE ITEMS DETERMINED DURING THE PRE-APPLICATION CONFERENCE TO NOT BE APPLICABLE.

PLACE A CHECK MARK NEXT TO EACH REQUIREMENT TO SHOW THAT THE INFORMATION HAS BEEN SUPPLIED OR THAT A WAIVER IS BEING REQUESTED. IF A WAIVER IS BEING REQUESTED PLEASE NOTE ON THE NEXT PAGE THE REASON FOR THE WAIVER. SIGN AND DATE THIS CHECKLIST WHEN ALL ITEMS HAVE BEEN COMPLETED. PLEASE SUBMIT THIS CHECKLIST WITH YOUR APPLICATION.

INFORMATION SUPPLIED	WAIVER REQUESTED	REQUIREMENT
	X	a. North arrow, scale and date of original submittal and last revision. Site plan is to be drawn at a scale of 1 inch = 100ft. or less.
X		b. Seal of the registered engineer, architect, landscape architect, surveyor, planner, or other site plan preparer. Location of proposed and/or existing property lines, dimensions, legal descriptions, setback lines and monument locations.
X		c. Location of existing and proposed public roads, rights-of-way and private easements of record and abutting streets.
X		d. Topography at maximum five foot intervals or appropriate topographic elevations to accurately represent existing and proposed grades and drainage flows.
X		e. Location and elevations of existing water courses and water bodies, including county drains and man-made surface drainage ways, stormwater controls, flood plains, and wetlands.
X		f. Location of existing and proposed buildings and intended uses thereof.
N.A.		g. Details of entryway and sign locations should be separately depicted with an elevation view.
X		h. Location, design, and dimensions of existing and/or proposed curbing, barrier free access, carports, parking areas (including indication of all spaces and method of surfacing), fire lanes and all lighting thereof.
X		i. Location, size, and characteristics of all loading and unloading areas.
N.A.		j. Location and design of all sidewalks, walkways, bicycle paths and areas for public use as approved by the Planning Commission.
X		k. Location of all other utilities on the site including but not limited to wells, septic systems, stormwater controls, natural gas, electric, cable TV, telephone and steam and proposed utility easements.
N.A.		l. Proposed location, dimensions and details of common open spaces and common facilities such as community buildings or swimming pools if applicable.

SPECIAL LAND USE PERMIT APPLICATION

SITE PLAN REQUIREMENT CHECKLIST

(TO BE SUBMITTED WITH APPLICATION AND SITE PLAN)

INFORMATION SUPPLIED	WAIVER REQUESTED	REQUIREMENT
X		m. Location and specifications for all fences, walls, and other screening features.
X		n. Location and specifications for all existing and proposed perimeter and internal landscaping and other buffering features.
X		o. Exterior lighting locations with area of illumination illustrated as well as the type of fixtures and shielding to be used.
N.A.		p. Location, size and specifications for screening of all trash receptacles and other solid waste disposal facilities.
X		q. Elevation drawing(s) for proposed commercial and industrial structures.
N.A.		r. Location and specifications for any existing or proposed above or below ground storage facilities for any chemicals, salts, flammable materials, or hazardous materials as well
N.A.		s. Floor plans, when needed to determine the number of parking spaces required.

PLEASE LIST THE REQUIREMENT FOR WHICH A WAIVER IS BEING REQUESTED. ALSO PROVIDE AN EXPLANATION/REASON FOR THE WAIVER REQUEST.

SECTION	REASON FOR WAIVER REQUEST
a.	**The Site Plan is produced at a scale of 1"=400' to better visualize the extent of the Project.**

AFFIDAVIT

I CERTIFY THAT ALL SITE PLAN REQUIREMENTS (A THROUGH S) ARE DRAWN ON THE SITE PLAN, ATTACHED TO THIS APPLICATION AND/OR I AM REQUESTING A WAIVER. I CERTIFY THAT ALL INFORMATION AND DATA ATTACHED TO AND MADE PART OF THIS SPECIAL LAND USE PERMIT APPLICATION ARE TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE.

Dawn DiPaolo — SIGNATURE

02-13-2020 — DATE

CHEBOYGAN COUNTY
PLANNING & ZONING DEPARTMENT

870 S. MAIN ST., RM. 103 ▪ PO BOX 70 ▪ CHEBOYGAN, MI 49721
PHONE: (231)627-8489 ▪ FAX: (231)627-3646

SPECIAL LAND USE PERMIT APPLICATION

PROPERTY LOCATION

Address	*City / Village*	*Twp / Sec.*	*Zoning District*
See the Attached List of Parcels and Site Plan	**Grant Township**	**T36N, R01E Sec.4, 5, 6, 8 & 9**	**M-AF and P-LS**
Property Tax I.D. Number **See the Attached**	*Plat or Condo Name / Lot or Unit No.*		

APPLICANT

Name	*Telephone*	*Fax*
Orion Renewable Energy Group, LLC	**(510)-267-8921**	**(510)-267-8911**
Address **155 Grand Ave., Suite 706**	*City, State & Zip* **Oakland, CA 94612**	*E-Mail* **ahoffman@orionrenewables.com**

OWNER *(If different from applicant)*

Name	*Telephone*	*Fax*
See the Attached List of Parcels and Site Plan		
Address	*City, State & Zip*	*E-Mail*

PROPOSED WORK

Type *(check all that apply)*

- ☐ New Building
- ☐ Addition
- ☐ Change in Use or Additional Use
- ☐ Reconstruction
- ☐ Relocated Building
- ☐ Sign, Type: _____
- ■ Other: **Level 3 SES-PV**

Building/Sign Information

Overall Length: **N.A.** feet
Overall Width: **N.A.** feet
Floor Area: **N.A.** sq. feet
Overall Building Height: **N.A.** feet Sign Area: **N.A.** sq. feet
Sign Height **N.A.** feet

PROPOSED USE *(check all that apply)*

- ☐ Single-Family Residence
- ☐ Duplex
- ☐ Multi-Family, # of units ___
- ☐ Expansion / Addition
- ☐ Garage or Accessory
- ☐ Storage
- ☐ Office
- ☐ Commercial
- ☐ Industrial
- ☐ Agricultural
- ☐ Institutional
- ☐ Utility
- ■ Other: Solar Energy System

Has there been a Site Plan or Special Use Permit approved for this parcel before? ☐ YES ■ NO

If YES, date of approval: _____ Approved Use: _____

Directions to site: The project is located approximately 13 miles southeast of Cheboygan, Michigan. The project area is located along North Black River Road and South of Twin Lakes Road.

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1. Describe all anticipated activities (e.g. type of business, hours of operation, number of employees, etc). Attach additional sheets if needed.
   The proposed photo-voltaic solar energy facility will produce clean, cost-effective power for export to the electricity to the grid. The Applicant may sell power to investor-owned or public electric utilities in the Midcontinent Independent System Operator (MISO) market. Project Operation and Maintenance (O&M) activities will be minimal compared to those conventional power plants. Operational activities are limited to monitoring the Project's performance, conducting maintenance for on-site equipment and responding to utility needs for performance adjustments.

Site Plan Standards.

PLEASE EXPLAIN HOW YOUR REQUEST MEETS EACH OF THE FOLLOWING STANDARDS

a. The site plan shall be designed so that there is a limited amount of change in the overall natural contours of the site and shall minimize reshaping in favor of designing the project to respect existing features of the site in relation to topography, the size and type of the lot, the character of adjoining property and the type and size of buildings. The site shall be developed so as not to impede the normal and orderly development or improvement of surrounding property for uses permitted in this Ordinance.
   The majority of the existing natural topography will remain unchanged and no significant grading is anticipated.

b. The landscape shall be preserved in its natural state, insofar as practical, by minimizing tree and soil removal, and by topographic modifications which result in smooth natural appearing slopes as opposed to abrupt changes in grade between the project and adjacent areas.

   Minimum earth disturbance is proposed to preserve the grades and slopes.

c. Special attention shall be given to proper site drainage so that removal of storm waters will not adversely affect neighboring properties.

   The project shall be designed to and obtain a permit from Michigan's EGLE Part 91, Soil Erosion and Sedimentation Control Program.

d. The site plan shall provide reasonable, visual and sound privacy for all dwelling units located therein. Fences, walls, barriers and landscaping shall be used, as appropriate, for the protection and enhancement of property and for the privacy of its occupants.

   See the attached Site Plan. Sufficient landscaping shall be provided. Existing native vegetation shall be utilized and supplemented where necessary.

e. All buildings or groups of buildings should be so arranged as to permit emergency vehicle access by some practical means.

   Adequate site access will be provided by site access roads.

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f. Every structure or dwelling unit shall have access to a public street, walkway or other area dedicated to common use.
N.A.

g. For subdivision plats and subdivision condominiums, there shall be a pedestrian circulation system as approved by the Planning Commission.
N.A

h. Exterior lighting shall be arranged as follows:

i. It is deflected away from adjacent properties.

Lighting will be shielded and directed downward where needed

ii. ii. It does not impede the vision of traffic along adjacent streets.

Lighting will be shielded and directed downward where needed

iii. It does not unnecessarily illuminate night skies.

Lighting will be shielded and directed downward where needed

i. The arrangement of public or common ways for vehicular and pedestrian circulation shall respect the pattern of existing or planned streets and pedestrian or bicycle pathways in the area. Streets and drives which are part of an existing or planned street pattern which serves adjacent development shall be of a width appropriate to the traffic volume they will carry and shall have a dedicated right-of-way equal to that specified in the Master Plan.

N.A.

j. Site plans shall conform to all applicable requirements of state and federal statutes and the Cheboygan County Master Plan, and approval may be conditioned on the applicant receiving necessary state and federal permits.

The project shall obtain all necessary permits prior to construction.

3. Size of property in sq. ft. or acres: 1,572 acres

4. Present use of property:

Agricultural

5. SUP Standards:

a. Is the property located in a zoning district in which the proposed special land use is allowed?

Yes, the project is located in the M-AF and P-LS Zoning Districts

b. Will the proposed special land use involve uses, activities, processes, materials, or equipment that will create a substantially negative impact on the natural resources of the County or the natural environment as a whole? **Explain**. The project will be designed to avoid wetlands, drains and drainage feature and will not significantly alter drainage patterns within the site. No impacts to water quality from erosion and sedimentation are expected. The project will prepare and implement a Soil Erosion and Sedimentation Control Plan (SESC) prior to construction. The SESC plan will include Best Management Practices (BMP's) to be employed to prevent soil erosion and discharge of other construction related pollutants that could contaminate nearby drainages.

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b. Will the proposed special land use involve uses, activities, processes, materials, or equipment that will create a substantially negative impact on other conforming properties in the area by reason of traffic, noise, smoke, fumes, glare, odors, or the accumulation of scrap material that can be seen from any public highway or seen from any adjoining land owned by another person? **Explain**. No, the project will not produce smoke, fumes, odors or the accumulation of scrap metal. The Project will be designed to meet the noise requirement and not exceed 60 decibels at the project perimeter. See the attached Noise Study. Solar panels are typically covered with a tempered glass layer that is treated with an anti-reflective coating that reduces the reflectivity of the panels. The Project will most likely use a single-axis horizontal tracking system which is designed to point the solar panels at the sun, resulting in most of the reflected sunlight being directed back into the sky and away from objects at ground level. The project will be designed to incorporate adequate vegetative screening and landscaping to prevent negative visual and glare impacts to adjoining properties. See the attached Site Plan.

d. Will the proposed special land use be designed, constructed, operated, and maintained so as not to diminish the opportunity for surrounding properties to be used and developed as zoned? **Explain**. Yes, the surrounding properties are also zoned M-AF and P-LS. A property valuation report was prepared to demonstrate that adjoining solar energy facilities do not adversely affect surrounding property values. See the attached Property Valuation Report.

e. Will the proposed special land use place demands on fire, police, or other public resources in excess of current capacity? **Explain**.
No, an emergency response plan will be finalized in coordination with local emergency service provider, which will ensure these provider have 24/7 site access and contact information for operations personnel. The Project is not anticipated exceed current current capacity.

f. Will the proposed special land use be adequately served by public or private streets, water and sewer facilities, and refuse collection and disposal services? **Explain**. The Project will have direct access from public roads for site access. The Project is not anticipated to have the need for water, sewer or refuse collection and disposal services.

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g. Will the proposed special land use will be adequately served by water and sewer facilities, and refuse collection and disposal services? The Project will have direct access from public roads for site access. The Project is not anticipated to have the need for water, sewer or refuse collection and disposal services.

h. Will the proposed special land use comply with all specific standards required under this Ordinance applicable to it (i.e. parking, setbacks, etc)? Yes, the Project will comply with all specific standards required under this Ordinance. See the attached Site Plan

6. Does the proposed use of the property include or involve either:
   - Junk or salvage yard (Section 3.6) ☐ YES ■ NO
   - Mineral extraction (Section 17.17) ☐ YES ■ NO

   If YES, this application must include a written plan as described in the Zoning Ordinance.

7. Attach a copy of Warranty Deed or other proof of ownership.

8. Attach a copy of certified Property Survey or dimensioned property land plat.

AFFIDAVIT

The undersigned affirms that the information and plans submitted in this application are true and correct to the best of the undersigned's knowledge.

Applicant's Signature [signature] **Date** 2/13/2020

Does the property owner give permission for County zoning officials to enter his or her property for inspection purposes?

☒ **Yes** ☐ **No**

Owner's Signature See attached lease documents **Date** _____

FOR PLANNING/ZONING DEPT. USE ONLY

Date Received:	2.14.2020	Notes:
Fee Amount Received:	$225.00 - Special Use Permit Fee	
Receipt Number:	7181	
Public Hearing Date:	3.18.2020	

Planning/Zoning Administrator Approval: [signature]

Signature

2.28.2020
Date

LEASE AGREEMENT

(#MI-ALV1-006)

This Lease Agreement (this "Agreement") is made, dated and effective as of April 5, 2018 (the "Effective Date"), between **Beethem Properties, a Michigan partnership**, ("Owner"), and **Orion Renewable Resources LLC, a Delaware limited liability company** (together with its transferees, successors and assigns, "Lessee"), and in connection herewith, Owner and Lessee agree, covenant and contract as set forth in this Agreement. Owner and Lessee are sometimes referred to in this Agreement as a "Party" or collectively as the "Parties".

NOW, THEREFORE, the Parties agree as follows:

1. Lease. Owner hereby leases to Lessee the real property of Owner consisting of approximately 214.81 acres (which includes 4.42 acres identified as an Excluded Area (defined below)) located in Cheboygan County, Michigan, and legally described on Exhibit A attached hereto and incorporated herein by reference. Such lease ("Lease") includes the right to access and utilize all radiant energy emitted from the sun upon, over and across the real property ("Solar Energy"), and any easements, rights-of-way, and other rights and benefits relating or appurtenant to such real property (collectively, the "Property"). In the event of inaccuracies or insufficiencies in the legal description in Exhibit A Lessee may modify Exhibit A to correct the inaccuracies or insufficiencies, and shall notify Owner of such modification.

2. Purpose. Lessee shall have the exclusive right to use the Property and the unobstructed flow of Solar Energy upon, over and across the Property for electric power, heat and/or steam generation purposes ("Solar Energy Purposes") and to derive all profits therefrom. For purposes of this Agreement, Solar Energy Purposes include, without limitation, the right to convert the Solar Energy into electrical energy and to collect and transmit the electrical energy so converted, together with any and all activities related thereto, including, without limitation, (a) determining the feasibility of Solar Energy conversion and power generation on the Property, including studies of the Solar Energy emitted upon, over and across the Property and other meteorological, archeological and environmental studies, land surveys and due diligence activities; (b) constructing, installing, using, replacing, relocating and removing from time to time, and maintaining, refurbishing and operating, Solar Energy collection and electrical generating equipment of all types including, without limitation, any such equipment utilizing photovoltaic and/or solar thermal technology (collectively referred to herein as "Solar Generating Equipment"), overhead and underground electrical transmission and communications lines, electric transformers, energy storage facilities, telecommunications equipment, power generation facilities to be operated in conjunction with Solar Generating Equipment, roads and gates, meteorological towers and Solar Energy measurement equipment, control buildings, maintenance yards, and related facilities and equipment (the Solar Generating Equipment together with all of the other foregoing equipment and improvements, collectively "Solar Facilities") on the Property; and (c) undertaking any other activities, whether accomplished by Lessee or a third party authorized by Lessee, that Lessee reasonably determines are necessary, useful or appropriate to accomplish any of the foregoing. Lessee and its consultants may enter the Property, upon reasonable advance notice, to do work related to development of Solar Facilities. Subject to Owner's rights to use the Property in any manner consistent with Section 8.2, Lessee shall have the right to control and

installation, maintenance, or operation of Solar Facilities, whether located on the Property or elsewhere; access over the Property to such Solar Facilities; Lessee's rights granted hereunder to use the Property for any other Solar Energy Purposes; or the undertaking of any other activities permitted hereunder. Without limiting the generality of the foregoing, the activities of Owner shall not disturb or interfere with the unobstructed flow of Solar Energy upon, over and across the Property, whether by placing towers or antennas of any type, planting trees or constructing buildings or other structures or facilities, or by engaging in any other activity on the Property or elsewhere that might delay the installation of, disrupt, or otherwise cause a decrease in the output or efficiency of the Solar Facilities. The area of land to remain unobstructed by Owner will consist horizontally of the entire Property, and vertically all space located above the surface of the Property. If Lessee builds Solar Facilities on only a portion of the Property, Owner may use the rest of the Property in any manner that complies with the foregoing. In addition, Owner represents that it is not aware of any pending or threatened lawsuits or government actions that might interfere with the construction or operation of Solar Facilities on the Property, or any delinquent taxes affecting the Property. For safety reasons, hunting is prohibited on the Property after the Start of Construction.

8.3 *Water Rights*. Owner shall retain its water rights and the ability to physically remove and contractually sell the water from existing wells on the site, provided that (a) Owner's exercise of its water rights shall not interfere with the construction, installation, maintenance, or operation of Solar Facilities, or access over the Property to such Solar Facilities, or Lessee's rights hereunder to use the Property for any other Solar Energy Purposes; and (b) Lessee shall be entitled to consume water from the Property for both onsite and offsite Solar Energy Purposes if it pays Owner market rates or purchases water directly from the local water authority.

8.4 *Liens and Tenants*. Except as disclosed by Owner in writing to Lessee on or prior to the Effective Date, Owner represents that there are no liens, encumbrances, leases, easements, mortgages, deeds of trust, security interests, mineral or gas and gas rights, options, sale contracts, claims, disputes or other exceptions to Owner's fee title ownership of the Property or to Owner's right, title or interest in the Property (collectively, "Liens"), which are not recorded in the public records of the County in which the Property is located. Lienholders (including tenants), whether or not their Liens are recorded, shall be Owner's responsibility, and Owner shall fully cooperate and assist Lessee in obtaining a non-disturbance agreement from each party that holds a Lien that Lessee determines in its discretion might interfere with Lessee's rights under this Agreement. A non-disturbance agreement is an agreement between Lessee and a lienholder which provides that the lienholder shall not disturb Lessee's possession or rights under this Agreement or terminate this Agreement so long as Owner is not entitled to terminate this Agreement under the provisions hereof. If Owner is unable to obtain any such non-disturbance agreement from a lienholder that holds a mortgage, deed of trust, tax lien or other Lien that is senior to this Agreement (if any), Lessee shall be entitled (but not obligated) to make payments in fulfillment of Owner's obligations to the lienholder and may offset the amount of such payments from amounts due Owner under this Agreement. Owner represents that Owner is not aware of any delinquent taxes affecting the Property.

8.5 *Requirements of Governmental Agencies*. Owner shall assist and fully cooperate with Lessee, at no out-of-pocket expense to Owner, in complying with or obtaining any land use permits and approvals, building permits, environmental impact reviews, or any other

approvals required for the financing, construction, installation, monitoring, replacement, relocation, maintenance, operation or removal of Solar Facilities (whether located on the Property or elsewhere), including execution of applications for such approvals if required. In connection with any applications for such approvals, Owner agrees at Lessee's request to support such application (at no out-of-pocket expense to Owner) at any administrative, judicial or legislative level, including participating in any appeals or regulatory proceedings. If Owner is contacted directly by any governmental agency about this Agreement, any Solar Facilities or the Property, Owner shall notify Lessee. To the extent permitted by law, Owner hereby waives any setbacks or other restrictions on the location of any Solar Facilities to be installed on the Property or on adjacent properties, including but not limited to waiver of all property line setbacks, pursuant to state or county rules, regulations or ordinances (that is, Owner approves a reduction of each such setback to zero), and Owner shall cooperate with Lessee in providing documentation of such setback waivers and shall execute any documents reasonably requested by Lessee to evidence Owner's waiver of such setbacks.

8.6 *Access*. Owner hereby grants to Lessee the right of ingress to and egress from Solar Facilities (whether located on the Property, on adjacent property or elsewhere) over and across the Property by means of roads and lanes thereon if existing, or otherwise by such route or routes as Lessee may construct from time to time ("Access Easement"). The Access Easement shall include the right to improve existing roads and lanes, shall run with the Property, and shall inure to the benefit of and be binding upon Owner and Lessee and their respective transferees, successors and assigns, and all persons claiming under them. The Access Easement shall expire upon termination or expiration of this Agreement.

8.7 *Construction Easement*. Owner grants Lessee an easement in, over and across the Property ("Construction Easement") which may be utilized on a temporary basis for access, construction laydown or other purposes to facilitate the construction, maintenance or repair of Solar Facilities (whether located on the Property or nearby properties) during any time that Lessee is conducting such work. Lessee shall have the right to (a) remove any existing trees on the Property that might interfere with operation of the Solar Facilities; and (b) change the grade of any part of the Property used as a Project Site, to the extent reasonably necessary to construct Solar Facilities. Lessee will use commercially reasonable efforts to minimize surface disturbance on the portion of the Property lying outside of the Project Site during construction. Lessee will comply with Section 7.6 with respect to damage caused by Lessee's use of the Construction Easement. The Construction Easement shall run with the Property, and shall inure to the benefit of and be binding upon Owner and Lessee and their respective transferees, successors and assigns, and all persons claiming under them. The Construction Easement shall expire upon the termination or expiration of this Agreement.

8.8 *Mineral Development*. Owner reserves the right to develop the minerals, if any, owned by Owner or third parties on the Property so long as such development (including, without limitation, any drilling or mining) does not interfere with Lessee's use of the Property (as provided in Section 8.2) and does not materially diminish the amount of land surface of the Property available for Solar Energy Purposes.

IN WITNESS WHEREOF, Owner and Lessee, individually or through duly authorized representatives, hereby execute this Agreement and certify that they have read, understand and agree to the terms and conditions of this Agreement.

"Owner"

Beethem Properties

William Beethem

Name: William Beethem
Title: Partner

Andrew J Beethem

Name: Andrew Beethem
Title: Partner

"Lessee"

Orion Renewable Resources LLC,
a Delaware limited liability company

By: Reid M. Buckley
Name: Reid M. Buckley
Title: Vice President

EXHIBIT A

Legal Description of the Property

ALL THAT CERTAIN real estate lying and being situated in Cheboygan County, Michigan, being more particularly bounded and described as follows:

Real Property Tax Parcel No. 151-008-100-004-00

The East Half (E 1/2) of the Northwest Quarter (NW 1/4) of Section 8, Township 36 North, Range 1 East
ACREAGE: 78.19

Real Property Tax Parcel No. 151-008-200-001-02

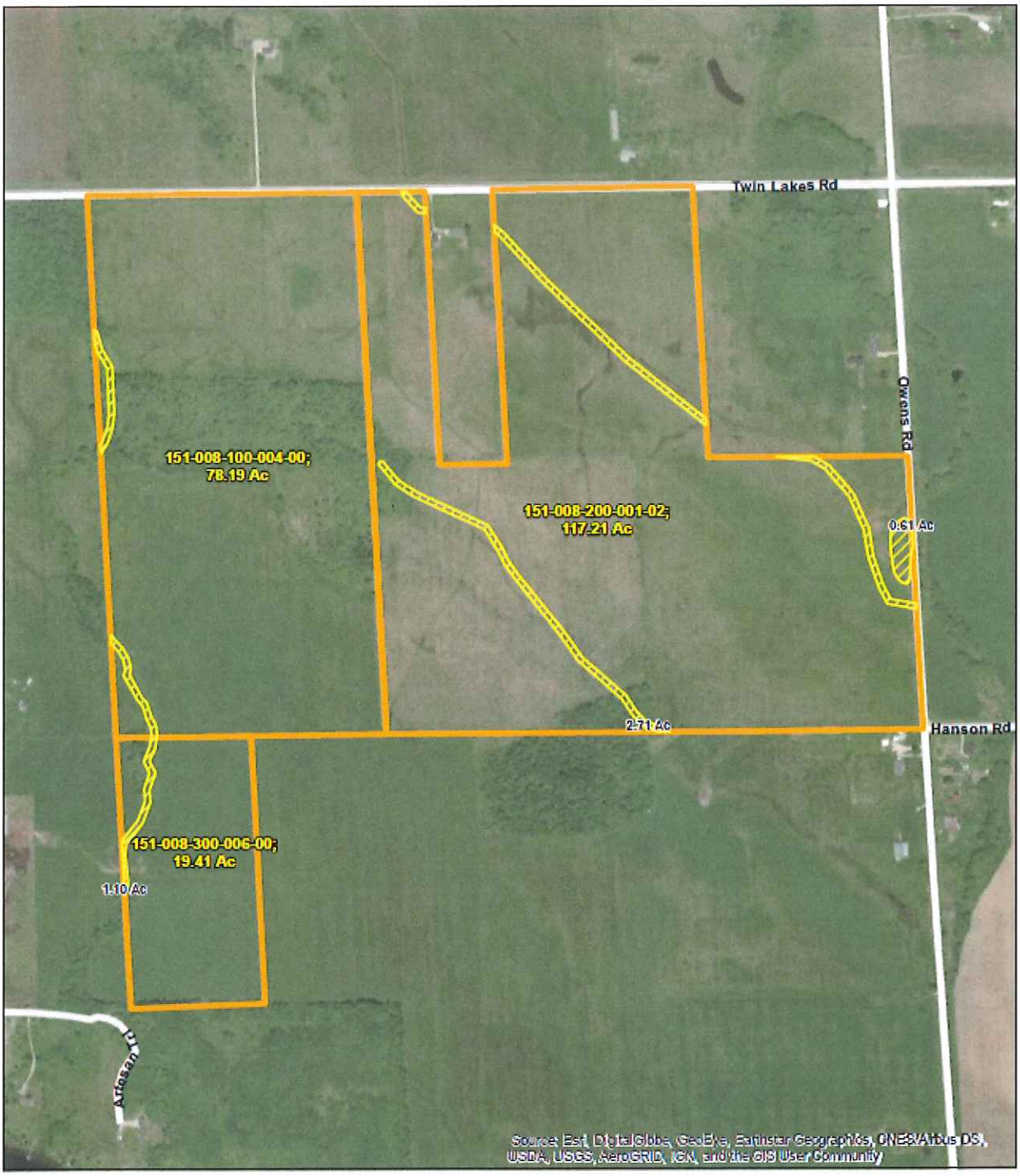
The Northeast Quarter (NE 1/4) of Section 8, Township 36 North, Range 1 East
EXCEPT the East Half (E 1/2) of the West Half (W 1/2) of the Northeast Quarter (NE 1/4) of the Northeast Quarter (NE 1/4) of Section 8, Township 36 North, Range 1 East
ALSO EXCEPT the East Half (E 1/2) of the Northeast Quarter (NE 1/4) of the Northeast Quarter (NE 1/4) of Section 8, Township 36 North, Range 1 East
ALSO EXCEPT the East Half (E 1/2) of the West Half (W 1/2) of the Northwest Quarter (NW 1/4) of the Northeast Quarter (NE 1/4) of Section 8, Township 36 North, Range 1 East
ACREAGE: 117.21

Real Property Tax Parcel No. 151-008-300-006-00

The West Half (W 1/2) of the Northeast Quarter (NE 1/4) of the Southwest Quarter (SW 1/4) of Section 8, Township 36 North, Range 1 East
ACREAGE: 19.41

(In the event of any inaccuracies or insufficiencies in the above legal description, Lessee may modify this Exhibit A to correct such inaccuracies or insufficiencies)

EXHIBIT B
Excluded Area



NORTH

1 inch = 600 feet

0 500 1,000 Feet

Exhibit B - Beethem Properties; MI-ALV1-006

No Solar Panels Area - 4.42 Ac

Property - 214.81 Ac

Cheboygan Co., MI
3/15/2018

ORION RENEWABLE ENERGY GROUP LLC

LEASE AGREEMENT
(#MI-ALV1-119)

This Lease Agreement (this "Agreement") is made, dated and effective as of ~~October~~ November 16, 2017 (the "Effective Date"), between **Tromble Bay Farms III, LLC, a Michigan limited liability company** ("Owner"), and **Orion Renewable Resources LLC, a Delaware limited liability company** (together with its transferees, successors and assigns, "Lessee"), and in connection herewith, Owner and Lessee agree, covenant and contract as set forth in this Agreement. Owner and Lessee are sometimes referred to in this Agreement as a "Party" or collectively as the "Parties".

NOW, THEREFORE, the Parties agree as follows:

1. Lease. Owner hereby leases to Lessee the real property of Owner consisting of approximately 317.54 acres (which includes 10.19 acres identified as an Excluded Area (defined below)) located in Cheboygan County, Michigan, and legally described on Exhibit A attached hereto and incorporated herein by reference. Such lease ("Lease") includes the right to access and utilize all radiant energy emitted from the sun upon, over and across the real property ("Solar Energy"), and any easements, rights-of-way, and other rights and benefits relating or appurtenant to such real property (collectively, the "Property"). In the event of inaccuracies or insufficiencies in the legal description in Exhibit A Lessee may modify Exhibit A to correct the inaccuracies or insufficiencies, and shall notify Owner of such modification.

2. Purpose. Lessee shall have the exclusive right to use the Property and the unobstructed flow of Solar Energy upon, over and across the Property for electric power, heat and/or steam generation purposes ("Solar Energy Purposes") and to derive all profits therefrom. For purposes of this Agreement, Solar Energy Purposes include, without limitation, the right to convert the Solar Energy into electrical energy and to collect and transmit the electrical energy so converted, together with any and all activities related thereto, including, without limitation, (a) determining the feasibility of Solar Energy conversion and power generation on the Property, including studies of the Solar Energy emitted upon, over and across the Property and other meteorological, archeological and environmental studies, land surveys and due diligence activities; (b) constructing, installing, using, replacing, relocating and removing from time to time, and maintaining, refurbishing and operating, Solar Energy collection and electrical generating equipment of all types including, without limitation, any such equipment utilizing photovoltaic and/or solar thermal technology (collectively referred to herein as "Solar Generating Equipment"), overhead and underground electrical transmission and communications lines, electric transformers, energy storage facilities, telecommunications equipment, power generation facilities to be operated in conjunction with Solar Generating Equipment, roads and gates, meteorological towers and Solar Energy measurement equipment, control buildings, maintenance yards, and related facilities and equipment (the Solar Generating Equipment together with all of the other foregoing equipment and improvements, collectively "Solar Facilities") on the Property; and (c) undertaking any other activities, whether accomplished by Lessee or a third party authorized by Lessee, that Lessee reasonably determines are necessary, useful or appropriate to accomplish any of the foregoing. Lessee and its consultants may enter the Property, upon reasonable advance notice, to do work related to development of Solar Facilities. Subject to Owner's rights to use the Property in any manner consistent with Section 8.2, Lessee shall have the right to control and

policy, to the extent Lessee has agreed to indemnify Owner pursuant to Section 7.3(a). The amount of such insurance shall be not less than $1 million before the Start of Construction and not less than $5 million after the Start of Construction of combined single limit liability coverage. Under such policy, Owner will be named as an additional insured with respect to operations or activities of Lessee but only to the extent Owner is held liable for damage and injuries caused by such operation or activities for which Lessee has agreed to indemnify Owner pursuant to Section 7.3(a). No coverage is provided for liability arising out of Owner's own negligence or misconduct. Certificates of such insurance, or evidence of self-insurance reasonably acceptable to Owner, shall be provided to Owner upon request.

7.3 *Mutual Indemnities.*

(a) Lessee's Indemnity. Lessee will indemnify, defend and hold harmless Owner and Owner's shareholders, directors, successors, assigns, personal representatives, trustees, mortgagees, employees and agents (collectively, "Owner's Indemnified Parties") against any and all losses, damages, claims, expenses and other liabilities, including without limitation, reasonable attorneys' fees, resulting from or arising out of physical damage to property or physical injury to any person, in each case to the extent caused by the operations or activities of Lessee or its employees, contractors or agents. The reference to property damage in the preceding sentence does not include losses of rent, business opportunities, profits and the like that may result from Owner's loss of use of the Project Site or any other portion of the Property occupied by Solar Facilities. This indemnification shall survive the termination of this Agreement. This indemnification shall not apply to losses, damages, claims, expenses and other liabilities to the extent caused by the negligence or misconduct of Owner or any of Owner's Indemnified Parties or any party other than Lessee or its employees, contractors or agents. Owner authorizes Lessee to take reasonable safety measures to reduce the risk that the Solar Facilities will cause physical damage or injuries.

(b) Owner's Indemnity. Owner will indemnify, defend and hold harmless Lessee and Lessee's members, shareholders, directors, successors, assigns, affiliates, personal representatives, trustees, mortgagees, employees and agents (collectively, "Lessee's Indemnified Parties") against any and all losses, damages, claims, expenses and other liabilities, including without limitation, reasonable attorneys' fees, resulting from or arising out of physical damage to property or physical injury to any person, in each case to the extent caused by (i) any negligent act or failure to act by Owner, guest or invitee, or (ii) any breach of this Agreement by Owner. This indemnification shall survive the termination of this Agreement. This indemnification shall not apply to losses, damages, claims, expenses and other liabilities to the extent caused by the negligence or misconduct of Lessee or any of Lessee's Indemnified Parties or any party other than Owner or its employees, contractors or agents.

7.4 *Requirements of Governmental Agencies.* Lessee, at its expense, shall comply in all material respects with valid laws, ordinances, statutes, orders, and regulations of any governmental agency applicable to the construction and operation of the Solar Facilities. Lessee shall have the right, in its sole discretion, to contest by appropriate legal proceedings, the validity or applicability to the Property, Project Site or Solar Facilities of any law, ordinance, statute, order, regulation, property assessment, or the like now or hereafter made or issued by any federal, state, county, local or other governmental agency or entity. Owner shall cooperate in every reasonable way in such contest, including joining in the signing of any reasonable protests or pleading that

Lessee may deem advisable to file, at no out-of-pocket expense to Owner. Any such contest or proceeding shall be controlled and directed by Lessee, but Lessee shall indemnify Owner from Lessee's failure to observe or comply with the contested law, ordinance, statute, order, regulation or property assessment.

7.5 *Construction Liens*. Lessee shall keep the Property free and clear of all liens and claims of liens for labor and services performed on, and materials, supplies, or equipment furnished to, the Property in connection with Lessee's use of the Property. Lessee may contest any such lien and the legal validity and amount of any such lien; *provided, however,* that if Lessee elects to contest any such lien, Lessee shall, within 60 days after it receives notice of the filing of such lien, either bond around such lien or establish appropriate reserves therefor, or otherwise remove such lien from the Property pursuant to applicable law.

7.6 *Lessee Non-Interference with Agricultural Activities*. In the construction and operation of its Solar Facilities, Lessee will make commercially reasonable efforts not to interfere with Owner's agricultural activities on the Property. To facilitate communication, Lessee and Owner will each designate a single point of contact with the other party.

(a) Construction and Siting. Lessee will consult with Owner (or, at Owner's request, with Owner's then-current tenant) prior to the Start of Construction to describe Lessee's plan and schedule for construction on the Property. As part of the consultation, Lessee will present a preliminary site map showing the Project Site and any new roads, overhead transmission lines or electric substation proposed to be located on the Property outside of the Project Site pursuant to Sections 8.6 or 10.1 (the "Related Facilities"), and solicit Owner's advice and input, before finalizing the site design. Lessee will also discuss with Owner the measures Lessee will take during construction to minimize conflicts between Lessee's construction activities and Owner's ongoing agricultural operations.

(b) Soil Restoration; Compaction; Weed Control. Outside of the Project Site, Lessee shall use commercially reasonable efforts to minimize any damage to and disturbance of growing crops and crop land caused by its construction activities and will work with Owner to minimize areas of potential soil compaction. Lessee shall not remove topsoil from the Property, and shall replace removed topsoil to the location from which it was removed to the extent practicable, or such other location on the Property as may be reasonably requested by Owner. Upon completion of construction on the Property, Lessee will restore the soil surface on any portion of the Property disturbed by Lessee that is outside of the Project Site or the boundaries of any Related Facilities. In addition, if such disturbed area was in pasture prior to construction, Lessee will re-plant native or similar grass seed on such portion of the Property. If Lessee causes compaction of any previously cultivated part of the Property located is outside of the Project Site or the boundaries of any Related Facilities, Lessee will "rip" such portion of the Property in at least three passes to a depth of at least 18 inches. After the Commercial Operation Date, Lessee will use commercially reasonable efforts to control weeds within the Project Site, the portions of the Property where Related Facilities have been installed, and in areas disturbed by Lessee's construction on the Property. Owner may spray to control weeds up to the edge of the Project Site.

(c) Underground Lines and Drainage Tiles. During construction on the Property, Lessee will promptly repair any damage to underground drainage tiles or waterways

caused by the construction activities of Lessee, and such repairs will be done by a qualified professional. Lessee shall have a continuing obligation to effect repairs to drainage tiles for any damage provided that such damage is related to the construction activities of Lessee. Once Owner has provided Lessee with written acceptance of the drainage repairs, Lessee shall be relieved of any obligation to effect further repairs unless Lessee shall cause new damage to drainage tiles or waterways.

(d) Crop Damage. If Lessee causes the destruction of existing growing crops on any part of the Property which is located outside of the Project Site or the boundaries of any Related Facilities, Lessee shall compensate Owner as calculated below (the "Crop Damage Payment"). In no case shall Lessee be required to pay more than a single, total crop loss in any one crop year on any given property. The Crop Damage Payment will be calculated using the following formula: Unit Price x 100% x Unit Yield Per Acre x Acres Damaged = Damages. Unit Price will be based on the average of the last previous March 1st and September 1st Chicago Board of Trade prices for that crop. Yield will be the average of the previous three (3) years' yields according to Owner's records for the smallest parcel of land that includes the damaged area. If Owner does not have yield records available, the parties will use FSA records or other commonly used yield information available for the area. The parties shall try in good faith to agree to the extent of damage and acreage affected. If they cannot agree, they shall promptly have the area measured and extent of damage assessed by an impartial party such as a crop insurance adjuster or extension agent. Payment shall be made within 60 days of the Commercial Operation Date for any damage caused during construction, and 30 days after determining extent of damage for damage caused at any other time.

(e) Gates and Fences. When installing a gate within Owner's existing fence, Lessee will make such fence cuts, braces, and repairs that will be permanent and remain functional for the remaining life of the fence of which they are part; alternatively, Owner may require Lessee to install a cattle guard in lieu of any internal gate. If Owner maintains locks on exterior gates, Owner will provide Lessee with keys or with the combinations to such locks. When accessing the Property, Lessee will close gates used by its personnel except when open to permit the passage of vehicular traffic, so that Owner's or Owner's tenant's livestock do not stray or escape through such gates. Additionally, Owner authorizes Lessee, at Lessee's sole expense, to take reasonable safety and security measures to reduce the risk of damage to Solar Facilities or the risk that Solar Facilities will cause damage, injury or death to people, livestock, other animals and property, including fencing around the Project Site and the perimeter of any electric substation, operations or maintenance building, or (during periods of construction) laydown area located outside of the Project Site, as Lessee may deem necessary or appropriate to secure or enclose the same.

(f) Roads. To minimize erosion caused by Lessee's construction of roads on the Property and facilitate natural drainage, Lessee will seek Owner's advice on the design and location of such roads. Lessee will incorporate Owner's advice into the final road design to the extent such advice does not substantially increase construction costs over a design based on good engineering practice, as determined by Lessee in its reasonable judgment. During construction, Lessee will keep Owner's existing site roads used by Lessee in good repair. After the Commercial Operation Date, Lessee will maintain roads used by Lessee on the Property outside of the Project Site to the extent necessary for Lessee's continued use, as reasonably determined by Lessee, and will use commercially reasonable efforts to minimize erosion caused by Lessee's road use. The

IN WITNESS WHEREOF, Owner and Lessee, individually or through duly authorized representatives, hereby execute this Agreement and certify that they have read, understand and agree to the terms and conditions of this Agreement.

"Owner"

Tromble Bay Farms III, LLC,
a Michigan limited liability company

Signed, sealed and delivered in the presence of:

Jonathan M. Kosmata
Witness

Jonathan M. Kosmata
Witness

Name: Rick A. Tromble, Trustee of The Rick A. Tromble Revocable Trust U/T/A Dated March 11, 1998
Title: Member

Signed, sealed and delivered in the presence of:

Shelly J. O'Day
Witness

Shelly J. O'Day
Witness

Name: Michele L. Tromble, Trustee of The Michele L. Tromble Revocable Trust U/T/A Dated March 11, 1998
Title: Member

"Lessee"

Orion Renewable Resources LLC,
a Delaware limited liability company

By: _____
Name: Reid M. Buckley
Title: Vice President

EXHIBIT A

Legal Description of the Property

ALL THAT CERTAIN real estate lying and being situated in Cheboygan County, Michigan, being more particularly bounded and described as follows:

Real Property Tax Parcel No. 151-008-400-001-00

The North ½ of the Southeast ¼ of Section 8, Township 36 North, Range 1 East, EXC: the East 697.00 feet of the North 125.00 feet thereof. ALSO EXC: Part of the Northeast ¼ of the Southeast ¼ of Section 8, Township 36 North, Range 1 East described as follows: Commencing at the East ¼ corner of Section 8; proceeding thence South along the East line of Section 8, a distance of 125.00 feet to the Point of Beginning; continuing thence South 208.71 feet; thence West and parallel to the East and West ¼ line 417.42 feet; thence North 208.71 feet; thence East 417.42 feet to the Point of Beginning. EXC: County Road right of way.

Real Property Tax Parcel No. 151-008-300-007-00

The East ½ of the Northeast ¼ of the Southwest ¼ of Section 8, Township 36 North, Range 1 East.

Real Property Tax Parcel No. 151-008-400-003-00

The Southwest ¼ of the Southeast ¼ of Section 8, Township 36 North, Range 1 East.

Real Property Tax Parcel No. 151-008-400-004-00

The Southeast ¼ of the Southeast ¼ of Section 8, Township 36 North, Range 1 East.

Real Property Tax Parcel No. 151-009-300-001-00

The Northwest ¼ of the Southwest ¼ of Section 9, Township 36 North, Range 1 East, EXC: Beginning at the Northeast corner thereof; thence South along East line 543.00 feet to fence line; thence Westerly along said fence line 401.10 feet; thence North parallel to said East line to North line thereof; thence East to Point of Beginning. Also EXC: North 243.00 feet of West 387.00 feet of said Northwest ¼ of the Southwest ¼, Section 9 al in T36N, R1E.

Real Property Tax Parcel No. 151-009-300-004-00

The South ½ of the Southwest ¼ of Section 9, Township 36 North, Range 1 East.

Real Property Tax Parcel No. 151-009-400-003-00

The Commencing at the Southeast corner of Section 9, Township 36 North, Range 1 East; thence North 01°05'00" West along the East line of said Section 972.32 feet to the Point of Beginning; thence North 01°05;00" West 337.50 feet to a T-iron stake at the Northeast corner of the Southeast ¼ of the Southeast /14 of said Section; thence North 87°15'30" West 1310.10 feet to ta T-iron

stake; thence South 00°53'30" East 335.33 feet to a T-iron stake; thence South 87°10'00" East 1311.37 feet to the Point of Beginning; being a part of the Southeast ¼ of said Section 9; EXCEPTING THEREFROM: That portion thereof as deeded in the instrument recorded in Liber 111, Page 505, Cheboygan County Records,

And Also:

Commencing at the Southeast corner of Section 9, Township 36 North, Range 1 East; thence North 01°05'00" West along the East line of said Section 635.92 feet to the Point of Beginning; thence North 01°05'00" West 336.40 feet; thence North 87°10'00" West 1311.37 feet to a T-iron stake; thence South 00°53'30" East 336.32 feet to a T-iron stake; thence South 87° 10'00" East 1312.49 feet to the Point of Beginning; being a part of the Southeast 1/4 of said Section 9; EXCEPTING THEREFROM: That portion thereof as deeded in the Instrument recorded in Liber 111, Page 505, Cheboygan County Records,

And Also:

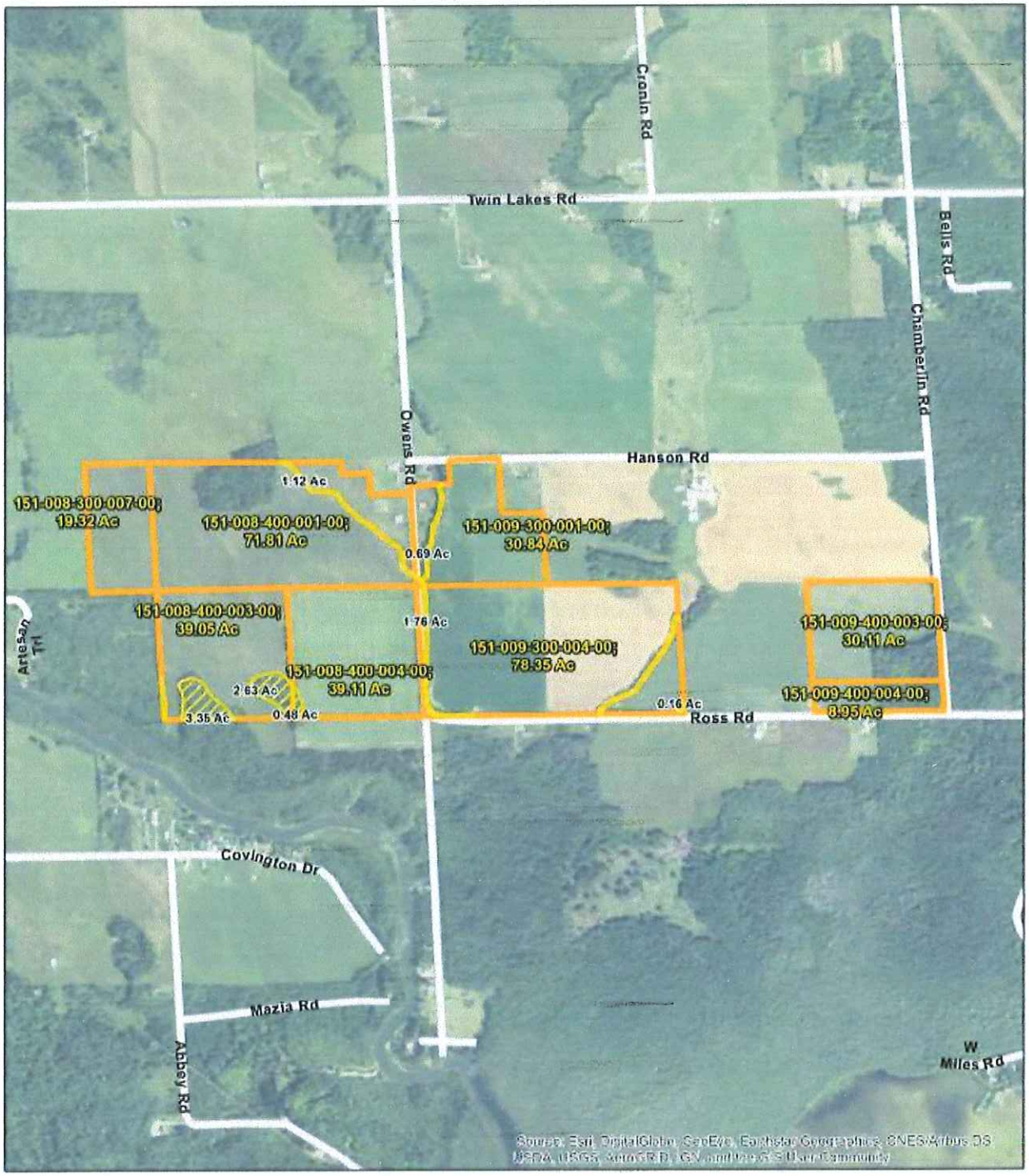
Commencing at the Southeast corner of Section 9, Township 36 North, Range 1 East; thence North 01°05'00" West along the East line of said Section 300.92 feet to the Point of Beginning; thence North 01°05'00" West 335.00 feet; thence North 87°10'00" West 1312.49 feet to a T-iron stake; thence South 00°53'30" East 334.92 feet to a T-iron stake; thence South 87°10'00" East 1313.61 feet to the Point of Beginning; being a part of the Southeast 1/4 of said Section 9; EXCEPTING THEREFROM: That portion thereof as deeded in the Instrument recorded in Liber 111, Page 505, Cheboygan County Records.

Real Property Tax Parcel No. 151-009-400-004-00

Beginning at the Southeast corner of Section 9, Township 36 North, Range 1 East; thence North 01°05'00" West along the East line of said Section 300.92 feet; thence North 87°10'00" West 1313.61 feet to a T-iron stake; thence South 00°53'30" East 300.86 feet to a T-iron stake on the South line of said Section; thence South 87°10'00" East 1314.62 feet to the Point of Beginning; being a part of the Southeast 1/4 of said Section 9; EXCEPTING THEREFROM: That portion thereof as deeded in the Instrument recorded in Liber 111, Page 505, Cheboygan County Records; FURTHER EXCEPTING THEREFROM: That portion thereof as deeded in the Instrument recorded in Uber 218, Page 327, Cheboygan County Records.

(In the event of any inaccuracies or insufficiencies in the above legal description, Lessee may modify this Exhibit A to correct such inaccuracies or insufficiencies)

EXHIBIT B
Excluded Area



NORTH

1 inch = 1,250 feet

0 500 1,000 1,500 2,000 Feet

Exhibit B -Tromble Bay Farms III, LLC; MI-ALV1-119

No Solar Panels Area - 10.19 Ac

Property - 317.54 Ac

Cheboygan Co., MI

10/23/2017

ORION RENEWABLE ENERGY GROUP LLC

LEASE AGREEMENT
(#MI-ALV1-105)

This Lease Agreement (this "Agreement") is made, dated and effective as of ~~October~~ November 16, 2017 (the "Effective Date"), between **Tromble Bay Farms II, LLC, a Michigan limited liability company** ("Owner"), and **Orion Renewable Resources LLC, a Delaware limited liability company** (together with its transferees, successors and assigns, "Lessee"), and in connection herewith, Owner and Lessee agree, covenant and contract as set forth in this Agreement. Owner and Lessee are sometimes referred to in this Agreement as a "Party" or collectively as the "Parties".

NOW, THEREFORE, the Parties agree as follows:

1. Lease. Owner hereby leases to Lessee the real property of Owner consisting of approximately 888.84 acres (which includes 62.95 acres identified as an Excluded Area (defined below)) located in Cheboygan County, Michigan, and legally described on Exhibit A attached hereto and incorporated herein by reference. Such lease ("Lease") includes the right to access and utilize all radiant energy emitted from the sun upon, over and across the real property ("Solar Energy"), and any easements, rights-of-way, and other rights and benefits relating or appurtenant to such real property (collectively, the "Property"). In the event of inaccuracies or insufficiencies in the legal description in Exhibit A Lessee may modify Exhibit A to correct the inaccuracies or insufficiencies, and shall notify Owner of such modification.

2. Purpose. Lessee shall have the exclusive right to use the Property and the unobstructed flow of Solar Energy upon, over and across the Property for electric power, heat and/or steam generation purposes ("Solar Energy Purposes") and to derive all profits therefrom. For purposes of this Agreement, Solar Energy Purposes include, without limitation, the right to convert the Solar Energy into electrical energy and to collect and transmit the electrical energy so converted, together with any and all activities related thereto, including, without limitation, (a) determining the feasibility of Solar Energy conversion and power generation on the Property, including studies of the Solar Energy emitted upon, over and across the Property and other meteorological, archeological and environmental studies, land surveys and due diligence activities; (b) constructing, installing, using, replacing, relocating and removing from time to time, and maintaining, refurbishing and operating, Solar Energy collection and electrical generating equipment of all types including, without limitation, any such equipment utilizing photovoltaic and/or solar thermal technology (collectively referred to herein as "Solar Generating Equipment"), overhead and underground electrical transmission and communications lines, electric transformers, energy storage facilities, telecommunications equipment, power generation facilities to be operated in conjunction with Solar Generating Equipment, roads and gates, meteorological towers and Solar Energy measurement equipment, control buildings, maintenance yards, and related facilities and equipment (the Solar Generating Equipment together with all of the other foregoing equipment and improvements, collectively "Solar Facilities") on the Property; and (c) undertaking any other activities, whether accomplished by Lessee or a third party authorized by Lessee, that Lessee reasonably determines are necessary, useful or appropriate to accomplish any of the foregoing. Lessee and its consultants may enter the Property, upon reasonable advance notice, to do work related to development of Solar Facilities. Subject to Owner's rights to use the Property in any manner consistent with Section 8.2, Lessee shall have the right to control and

8.5 *Requirements of Governmental Agencies*. Owner shall assist and fully cooperate with Lessee, at no out-of-pocket expense to Owner, in complying with or obtaining any land use permits and approvals, building permits, environmental impact reviews, or any other approvals required for the financing, construction, installation, monitoring, replacement, relocation, maintenance, operation or removal of Solar Facilities (whether located on the Property or elsewhere), including execution of applications for such approvals if required. In connection with any applications for such approvals, Owner agrees at Lessee's request to support such application (at no out-of-pocket expense to Owner) at any administrative, judicial or legislative level, including participating in any appeals or regulatory proceedings. If Owner is contacted directly by any governmental agency about this Agreement, any Solar Facilities or the Property, Owner shall notify Lessee. To the extent permitted by law, Owner hereby waives any setbacks or other restrictions on the location of any Solar Facilities to be installed on the Property or on adjacent properties, including but not limited to waiver of all property line setbacks, pursuant to state or county rules, regulations or ordinances (that is, Owner approves a reduction of each such setback to zero), and Owner shall cooperate with Lessee in providing documentation of such setback waivers and shall execute any documents reasonably requested by Lessee to evidence Owner's waiver of such setbacks.

8.6 *Access*. Owner hereby grants to Lessee the right of ingress to and egress from Solar Facilities (whether located on the Property, on adjacent property or elsewhere) over and across the Property by means of roads and lanes thereon if existing, or otherwise by such route or routes as Lessee may construct from time to time ("Access Easement"). The Access Easement shall include the right to improve existing roads and lanes, shall run with the Property, and shall inure to the benefit of and be binding upon Owner and Lessee and their respective transferees, successors and assigns, and all persons claiming under them. The Access Easement shall expire upon termination or expiration of this Agreement.

8.7 *Construction Easement*. Owner grants Lessee an easement in, over and across the Property ("Construction Easement") which may be utilized on a temporary basis for access, construction laydown or other purposes to facilitate the construction, maintenance or repair of Solar Facilities (whether located on the Property or nearby properties) during any time that Lessee is conducting such work. Lessee shall have the right to (a) remove any existing trees on the Property that might interfere with operation of the Solar Facilities; and (b) change the grade of any part of the Property used as a Project Site, to the extent reasonably necessary to construct Solar Facilities. Lessee will use commercially reasonable efforts to minimize surface disturbance on the portion of the Property lying outside of the Project Site during construction. Lessee will comply with Section 7.6 with respect to damage caused by Lessee's use of the Construction Easement. The Construction Easement shall run with the Property, and shall inure to the benefit of and be binding upon Owner and Lessee and their respective transferees, successors and assigns, and all persons claiming under them. The Construction Easement shall expire upon the termination or expiration of this Agreement.

8.8 *Mineral Development*. Owner reserves the right to develop the minerals, if any, owned by Owner or third parties on the Property so long as such development (including, without limitation, any drilling or mining) does not interfere with Lessee's use of the Property (as provided in Section 8.2) and does not materially diminish the amount of land surface of the Property available for Solar Energy Purposes.

IN WITNESS WHEREOF, Owner and Lessee, individually or through duly authorized representatives, hereby execute this Agreement and certify that they have read, understand and agree to the terms and conditions of this Agreement.

"Owner"

Tromble Bay Farms II, LLC,
a Michigan limited liability company

Signed, sealed and delivered in the presence of:

Jonathan M. Kosmata
Witness

Jonathan Kosmata
Witness

Trustee
Name: Rick A. Tromble, Trustee of The Rick A. Tromble Revocable Living Trust U/T/A Dated March 11, 1998
Title: Member

Signed, sealed and delivered in the presence of:

Shelly J. O'Day
Witness

Shelly J. O'Day
Witness

Michele Tromble-Trustee
Name: Michele L. Tromble, Trustee of The Michele L. Tromble Revocable Living Trust U/T/A Dated March 11, 1998
Title: Member

"Lessee"

Orion Renewable Resources LLC,
a Delaware limited liability company

By: Reid M. Buckley
Name: Reid M. Buckley
Title: Vice President

EXHIBIT A

Legal Description of the Property

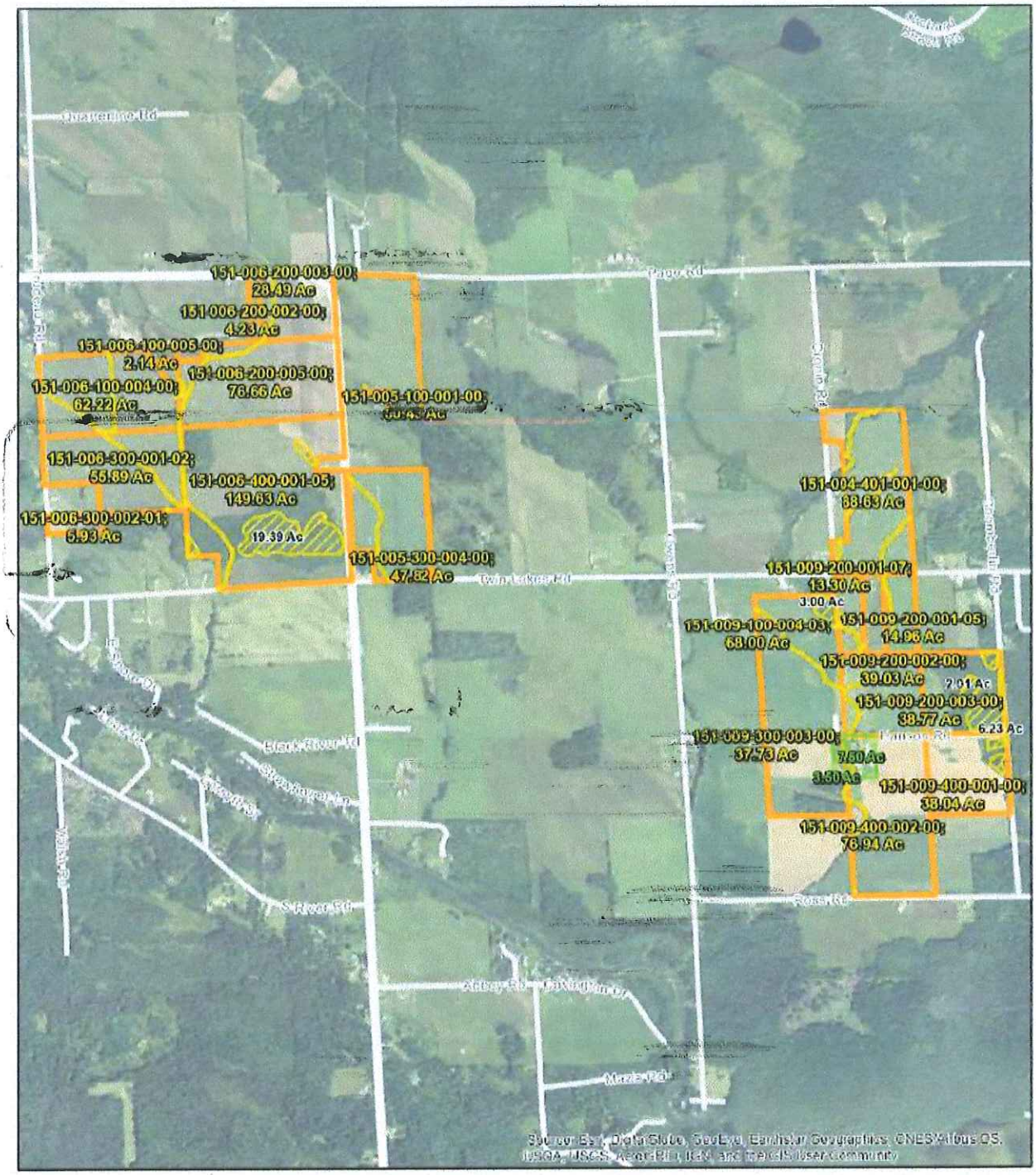
ALL THAT CERTAIN real estate lying and being situated in Cheboygan County, Michigan, being more particularly bounded and described as follows:

Tax Parcel No.	Section	Township	Range	Legal Description	Acres
151-006-200-002-00	6	36N	1E	Part of NW FRL ¼ of the NE FRL ¼	4.23
151-005-300-004-00	5	36N	1E	Part of the W ¼	47.82
151-005-100-001-00	5	36N	1E	W ½ of the NW ¼, EXC: BEG AT W ¼ COR SEC 5; TH N 00° 25' W ALG W LI 325FT; TH N 87° 35' E 770FT; TH S 00° 25' E 394.02FT TO E W ¼ LI; TH N 87° 18' 15" W 770.01FT TO POB.	60.43
151-004-401-001-00	4	36N	1E	W ½ of the SE ¼, EXC: COM SW COR W ½ OF SE ¼, SEC 4; TH N 527.5FT TO POB; TH N 1585FT; TH E 275FT; TH S 1585FT; TH W 275FT TO POB.	68.63
151-009-200-003-00	9	36N	1E	SE ¼ of the NE ¼	38.77
151-009-400-001-00	9	36N	1E	NE ¼ of the SE ¼	38.04
151-009-200-002-00	9	36N	1E	SW ¼ of the NE ¼	39.03
151-009-400-002-00	9	36N	1E	W ½ of the SE ¼	76.94
151-009-100-004-03	9	36N	1E	E ½ of the NW ¼, EXC: N ½ OF N ½ OF NE ¼ OF NW ¼.	68.00
151-009-300-003-00	9	36N	1E	NE ¼ of the SW ¼	37.73
151-009-200-001-07	9	36N	1E	Part of the NE ¼	13.30
151-006-400-001-05	6	36N	1E	SE ¼, EXC: COM E ¼ COR SEC 6, T36N,R1E; TH ALG E LI OF SD SEC S 01° 15' 07" E 647.43FT TO POB; TH CONT S 01° 15' 07" E 206.46FT; TH S 88° 44' 53" W 448.23FT; TH N 01° 15' 07" W 206.46FT; TH N 88° 44' 53" E 448.23FT TO POB.	149.63
151-006-200-005-00	6	36N	1E	S ½ of the NE ¼, EXC: W 439.56FT OF N 232.32FT.	76.66

151-006-200-003-00	6	36N	1E	NE FRL ¼ of the NE FRL ¼	28.49
151-006-100-005-00	6	36N	1E	Part of the SE ¼ of the NW ¼	2.14
151-006-300-001-02	6	36N	1E	N FRL ½ of the SW FRL ¼, EXC: COM AT W 1/4 COR SEC 6, T36N,R1E; TH ALG W SEC LI S 01° 09' 13" W 803.32FT TO POB; TH N 88° 17' 35" E 855FT; TH S 01° 09' 13" E 499.88FT TO S LI OF NW FRL 1/4 OF SW FRL 1/4; TH ALG SD LI S 88° 17' 35" W T.	55.89
151-006-100-004-00	6	36N	1E	S ½ of the NW ¼, EXC: COM AT NE COR; TH S ALG ¼ LI 3.52 CHS; TH W & PARA WITH N 1/8 LI SEC 6, 4.86 CHS; TH N 34° 45' W 4.19 CHS TO 1/8 LI; TH E ON 1/8 LI ABOUT 7.69 CHS TO POB.	62.22
151-009-200-001-05	9	36N	1E	Part of the NE ¼	14.96
151-006-300-002-01	6	36N	1E	SW FRL ¼ of the SW FRL ¼, EXC: S 12 ACRES. **AND** EXC: COM AT SW COR OF SEC 6, T36N,R1E; TH ALG W LI OF SD SEC N 01° 09M 13S W 574.64FT TO POB; TH CONT N 01° 09' 13" W 480FT; TH N 88° 17' 35" E 908.80FT; TH S 01° 13' 11" E 480FT; TH S.	

(In the event of any inaccuracies or insufficiencies in the above legal description, Lessee may modify this Exhibit A to correct such inaccuracies or insufficiencies)

EXHIBIT B
Excluded Area



NORTH

1 inch = 2,000 feet

0 1,000 2,000 3,000 Feet

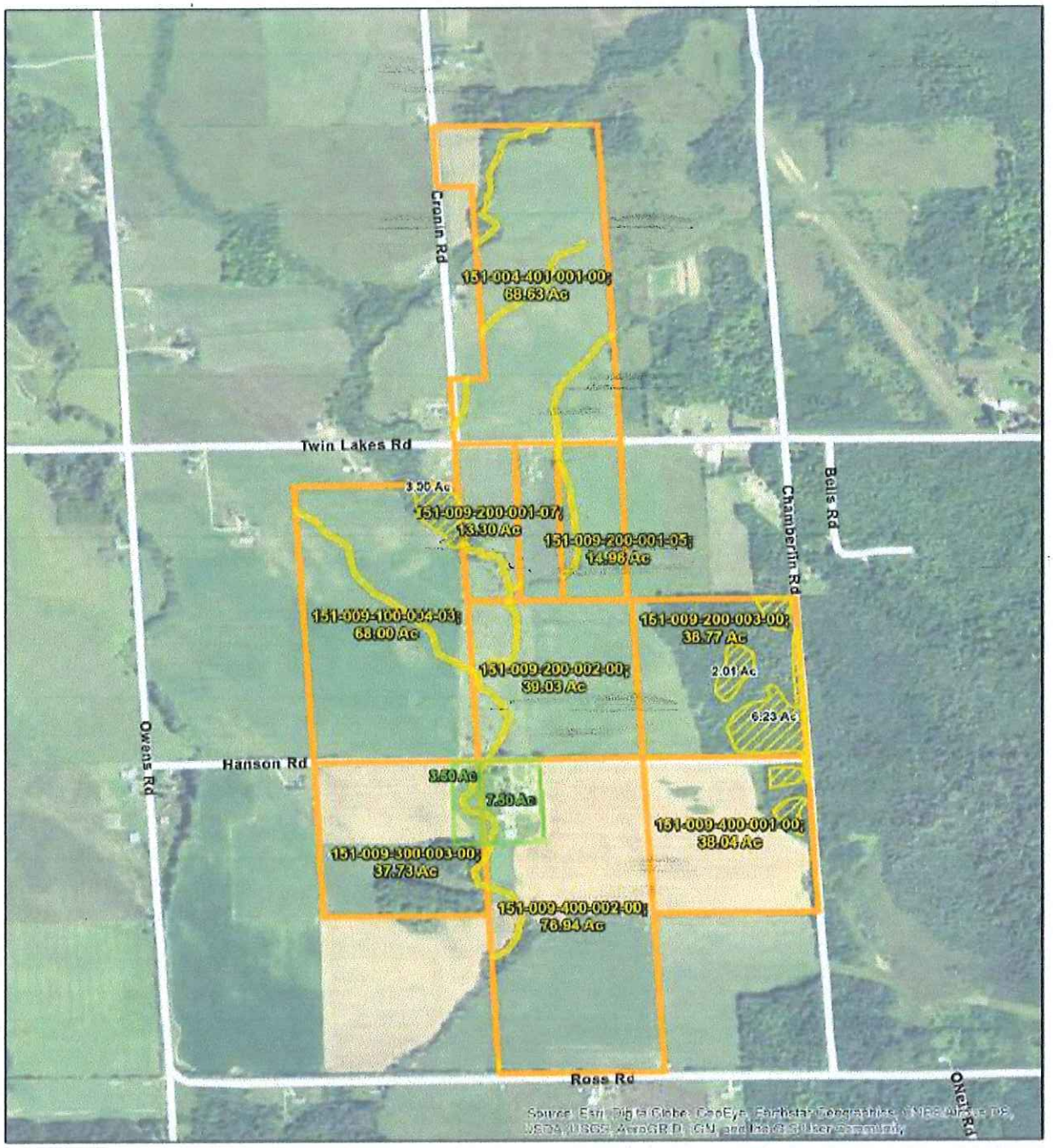
Exhibit B - Tromble Bay Farms II, LLC; MI-ALV1-105

No Facilities Area - 11.00 Ac
No Solar Panels Area - 51.95 Ac
Property - 888.84 Ac

Cheboygan Co., MI
7/19/2017

ORION RENEWABLE ENERGY GROUP LLC

EXHIBIT B
Excluded Area
(continued)



NORTH

1 inch = 1,000 feet

0 500 1,000 1,500 Feet

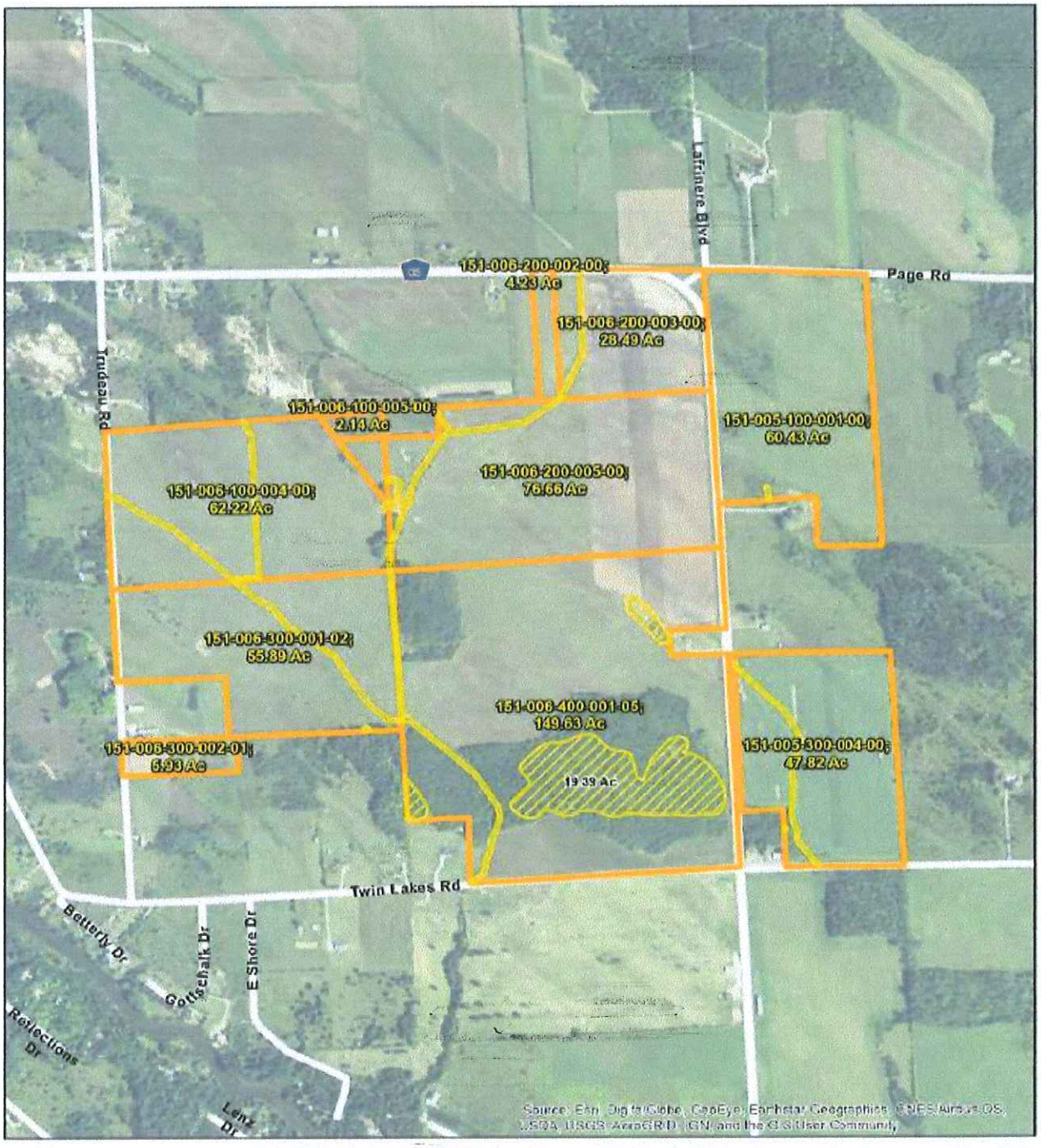
Exhibit B - Tromble Bay Farms II, LLC (East); MI-ALV1-105

Cheboygan Co., MI
7/19/2017

No Facilities Area - 11.00 Ac
No Solar Panels Area - 51.95 Ac
Property - 888.84 Ac

ORION RENEWABLE ENERGY GROUP LLC

EXHIBIT B
Excluded Area
(continued)



NORTH

1 inch = 1,000 feet

0 500 1,000 1,500 Feet

Exhibit B - Tromble Bay Farms II, LLC (West); MI-ALV1-105

Cheboygan Co., MI

7/19/2017

No Facilities Area - 11.00 Ac

No Solar Panels Area - 51.95 Ac

Property - 888.84 Ac

ORION RENEWABLE ENERGY GROUP LLC

LEASE AGREEMENT
(#MI-ALV1-114)

This Lease Agreement (this "Agreement") is made, dated and effective as of April 5, 2018 (the "Effective Date"), between **David Wolf and Michele Wolf, husband and wife**, (collectively, "Owner"), and **Orion Renewable Resources LLC, a Delaware limited liability company** (together with its transferees, successors and assigns, "Lessee"), and in connection herewith, Owner and Lessee agree, covenant and contract as set forth in this Agreement. Owner and Lessee are sometimes referred to in this Agreement as a "Party" or collectively as the "Parties".

NOW, THEREFORE, the Parties agree as follows:

1. Lease. Owner hereby leases to Lessee the real property of Owner consisting of approximately 71.14 acres (which includes 21.70 acres identified as an Excluded Area (defined below)) located in Cheboygan County, Michigan, and legally described on Exhibit A attached hereto and incorporated herein by reference. Such lease ("Lease") includes the right to access and utilize all radiant energy emitted from the sun upon, over and across the real property ("Solar Energy"), and any easements, rights-of-way, and other rights and benefits relating or appurtenant to such real property (collectively, the "Property"). In the event of inaccuracies or insufficiencies in the legal description in Exhibit A Lessee may modify Exhibit A to correct the inaccuracies or insufficiencies, and shall notify Owner of such modification.

2. Purpose. Lessee shall have the exclusive right to use the Property and the unobstructed flow of Solar Energy upon, over and across the Property for electric power, heat and/or steam generation purposes ("Solar Energy Purposes") and to derive all profits therefrom. For purposes of this Agreement, Solar Energy Purposes include, without limitation, the right to convert the Solar Energy into electrical energy and to collect and transmit the electrical energy so converted, together with any and all activities related thereto, including, without limitation, (a) determining the feasibility of Solar Energy conversion and power generation on the Property, including studies of the Solar Energy emitted upon, over and across the Property and other meteorological, archeological and environmental studies, land surveys and due diligence activities; (b) constructing, installing, using, replacing, relocating and removing from time to time, and maintaining, refurbishing and operating, Solar Energy collection and electrical generating equipment of all types including, without limitation, any such equipment utilizing photovoltaic and/or solar thermal technology (collectively referred to herein as "Solar Generating Equipment"), overhead and underground electrical transmission and communications lines, electric transformers, energy storage facilities, telecommunications equipment, power generation facilities to be operated in conjunction with Solar Generating Equipment, roads and gates, meteorological towers and Solar Energy measurement equipment, control buildings, maintenance yards, and related facilities and equipment (the Solar Generating Equipment together with all of the other foregoing equipment and improvements, collectively "Solar Facilities") on the Property; and (c) undertaking any other activities, whether accomplished by Lessee or a third party authorized by Lessee, that Lessee reasonably determines are necessary, useful or appropriate to accomplish any of the foregoing. Lessee and its consultants may enter the Property, upon reasonable advance notice, to do work related to development of Solar Facilities. Subject to Owner's rights to use the Property in any manner consistent with Section 8.2, Lessee shall have the right to control and

than $5 million after the Start of Construction of combined single limit liability coverage. Under such policy, Owner will be named as an additional insured with respect to operations or activities of Lessee but only to the extent Owner is held liable for damage and injuries caused by such operation or activities for which Lessee has agreed to indemnify Owner pursuant to Section 7.3(a). No coverage is provided for liability arising out of Owner's own negligence or misconduct. Certificates of such insurance, or evidence of self-insurance reasonably acceptable to Owner, shall be provided to Owner upon request.

7.3 *Mutual Indemnities*.

(a) Lessee's Indemnity. Lessee will indemnify, defend and hold harmless Owner and Owner's shareholders, directors, successors, assigns, personal representatives, trustees, mortgagees, employees and agents (collectively, "Owner's Indemnified Parties") against any and all losses, damages, claims, expenses and other liabilities, including without limitation, reasonable attorneys' fees, resulting from or arising out of physical damage to property or physical injury to any person, in each case to the extent caused by the operations or activities of Lessee or its employees, contractors or agents. The reference to property damage in the preceding sentence does not include losses of rent, business opportunities, profits and the like that may result from Owner's loss of use of the Project Site or any other portion of the Property occupied by Solar Facilities. This indemnification shall survive the termination of this Agreement. This indemnification shall not apply to losses, damages, claims, expenses and other liabilities to the extent caused by the negligence or misconduct of Owner or any of Owner's Indemnified Parties or any party other than Lessee or its employees, contractors or agents. Owner authorizes Lessee to take reasonable safety measures to reduce the risk that the Solar Facilities will cause physical damage or injuries.

(b) Owner's Indemnity. Owner will indemnify, defend and hold harmless Lessee and Lessee's members, shareholders, directors, successors, assigns, affiliates, personal representatives, trustees, mortgagees, employees and agents (collectively, "Lessee's Indemnified Parties") against any and all losses, damages, claims, expenses and other liabilities, including without limitation, reasonable attorneys' fees, resulting from or arising out of physical damage to property or physical injury to any person, in each case to the extent caused by (i) any negligent act or failure to act by Owner, guest or invitee, or (ii) any breach of this Agreement by Owner. This indemnification shall survive the termination of this Agreement. This indemnification shall not apply to losses, damages, claims, expenses and other liabilities to the extent caused by the negligence or misconduct of Lessee or any of Lessee's Indemnified Parties or any party other than Owner or its employees, contractors or agents.

7.4 *Requirements of Governmental Agencies*. Lessee, at its expense, shall comply in all material respects with valid laws, ordinances, statutes, orders, and regulations of any governmental agency applicable to the construction and operation of the Solar Facilities. Lessee shall have the right, in its sole discretion, to contest by appropriate legal proceedings, the validity or applicability to the Property, Project Site or Solar Facilities of any law, ordinance, statute, order, regulation, property assessment, or the like now or hereafter made or issued by any federal, state, county, local or other governmental agency or entity. Owner shall cooperate in every reasonable way in such contest, including joining in the signing of any reasonable protests or pleading that Lessee may deem advisable to file, at no out-of-pocket expense to Owner. Any such contest or proceeding shall be controlled and directed by Lessee, but Lessee shall indemnify Owner from

Lessee's failure to observe or comply with the contested law, ordinance, statute, order, regulation or property assessment.

7.5 *Construction Liens*. Lessee shall keep the Property free and clear of all liens and claims of liens for labor and services performed on, and materials, supplies, or equipment furnished to, the Property in connection with Lessee's use of the Property. Lessee may contest any such lien and the legal validity and amount of any such lien; *provided, however*, that if Lessee elects to contest any such lien, Lessee shall, within 60 days after it receives notice of the filing of such lien, either bond around such lien or establish appropriate reserves therefor, or otherwise remove such lien from the Property pursuant to applicable law.

7.6 *Lessee Non-Interference with Agricultural Activities*. In the construction and operation of its Solar Facilities, Lessee will make commercially reasonable efforts not to interfere with Owner's agricultural activities on the Property. To facilitate communication, Lessee and Owner will each designate a single point of contact with the other party.

(a) Construction and Siting. Lessee will consult with Owner (or, at Owner's request, with Owner's then-current tenant) prior to the Start of Construction to describe Lessee's plan and schedule for construction on the Property. As part of the consultation, Lessee will present a preliminary site map showing the Project Site and any new roads, overhead transmission lines or electric substation proposed to be located on the Property outside of the Project Site pursuant to Sections 8.6 or 10.1 (the "Related Facilities"), and solicit Owner's advice and input, before finalizing the site design. Lessee will also discuss with Owner the measures Lessee will take during construction to minimize conflicts between Lessee's construction activities and Owner's ongoing agricultural operations.

(b) Soil Restoration; Compaction; Weed Control. Outside of the Project Site, Lessee shall use commercially reasonable efforts to minimize any damage to and disturbance of growing crops and crop land caused by its construction activities and will work with Owner to minimize areas of potential soil compaction. Lessee shall not remove topsoil from the Property, and shall replace removed topsoil to the location from which it was removed to the extent practicable, or such other location on the Property as may be reasonably requested by Owner. Upon completion of construction on the Property, Lessee will restore the soil surface on any portion of the Property disturbed by Lessee that is outside of the Project Site or the boundaries of any Related Facilities. In addition, if such disturbed area was in pasture prior to construction, Lessee will re-plant native or similar grass seed on such portion of the Property. If Lessee causes compaction of any previously cultivated part of the Property located is outside of the Project Site or the boundaries of any Related Facilities, Lessee will "rip" such portion of the Property in at least three passes to a depth of at least 18 inches. After the Commercial Operation Date, Lessee will use commercially reasonable efforts to control weeds within the Project Site, the portions of the Property where Related Facilities have been installed, and in areas disturbed by Lessee's construction on the Property. Owner may spray to control weeds up to the edge of the Project Site.

(c) Underground Lines and Drainage Tiles. During construction on the Property, Lessee will promptly repair any damage to underground drainage tiles or waterways caused by the construction activities of Lessee, and such repairs will be done by a qualified professional. Lessee shall have a continuing obligation to effect repairs to drainage tiles for any

damage provided that such damage is related to the construction activities of Lessee. Once Owner has provided Lessee with written acceptance of the drainage repairs, Lessee shall be relieved of any obligation to effect further repairs unless Lessee shall cause new damage to drainage tiles or waterways.

(d) Crop Damage. If Lessee causes the destruction of existing growing crops on any part of the Property which is located outside of the Project Site or the boundaries of any Related Facilities, Lessee shall compensate Owner as calculated below (the "Crop Damage Payment"). In no case shall Lessee be required to pay more than a single, total crop loss in any one crop year on any given property. The Crop Damage Payment will be calculated using the following formula: Unit Price x 100% x Unit Yield Per Acre x Acres Damaged = Damages. Unit Price will be based on the average of the last previous March 1st and September 1st Chicago Board of Trade prices for that crop. Yield will be the average of the previous three (3) years' yields according to Owner's records for the smallest parcel of land that includes the damaged area. If Owner does not have yield records available, the parties will use FSA records or other commonly used yield information available for the area. The parties shall try in good faith to agree to the extent of damage and acreage affected. If they cannot agree, they shall promptly have the area measured and extent of damage assessed by an impartial party such as a crop insurance adjuster or extension agent. Payment shall be made within 60 days of the Commercial Operation Date for any damage caused during construction, and 30 days after determining extent of damage for damage caused at any other time.

(e) Gates and Fences. When installing a gate within Owner's existing fence, Lessee will make such fence cuts, braces, and repairs that will be permanent and remain functional for the remaining life of the fence of which they are part; alternatively, Owner may require Lessee to install a cattle guard in lieu of any internal gate. If Owner maintains locks on exterior gates, Owner will provide Lessee with keys or with the combinations to such locks. When accessing the Property, Lessee will close gates used by its personnel except when open to permit the passage of vehicular traffic, so that Owner's or Owner's tenant's livestock do not stray or escape through such gates. Additionally, Owner authorizes Lessee, at Lessee's sole expense, to take reasonable safety and security measures to reduce the risk of damage to Solar Facilities or the risk that Solar Facilities will cause damage, injury or death to people, livestock, other animals and property, including fencing around the Project Site and the perimeter of any electric substation, operations or maintenance building, or (during periods of construction) laydown area located outside of the Project Site, as Lessee may deem necessary or appropriate to secure or enclose the same.

(f) Roads. To minimize erosion caused by Lessee's construction of roads on the Property and facilitate natural drainage, Lessee will seek Owner's advice on the design and location of such roads. Lessee will incorporate Owner's advice into the final road design to the extent such advice does not substantially increase construction costs over a design based on good engineering practice, as determined by Lessee in its reasonable judgment. During construction, Lessee will keep Owner's existing site roads used by Lessee in good repair. After the Commercial Operation Date, Lessee will maintain roads used by Lessee on the Property outside of the Project Site to the extent necessary for Lessee's continued use, as reasonably determined by Lessee, and will use commercially reasonable efforts to minimize erosion caused by Lessee's road use. The crown of new roads located in any previously cultivated portion of the Property will be kept to a minimum. Lessee will ensure there is an adequate crossing point for agricultural vehicles over any

IN WITNESS WHEREOF, Owner and Lessee, individually or through duly authorized representatives, hereby execute this Agreement and certify that they have read, understand and agree to the terms and conditions of this Agreement.

"Owner"

David Wolf and Michele Wolf

Name: David Wolf
Title: Owner

Name: Michele Wolf
Title: Owner

"Lessee"

Orion Renewable Resources LLC,
a Delaware limited liability company

By:
Name: Reid M. Buckley
Title: Vice President

EXHIBIT A

Legal Description of the Property

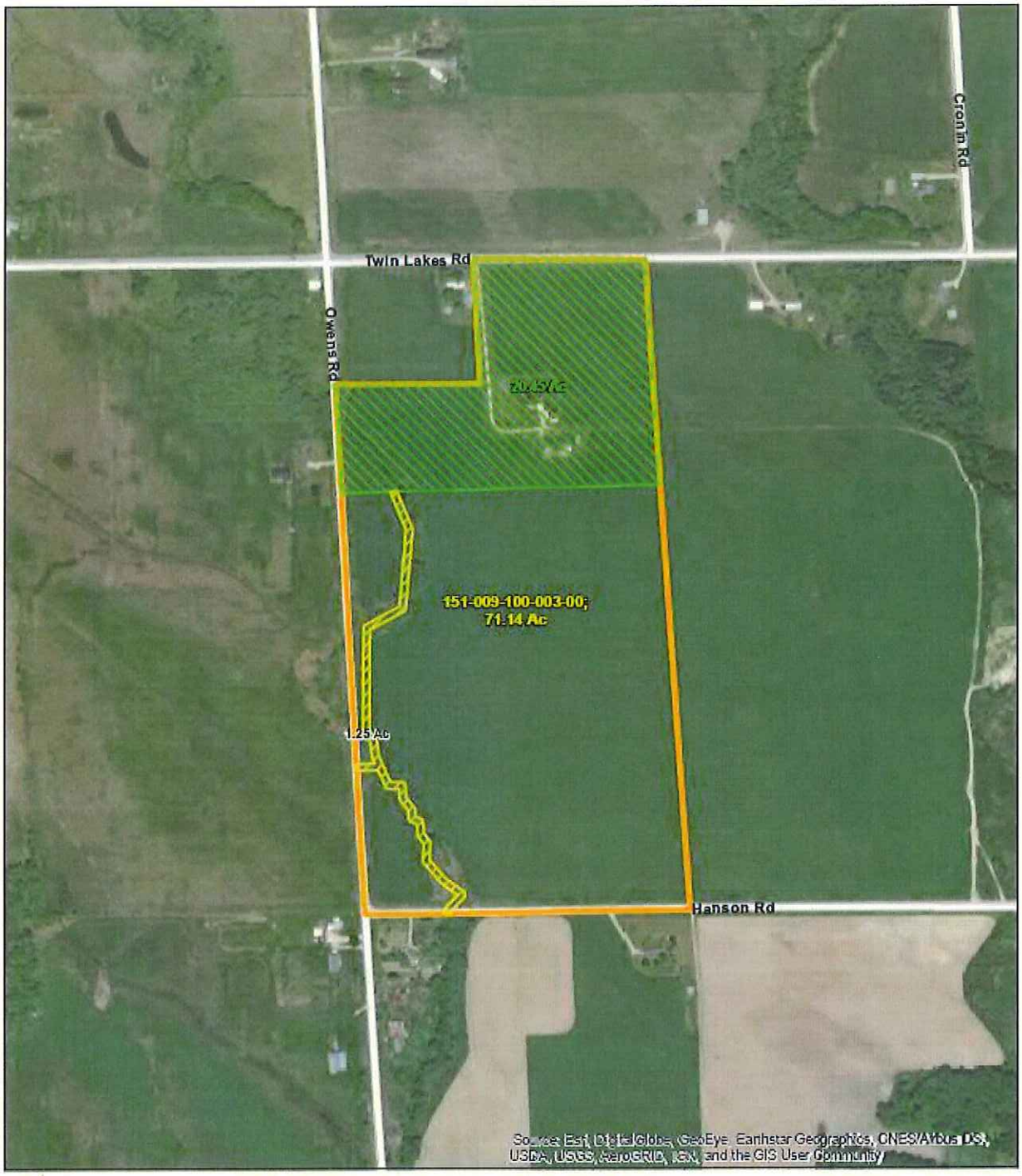
ALL THAT CERTAIN real estate lying and being situated in Cheboygan County, Michigan, being more particularly bounded and described as follows:

Real Property Tax Parcel No. 151-009-100-003-00

The West Half (W 1/2) of the Northwest Quarter (NW 1/4) of Section 9, Township 36 North, Range 1 East
EXCEPT Commencing at the Northwest corner of Section 9, Township 36 North, Range 1 East; thence East along North Section line 584 feet; thence Sontherly 500 feet; thence Westerly and parallel with the North Section line to the West line of Section 9; thence Northerly along said Section line to the point of beginning.
ACREAGE: 71.14

(In the event of any inaccuracies or insufficiencies in the above legal description, Lessee may modify this Exhibit A to correct such inaccuracies or insufficiencies)

EXHIBIT B
Excluded Area



NORTH

1 inch = 500 feet

0 300 600 Feet

Exhibit B - David and Michele Wolf; MI-ALV1-114

No Facilities Area - 20.45 Ac

No Solar Panels Area - 1.25 Ac

Property - 71.14 Ac

Cheboygan Co., MI
3/15/2018

ORION RENEWABLE ENERGY GROUP LLC

Recording Requested By and
When Recorded Return to:

Orion Renewable Resources LLC
c/o Orion Renewable Energy Group LLC
155 Grand Avenue, Suite 706
Oakland, CA 94612
(510) 267-8921
Attn: General Counsel

#MI-ALV1-044T
Cheboygan County, Michigan

GRANT OF EASEMENT AND EASEMENT AGREEMENT FOR UNDERGROUND COLLECTION FACILITIES

THIS GRANT OF EASEMENT AND EASEMENT AGREEMENT FOR COLLECTION FACILITIES (this "Agreement") is made, dated and effective as of June 5, 2018 (the "Effective Date"), between **Lisa A. Herron, a single person** ("Owner"), and **Orion Renewable Resources LLC, a Delaware limited liability company** ("Grantee").

Grantee is developing a solar farm in portions of Cheboygan County, Michigan ("Solar Farm") and Owner is the sole owner of certain real property consisting of approximately 79.30 acres of land in Cheboygan County, Michigan, as more particularly described in Exhibit A attached hereto and made part hereof (the "Property").

For good and valuable consideration, the legal sufficiency of which is hereby acknowledged by both parties, Owner and Grantee agree as follows:

1. Addresses. All notices, requests and communications in connection with this Agreement shall be addressed as follows:

If to Owner: Lisa A. Herron
7393 Twin Lakes Rd.
Cheboygan, MI 49721

If to Grantee: Orion Renewable Resources LLC
c/o Orion Renewable Energy Group LLC
155 Grand Avenue, Suite 706
Oakland, CA 94612
Attention: General Counsel

2. Grant of Collection Easement. Owner grants to Grantee an easement (the "Collection Easement") in, on, under, along and across a portion of the Property approximately

replace, relocate, remove, maintain and use the following from time to time: underground wires and cables for the collection and transmission of electrical energy and/or for communication purposes, and all necessary and proper surface markers and other appliances, fixtures, and related facilities for use in connection with said wires and cables in, on, under, along and across the Easement Area (the foregoing enumerated items are herein collectively called the "Collection Facilities"). The Collection Easement shall expire upon termination or expiration of this Agreement. The Easement Area will be located within the "Easement Corridor" shown on the map attached hereto as Exhibit A-1, and Grantee will use commercially reasonable efforts to locate the Easement Area as close as reasonably practicable to a property line, public road, existing transmission line, or fence line.

3. Payment. In consideration of the rights granted hereunder, Grantee agrees to pay Owner the amounts set forth in the Fee Schedule attached hereto ("Fee Schedule").

4. Early Termination. If Grantee has not commenced construction of the Solar Farm ("Start of Construction") on or before the seventh anniversary of the Effective Date, Owner may terminate this Agreement by written notice to Grantee within 60 days of such anniversary, and upon such termination, there shall be no further obligations of either party; *provided, however,* that upon payment of the amount set forth in the Fee Schedule, Grantee may extend such seventh anniversary date to the tenth anniversary of the Effective Date. Grantee shall notify Owner prior to the commencement of construction of Collection Facilities.

5. Term and Termination.

5.1. Unless earlier terminated, this Agreement shall be for an initial term ("Initial Term") commencing on the Effective Date and continuing until the later of (a) 30 years after the first day of the month following the month in which the Solar Farm begins delivering commercial quantities of electricity to the electric utility grid, or (b) 37 years after the Effective Date. Unless earlier terminated, Grantee may elect to extend the Initial Term for one or two additional 10-year terms commencing on the last day of the Initial Term or the 10th anniversary of such day, respectively, upon at least 30 days' notice to Owner.

5.2. An "Event of Default" shall exist under this Agreement if: (1) (A) Grantee fails to pay Owner any amount due hereunder, or (B) Grantee defaults in the performance of any other material covenant or agreement contained in this Agreement, and (2) either such default in (A) and (B) hereof continues uncured for a period of 60 days after written notice thereof from Owner to Grantee, unless such default cannot be reasonably cured within such 60-day period, in which case no Event of Default shall exist if Grantee, within such 60-day period, commences to cure such default and thereafter prosecutes the cure of such default in good faith and with due diligence. Upon the occurrence of an Event of Default, Owner may terminate this Agreement by recording in the real property records of Cheboygan County, Michigan (the "County Records") a declaration stating that this Agreement has terminated by reason of the occurrence of an Event of Default. Grantee may terminate this Agreement as to all or any part of the Property at any time upon notice to Owner.

5.3. Upon the expiration or earlier termination of this Agreement, Grantee shall promptly de-energize any electrical lines or facilities in, on or under the Easement Area, remove

11. Compliance with Laws; Setback Waiver. Grantee shall comply with all laws, regulations and rules governing the construction, reconstruction, relocation, replacement, removal, maintenance and use of the Collection Facilities. Owner hereby waives any setbacks that otherwise restrict the location of any Collection Facilities to be installed on the Property or on adjacent properties, including but not limited to waiver of all property line setbacks, pursuant to state or county rules, regulations or ordinances (that is, Owner approves a reduction of each such setback to zero), and Owner shall cooperate with Grantee in obtaining written waivers of such setbacks and shall execute any documents reasonably requested by Grantee to evidence Owner's waiver of such setbacks.

12. Assignment. Grantee may assign this Agreement or its rights with respect to the Collection Easement, in whole or in part, without the need for Owner's consent. This Agreement and all easements and rights granted herein, including the Collection Easement, shall burden the Property and shall run with the Property. This Agreement and the Collection Easement shall inure to the benefit of, and be binding upon, Owner and Grantee and their respective transferees, heirs, successors and assigns and all persons claiming under them. Any sale or other transfer of the Property by Owner shall be subject to the Collection Easement and this Agreement. References to Grantee in this Agreement shall be deemed to include its assignees in possession of the Property.

13. Indemnity. (a) Grantee shall, at all times, save and hold harmless and indemnify Owner, its officers, partners, agents, contractors and employees, from and against all losses, damages, expenses, claims, demands, suits and actions to the extent caused by the operations or activities of Grantee, its officers, partners, agents, contractors and employees. (b) Owner shall, at all times, save and hold harmless and indemnify Grantee, its officers, partners, agents, contractors and employees, from and against all losses, damages, expenses, claims, demands, suits and actions, to the extent caused by the operations or activities of Owner, its officers, partners, agents, contractors and employees.

14. Financing.

14.1. Grantee may collaterally assign, mortgage or otherwise encumber its interest in this Agreement to a Financing Party (as hereinafter defined) under a Mortgage (as hereinafter defined). The term "Financing Party" means (i) any institution (including any trustee or agent of behalf of such institution) providing debt or other financing (including easement financing) to or for the benefit of Grantee or its successors or assigns, (ii) any counterparty under a power purchase agreement, renewable energy agreement or similar agreement that has been provided a Mortgage (as defined herein) by Grantee to secure obligations owing to such counterparty, and (iii) any tax equity investor in Grantee (until the "DRO Zero Date" or similar date that such tax equity investor has received a specified after-tax rate of return on its investment and has a balance in its respective capital account of at least zero). The term "Mortgage" shall mean any mortgage, deed of trust, deed to secure debt or other security instrument by which Grantee's interest in this Agreement, the Collection Facilities, or the Property is collaterally assigned, mortgaged, pledged, conveyed, assigned or otherwise transferred or encumbered to secure a debt or other obligation to a Financing Party. A Financing Party who provides written notice to Owner of its Mortgage (if applicable), or of its position as a Financing Party, along with its address for notices, shall be referred to as "Lender."

IN WITNESS WHEREOF, Owner and Grantee have caused this Agreement to be executed and delivered by their duly authorized representatives as of the Effective Date.

"OWNER"

Lisa A. Herron

"GRANTEE"

Orion Renewable Resources LLC,
a Delaware limited liability company

By _____
Name: Reid M. Buckley
Title: Vice President

STATE OF MICHIGAN §
§
COUNTY OF Cheboygan §

The foregoing instrument was acknowledged before me this 24 day of, May 2018, by Lisa A. Herron

Notary Public Signature

Martina Dupertuis
NOTARY PUBLIC-STATE OF MICHIGAN
COUNTY OF CHEBOYGAN
My Commision Expires 05/06/2024
Acting in the County of Cheboygan

(Title or rank)

(Serial number, if any)

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

STATE OF CALIFORNIA §
§
COUNTY OF ALAMEDA §

On June 5, 2018, before me, Analisa Garcia, a Notary Public, personally appeared Reid M. Buckley, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

[Notary Stamp/Seal]

Notary Public in and for the State of California

ANALISA GARCIA
Commission # 2099498
Notary Public - California
Alameda County
My Comm. Expires Feb 8, 2019

Exhibit A

Description of Property

That certain real property of Owner located in Cheboygan County, Michigan, to wit:

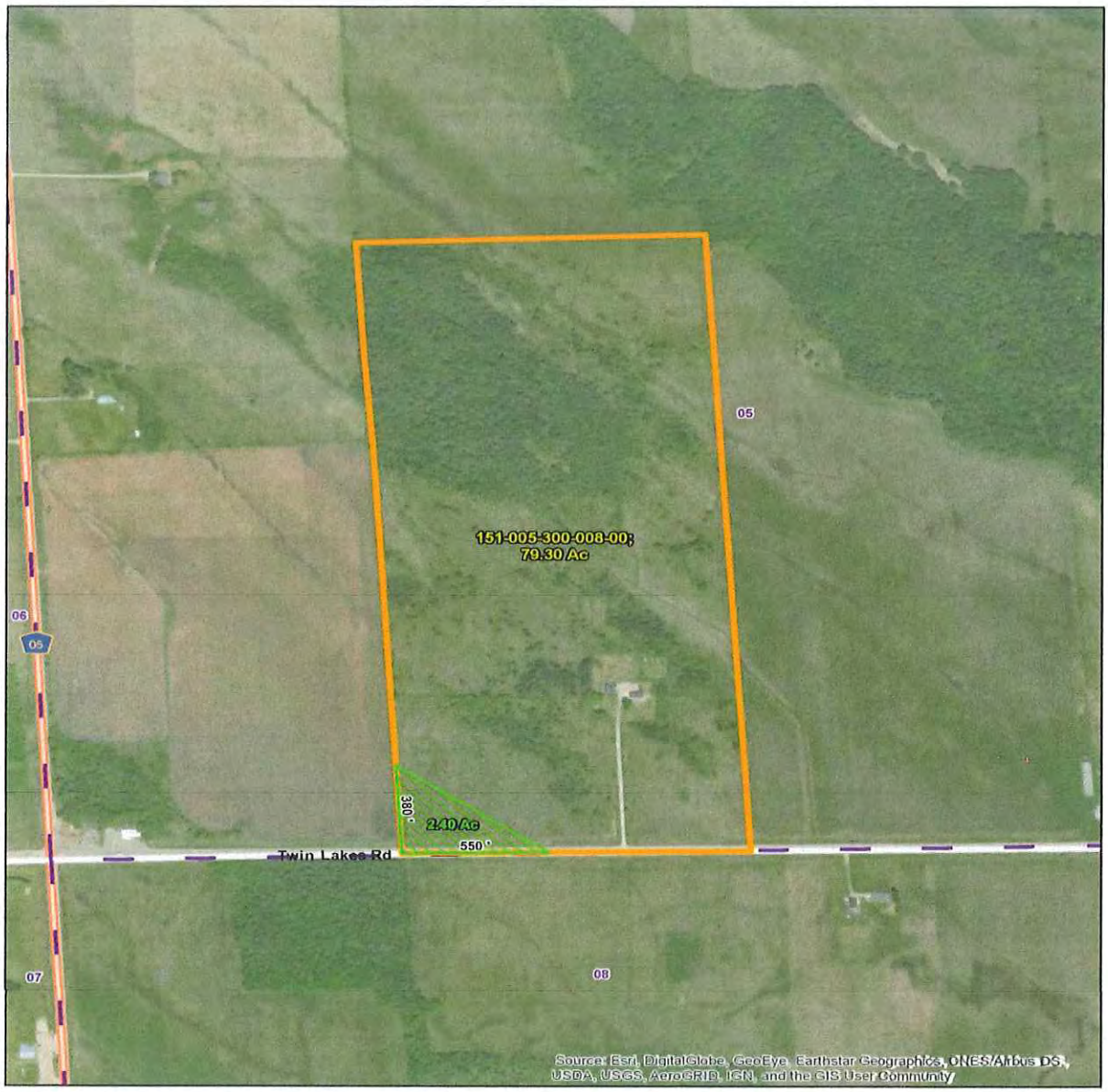
Real Property Tax Parcel No. 151-005-300-008-00

The East Half of the Southwest Quarter of Section 5, Township 36 North, Range 1 East, in the Township of Grant, County of Cheboygan, State of Michigan.

(In the event of any inaccuracy or insufficiency in the foregoing legal description, Grantee may record an amendment or correction of this Agreement, but only for purposes of correcting the inaccuracy or insufficiency of the legal description)

Exhibit A-1

Map of Property and Easement Corridor



NORTH

1 inch = 500 feet

0 300 600 Feet

Exhibit A-1 - Lisa A. Herron; MI-ALV1-044

Easement Corridor - 2.40 Ac

Property - 79.30 Ac

Sections

Cheboygan Co., MI

5/14/2018

ORION RENEWABLE ENERGY GROUP LLC

February 25, 2020

Director of Planning and Zoning,
Planning Commission
Cheboygan County
870 South Main Street, Room 103
Cheboygan, Michigan 49721

Re: Solar Project Application for Site Plan Approval and Special Use Permit

Dear Ladies and Gentlemen:

Orion Renewable Resources LLC ("Applicant") submits this application ("Application") and respectfully requests site plan approval and approval of a special use permit to build a solar farm in Cheboygan County pursuant to Ordinance Sections 20.7 and 18.7, respectively. This Application is submitted along with the attached exhibits for consideration by the Director of Planning and Zoning and the Planning Commission.

I. INTRODUCTION

Today, renewable energy projects are the world's fastest growing, most affordable source of electricity. Orion Renewable Energy Group LLC, an affiliate of the Applicant, has developed over 5,000 megawatts of clean, renewable energy worldwide, including projects located in Illinois, Indiana, Oklahoma, Oregon, Pennsylvania, Texas, and Wyoming. Its team of meteorologists, engineers, and developers visit and study sites across the country to find those locations with the right combination of renewable energy resource, landowner partners, compatible environmental conditions, and transmission grid accessibility. Based on its review, Cheboygan County has been identified as an optimal location for a solar facility.

The Applicant proposes to develop, construct, and operate a photovoltaic solar energy facility known as the Cheboygan Solar Project ("Project") within Cheboygan County, Michigan. To accomplish this, the Project has leased a total of approximately 1,566 acres of private property in Cheboygan County. Solar panels for the Project will be located on leased land inside a fenced area of approximately 862 acres ("Project Area"). Of the fenced Project Area, approximately 227 acres will be covered by solar panels, as measured when they are oriented horizontally.

As noted in the County's Master Plan, one of the County's goals is to "provide opportunities for safe and efficient use and transport of energy sources." The first two strategies set forth for meeting that goal are to "allow for appropriate use and transport of all forms of energy" and "ensure opportunities for development of renewable energy that maximizes sustainable use of natural resources and retains

energy dollars in the local economy." (Cheboygan County Master Plan, page 15.) Approval of the proposed Project will help the County to meet this goal.

The Project would enable the County to further other goals of the County Master Plan as well, as it is expected to provide significant benefits such as (and refer to attached Exhibit K):

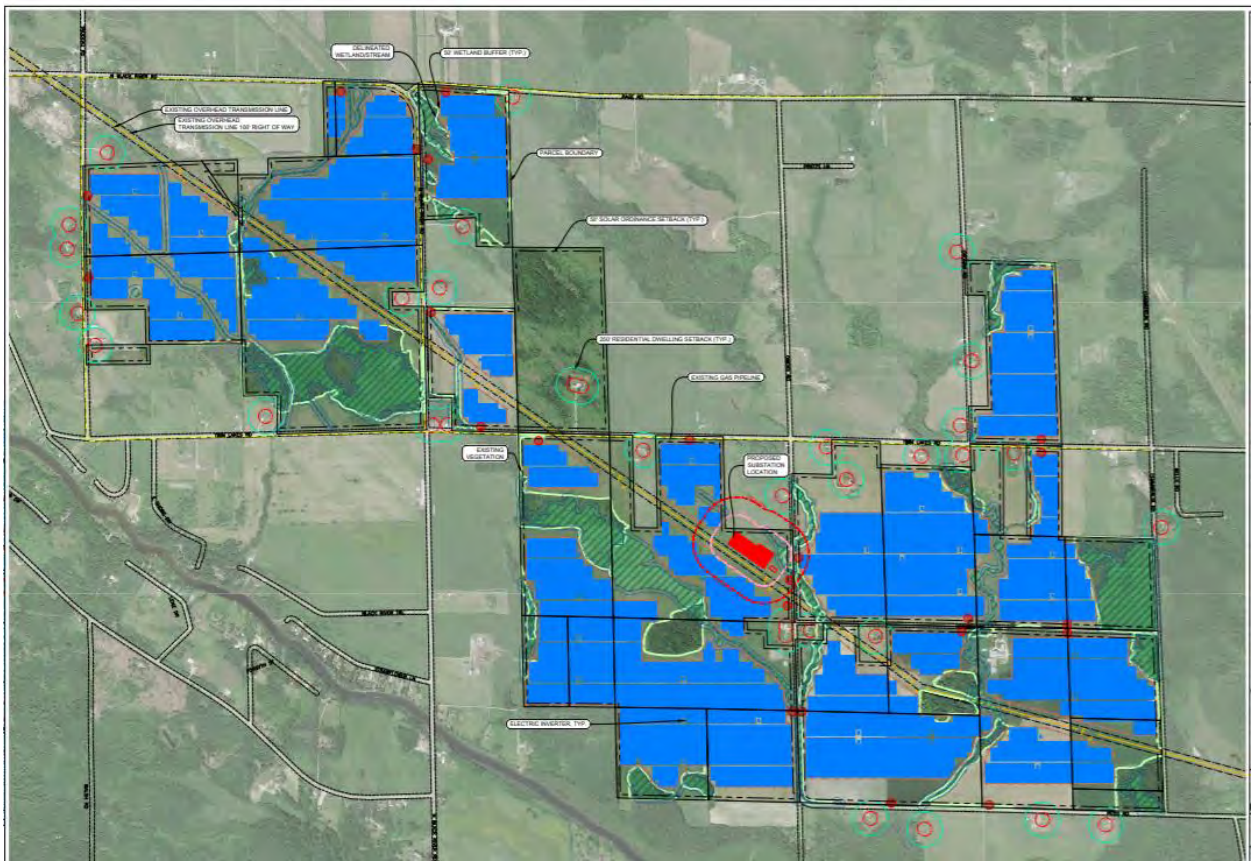
- Approximately 200 jobs during construction, directly benefitting local workers, hotels, restaurants, and retailers
- 2 to 4 well-paying, full-time jobs during operations
- Approximately $7.4 million in property taxes to the County over the useful life of the project, including an estimated $1.2 million in property taxes to local school districts
- Ongoing payments to local landowners who live, work, and invest in the County
- Additional taxes of approximately $700,000 for services such as ambulance, road improvements, and 911

The Applicant is respectfully requesting that the Director of Planning and Zoning and the Planning Commission grant its Application for the reasons set forth herein, furthering the development of renewable power in the County, which will benefit landowners, the community, power purchasers and their customers, and the environment.

II. PROPERTY LOCATION / OWNER INFORMATION

The Project Area would be comprised of a total of 31 parcels of land in Cheboygan County. A list of parcels by Parcel ID number with owner information is provided in Exhibit A to this Application.

A map depicting the Project Area is provided below and is also attached in a larger format in the Site Plan included in Exhibit A to this Application.



III. LEGAL ANALYSIS – SOLAR ORDINANCE REQUIREMENTS

The following responses demonstrate that the Applicant's Application meets or exceeds all of the applicable standards under the Cheboygan County Zoning Ordinances for Level 3 SES-PV Systems.

17.30.3 APPLICATION REQUIREMENTS

4. Level 3 SES-PV Systems shall require a special use permit in accordance with Section 18.7. and a site plan review in accordance with Section 20.10.

The following information shall be required in addition to that required in Section 18.7. and Section 20.10.:

A. Project Description: Identify the Level 3 SES-PV Facility perimeter of the project development area, maximum rated power output, safety and noise characteristics of the individual components of the system, including inverters and transformers system including the transmission line/grid connection. Identify the project construction timeframe, project life, potential development phases and potential future expansions.

Applicant Response: As detailed in the Site Plan (attached as Exhibit A), the Project has leased a total of approximately 1,566 acres of private property and solar panels will be located on leased land inside a fenced Project Area of approximately 862 acres. The solar modules themselves within the fenced Project Area will be mounted on single-axis trackers and are anticipated to cover approximately 227 acres when positioned horizontally. The Project's solar panels are anticipated to produce up to 91 megawatts of power when the output is converted to alternating current ("MWac").

A significant amount of research has been conducted regarding the safety of solar farms, including their individual components. In May 2017, the North Carolina Clean Energy Technology Center at North Carolina State University published a comprehensive report titled "Health and Safety Impacts of Solar Photovoltaics." This report considered various potential safety concerns of solar photovoltaics, and concludes that "…the negative health and safety impacts of utility-scale PV development were shown to be negligible, while the public health and safety benefits of installing these facilities are significant and far outweigh any negative impacts." The full report is attached as Exhibit B to this Application.

The main components of each phase of the Project are expected to be constructed in approximately 9 to 14 months depending on weather conditions, and the Project may be built in phases if the full capacity of 91 MWac is not constructed in the first phase. Once commissioned and operational, the project life of each phase is anticipated to be at least 30 years.

There are no current plans for future expansion of the project beyond 91 MWac.

B. Visual Impacts: Graphically demonstrate the visual impact of the project using digital and/or photographic renditions with consideration given to required setbacks and proposed landscaping.

Applicant Response: The Applicant has prepared photo simulations to visually depict the appearance of the proposed Project. These simulations are attached as Exhibit E to this Application. Six simulation points were performed at the following locations around the Project site:

1. ViewPoint 1-Twin Lakes Road just east of N Black River Road looking Southeast
2. ViewPoint 2-Hanson Road just west of Chamberlain Road looking South
3. ViewPoint 3-Intersection of Hanson Road and Owens Road looking Northeast
4. ViewPoint 4-Ross Road just east of Owens Road looking North

5. ViewPoint 5-Twin Lakes Road just west of Chamberlain looking Northwest
6. ViewPoint 6-Twin Lakes Road between N Black River Road and Owens Road looking Southeast
7. ViewPoint 7-Twin Lakes Road just east of N Black River Road looking Northeast
8. ViewPoint 8-N Black River Road, north of Twin Lakes Road looking Northwest

Visual simulations incorporate required setbacks and three include proposed landscaping at time of planting and 10 years growth. Note that the full Landscaping Plan is incorporated into the site plan attached hereto as Exhibit A.

C. Waste: Identify any solid or hazardous waste generated by the project and provide a disposal plan for such waste.

Applicant Response: The Project will not generate any solid or hazardous waste, except as follows:

During Construction

Project construction will involve routine transport, use and disposal of solid or hazardous materials such as paints, oils, grease, caulking, cleaning fluids, dust palliative, herbicides, and solvents consistent with applicable Federal, State, and local regulations. Small amounts of these materials will be on-site at any given time and they are typical materials used in solar and other project construction.

Any required material safety data sheets (MSDS) for materials present at the Project site will be made readily available to on-site personnel. Sanitary waste will be managed using portable toilets located on-site.

The disposal of all materials will be performed in accordance with applicable regulations.

Operations

Operations and Maintenance (O&M) activities associated with the Project will be minimal compared to those for conventional power plants and will require limited use of solid or hazardous materials. Any such materials will be stored on-site in designated areas in accordance with all applicable regulations.

D. Lighting: Provide a plan showing all lighting within the facility. All lighting shall be in compliance with the standards of Sections 3.7.1 and 20.10h.

Applicant Response: The Applicant understands the lighting standards in Sections 3.7.1 and 20.10h and will comply with them. The Site Plan (attached as Exhibit A) shows the locations of all lighting within the proposed facility.

During operations, lighting is not needed under typical nighttime conditions. Only in occasional unscheduled maintenance situations will lighting be temporarily used at night via motion-activated sensors or manual activation.

Some localized security-related lighting may also be required during construction and/or operations. Perimeter and safety lights will be installed and used only on an as-needed basis for emergencies or protection against security breach.

Lighting activated manually or by motion detection will be provided at points of site ingress and egress, any operations and maintenance, and the Project substation.

The on-site Project substation or switchyard will include lighting to allow for safety inspections or maintenance that may be required during the evening hours. Lighting will also be provided next to the entrance door to the operations and maintenance building and mounted at the site entrance gates to allow for safe entry and exit. Since maintenance activities are not typically carried out during the evening hours, lights will only be turned on as needed.

All lighting will be shielded and directed downward to minimize any effects to the surrounding area (adjacent properties and adjacent streets).

E. Transportation Plan: Provide a proposed access plan to be utilized during construction and operational phases. The plan must show proposed project service road ingress and egress locations to adjacent roadways. Due to infrequent access following construction, it is not required to provide for paved curbs and gutters on access drives unless required by the State Department of Transportation or County Road Commission.

Applicant Response: Proposed service road ingress and egress locations for construction and operations are shown on the attached Site Plan (Exhibit A).

Project construction is expected to last approximately 9 to 14 months for each phase. Most workers are expected to use County roads (such as Twin Lakes Road, Hanson Road and Owens Road) to arrive at the various access points to the Project site. Large equipment and other supply deliveries are expected to be made to the site during non-commute periods.

During operation of the Project, technicians and contractors will typically drive to the site for maintenance and security purposes. Due to low maintenance requirements during operation, road traffic associated with the Project is expected to be less than for a typical domestic farm.

F. Public Safety: Identify emergency and normal shutdown procedures, potential hazards to adjacent properties, public roadways and to the general public that may be created.

Applicant Response: The Emergency Fire and Safety Plan is attached as Exhibit G and addresses the above criterion. The Project is expected to have 2 to 4 full-time technicians on-site during normal working hours to address any emergencies or required shutdown procedures. In addition, the Project will be monitored remotely 24/7, with the ability to contact on-call technicians and emergency service providers after normal working hours, as needed. In the event of an emergency, the Project can be instantaneously and remotely disconnected from the electric transmission grid.

An emergency response plan will be prepared in coordination with local emergency service providers, which will ensure that these providers have 24/7 site access and contact information for operations personnel.

The Health and Safety Impacts of Solar Photovoltaics report attached as Exhibit B addresses common health and safety questions relating to photovoltaic solar farms and Exhibit G Emergency Fire and Safety Plan is also attached as stated above.

> **G. Engineering and Installation: A preliminary design layout shall be provided to include standard drawings of the structural components of the solar farm and any electrical storage system in support of the Level 3 SES-PV System, including base and footings along with engineering data and calculations to demonstrate compliance with the applicable approval standards of this Ordinance.**

Applicant Response: Please refer to Exhibit A for a preliminary design of the proposed Project and components and Exhibit I for supporting specification information to demonstrate compliance with the approval standards of the County ordinance.

> **H. Drainage and Soil Erosion:**
>
> > **i. The application shall show compliance with stormwater runoff and soil erosion control requirements and shall demonstrate how solar panels shall be positioned to prevent erosion.**
> >
> > **ii. The application shall also demonstrate how vegetative cover will be maintained under and around the solar panels.**

Applicant Response: The Project will be designed to minimize impacts to wetlands, drains and drainage features, and will not significantly alter drainage patterns within the site. No significant impacts to water quality from erosion and sedimentation are expected.

A Vegetative Management Plan is attached as Exhibit H. This plan is designed to reduce overall stormwater runoff, improve soil conditions at the site, and create habitat for pollinators (e.g., bees, butterflies) and other local wildlife. In addition, there are long-term local community benefits from a native vegetative land cover, as opposed to a turf grass or graveled/rock land cover. Nearby farmland can benefit in the form of increased insect pollinator activity.

> **I. Impervious Surface/Stormwater: If more than 8,000 square-feet of impervious surface will be located on the site, the application shall require a drainage plan prepared by a registered civil engineer showing how stormwater runoff from hardstand areas will be managed and demonstrating that runoff from the site will not exceed the natural runoff rate or otherwise cause undue flooding. Material Safety Data Sheets (MSDS) shall be supplied for all hazardous**

materials to be used on site. Any necessary permits from outside agencies for off-site discharge or disposal shall be provided. Solar panels are not considered impervious.

Applicant Response: More than 8,000 square feet of impervious surface would not be located on the Project site, due to the fact that solar panels are not considered impervious. In addition, no hazardous materials (outside of small amounts in photovoltaic cells encapsulated between layers of plastic in the solar panels themselves) would be used on the Project site – see Section III.C above.

J. Safety Access: A security access plan shall be provided with the application for Level 3 SES-PV Systems. Lockboxes and keys shall be provided for any locked entrances for emergency personnel access to any locked fenced portions of the facility.

Applicant Response: An emergency response plan which includes emergency access will be prepared in coordination with local emergency service providers, which will ensure these providers have 24/7 site access and contact information for operations personnel. (See Section III.F above.) The plan will provide that lockboxes and keys will be provided to emergency personnel to provide access to locked fenced portions of the proposed Project facilities.

K. County Review: Because of the ever-changing technical capabilities of photovoltaic solar panels and of new technology in general, the County Planning Commission will have the authority to review and consider alternatives in both the dimensional and physical requirements contained in this Section as part of the special land use review process.

Applicant Response: The Applicant understands and accepts this provision, with the understanding that such review and consideration of alternatives is intended to occur prior to the issuance of a special land use permit.

L. Telecommunications Infrastructure: Identify any electromagnetic fields that are generated that will interfere with electronic communication devices located outside the perimeter of the facility.

Applicant Response: While electromagnetic fields occur with any electrical equipment, studies have shown that they have no measurable effect on electronic communication devices located outside the perimeter of the facility. For example:

- Naval Facilities Engineering Command (NAVFAC) issued a white paper on potential Electromagnetic Interference (EMI) near airfields stating that PV inverters, which are the main potential source of EMI on a solar farm, are inherently low-frequency devices that are not prone to radiating EMI. The white paper also states that no interference is expected above 1 MHz because of the inverters' low-frequency operation. In addition, interaction at lower frequencies (100 kHz-1 MHz) is very low risk because of the poor

coupling of these extremely long wavelengths to free space, limiting propagation of the signal.[1]

- The Massachusetts Clean Energy Center commissioned a study to measure the magnetic field level and electric field level of a utility-scale solar farm. The study showed that the magnetic field level was not higher than 0.4m/G (acceptable limit according to the study was 500m/G), and that the electric field level was not higher than 5V/m (acceptable limit according to the study was 4,200V/m.[2]

M. Final Decommissioning and Reclamation Plan: A decommissioning and reclamation plan shall be developed and furnished to the Planning Commission describing actions to be taken at the end of the Level 3 SES-PV System's useful life or in the event of abandonment and termination of the project. The information shall include a description of how the following conditions shall be met: i. Removal of all non-utility owned equipment, including conduit buried at less than three (3) feet, structures, fencing, roads and foundations. ii. Restoration of the property to its original condition prior to construction of the Level 3 SES-PV System, subject to reasonable wear and tear. The owner of the leased parcel, however, may request the restored ground surface not to be revegetated, and may request that graveled areas, developed access roads, fences, vegetative screening and berms remain. iii. A timeframe for completion of decommissioning with specific timeframes specified for:

a) All above ground buildings, equipment and structures.

b) All below ground foundations and electrical cables.

c) Restoration of all ground surfaces not specifically exempt.

d) Furnishing a description and copy of any memorandum of lease or any other agreement(s) with the landowner(s) regarding decommissioning.

e) Providing a list of names, addresses and telephone numbers of persons or parties responsible for designating the contractor(s) responsible for decommissioning.

f) Providing a plan and schedule for updating the decommissioning plan every 5 (five) years.

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[1] Dann, Geoff and C. Deline. (2015) Renewable Energy, Photovoltaic Systems Near Airfields: Electromagnetic Interference. NAVFAC White Paper accessed July 2019 - https://www.nrel.gov/docs/fy15osti/63310.pdf

[2] Tech Environmental, Inc. (2012) Study of Acoustic and EMF Levels from Solar Photovoltaic Projects. Prepared for Massachusetts Clean Energy Center. Accessed July 2019 https://files.masscec.com/research/StudyAcousticEMFLevelsSolarPhotovoltaicProjects.pdf

g) Justification for the requested decommissioning time period requested must be sufficient to allow the Planning Commission to approve or revise the proposed decommissioning timeframe based on the material submitted.

Applicant Response: Applicant understands these requirements, and has incorporated the required information into the Decommissioning and Site Reclamation Plan attached hereto as Exhibit J.

IV. LEGAL ANALYSIS – SITE PLAN APPROVAL

The following responses demonstrate that the Application meets or exceeds all applicable standards under Article 20 of the Cheboygan County Zoning Ordinance for site plan review and approval.

SECTION 20.6. APPLICATION REQUIREMENTS FOR SITE PLAN The application for site plan approval shall, at a minimum, include the following information on the application, site plan, or attached as exhibits:

a. The applicant's name, address, and phone number in full.
b. Proof of property ownership and whether there are any options on the property.
c. The name and address of the owner(s) of record if the applicant is not the owner of record (or firm or corporation having a legal or equitable interest in the land), and the signature of the owner(s).
d. The address and or parcel number of the property.
e. Name and address of the developer (if different from the applicant).
f. Name and address of the engineer, architect, land surveyor, or other site plan preparer if the request includes a structure(s) and/or addition(s) to be used for profit or public involvement.
g. Project description, including the total number of structures, units, bedrooms, offices, square feet, total and usable floor area, parking spaces, carports or garages, employees by shift, amount of recreation and open space, type of recreation facilities to be provided, and related information as pertinent or otherwise required by the ordinance.
h. The total and net acreage of all parcels in the project.
i. Land uses, zoning classification and existing structures on the subject parcel and adjoining parcels.
j. Project completion schedule/development phases.
k. Written statements relative to project impacts on existing infrastructure (including traffic capacity of streets, schools, and existing utilities) and on the natural environment of the site and adjoining lands.

Applicant Response: All of the above information has been included in the Site Plan, attached hereto as Exhibit A.

SECTION 20.7. SITE PLAN REQUIREMENTS (Rev. 08/01/10, Amendment #86) For all Site Plan Reviews, Special Use Permits, and Planned Unit Developments, fifteen (15) copies of the site plan containing all information required in this Ordinance shall be presented for consideration. The site plan shall consist of an accurate, reproducible drawing at a scale of 1"= 100' or less, showing the site and all structures within 150' of the site. If multiple sheets are used, each shall be labeled and numbered and the preparer identified. If the applicant fails to provide all the information required by this Ordinance, then the site plan shall be deemed incomplete, shall not be processed, and may be denied by the Zoning Administrator on that basis. Each site plan shall depict the following, unless the Planning Commission waives a particular information requirement of this section upon a finding that the information is not applicable to the proposed development and the information is not needed to determine whether the proposed development meets the standards for approval in Section 20.10 of this Ordinance:

a. North arrow, scale and date of original submittal and last revision.
b. Seal of the registered engineer, architect, landscape architect, surveyor, planner, or other site plan preparer. Location of proposed and/or existing property lines, dimensions, legal descriptions, setback lines and monument locations.
c. Location of existing and proposed public roads, rights-of-way and private easements of record and abutting streets.
d. Topography at maximum five foot intervals or appropriate topographic elevations to accurately represent existing and proposed grades and drainage flows.
e. Location and elevations of existing water courses and water bodies, including county drains and man-made surface drainage ways, stormwater controls, flood plains, and wetlands.
f. Location of existing and proposed buildings and intended uses thereof.
g. Details of entryway and sign locations should be separately depicted with an elevation view.
h. Location, design, and dimensions of existing and/or proposed curbing, barrier free access, carports, parking areas (including indication of all spaces and method of surfacing), fire lanes and all lighting thereof.
i. Location, size, and characteristics of all loading and unloading areas.
j. Location and design of all sidewalks, walkways, bicycle paths and areas for public use as approved by the Planning Commission.
k. Location of all other utilities on the site including but not limited to wells, septic systems, stormwater controls, natural gas, electric, cable TV, telephone and steam and proposed utility easements.
l. Proposed location, dimensions and details of common open spaces and common facilities such as community buildings or swimming pools if applicable.
m. Location and specifications for all fences, walls, and other screening features.
n. Location and specifications for all existing and proposed perimeter and internal landscaping and other buffering features.

o. Exterior lighting locations with area of illumination illustrated as well as the type of fixtures and shielding to be used.
p. Location, size and specifications for screening of all trash receptacles and other solid waste disposal facilities.
q. Elevation drawing(s) for proposed commercial and industrial structures.
r. Location and specifications for any existing or proposed above or below ground storage facilities for any chemicals, salts, flammable materials, or hazardous materials as well as any containment structures or clear zones required by government authorities.
s. Floor plans, when needed to determine the number of parking spaces required

Applicant Response: All of the above information has been included in the Site Plan, attached hereto as Exhibit A.

SECTION 20.10. STANDARDS FOR GRANTING SITE PLAN APPROVAL The Planning Commission shall approve, or approve with conditions, an application for a site plan only upon a finding that the proposed site plan complies with all applicable provisions of this Ordinance and the standards listed below, unless the Planning Commission waives a particular standard upon a finding that the standard is not applicable to the proposed development under consideration and the waiver of that standard will not be significantly detrimental to surrounding property or to the intent of the Ordinance. The Planning Commission's decision shall be in writing and shall include findings of fact, based on evidence presented on each standard.

a. The site plan shall be designed so that there is a limited amount of change in the overall natural contours of the site and shall minimize reshaping in favor of designing the project to respect existing features of the site in relation to topography, the size and type of the lot, the character of adjoining property and the type and size of buildings. The site shall be developed so as not to impede the normal and orderly development or improvement of surrounding property for uses permitted in this Ordinance.
b. The landscape shall be preserved in its natural state, insofar as practical, by minimizing tree and soil removal, and by topographic modifications which result in smooth natural appearing slopes as opposed to abrupt changes in grade between the project and adjacent areas.
c. Special attention shall be given to proper site drainage so that removal of storm waters will not adversely affect neighboring properties.
d. The site plan shall provide reasonable, visual and sound privacy for all dwelling units located therein. Fences, walls, barriers and landscaping shall be used, as appropriate, for the protection and enhancement of property and for the privacy of its occupants.
e. All buildings or groups of buildings should be so arranged as to permit emergency vehicle access by some practical means.
f. Every structure or dwelling unit shall have access to a public street, walkway or other area dedicated to common use.

g. For subdivision plats and subdivision condominiums, there shall be a pedestrian circulation system as approved by the Planning Commission.
h. Exterior lighting shall be arranged as follows:
a. It is deflected away from adjacent properties.
b. It does not impede the vision of traffic along adjacent streets.
c. It does not unnecessarily illuminate night skies.
i. The arrangement of public or common ways for vehicular and pedestrian circulation shall respect the pattern of existing or planned streets and pedestrian or bicycle pathways in the area. Streets and drives which are part of an existing or planned street pattern which serves adjacent development shall be of a width appropriate to the traffic volume they will carry and shall have a dedicated right-of-way equal to that specified in the Master Plan.
j. Site plans shall conform to all applicable requirements of state and federal statutes and the Cheboygan County Master Plan, and approval may be conditioned on the applicant receiving necessary state and federal permits.

Applicant Response: The applicant understands the above standards, and has met or exceeded each standard as shown in the Site Plan attached hereto as Exhibit A and the other Application documents.

V. LEGAL ANALYSIS – SPECIAL LAND USE PERMIT

The following responses demonstrate that the Application meets or exceeds all applicable standards of the Cheboygan County Zoning Ordinance for Special Land Use Permit Approval of the proposed Project.

SECTION 18.7. STANDARDS FOR SPECIAL LAND USE APPROVAL (Rev. 04/26/08, Amendment #74, Rev. 03/01/19, Amendment #151) The Planning Commission shall approve, or approve with conditions, an application for a special land use permit only upon a finding that the proposed special land use complies with all of the following standards:

a. The property subject to the application is located in a zoning district in which the proposed special land use is allowed.

Applicant Response: The properties subject to the Application are all zoned M-AF (Agriculture and Forestry Management Zoning District) and P-LS. In Section 9.3.27, under Article 9 of the Zoning Ordinance which governs properties zoned M-AF and P-LS, Level 3 SES-PV Systems are listed as a use that requires a special land use permit in accordance with Section 17.30.6.C.

b. The proposed special land use will not involve uses, activities, processes, materials, or equipment that will create a substantially negative impact on the natural resources of the County or the natural environment as a whole.

Applicant Response: As proposed approximately 227 acres of privately owned land within the fenced Project Area would be covered by solar panels, as measured when they are oriented horizontally. This is relatively small given the available agricultural land and land generally in Cheboygan County.

All of this land is zoned M-AF (Agriculture and Forestry Management Zoning District) and P-LS (Lake and Stream Protection District), which are specifically identified in the Cheboygan County Ordinance, as suitable for solar development.

In addition, the Project will result in minimal new additional impervious surface area (see Section III.I above), and will avoid impacts to sensitive natural resources, preserving the natural features in the area. The Project area is not believed to provide critical habitat for endangered, threatened or sensitive species. Installation of the Project will minimize, to the extent practicable, impacts on wetlands and trees as required by applicable State and Federal law. The location of the Project avoids any designated conservation areas in Cheboygan County. Additionally, the Project will obtain all required permits in order to comply with the U.S. Clean Water Act and its Michigan equivalent.

Also, the Applicant will plant native seed mixes and pollinator-friendly plantings that enhance the habitat of butterflies, bees, and birds, as described in the Vegetative Management Plan attached as Exhibit H to this application. These activities would be helpful to continued agricultural activities in and around the Project site, including crop cultivation on ground not occupied by solar facilities, and support the natural resources in and surrounding the Project site, all of which is in the express interest of local landowners.

c. The proposed special land use will not involve uses, activities, processes, materials, or equipment, or hours of operation that will create a substantially negative impact on other conforming properties in the area by reason of traffic, noise, smoke, fumes, glare, odors, or the accumulation of scrap material that can be seen from any public or private highway or seen from any adjoining land owned by another person.

Applicant Response: The proposed Project will not create a substantially negative impact on other conforming properties in the area, as discussed below:

(i) *Traffic* – During construction, it is estimated that there will be an average of approximately 200 jobs. These include drivers delivering the SES-PVs and installation equipment to the site, laborers installing the SES-PVs on the property, as well as botanists that will install the landscaping and pollinators between solar arrays. The average number of trips generated during construction would average less than 500. During commercial operations, the project will likely include 2-4 full-time employees during normal work hours. This staff would generate approximately 10 trips per day. During the occasional maintenance events, crews of up to 20 workers would access the site. They would generate approximately 50 trips per day. Given the size of the project, all of these trip estimates are far lower that what the property would generate for most of the permitted uses listed in Section 9.2 of the

Zoning Ordinance, such as single family dwellings, two family dwellings, commercial farms, greenhouses, nurseries, markets for sale of product grown or produced on the premises, home occupations, cemeteries, private aircraft landing strips, private storage buildings and hobby farms, or combinations of such uses. Moreover, again because of the size of the project, the trips generated during construction, operation and maintenance activities are spread out over a large area and not concentrated in any one section.

(ii) *Noise* – Sound simulations produced for the project (attached as Exhibit D) demonstrate that the facility will not exceed 60 dBA as measured at the property line. It is also important to note that SES-PVs do not generate electricity when the sun has dropped or is obscured. Thus, they produce minimal or no noise at night, during storm events and during heavy overcast days.

(iii) *Smoke* – SES-PVs do not generate any smoke during construction, operation, and maintenance activities.

(iv) *Fumes* – SES-PVs do not generate fumes during operation and maintenance activities. During the construction phase, the only fumes generated would be emissions from vehicles delivering SES-PV materials and equipment used for their installation. Such fumes would not be any greater than the typical traffic experienced throughout the County's road systems.

(v) *Glare* – SES-PVs contain solar cells which are designed to capture solar energy to convert it into useable energy. Therefore, SES-PVs are designed to be as absorptive as possible to maximize the efficiency of energy production (thereby minimizing potential reflective glare). SES-PVs typically are covered with a tempered glass layer that is treated with an anti-reflective coating that reduces the reflectivity of the panels. By comparison, SES-PVs with anti-reflective coatings reflect significantly less light than smooth water (as found on the several lakes within Grant Township and many others throughout the County), and less than half the light reflected by standard glass commonly used in residential or commercial applications.[3]

(vi) *Odors* – SES-PVs do not generate odors during any of the stages of their lifespan (construction, operation and maintenance). SES-PVs are comprised primarily of glass and aluminum, which do not emit odors. The remaining materials are electronics which are encapsulated in the glass. They do not emit odors, either.

(vii) *Accumulation of Scrap Materials* – During operation, SES-PVs do not generate any scrap or waste material. During the construction phase, there is a small amount of scrap material generated in the form of packaging around the SES-PVs. This material will be removed prior to the completion of the construction activities. Its volume would be far less than the scrap generated by the

[3] Shields, Mark 2010. PV Systems: Low Levels of Glare and Reflectants vs. Surrounding Environment. Accessed February 3, 2020.

primary permitted uses in the M-AF zoned district (one and two family residential and commercial farming) over an area the size of the project.

d. The proposed special land use will be designed, constructed, operated, and maintained so as not to diminish the opportunity for surrounding properties to be used and developed as zoned.

Applicant Response: The design, construction, operation, and maintenance of the proposed Project will not diminish in any way the opportunity for surrounding properties to be used and developed as zoned. Most of the surrounding property consists of farmland and woodland. An SES-PV project is an ideal neighbor for these properties. As indicated in Section V (c) above, this Project would not create traffic, noise, smoke, fumes, glare, odors, or scrap material that would negatively impact the use or development of surrounding properties.

e. The proposed special land use will not place demands on fire, police, or other public resources in excess of current capacity nor increase hazards from fire or other dangers to the subject property or adjacent properties.

Applicant Response: The proposed Project will not place undue demands on public services. The Emergency Fire and Safety Plan is attached as Exhibit G.

f. The proposed special land use shall not increase traffic hazards or cause congestion on the public or private highways and streets of the area in excess of current capacity. Adequate access to the site shall be furnished either by existing roads and highways or proposed roads and highways. Signs, buildings, plantings, or other elements of the proposed project shall not interfere with driver visibility or safe vehicle operation. Entrance drives to the use and to off-street parking areas shall be no less than 25 feet from a street intersection (measured from the road right-of-way) or from the boundary of a different zoning district.

Applicant Response: The Applicant proposes to be in compliance with the above criterion. Project construction and operation, proposed service road ingress and egress locations are shown on the attached Site Plan (Exhibit A).

As discussed in Section V (c)(i) above, the Project will generate very little increase in traffic or congestion once it is fully constructed and operational. During the construction phase, the Project will work closely with the County to plan road usage by construction workers and minimize congestion. With regard to site access there will only be a few access points to public streets and all access will be furnished by existing roads and highways. The Project will also position signs, buildings, plantings, or other elements of the proposed Project so as not to interfere with driver visibility or safe vehicle operation. Entrance drives to the Project and any off-street parking areas will be at least 25 feet from street intersections or from boundaries of a different zoning district.

g. The proposed special land use will be adequately served by water and sewer facilities, and refuse collection and disposal services.

Applicant Response: The proposed O&M building will have a water well and septic tank. Garbage and trash will be hauled offsite to an authorized local landfill.

h. The proposed special land use will comply with all specific standards required under this Ordinance applicable to it.

Applicant Response: The Project will comply with all specific standards required under the Zoning Ordinance, including the standards for granting site plan approval in Section 20.10 (see Section IV above) and the standards and conditions for Level 3 SES-PV systems found in Section 17.30.6.C. of the Zoning Ordinance which are specifically addressed below:

17.306.C. Level 3 Solar Energy Systems – Photovoltaic (SES-PV)

A. Setbacks:

i. All Level 3 SES-PV Systems along with their supporting structures, inverters and supporting buildings and equipment (excluding fencing, vegetative screening, berms, roads, underground cables and generator system step-up transformer facilities) shall comply with the following setbacks:

a) 100 feet from any dwelling. This setback may be waived or reduced if requested by the owner of the dwelling to be screened.

b) 50 feet from any Level 3 SES-PV Facility perimeter not abutting a private or public road unless requested to be waived by the property owner of the parcel to be screened.

c) 50 feet from any public or private road right of way..

d) 500 feet from any major body of water as listed in section 10.1.2.

e) 40 feet from any perennial stream, other than those listed in Section 10.1.2, shown as part of the P-LS zoning district. However, underground cables may be allowed if permitted by the Michigan Department of Environmental Quality (MDEQ) and the Army Corps of Engineers.

ii. The generator system step-up transformer facility and any electrical storage facility shall meet the following setbacks:

a) 500 feet from any dwelling.

b) 250 feet from any public or private road abutting the Level 3 SES-PV Facility perimeter of or bisecting the project.

c) 500 feet from the ordinary high water mark of any body of water listed in Section 10.1.2.

iii. All tree plantings utilized for screening shall have setbacks of seven (7) feet from any property line, public or private road right(s)-of-way, utility or driveway easement(s) or the Level 3 SESPV Facility perimeter. The seven (7) foot setback shall be measured at the time of planting from the center of the trunks of the trees used for screening. iv. Fencing shall be no closer than one (1) foot from any property line, public road right(s)-of-way, utility or driveway easement(s) or the established Level 3 SES-PV Facility perimeter. Fencing is considered a security measure and cannot be considered as adequate screening for a Level 3 SES-PV System.

Applicant Response: See the attached Site Plan (Exhibit A). The Applicant understands foregoing the setback requirements and has met or exceeded them. In response to an open house that was held on February 10th the applicant removed a row of panels on the south side of the project along Ross Road to provide an additional buffer from the homes on the south side of Ross Road.

B. Vegetative Screening and Landscaping:
i. Level 3 SES-PV facilities abutting a public or private road or property line of an adjacent parcel shall comply with the following requirements:

a) Screening shall be required along any public or private road right(s)-of-way and opposite any dwelling on the same or adjacent parcels unless the owner of the dwelling to be screened requests in writing otherwise.
b) Evergreen coniferous trees or a combination of trees and berms shall be the minimum acceptable methods of screening wherever screening is required.
c) Minimum height at time of planting requirements for trees utilized for screening are as follows:

1. Trees planted opposite a dwelling shall be a minimum of eight (8) feet tall at the time of planting. The tree height may be reduced by one (1) foot for each one (1) foot in the height of the berm on which it is planted, i.e., the total of the berm and tree height must be a minimum of eight (8) feet in height. If the road bed is elevated above the surrounding land surface at the location requiring screening, tree tops shall be at least eight (8) feet above the road surface.
2. Tree height at the time of planting shall not be allowed to be reduced below four (4) feet in height regardless of berm height (see Figure 2).
3. Trees planted for screening along road rights-of-way not opposite a dwelling shall require a minimum height at the time of planting of five (5) feet.

ii. Buried electrical cables within easements used to connect noncontiguous parcels with the Level 3 SES-PV facility, although an integral part of the facility, shall not require screening regardless of proximity to any dwelling.

iii. All tree plantings or combination of trees and berms utilized for screening opposite a dwelling shall extend 100 feet in either direction from a point on the Level 3 SES-PV facility perimeter directly opposite the midpoint of the opposing dwelling. iv. In the event a property line lies within the road right(s)-of-way, setbacks shall be measured from the edge of the road right(s)-of-way. v. At road or driveway intersections, vegetative screening or combination of trees and berms or fences shall be established or maintained in a manner that does not obstruct the view of vehicular traffic in any direction. All right-ofway intersections shall be provided and maintained with a clear unobstructed vision corner extending not less than 20 feet from all right-of-way line intersections along said right-of-way line in the form of a triangle.
vi. Natural vegetative screening is encouraged to be incorporated and maintained into the evergreen coniferous tree screening requirements per Section 17.30.6.C.B. However, natural vegetative screening shall be considered an addition to, and not a replacement for, the evergreen coniferous tree screening requirements. vii. All trees planted for screening shall be maintained in good condition for the life of the project. All dead, dying or diseased trees shall be replaced within one (1) year with trees in compliance with the standards set forth in this Section.

Applicant Response: The Applicant understands the foregoing vegetative screening and landscaping requirements and has met them. See the Site Plan that incorporates the Landscaping and Screening/Buffering Plan attached as Exhibit A.

C. Noise:
No Level 3 SES-PV facility shall generate noise that, when measured at the Level 3 SES-PV Facility's perimeter, shall exceed 60 decibels (dBA). This standard does not apply during construction, routine equipment maintenance, repair or replacement, or at the time of decommissioning and reclamation.

Applicant Response: The Applicant understands this noise requirement and the Project will comply with it. Sound Simulations for the Project (attached as Exhibit D) demonstrate this compliance. Solar equipment does not generate electricity when the sun is not shining and produce minimal noise at night.

D. Electrical Interconnection:
All electrical interconnections or distribution lines shall comply with all applicable codes and standards. Only existing aboveground transmission lines as well as above-ground transmission lines from the project generation station step-up transformer facility to the point of interconnection with transmission lines are permitted above ground. All other electrical interconnections shall be buried unless other requirements are determined at the time of building permit review.

Applicant Response: The Applicant understands these electrical interconnection requirements and will comply with them.

> **E. Height Restriction: Level 3 SES-PV solar collection panels with their support structures shall not exceed 20 feet in height when oriented at maximum tilt. All other structures except those within the generation station step-up transformer facility and associated transmission towers shall be limited to thirty-five (35) feet. Equipment within the generation station step-up transformer facility shall be exempt from height restrictions.**

Applicant Response: Applicant understands these height restrictions and will comply with them. As shown in the Site Plan (Exhibit A), typical maximum height of photovoltaic panels is less than 10 feet, but in no event will exceed 20 feet.

> **F. Performance Guarantee: In conjunction with the approval of a Level 3 SES-PV System the Planning Commission shall require the owner of the Level 3 SES-PV System to furnish the County with a performance guarantee in the form of a cash deposit, certified check, irrevocable letter of credit or surety bond acceptable to the County in an amount equal to the estimated costs associated with removal of the Level 3 SES-PV facility, including all solar panels, supporting structures, inverters, transformers and all associated equipment in accordance with the decommissioning and restoration plan in Section 17.30.3.3.M. This performance guarantee shall be furnished prior to the construction of the Level 3 SES-PV System and may be combined with any performance guarantee required to be given to the owner of the site.**

Applicant Response: The Applicant understands this requirement for a performance guarantee and will comply with it.

> **G. Final Reclamation: Any Level 3 SES-PV System not operated for a continuous period of twelve (12) months shall be considered abandoned. The owner of any Level 3 SES-PV System that is abandoned as provided herein shall be removed from the property upon receipt of notice from the Zoning Administrator of such abandonment, or the end of operation under the terms and conditions of this subsection. The timeframe for final reclamation shall be determined and approved by the Planning Commission and made a condition of approval of the special use permit. Except as provided herein, the Level 3 SES-PV System shall be removed from the property by the owner of the Level 3 SESPV System, including all structures, equipment, components, and subsystems, except underground cables buried at a depth greater than three (3) feet. Berms and trees, service roads and fencing, however, if requested by the owner of the property on which the Level 3 SES-PV System is located, shall be**

permitted to remain. Furthermore, the property owner may request that the property on which the Level 3 SES-PV System functioned remain unvegetated.

Applicant Response: The Applicant understands these reclamation requirements and will comply with them. Please see attached Exhibit J.

VI. CONCLUSION

In conclusion, the Applicant believes the Application meets all Zoning Ordinance requirements and requests that the foregoing materials be considered by the Zoning Administrator and the Planning Commission at the first available date. Thank you in advance for your time and attention to this Application and we look forward to working with the County throughout the review and approval process.

Sincerely,

Amanda Hoffman

On behalf of:
Orion Renewable Resources LLC, as Applicant
c/o Orion Renewable Energy Group
155 Grand Ave, Suite 706
Oakland, CA 94612
c: (503) 476-4883
www.orionrenewables.com

Cheboygan County February 25, 2019
Director of Planning and Zoning, and Planning Commission
22

LIST OF EXHIBITS

EXHIBIT A - Site Plan

EXHIBIT A-1-List of Parcels

EXHIBIT B - Health and Safety Impacts of Solar Photovoltaics

EXHIBIT C – Zoning Overlay Detail Map

EXHIBIT D - Sound Simulations

EXHIBIT E - Visual Simulations

EXHIBIT F - Property Valuation Report

EXHIBIT G – Emergency Safety and Fire Plan

EXHIBIT H - Vegetative Management Plan

EXHIBIT I – Structural Specifications

EXHIBIT J - Decommissioning and Final Reclamation Plan

EXHIBIT K-Property Tax Contribution

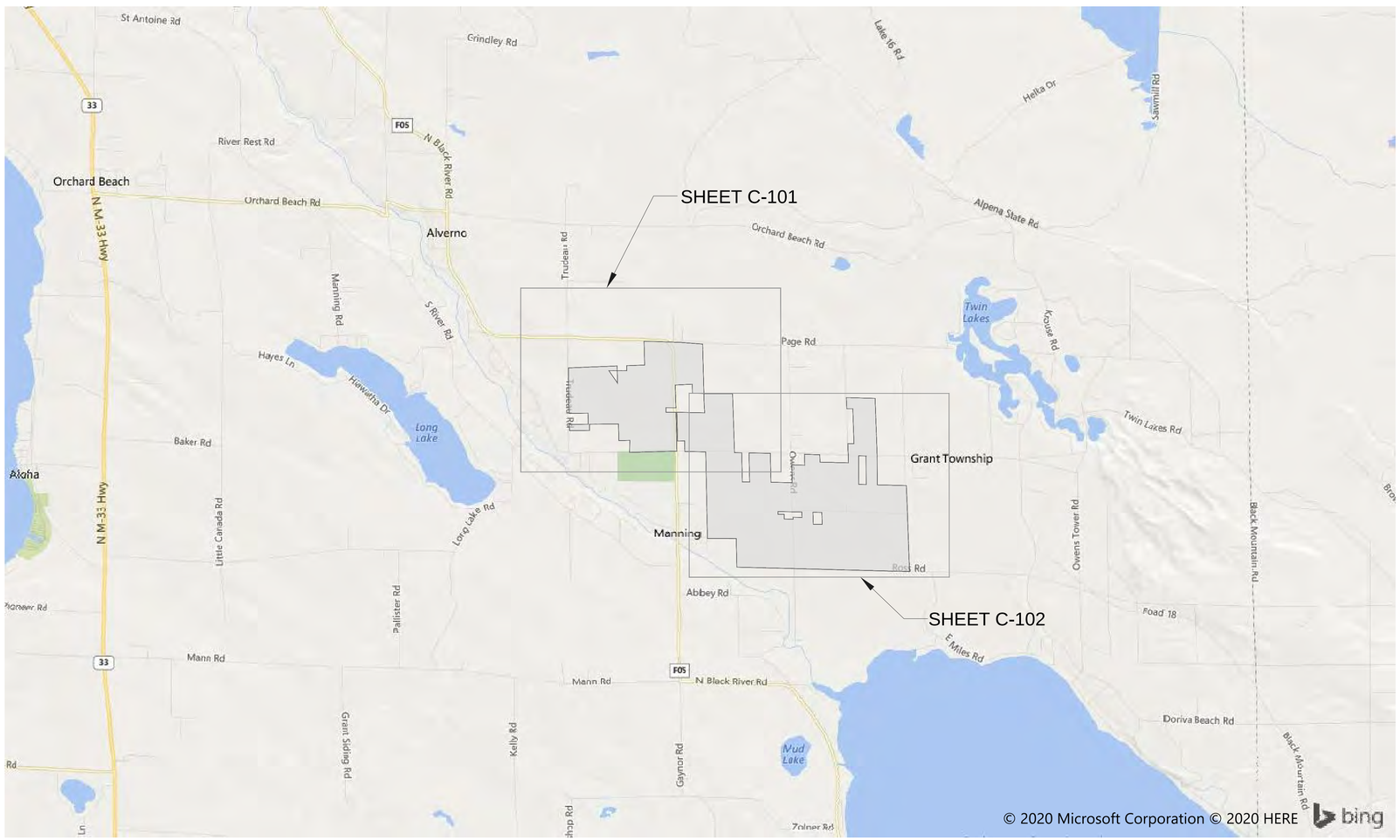
EXHIBIT A

SITE PLAN

CHEBOYGAN SOLAR PROJECT

SPECIAL LAND USE SITE PLAN

ORION RENEWABLE ENERGY GROUP, LLC
GRANT TOWNSHIP
CHEBOYGAN COUNTY, MICHIGAN



VICINTY MAP

SCALE: 1" = 3000'

NOTE:
LOCATIONS, DIMENSIONS, AND SUPPLIERS OF ALL IMPROVEMENTS MAY BE MODIFIED TO ACCOMMODATE PROJECT CRITERIA, SUBJECT TO TOWNSHIP REQUIREMENTS AND APPROVALS, IF ANY."

Sheet List Table	
Sheet Number	Sheet Title
C-001	COVER SHEET
C-002	OVERALL MAP
C-101	SITE PLAN
C-102	SITE PLAN
C-201	GENERAL NOTES & DETAILS
C-202	INVERTER ELEVATIONS
C-203	MODULE TRACKER DETAILS
C-204	O&M BUILDING DETAILS
C-205	FENCE DETAILS
C-206	SUBSTATION & INTERCONNECTION FACILITIES - GENERAL ARRANGEMENT
C-207	SUBSTATION & INTERCONNECTION FACILITIES - ELEVATION VIEW
L-101	LANDSCAPE DETAILS

SITE PLAN PREPARED BY:
SHOENER ENVIRONMENTAL INC.
239 MAIN STREET, SUITE 301
DICKSON CITY, PA 18519

SITE PLAN
CHEBOYGAN SOLAR ENERGY PROJECT
GRANT TOWNSHIP, CHEBOYGAN COUNTY, MICHIGAN

SHEET TITLE:
COVER SHEET
C-001

DATE: 02/26/2020

ENGINEER'S SEAL:
STATE OF MICHIGAN
DOMENICK DIPAOLO
ENGINEER
No. 6201069937
LICENSED PROFESSIONAL ENGINEER

DEVELOPER:
ORION RENEWABLE ENERGY GROUP LLC

CONSULTANT:
Shoener environmental engineering energy

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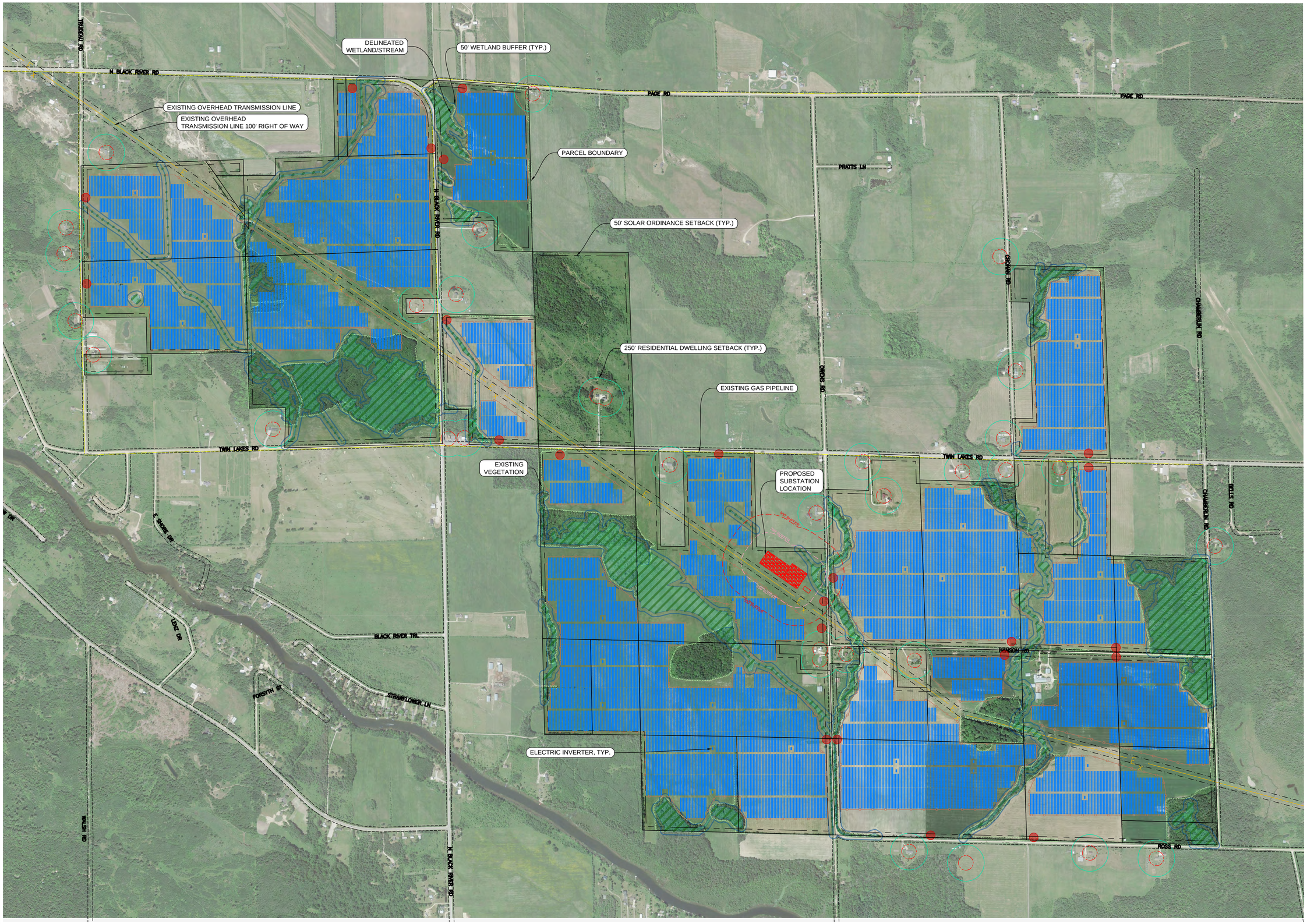

SITE PLAN
CHEBOYGAN SOLAR ENERGY PROJECT

GRANT TOWNSHIP,
CHEBOYGAN COUNTY,
MICHIGAN

SHEET TITLE:

OVERALL MAP

C-002

LEGEND

PROPOSED SOLAR MODULE

PROPOSED ELECTRIC INVERTER

PROPOSED FENCE

RESIDENCE/DWELLING SETBACKS

100' SOLAR ORDINACE SETBACK

250' APPLICANT IMPOSED SETBACK

PARCEL BOUNDARY

50' SOLAR ORDINANCE SETBACK

EXISTING UNDERGROUND GAS LINE

EX. 66' ROAD RIGHT-OF-WAY

EX. OVERHEAD ELECTRIC

OVERHEAD ELECTRIC RIGHT-OF-WAY

50' BUFFER

50' BUFFER

DELINEATED WETLANDS/STREAMS AND 50' BUFFER

PROPOSED INGRESS/EGRESS LOCATION

50' BUFFER

50' BUFFER

PROPOSED SUBSTATION FOOTPRINT

PROPOSED O&M BUILDING

N

DATE: 02/26/2020

ENGINEER'S SEAL:

STATE OF MICHIGAN
DOMENICK DIPAOLO
ENGINEER
No. 6201069937
LICENSED PROFESSIONAL ENGINEER

1"=600'

0 600 1200 1800

DEVELOPER:

ORION RENEWABLE ENERGY GROUP LLC

CONSULTANT:

Shoener environmental engineering energy

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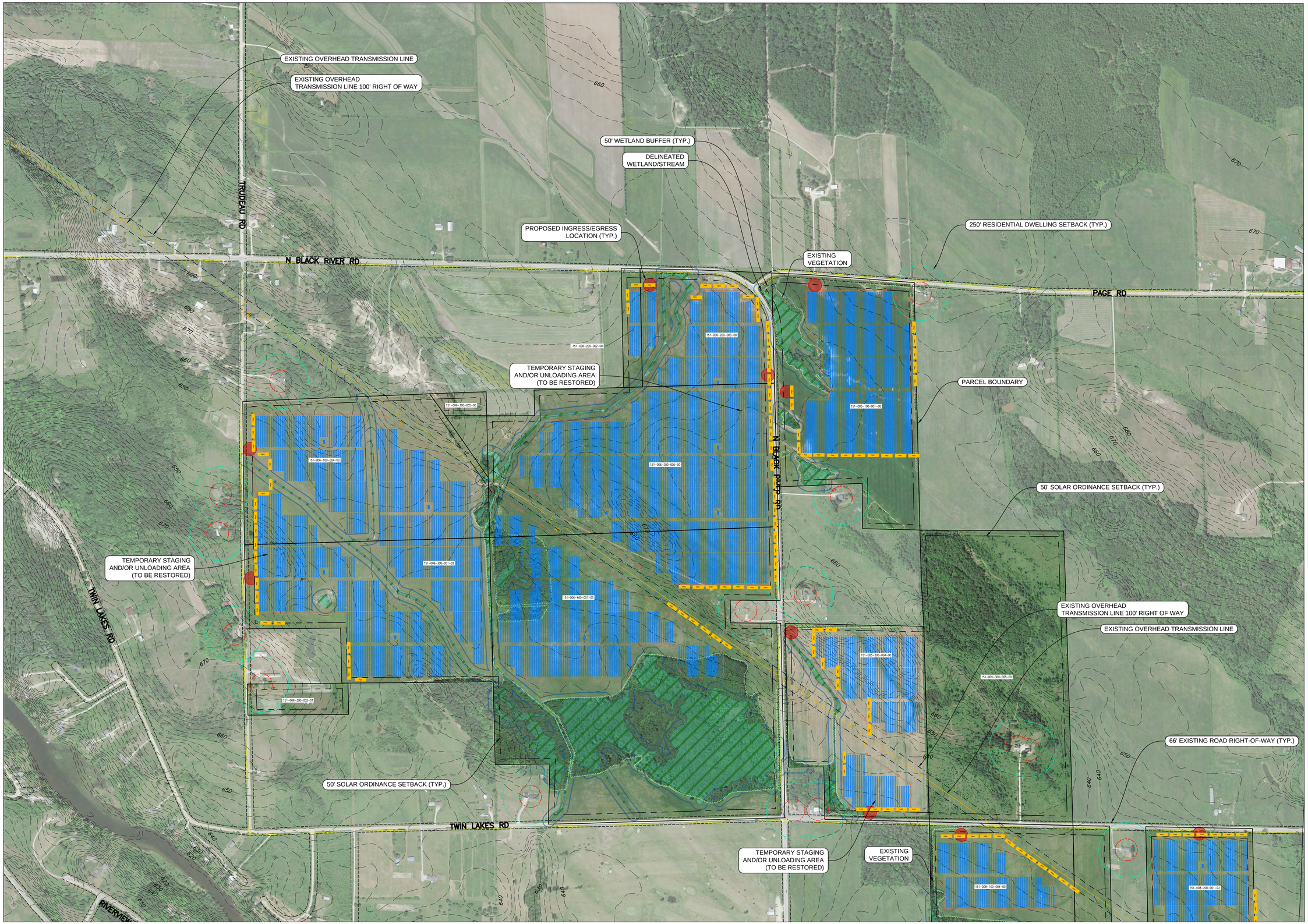

SITE PLAN
CHEBOYGAN SOLAR ENERGY PROJECT

GRANT TOWNSHIP,
CHEBOYGAN COUNTY,
MICHIGAN

SHEET TITLE:

SITE PLAN

C-101

LEGEND

PROPOSED SOLAR MODULE

PROPOSED ELECTRIC INVERTER

PROPOSED FENCE

RESIDENCE/DWELLING SETBACKS

100' SOLAR ORDINACE SETBACK

250' APPLICANT IMPOSED SETBACK

2' USGS CONTOURS

580 — 680 — 10' MAJOR CONTOUR

2' MINOR CONTOUR

PARCEL BOUNDARY

50' SOLAR ORDINANCE SETBACK

EXISTING UNDERGROUND GAS LINE

EX. 66' ROAD RIGHT-OF-WAY

EX. OVERHEAD ELECTRIC

OVERHEAD ELECTRIC RIGHT-OF-WAY

50' BUFFER — 50' BUFFER

DELINEATED WETLANDS/STREAMS AND 50' BUFFER

PROPOSED INGRESS/EGRESS LOCATION

LANDSCAPE LEGEND

PM1	PLANT MODULE 1 (SEE L101)
PM2	PLANT MODULE 2 (SEE L101)
PM3	PLANT MODULE 3 (SEE L101)
PM4	PLANT MODULE 4 (SEE L101)

DATE: 02/26/2020

ENGINEER'S SEAL:

STATE OF MICHIGAN
DOMENICK DIABLO
ENGINEER
No. 6201069937
LICENSED PROFESSIONAL ENGINEER

1"=400'

0 400 800 1200

DEVELOPER:

ORION RENEWABLE ENERGY GROUP LLC

CONSULTANT:

Shoener environmental :: engineering :: energy

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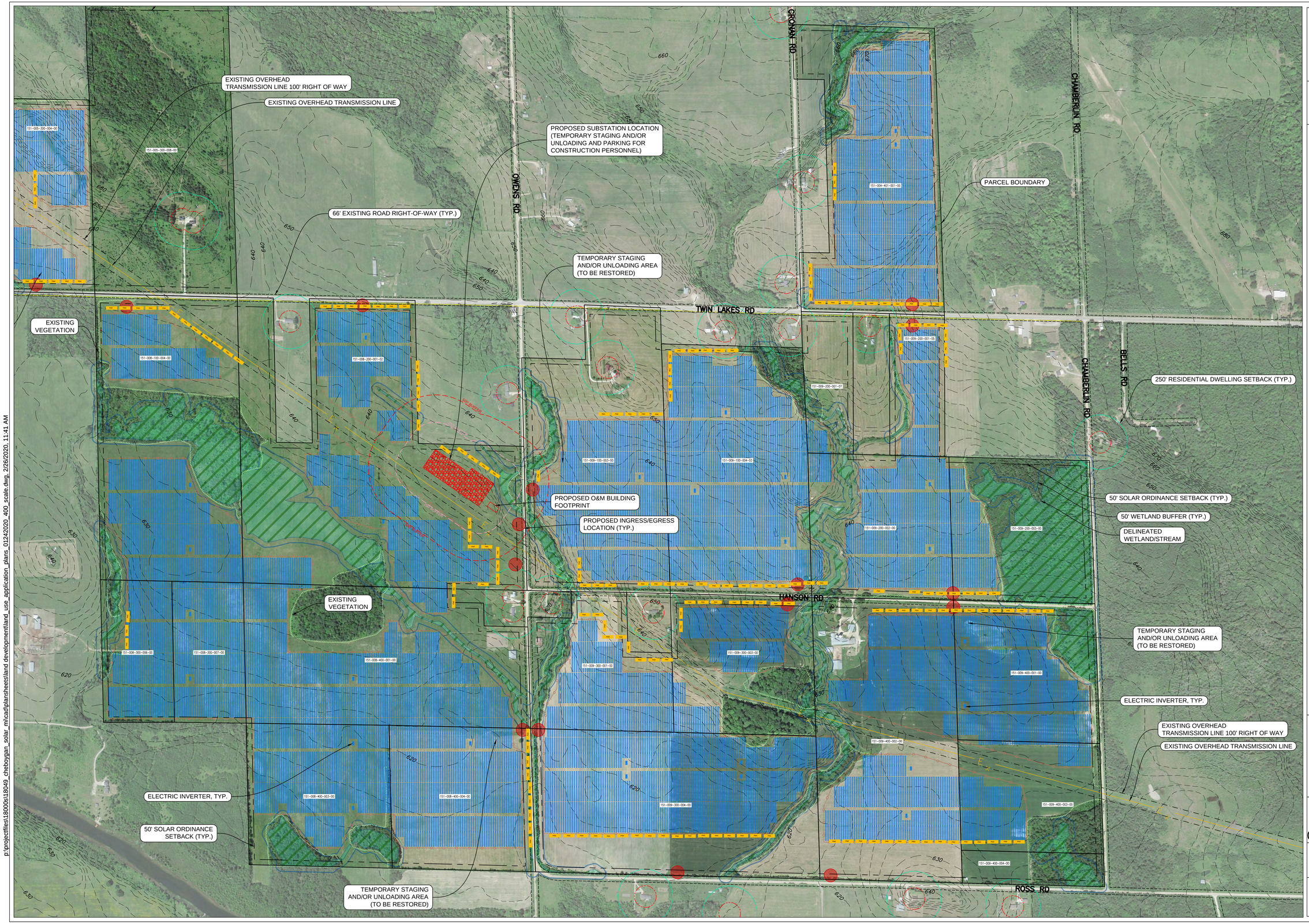

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SITE PLAN
CHEBOYGAN SOLAR ENERGY PROJECT

GRANT TOWNSHIP, CHEBOYGAN COUNTY, MICHIGAN

SHEET TITLE:

SITE PLAN

C-102

LEGEND

PROPOSED SOLAR MODULE

PROPOSED ELECTRIC INVERTER

PROPOSED FENCE

RESIDENCE/DWELLING SETBACKS

100' SOLAR ORDINACE SETBACK

250' APPLICANT IMPOSED SETBACK

2' USGS CONTOURS

580 — 680

10' MAJOR CONTOUR

2' MINOR CONTOUR

PARCEL BOUNDARY

50' SOLAR ORDINANCE SETBACK

EXISTING UNDERGROUND GAS LINE

EX. 66' ROAD RIGHT-OF-WAY

EX. OVERHEAD ELECTRIC

OVERHEAD ELECTRIC RIGHT-OF-WAY

50' BUFFER — 50' BUFFER

DELINEATED WETLANDS/STREAMS AND 50' BUFFER

PROPOSED INGRESS/EGRESS LOCATION

50' BUFFER

PROPOSED SUBSTATION FOOTPRINT

PROPOSED O&M BUILDING

LANDSCAPE LEGEND

PM1	PLANT MODULE 1 (SEE L101)
PM2	PLANT MODULE 2 (SEE L101)
PM3	PLANT MODULE 3 (SEE L101)
PM4	PLANT MODULE 4 (SEE L101)

DATE: 02/26/2020

ENGINEER'S SEAL:

STATE OF MICHIGAN
DOMENICK DIPAOLO
ENGINEER
No. 6201069937
LICENSED PROFESSIONAL ENGINEER

1"=400'

0 400 800 1200

DEVELOPER:

ORION RENEWABLE ENERGY GROUP LLC

CONSULTANT:

Shoener environmental engineering energy

GENERAL NOTES

1. LOCATIONS, DIMENSIONS, AND SUPPLIERS OF ALL IMPROVEMENTS MAY BE MODIFIED TO ACCOMMODATE PROJECT CRITERIA, SUBJECT TO COUNTY REQUIREMENTS AND APPROVALS, IF ANY."
2. PARTICIPATING LAND ON WHICH SOLAR PANELS ARE SHOWN INCLUDES LANDOWNERS UNDER AGREEMENT TO BE INCLUDED IN THE SPECIAL USE PERMIT APPLICATION.
3. THE PROPERTY LINES SHOWN HEREON WERE PLOTTED FROM GIS AND OTHER PUBLICLY AVAILABLE DATA.
4. LAYOUT BASED ON GIS AND OTHER PUBLICLY AVAILABLE DATA.
5. 2 FOOT CONTOURS WERE DERIVED FROM USGS 1M DIGITAL ELEVATION MODEL.
6. PLAN IS CONCEPTUAL, NOT FOR CONSTRUCTION.
7. MATERIAL SAFETY DATA SHEETS (MSDS) SHALL BE SUPPLIED FOR ALL HAZARDOUS MATERIALS TO BE USED ON SITE.
8. LOCKBOXES AND KEYS SHALL BE PROVIDED FOR ANY LOCKED ENTRANCES FOR EMERGENCY PERSONNEL ACCESS TO ANY LOCKED FENCED PORTIONS OF THE FACILITY.
9. THE PROPOSED GROUND MOUNTED SOLAR ARRAYS, AND ASSOCIATED ACCESS ROADS, SHALL BE INSTALLED AT EXISTING GRADE WITHOUT SIGNIFICANT ALTERATION OF THE EXISTING GROUND SURFACE.
10. WETLANDS AND OTHER WATERS WERE DELINEATED BY SHOENER ENVIRONMENTAL INC. IN MAY, 2019.
11. TEMPORARY STAGING AND/OR UNLOADING AREAS WILL BE LOCATED WITHIN THE PROPOSED SES–PV SOLAR PANEL BLOCKS AND WILL BE RESTORED.

CODE COMPLIANCE

ANY SES–PV SYSTEMS SHALL MEET OR EXCEED ANY APPLICABLE STANDARDS AND REGULATIONS OF THE INTERNATIONAL FIRE CODE AS AMENDED, THE NATIONAL ELECTRIC SAFETY CODE AS AMENDED AND ANY OTHER APPLICABLE REGULATIONS OF THE STATE AND FEDERAL GOVERNMENT WITH THE AUTHORITY TO REGULATE SOLAR ENERGY SYSTEMS IN EFFECT AT THE TIME OF SES–PV SYSTEM APPROVAL.

ELECTRICAL INTERCONNECTION

ALL ELECTRICAL INTERCONNECTIONS OR DISTRIBUTION LINES SHALL COMPLY WITH ALL APPLICABLE CODES AND STANDARDS. ONLY EXISTING ABOVEGROUND TRANSMISSION LINES AS WELL AS ABOVE–GROUND TRANSMISSION LINES FROM THE PROJECT GENERATION STATION STEP–UP TRANSFORMER FACILITY TO THE POINT OF INTERCONNECTION WITH TRANSMISSION LINES ARE PERMITTED ABOVE GROUND. ALL OTHER ELECTRICAL INTERCONNECTIONS SHALL BE BURIED UNLESS OTHER REQUIREMENTS ARE DETERMINED AT THE TIME OF BUILDING PERMIT REVIEW.

HEIGHT RESTRICTIONS

LEVEL 3 SES–PV SOLAR COLLECTION PANELS WITH THEIR SUPPORT STRUCTURES SHALL NOT EXCEED 20 FEET IN HEIGHT WHEN ORIENTED AT MAXIMUM TILT. ALL OTHER STRUCTURES EXCEPT THOSE WITHIN THE GENERATION STATION STEP–UP TRANSFORMER FACILITY AND ASSOCIATED TRANSMISSION TOWERS SHALL BE LIMITED TO THIRTY–FIVE (35) FEET. EQUIPMENT WITHIN THE GENERATION STATION STEP–UP TRANSFORMER FACILITY SHALL BE EXEMPT FROM HEIGHT RESTRICTIONS.

LANDSCAPING NOTES

I. LEVEL 3 SES–PV FACILITIES ABUTTING A PUBLIC OR PRIVATE ROAD OR PROPERTY LINE OF AN ADJACENT PARCEL SHALL COMPLY WITH THEFOLLOWING REQUIREMENTS:
   A) SCREENING SHALL BE REQUIRED ALONG ANY PUBLIC OR PRIVATE ROAD RIGHT(S)–OF–WAY AND OPPOSITE ANY DWELLING ON THE SAME OR ADJACENT PARCELS UNLESS THE OWNER OF THE DWELLING TO BE SCREENED REQUESTS IN WRITING OTHERWISE.
   B) EVERGREEN CONIFEROUS TREES OR A COMBINATION OF TREES AND BERMS SHALL BE THE MINIMUM ACCEPTABLE METHODS OF SCREENING WHEREVER SCREENING IS REQUIRED.
   C) MINIMUM HEIGHT AT TIME OF PLANTING REQUIREMENTS FOR TREES UTILIZED FOR SCREENING ARE AS FOLLOWS:
      1. TREES PLANTED OPPOSITE A DWELLING SHALL BE A MINIMUM OF EIGHT (8) FEET TALL AT THE TIME OF PLANTING. THE TREE HEIGHT MAY BE REDUCED BY ONE (1) FOOT FOR EACH ONE (1) FOOT IN THE HEIGHT OF THE BERM ON WHICH IT IS PLANTED, I.E. THE TOTAL OF THE BERM AND TREE HEIGHT MUST BE A MINIMUM OF EIGHT (8) FEET IN HEIGHT. IF THE ROAD BED IS ELEVATED ABOVE THE SURROUNDING LAND SURFACE AT THE LOCATION REQUIRING SCREENING, TREE TOPS SHALL BE AT LEAST EIGHT (8) FEET ABOVE THE ROAD SURFACE.
      2. TREE HEIGHT AT THE TIME OF PLANTING SHALL NOT BE ALLOWED TO BE REDUCED BELOW FOUR (4) FEET IN HEIGHT REGARDLESS OF BERM HEIGHT (SEE FIGURE 2).
      3. TREES PLANTED FOR SCREENING ALONG ROAD RIGHTS–OF–WAY NOT OPPOSITE A DWELLING SHALL REQUIRE A MINIMUM HEIGHT AT THE TIME OF PLANTING OF FIVE (5) FEET.

II. BURIED ELECTRICAL CABLES WITHIN EASEMENTS USED TO CONNECT NONCONTIGUOUS PARCELS WITH THE LEVEL 3 SES–PV FACILITY, ALTHOUGH AN INTEGRAL PART OF THE FACILITY, SHALL NOT REQUIRE SCREENING REGARDLESS OF PROXIMITY TO ANY DWELLING.

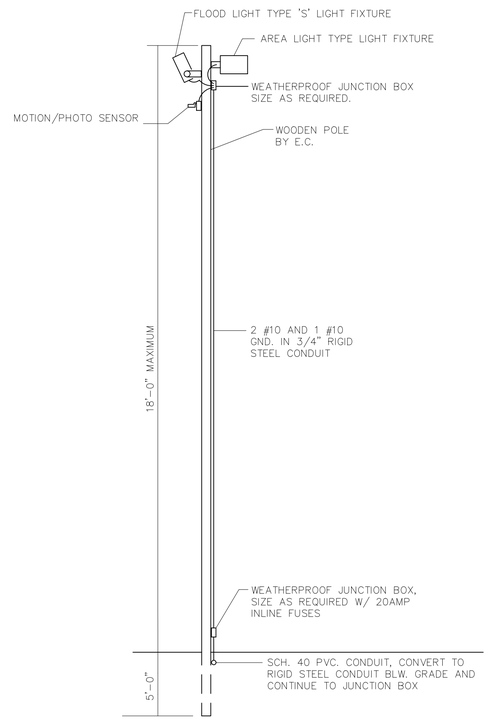
III. ALL TREE PLANTINGS OR COMBINATION OF TREES AND BERMS UTILIZED FOR SCREENING OPPOSITE A DWELLING SHALL EXTEND 100 FEET IN EITHER DIRECTION FROM A POINT ON THE LEVEL 3 SES–PV FACILITY PERIMETER DIRECTLY OPPOSITE THE MIDPOINT OF THE OPPOSING DWELLING.

IV. IN THE EVENT A PROPERTY LINE LIES WITHIN THE ROAD RIGHT(S)–OF–WAY, SETBACKS SHALL BE MEASURED FROM THE EDGE OF THE ROAD RIGHT(S)–OF–WAY.

V. AT ROAD OR DRIVEWAY INTERSECTIONS, VEGETATIVE SCREENING OR COMBINATION OF TREES AND BERMS OR FENCES SHALL BE ESTABLISHED OR MAINTAINED IN A MANNER THAT DOES NOT OBSTRUCT THE VIEW OF VEHICULAR TRAFFIC IN ANY DIRECTION. ALL RIGHT–OFWAY INTERSECTIONS SHALL BE PROVIDED AND MAINTAINED WITH A CLEAR UNOBSTRUCTED VISION CORNER EXTENDING NOT LESS THAN 20 FEET FROM ALL RIGHT–OF–WAY LINE INTERSECTIONS ALONG SAID RIGHT–OF–WAY LINE IN THE FORM OF A TRIANGLE.

VI. NATURAL VEGETATIVE SCREENING IS ENCOURAGED TO BE INCORPORATED AND MAINTAINED INTO THE EVERGREEN CONIFEROUS TREE SCREENING REQUIREMENTS PER SECTION 17.30.6.C.B. HOWEVER, NATURAL VEGETATIVE SCREENING SHALL BE CONSIDERED AN ADDITION TO, AND NOT A REPLACEMENT FOR, THE EVERGREEN CONIFEROUS TREE SCREENING REQUIREMENTS.

VII. ALL TREES PLANTED FOR SCREENING SHALL BE MAINTAINED IN GOOD CONDITION FOR THE LIFE OF THE PROJECT. ALL DEAD, DYING OR DISEASED TREES SHALL BE REPLACED WITHIN ONE (1) YEAR WITH TREES IN COMPLIANCE WITH THE STANDARDS SET FORTH IN THIS SECTION.



1 C–201 LIGHTING FIXTURE / POLE MOUNTING DETAIL

N.T.S.

NOTE: ALL ITEMS SHOWN TO BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR INCLUDING THE POLE.

REQUIRED SETBACKS

I. ALL LEVEL 3 SES–PV SYSTEMS ALONG WITH THEIR SUPPORTING STRUCTURES, INVERTERS AND SUPPORTING BUILDINGS AND EQUIPMENT (EXCLUDING FENCING, VEGETATIVE SCREENING, BERMS, ROADS, UNDERGROUND CABLES AND GENERATOR SYSTEM STEP–UP TRANSFORMER FACILITIES) SHALL COMPLY WITH THE FOLLOWING SETBACKS:
   A) 100 FEET FROM ANY DWELLING. THIS SETBACK MAY BE WAIVED OR REDUCED IF REQUESTED BY THE OWNER OF THE DWELLING TO BE SCREENED.
   B) 50 FEET FROM ANY LEVEL 3 SES–PV FACILITY PERIMETER NOT ABUTTING A PRIVATE OR PUBLIC ROAD UNLESS REQUESTED TO BE WAIVED BY THE PROPERTY OWNER OF THE PARCEL TO BE SCREENED.
   C) 50 FEET FROM ANY PUBLIC OR PRIVATE ROAD RIGHT OF WAY..
   D) 500 FEET FROM ANY MAJOR BODY OF WATER AS LISTED IN SECTION 10.1.2.
   E) 40 FEET FROM ANY PERENNIAL STREAM, OTHER THAN THOSE LISTED IN SECTION 10.1.2, SHOWN AS PART OF THE P–LS ZONING DISTRICT. HOWEVER, UNDERGROUND CABLES MAY BE ALLOWED IF PERMITTED BY THE MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY (MDEQ) AND THE ARMY CORPS OF ENGINEERS.

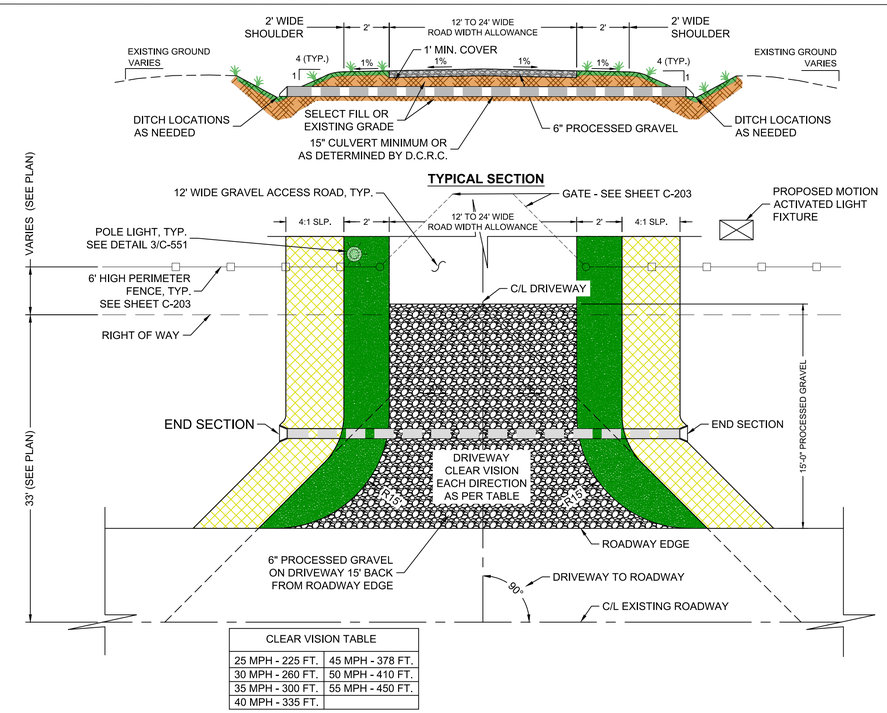
II. THE GENERATOR SYSTEM STEP–UP TRANSFORMER FACILITY AND ANY ELECTRICAL STORAGE FACILITY SHALL MEET THE FOLLOWING SETBACKS:
   A) 500 FEET FROM ANY DWELLING.
   B) 250 FEET FROM ANY PUBLIC OR PRIVATE ROAD ABUTTING THE LEVEL 3 SES–PV FACILITY PERIMETER OF OR BISECTING THE PROJECT.
   C) 500 FEET FROM THE ORDINARY HIGH WATER MARK OF ANY BODY OF WATER LISTED IN SECTION 10.1.2.

III. ALL TREE PLANTINGS UTILIZED FOR SCREENING SHALL HAVE SETBACKS OF SEVEN (7) FEET FROM ANY PROPERTY LINE, PUBLIC OR PRIVATE ROAD RIGHT(S)–OF–WAY, UTILITY OR DRIVEWAY EASEMENT(S) OR THE LEVEL 3 SESPV FACILITY PERIMETER. THE SEVEN (7) FOOT SETBACK SHALL BE MEASURED AT THE TIME OF PLANTING FROM THE CENTER OF THE TRUNKS OF THE TREES USED FOR SCREENING.

IV. FENCING SHALL BE NO CLOSER THAN ONE (1) FOOT FROM ANY PROPERTY LINE, PUBLIC ROAD RIGHT(S)–OF–WAY, UTILITY OR DRIVEWAY EASEMENT(S) OR THE ESTABLISHED LEVEL 3 SES–PV FACILITY PERIMETER. FENCING IS CONSIDERED A SECURITY MEASURE AND CANNOT BE CONSIDERED AS ADEQUATE SCREENING FOR A LEVEL 3 SES–PV SYSTEM.

APPLICANT IMPOSED SETBACK

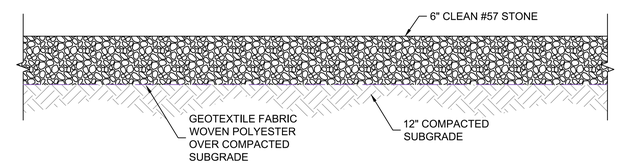
1. TWO HUNDRED FIFTY (250) FEET FROM EXISTING RESIDENCE/HOUSE.
2. FIFTY (50) FEET FROM ANY DELINEATED WETLAND OR STREAM.



CLEAR VISION TABLE	
25 MPH - 225 FT.	45 MPH - 378 FT.
30 MPH - 260 FT.	50 MPH - 410 FT.
35 MPH - 300 FT.	55 MPH - 450 FT.
40 MPH - 335 FT.	

2 C–201 ACCESS ROAD ENTRANCE DETAIL

N.T.S.



3 C–201 TYPICAL GRAVEL ACCESS ROAD SECTION

N.T.S.

TEMPORARY STAGING AND/OR UNLOADING AREA

1. TEMPORARY STAGING AND/OR UNLOADING AREAS WILL BE LOCATED WITHIN THE PROPOSED SES–PV SOLAR PANEL BLOCKS AND WILL BE RESTORED.
2. TEMPORARY STAGING AND/OR UNLOADING AND PARKING FOR CONSTRUCTION PERSONNEL WILL BE LOCATED WITHIN THE PROPOSED SUBSTATION AND O&M AREAS,

SITE PLAN
CHEBOYGAN SOLAR ENERGY PROJECT
GRANT TOWNSHIP, CHEBOYGAN COUNTY, MICHIGAN

SHEET TITLE:
GENERAL NOTES & DETAILS
C-201

DATE: 02/26/2020

ENGINEER'S SEAL:
STATE OF MICHIGAN
DOMENICK DIPAOLO
ENGINEER
No. 6201069937
LICENSED PROFESSIONAL ENGINEER

DEVELOPER:
ORION RENEWABLE ENERGY GROUP LLC

CONSULTANT:
Shoener environmental engineering energy

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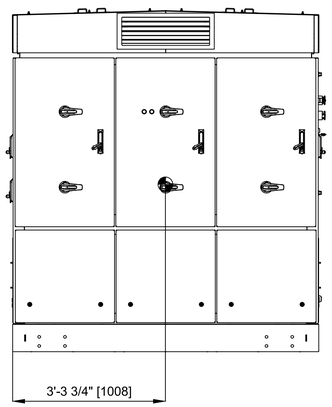
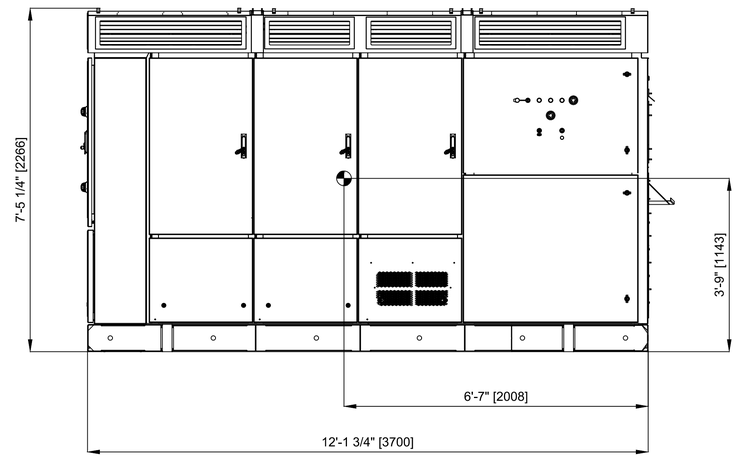
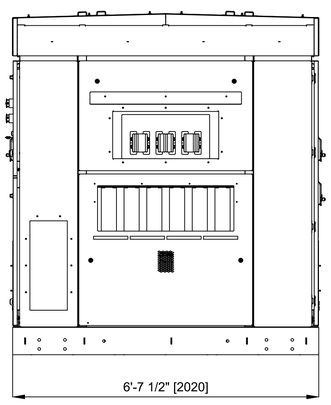
NOTE:
LOCATIONS, DIMENSIONS, AND SUPPLIERS OF ALL IMPROVEMENTS MAY BE MODIFIED TO ACCOMMODATE PROJECT CRITERIA, SUBJECT TO TOWNSHIP REQUIREMENTS AND APPROVALS, IF ANY."



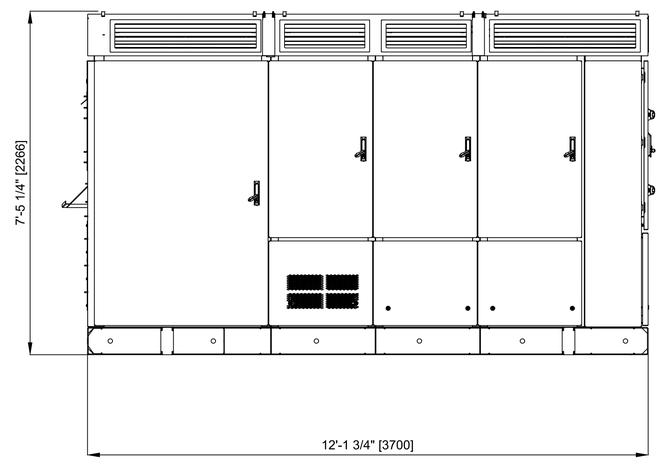
END LEFT



ELEVATION LEFT



END RIGHT



ELEVATION RIGHT

SITE PLAN
CHEBOYGAN SOLAR ENERGY PROJECT
GRANT TOWNSHIP, CHEBOYGAN COUNTY, MICHIGAN

SHEET TITLE:
INVERTER ELEVATIONS
C-202

DATE: 02/26/2020

ENGINEER'S SEAL:

STATE OF MICHIGAN
DOMENICK DIPAOLO
ENGINEER
No. 6201069937
LICENSED PROFESSIONAL ENGINEER

DEVELOPER:
ORION RENEWABLE ENERGY GROUP LLC

CONSULTANT:
Shoener environmental engineering energy

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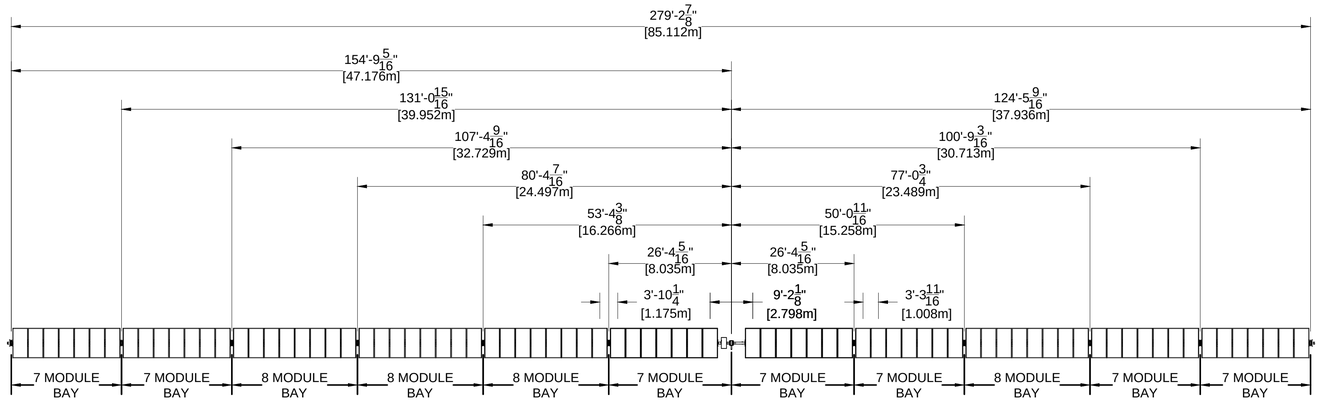
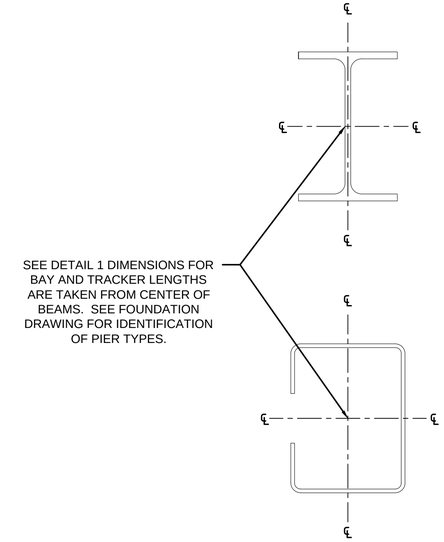
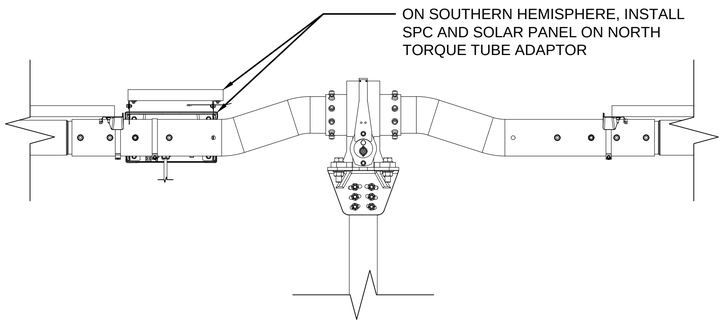


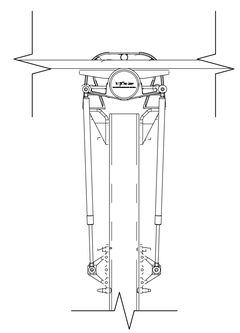
1 C-203 PIER SPACING
SCALE: N.T.S.



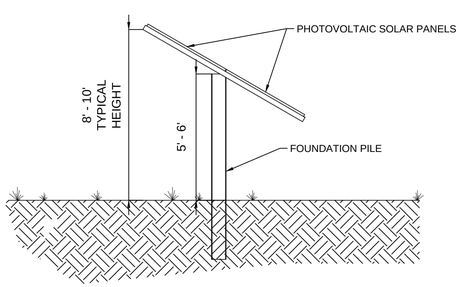
2 C-203 CENTER OF WEB
SCALE: N.T.S.



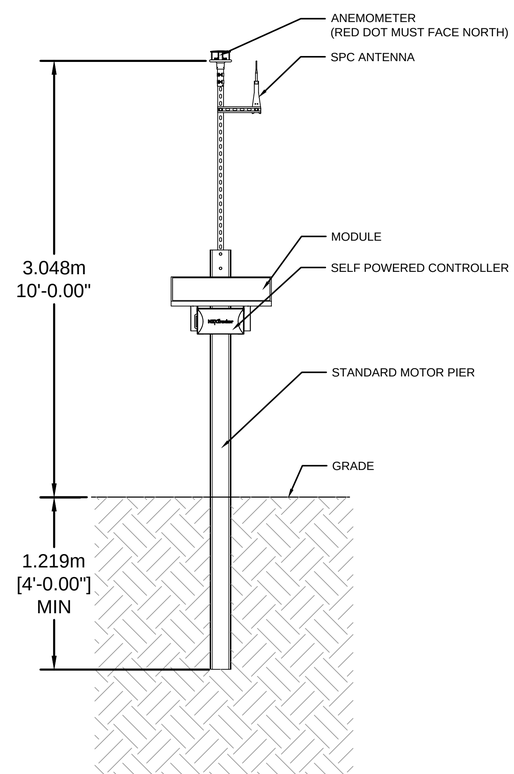
3 C-203 SELF POWERED CONTROLLER
SCALE: N.T.S.



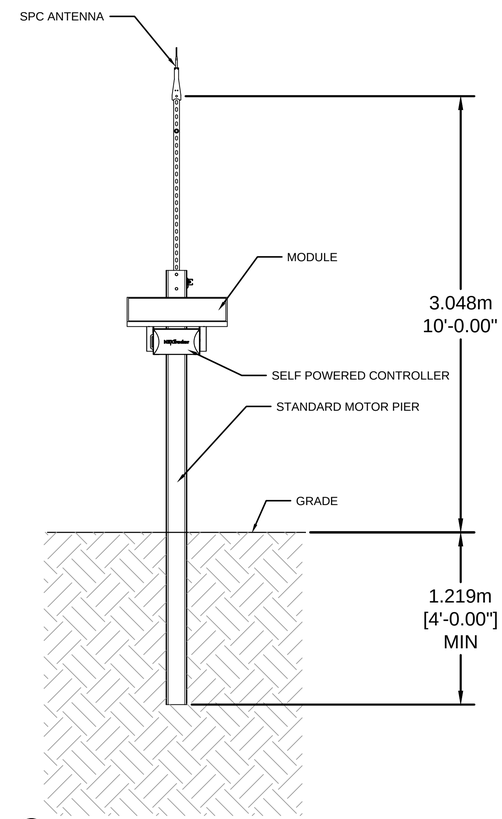
5 C-203 DOUBLE DAMPER
SCALE: N.T.S.



4 C-203 SOLAR PANEL SECTION
SCALE: N.T.S.



6 C-203 SPT WEATHER STATION, ULTRASONIC WIND SENSOR
SCALE: N.T.S.



7 C-203 SPT WEATHER STATION, ULTRASONIC SNOW SENSOR
SCALE: N.T.S.

NOTE:
LOCATIONS, DIMENSIONS, AND SUPPLIERS OF ALL IMPROVEMENTS MAY BE MODIFIED TO ACCOMMODATE PROJECT CRITERIA, SUBJECT TO TOWNSHIP REQUIREMENTS AND APPROVALS, IF ANY."

SITE PLAN
CHEBOYGAN SOLAR ENERGY PROJECT
GRANT TOWNSHIP, CHEBOYGAN COUNTY, MICHIGAN

SHEET TITLE:
MODULE TRACKER DETAILS
C-203

DATE: 02/26/2020

ENGINEER'S SEAL:
STATE OF MICHIGAN
DOMENICK DIPAOLO
ENGINEER
No. 6201060937
LICENSED PROFESSIONAL ENGINEER

DEVELOPER:
ORION RENEWABLE ENERGY GROUP LLC

CONSULTANT:
Shoener environmental engineering energy

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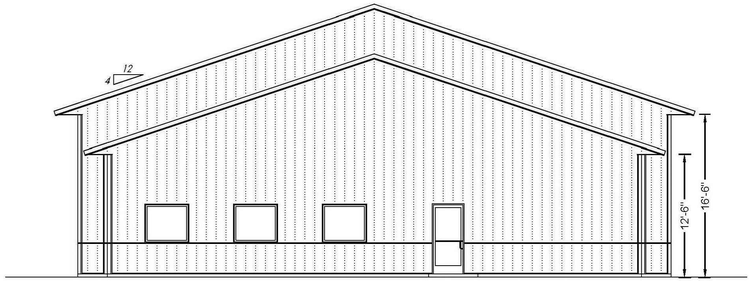
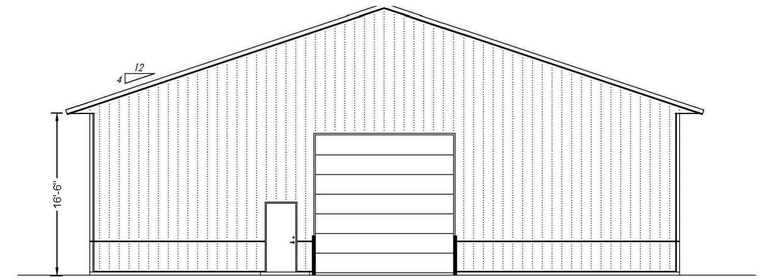
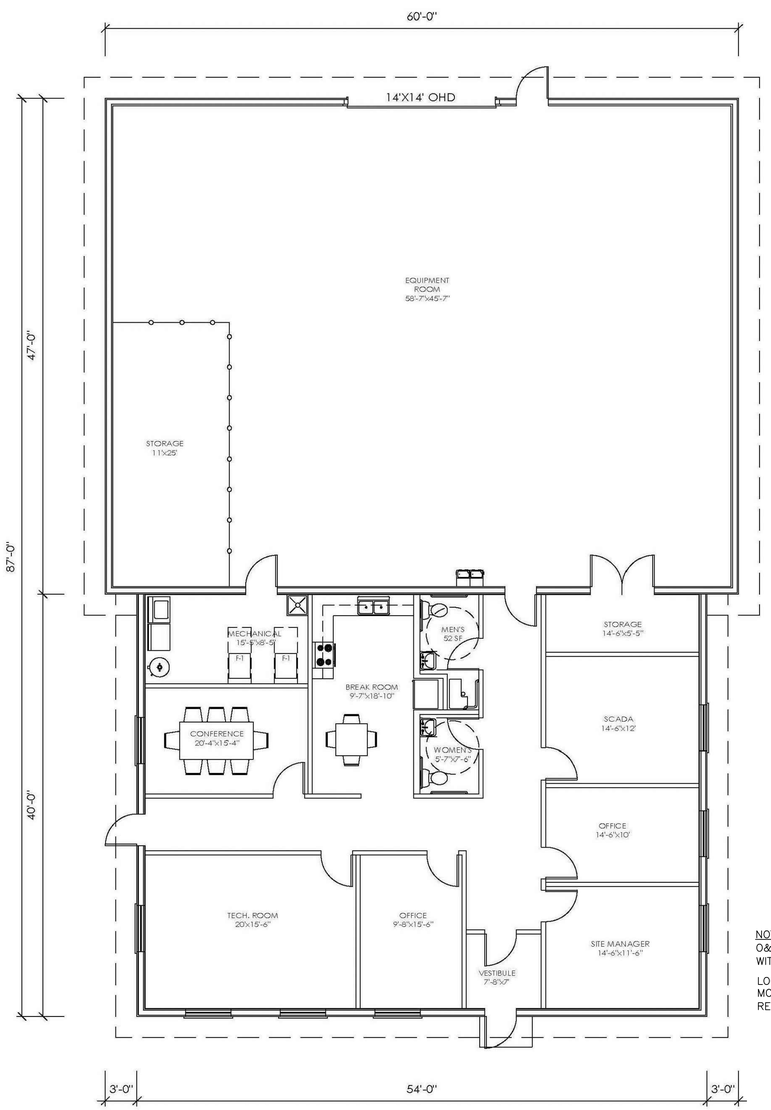


NORTHWEST ELEVATION

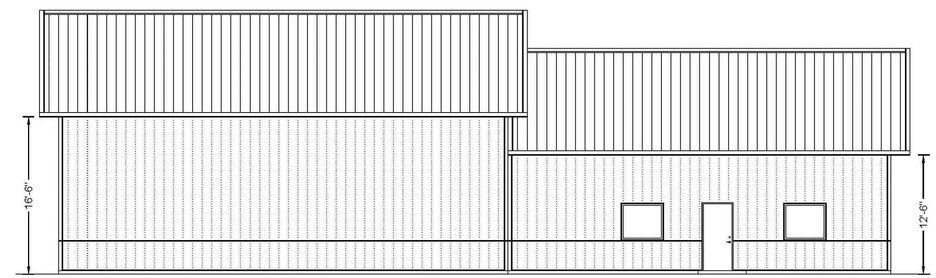


SOUTHEAST ELEVATION

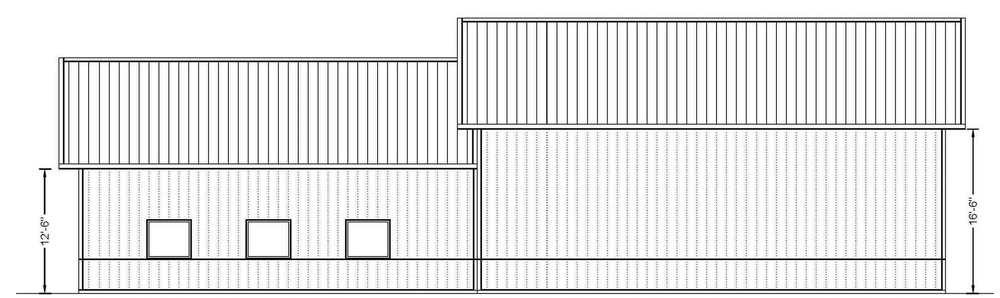


NOTE:
O&M BUILDING SHALL INCORPORATE A PERIMETER GRAVEL AREA (25' WIDTH) WITH FOUR (4) PARKING STALLS.

LOCATIONS, DIMENSIONS, AND SUPPLIERS OF ALL IMPROVEMENTS MAY BE MODIFIED TO ACCOMMODATE PROJECT CRITERIA, SUBJECT TO TOWNSHIP REQUIREMENTS AND APPROVALS, IF ANY."



NORTHEAST ELEVATION



SOUTHWEST ELEVATION

SITE PLAN
CHEBOYGAN SOLAR ENERGY PROJECT
GRANT TOWNSHIP, CHEBOYGAN COUNTY, MICHIGAN

SHEET TITLE:
O&M BUILDING DETAILS
C-204

DATE: 02/26/2020

ENGINEER'S SEAL:
STATE OF MICHIGAN
DOMENICK DIPAOLO
ENGINEER
No. 6201069937
LICENSED PROFESSIONAL ENGINEER

DEVELOPER:
ORION RENEWABLE ENERGY GROUP LLC

CONSULTANT:
Shoener environmental engineering energy

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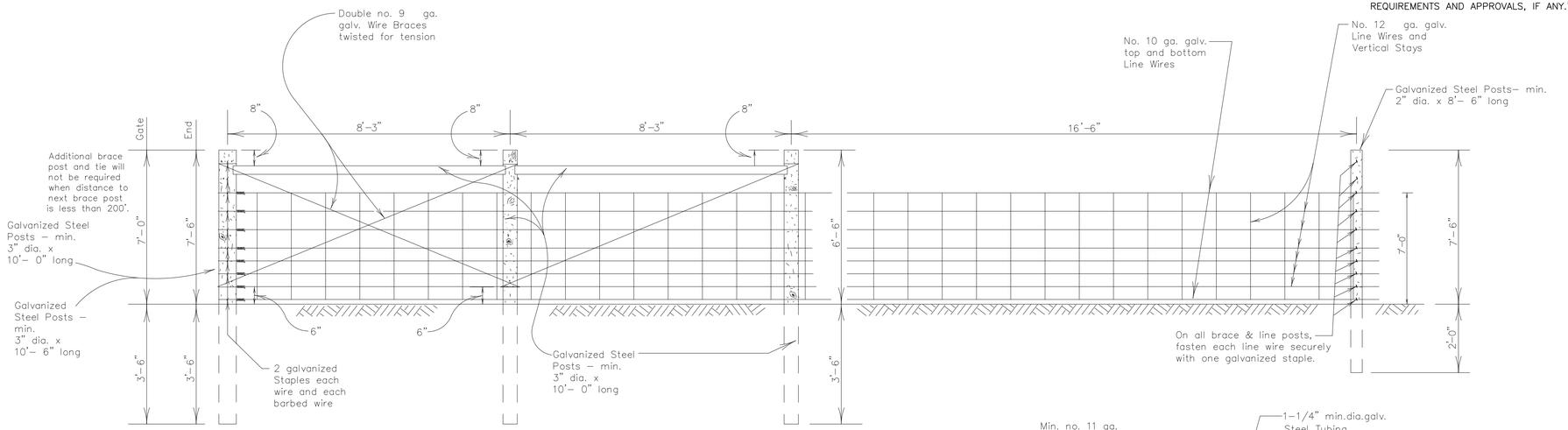
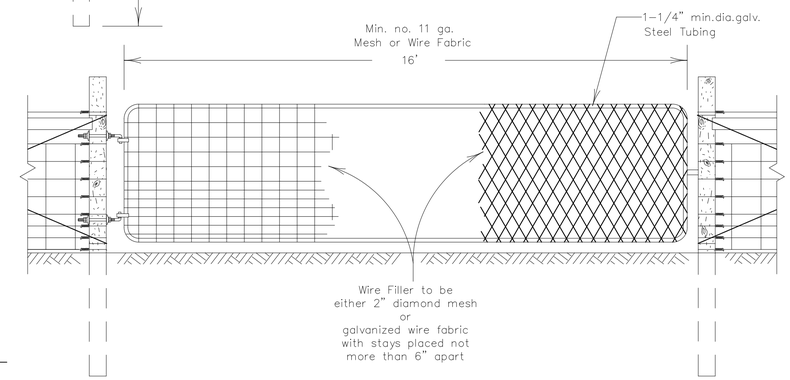
NOTE:
LOCATIONS, DIMENSIONS, AND SUPPLIERS OF ALL IMPROVEMENTS MAY BE MODIFIED TO ACCOMMODATE PROJECT CRITERIA, SUBJECT TO TOWNSHIP REQUIREMENTS AND APPROVALS, IF ANY."



SECTION GALVANIZED WOVEN WIRE FENCE WITH GALVANIZED STEEL POSTS
Bracing Detail Used at Ends and Gates
TYPE "B" FENCE
(See General Note 6)

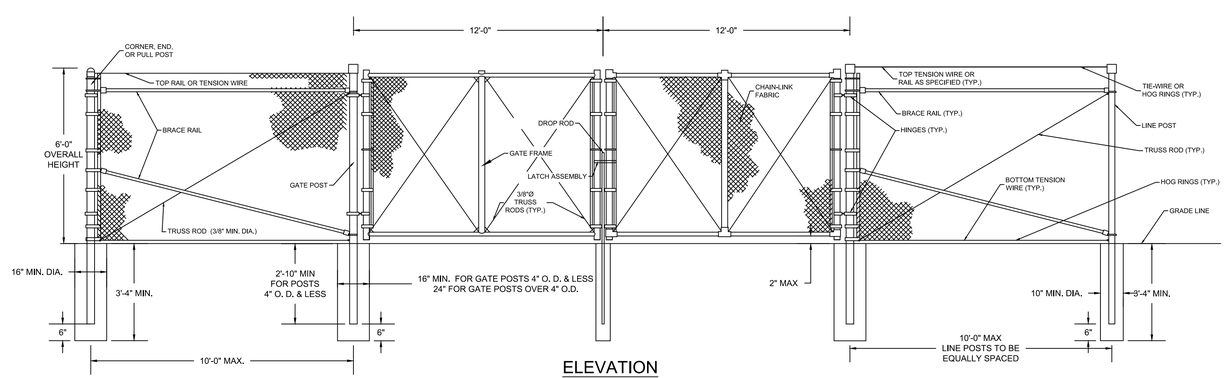


GATE DETAIL

WOVEN WIRE FENCE DETAILS

1 C-205

(NOT TO SCALE)



ELEVATION

CHAIN LINK FENCE DETAILS

2 C-205

DOUBLE SWING GATE & FENCE DETAILS

(NOT TO SCALE)

NOTE: FOR SUBSTATION ENCLOSURE ONLY.

SITE PLAN
CHEBOYGAN SOLAR ENERGY PROJECT
GRANT TOWNSHIP, CHEBOYGAN COUNTY, MICHIGAN

SHEET TITLE:
FENCE DETAILS
C-205

DATE: 02/26/2020

ENGINEER'S SEAL:

STATE OF MICHIGAN
DOMENICK DIPAOLO
ENGINEER
No. 6201060937
LICENSED PROFESSIONAL ENGINEER

DEVELOPER:
ORION RENEWABLE ENERGY GROUP LLC

CONSULTANT:
Shoener environmental engineering energy

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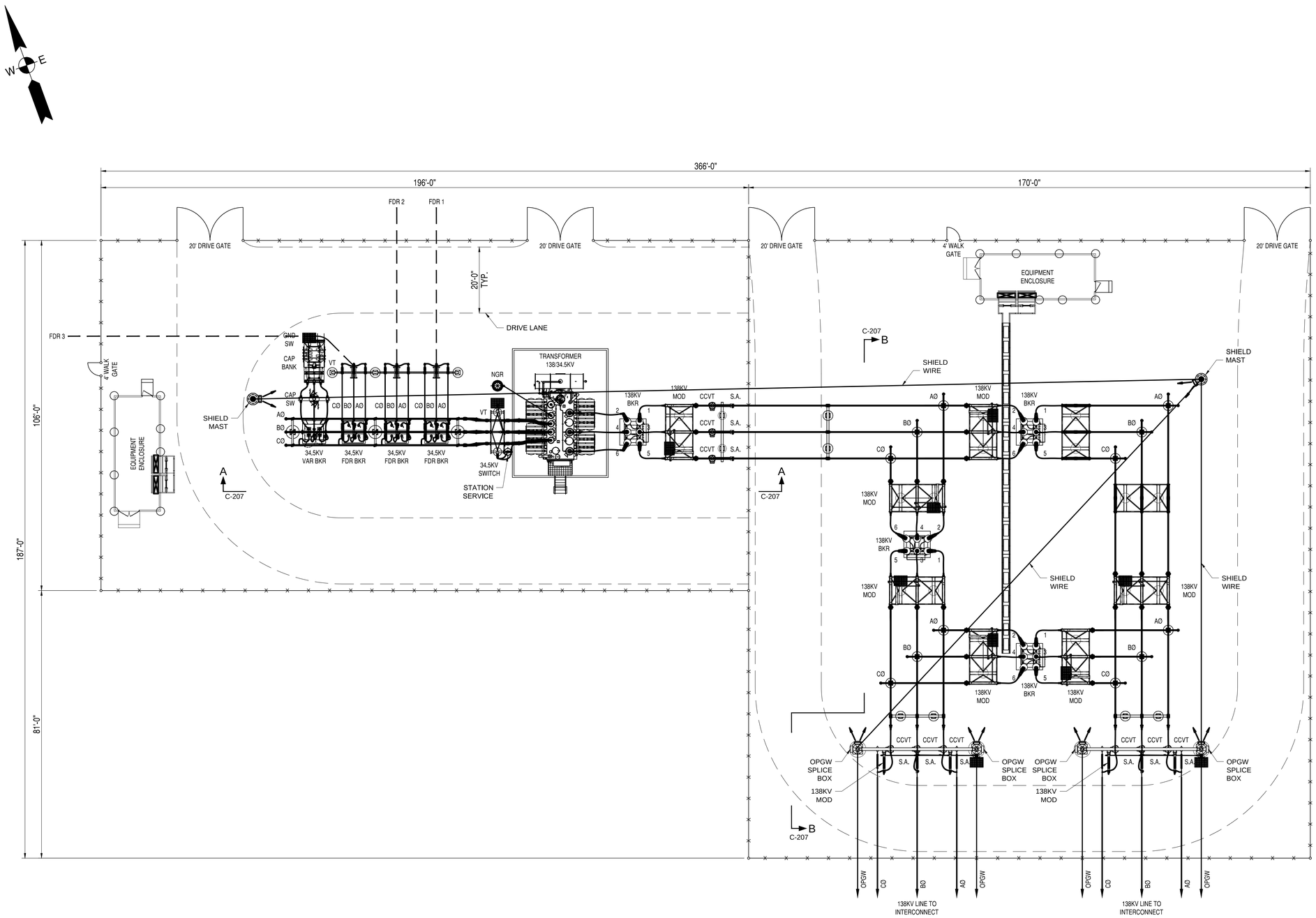

SCALE 1/16" = 1'-0"

8' 0 8' 16' 24' 32' 40'

SITE PLAN
CHEBOYGAN SOLAR ENERGY PROJECT

GRANT TOWNSHIP,
CHEBOYGAN COUNTY,
MICHIGAN

SHEET TITLE:
SUBSTATION & INTERCONNECTION FACILITIES - GENERAL ARRANGEMENT
C-206

LEGEND

F	FIXED FITTING
S	SLIP FITTING
E	EXPANSION FITTING
	BASE LINE INTERSECTION
	FENCE w/ BARBS
	OPERATOR PLATFORM

DATE: 02/26/2020

ENGINEER'S SEAL:

STATE OF MICHIGAN
DOMENICK DIPAOLO
ENGINEER
No. 6201069937
LICENSED PROFESSIONAL ENGINEER

DEVELOPER:
ORION RENEWABLE ENERGY GROUP LLC

CONSULTANT:
Shoener environmental | engineering | energy

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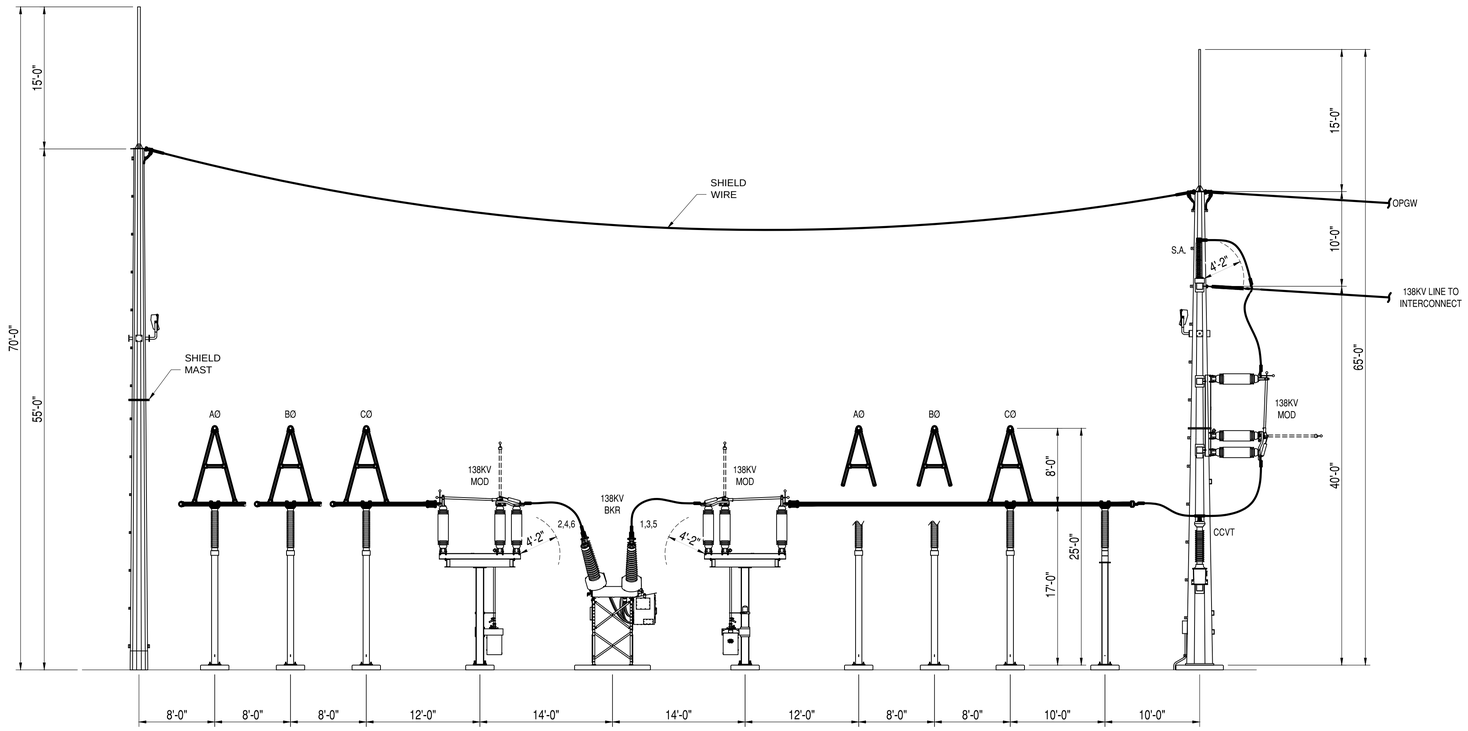
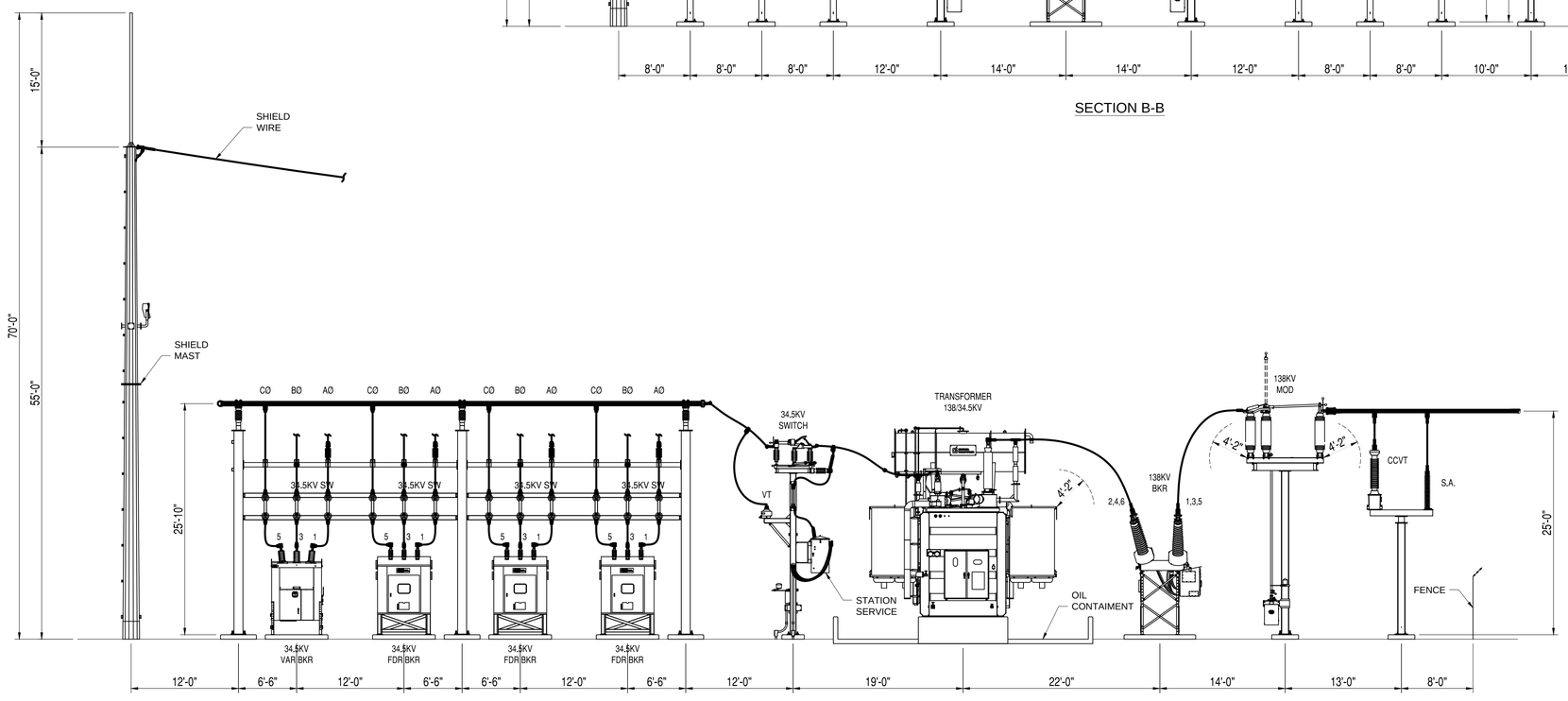


SECTION B-B



SECTION A-A

SCALE 1/8" = 1'-0"

4' 0 4' 8' 12' 16' 20'

SITE PLAN
CHEBOYGAN SOLAR ENERGY PROJECT

GRANT TOWNSHIP,
CHEBOYGAN COUNTY,
MICHIGAN

SHEET TITLE:
SUBSTATION & INTERCONNECTION FACILITIES - ELEVATION VIEW

C-207

LEGEND

F	FIXED FITTING
S	SLIP FITTING
E	EXPANSION FITTING
	BASE LINE INTERSECTION
	FENCE w/ BARBS
	OPERATOR PLATFORM

DATE: 02/26/2020

ENGINEER'S SEAL:

STATE OF MICHIGAN
DOMENICK DIPAOLO
ENGINEER
No. 6201069937
LICENSED PROFESSIONAL ENGINEER

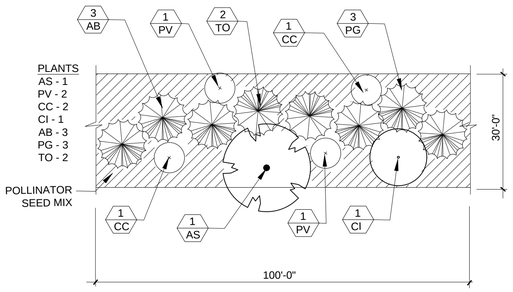
DEVELOPER:

ORION RENEWABLE ENERGY GROUP LLC

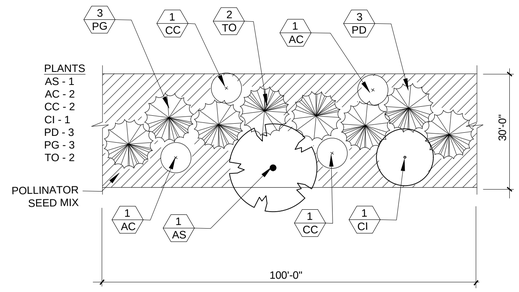
CONSULTANT:

Shoener environmental engineering energy

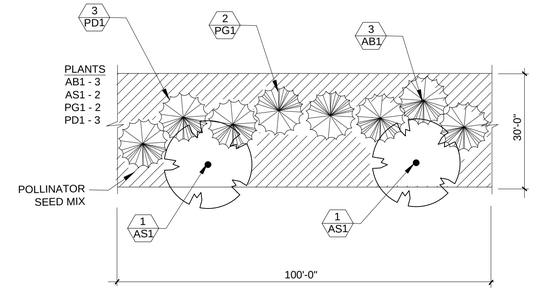
p:\projectfiles\18000s\18049_cheboygan_solar_mi\cad\plansheets\land development\details\cheboygan_details_01242020.dwg, 2/26/2020, 11:41 AM



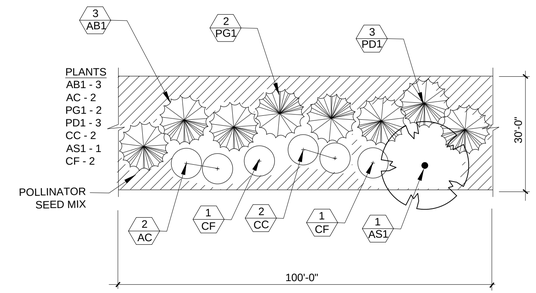
PM1 PLANT MODULE 1 (43)
RESIDENTIAL SCREENING
SCALE 1"=20'



PM2 PLANT MODULE 2 (35)
RESIDENTIAL SCREENING
SCALE 1"=20'



PM3 PLANT MODULE 3 (98)
PUBLIC OR PRIVATE ROAD
RIGHTS-OF-WAY SCREENING
SCALE 1"=20'

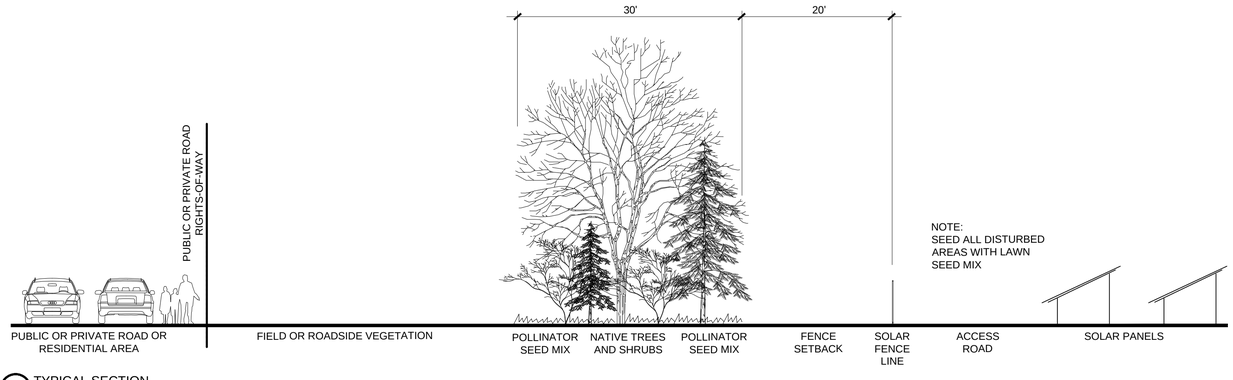


PM4 PLANT MODULE 4 (107)
PUBLIC OR PRIVATE ROAD
RIGHTS-OF-WAY SCREENING
SCALE 1"=20'

SYMBOL	QTY.	BOTANICAL NAME	COMMON NAME	SIZE	ROOT	REMARKS	MATURE HT/SPREAD	GROWTH RATE
DECIDUOUS TREES AND SHRUBS								
AC	188	AMELANCHIAR CANADENSIS	SERVICEBERRY	4' HGT.	#10 CONT	MULTI-STEM	12-15'HT/10'SP	2'/YR
AS	40	ACER SACCHARUM 'LEGACY'	LEGACY SUGAR MAPLE	8' HGT.	B&B	FULL	50' HT/20-25 'SP	2'/YR
AS1	211	ACER SACCHARUM 'LEGACY'	LEGACY SUGAR MAPLE	5' HGT.	#10 CONT	FULL	50' HT/20-25 'SP	2'/YR
CC	230	CERCIS CANADENSIS	EASTERN REDBUD	4' HGT.	#10 CONT	MULTI-STEM	12-15'HT/10'SP	2'/YR
CF	150	CORNUS FLORIDA	PINK FLOWERING DOGWOOD	5' HGT.	#10 CONT	FULL	15-20'HT/10-15'SP	1'/YR
CI	40	CRATAEGUS CRUSCALLI 'INERMIS'	THORNLESS COCKSPUR HAWTHORN	8' HGT.	B&B	FULL	15-20'HT/10-15'SP	1'/YR
PV	42	PRUNUS VIRGINIANNA 'SHUBERT'	RED CANADA CHOKECHERRY	4' HGT.	#10 CONT	MULTI-STEM	15-20'HT/10-15'SP	1'/YR
EVERGREEN TREES								
AB	63	ABIES BALSAMEA	BALSAM FIR	8' HGT.	B&B	FULL	40-50' HT/20-30' SP	1'/YR
AB1	429	ABIES BALSAMEA	BALSAM FIR	5' HGT.	B&B	FULL	40-50' HT/20-30' SP	1'/YR
PD	57	PICEA GLAUCA 'DENSATA'	BLACK HILLS SPRUCE	8' HGT.	B&B	FULL	40-60' HT/15-25' SP	1'/YR
PD1	429	PICEA GLAUCA 'DENSATA'	BLACK HILLS SPRUCE	5' HGT.	B&B	FULL	40-60' HT/15-25' SP	1'/YR
PG	120	PICEA GLAUCA	CANADIAN SPRUCE	8' HGT.	B&B	FULL	40-60' HT/15-25' SP	1'/YR
PG1	286	PICEA GLAUCA	CANADIAN SPRUCE	5' HGT.	B&B	FULL	40-60' HT/15-25' SP	1'/YR
TO	80	THUJA OCCIDENTALIS 'NIGRA'	NORTHERN WHITE CEDAR	8' HGT.	B&B	FULL	40' HT/10-15' SP	1'/YR

SEEDING SCHEDULE

1. POLINATOR SEED MIX:
   ERNST - 140 PARTIALLY SHADED AREA ROADSIDE WILDFLOWER MIX
   BY ERNST SEEDS. APPLY AT A RATE OF 20# PER ACRE.
   ADD COVER CROP 4# PER 1000 SF ANNUAL RYE GRASS.
2. LAWN SEED MIX:
   ERNST - CREEPING RED FESCUE 'NO MOW' BY ERNST SEEDS.
   APPLY AT A RATE OF 30# PER ACRE.



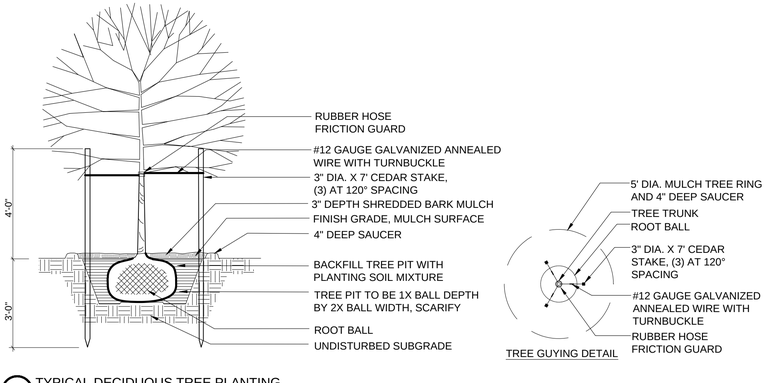
1 TYPICAL SECTION
SCALE 1"=10'-0"

PLANTING NOTES

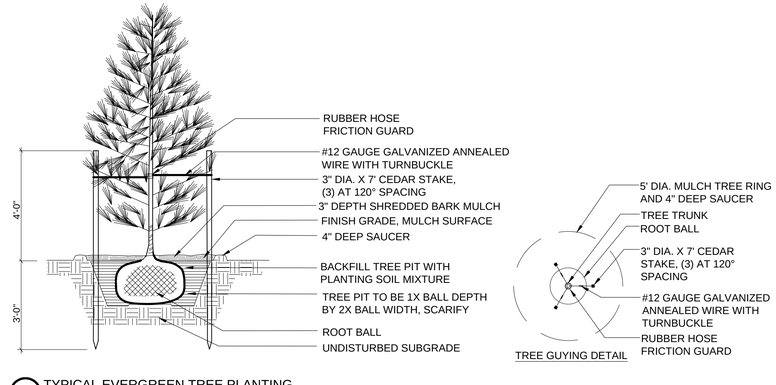
1. QUALITY ASSURANCE
   A. NOMENCLATURE: PLANT NAMES SHALL CONFORM TO THE LATEST EDITION OF "STANDARDIZED PLANT NAMES" AS ADOPTED BY THE AMERICAN JOINT COMMITTEE ON HORTICULTURAL NOMENCLATURE.
   B. SIZE AND GRADING: PLANT SIZES AND GRADING SHALL CONFORM TO THE LATEST EDITION OF "AMERICAN STANDARD FOR NURSERY STOCK" AS SPONSORED BY THE AMERICAN ASSOCIATION OF NURSERYMEN, INC. (AAN), UNLESS OTHERWISE SPECIFIED.
   C. NURSERY SOURCE: OBTAIN FRESHLY DUG, HEALTHY, VIGOROUS, PLANTS NURSERY GROWN UNDER CLIMATIC CONDITIONS SIMILAR TO THOSE IN THE LOCALITY OF THE PROJECT FOR A MINIMUM OF 2 YEARS. PLANTS SHALL HAVE BEEN LINED OUT IN ROWS, ANNUALLY CULTIVATED, SPRAYED, PRUNED, AND FERTILIZED IN ACCORDANCE WITH GOOD HORTICULTURAL PRACTICE. ALL PLANTS SHALL HAVE BEEN TRANSPLANTED OR ROOT PRUNED AT LEAST ONCE IN THE PAST 3 YEARS. BALLED AND BURLAPPED PLANTS MUST COME FROM SOIL WHICH WILL HOLD A FIRM ROOT BALL. HEELED IN PLANTS AND PLANTS FROM COLD STORAGE ARE NOT ACCEPTABLE.
   D. SUBSTITUTIONS: DO NOT MAKE SUBSTITUTIONS OF TREES AND/OR SHRUB MATERIALS. IF REQUIRED LANDSCAPE MATERIAL IS NOT OBTAINABLE, SUBMIT PROOF OF NON-AVAILABILITY AND PROPOSAL FOR USE OF EQUIVALENT MATERIAL. WHEN AUTHORIZED, ADJUSTMENTS OF CONTRACT AMOUNT (IF ANY) WILL BE MADE BY CHANGE ORDER.
2. SEEDING & PLANTING SEASONS AND TIMING CONDITIONS:
   A. UNLESS OTHERWISE DIRECTED IN WRITING, SEEDING SHALL OCCUR FROM MARCH 15 TO JUNE 1, AND FROM AUGUST 15 TO NOVEMBER 15.
   B. UNLESS OTHERWISE DIRECTED IN WRITING THE PLANTING OF TREES AND SHRUBS SHALL BE FROM MARCH 15 TO JUNE 1, AND FROM SEPTEMBER 1 TO DECEMBER 15.
   C. PROCEED WITH AND COMPLETE SEEDING WORK AS RAPIDLY AS PORTIONS OF THE SITE BECOME AVAILABLE, WORKING WITHIN THE SEASONAL LIMITATIONS FOR EACH KIND OF LANDSCAPE WORK REQUIRED.
   D. PROVIDE TEMPORARY ANNUAL RYEGRASS COVER FOR SEEDING OUTSIDE PERMITTED SEEDING PERIODS.
3. PRODUCTS:
   A. IMPORTED TOPSOIL: PROVIDE TOPSOIL CONFORMING TO THE FOLLOWING:
      A.1. ORIGINAL LOAM TOPSOIL, WELL DRAINED HOMOGENOUS TEXTURE AND OF UNIFORM GRADE, WITHOUT THE ADMIXTURE OF SUBSOIL MATERIAL AND FREE OF DENSE MATERIAL, HARDPAN, CLAY, STONES, SOD OR OTHER OBJECTIONABLE FOREIGN MATERIAL.
      A.2. CONTAINING NOT LESS THAN 5% NOR MORE THAN 20% ORGANIC MATTER IN THAT PORTION OF A SAMPLE PASSING A 1/4" SIEVE WHEN DETERMINED BY THE WET COMBUSTION METHOD ON A SAMPLE DRIED AT 105° C.
      A.3. CONTAINING A pH VALUE WITHIN THE RANGE OF 6.5–7.5 ON THAT PORTION OF THE SAMPLE WHICH PASSES A 1/4" SIEVE.
      A.4. CONTAINING THE FOLLOWING WASHED GRADATIONS:

SIEVE DESIGNATION	% PASSING
1/2"	100
1/4"	97 – 100
NO. 200	20 – 65 (OF THE 1/4" SIEVE)

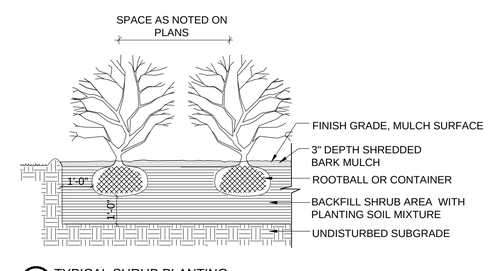
   B. SEED MIXTURE: SEE SEEDING SCHEDULE, THIS SHEET. PROVIDE FRESH, CLEAN, NEW-CROP SEED MIXED IN THE PROPORTIONS SPECIFIED FOR SPECIES AND VARIETY, AND CONFIRMING TO FEDERAL AND STATE STANDARDS.
   C. FERTILIZER:
      C.1. FOR SPRING SEEDING: COMMERCIAL STARTER FERTILIZER, GRANULAR, NONBURNING PRODUCT CONTAINING 10% NITROGEN, 6% AVAILABLE PHOSPHORUS, AND 4% WATER SOLUBLE POTASH (10–6–4).
      C.2. FOR FALL SEEDING: COMMERCIAL STARTER FERTILIZER, GRANULAR, NONBURNING PRODUCT, CONTAINING 5% NITROGEN, 10% AVAILABLE PHOSPHORUS, AND 5% WATER SOLUBLE POTASH (5–10–5).
      C.3. FOR FINAL FERTILIZING: IF APPLIED IN SPRING SEASON, SHALL BE A SLOW RELEASE COMMERCIAL FERTILIZER, GRANULAR, WITH HIGH NITROGEN, 38%, URAMITE OR APPROVED EQUAL. IF APPLIED IN FALL SEASON, SHALL BE AS SPECIFIED IN (3.C.2) ABOVE.
   D. TREES AND SHRUBS:
      D.1. PLANTING SOIL MIXTURE: SHALL BE PREMIXED IN BULK, AND CONTAIN THE FOLLOWING BY VOLUME:
         20 PARTS TOPSOIL
         10 PARTS PEAT
         1 PART BONE MEAL
      D.2. PEAT: BROWN TO BLACK IN COLOR, WEED AND SEED FREE, DRIED SPHAGNUM PEAT, CONTAINING NOT MORE THAN 9% MINERAL ON A DRY BASIS AND CONFORMING TO NYSDOT 713–20.
      D.3. BONE MEAL: FINELY GROUND, RAW, MINIMUM 4% NITROGEN AND 20% PHOSPHORIC ACID. IT SHALL BE DELIVERED IN SEALED BAGS SHOWING THE MANUFACTURER'S GUARANTIED ANALYSIS.
      D.4. STAKES: 7 FT LONG, 3 IN DIA. CEDAR STAKES. REMOVE STAKES AT END OF WARRANTY PERIOD.
      D.5. HOSE: NEW, 2–PLY GARDEN HOSE NOT LESS THAN 1/2 INCH IN DIAMETER.
      D.6. MULCH: GROUND OR SHREDDED BARK MULCH FROM HARDWOOD TREES, NATURAL BROWN COLOR. NO PIECES OVER 2 INCHES GREATEST DIMENSION. FREE FROM WOOD CHIPS, SAWDUST, STONES, DEBRIS, AND DELETERIOUS MATERIALS. APPLIED TO A DEPTH OF 3 INCHES.
4. EXECUTION:
   A. LANDSCAPE WORK SHALL BE UNDERTAKEN AS SOON AS SITE AREAS ARE AVAILABLE.
   B. TOPSOIL SHALL BE SPREAD NO LESS THAN 4" OVER SOIL AREAS TO RECEIVE SEED MIXES. SOIL AMENDMENTS SHALL BE THOROUGHLY MIXED INTO THE TOP 4" OF TOPSOIL, FOLLOWING THE SPECIFICATIONS STATED BELOW.
   C. PERFORM FINE GRADING TO FINISHED ELEVATION ONLY IMMEDIATELY PRIOR TO PLANTING. PLANTING AREAS SHALL BE GRADED TO A SMOOTH, EVEN SURFACE, FREE OF DEPRESSIONS OR RIDGES WITH A UNIFORM LOOSE, FINE TEXTURE.
   D. THE SOIL SHALL BE TESTED FOR pH AND LIME ADDED IF NECESSARY TO AMOUNT RECOMMENDED FOR EACH PLANT SPECIES.
   E. LAWN:
      E.1.1. PRIMARY SEED MIX: SEED AT THE RATES SPECIFIED, SEE SEEDING SCHEDULE ON THIS SHEET.
      E.1.2. TEMPORARY COVER SEED MIX: ANNUAL RYE GRASS, SEED AT THE RATE OF 4 LBS PER 1,000 SF.
      E.1.3. TEMPORARY COVER SEED MIX TO BE APPLIED ONLY FOR WINTER OR SUMMER SOIL STABILIZATION OUTSIDE ALLOWED SEEDING PERIODS.
   F. ALL SEEDED AREAS SHALL BE PROTECTED FROM EROSION BY A UNIFORM BLANKET OF STRAW OR HYDROMULCH, PER MANUFACTURE'S RECOMMENDATION.
   G. ALL NEWLY PLANTED AREAS SHALL BE KEPT MOIST BY WATERING UNTIL GRASSES ARE WELL ESTABLISHED. THE LANDSCAPE CONTRACTOR MUST WATER TREES WHEN NECESSARY FOR 60 DAYS AFTER COMPLETION.
   H. LAWNS ARE TO BE WARRANTED UNTIL THEY HAVE BECOME ESTABLISHED, UNTIL FINAL ACCEPTANCE, AND NOT LESS THAN 60 DAYS AFTER COMPLETION OF ALL WORK. TREES AND SHRUBS SHALL BE WARRANTED AGAINST DEFECTS INCLUDING POOR GROWTH AND DEATH, EXCEPT WHEN RESULTING FROM OWNER NEGLECT, INCIDENTS THAT ARE BEYOND THE CONTROL OF THE LANDSCAPE INSTALLER AND DAMAGE OR ABUSE BY OTHERS, FOR AT LEAST ONE FULL YEAR AFTER PROJECT COMPLETION.
5. IN ACCORDANCE WITH ARTICLE 17–SUPPLEMENT REGULATIONS AND STANDARDS, SECTION 17.30.6.C PAR. B, IF THE ROAD BED IS ELEVATED ABOVE THE SURROUNDING LAND SURFACE AT THE LOCATION REQUIRING SCREENING, TREE TOPS SHALL BE AT LEAST EIGHT (8) FEET ABOVE THE ROAD SURFACE.



2 TYPICAL DECIDUOUS TREE PLANTING
NOT TO SCALE



3 TYPICAL EVERGREEN TREE PLANTING
NOT TO SCALE



4 TYPICAL SHRUB PLANTING
NOT TO SCALE

SITE PLAN CHEBOYGAN SOLAR ENERGY PROJECT

GRANT TOWNSHIP, CHEBOYGAN COUNTY, MICHIGAN

SHEET TITLE:

LANDSCAPE DETAILS

L-101

DATE: 02/26/2020

ENGINEER'S SEAL:

DEVELOPER:

ORION RENEWABLE ENERGY GROUP LLC

CONSULTANT:

Shoener environmental | engineering | energy

p:\projectfiles\18000s\18049_cheboygan_solar_mi\cad\plansheets\land development\details\cheboygan_details_01242020.dwg, 2/26/2020, 11:42 AM

EXHIBIT A-1

LIST OF PARCELS

Cheboygan County List of Owners

Parcel No.	Owner	Owner Address	Approx. Parcel Acreage
151-009-200-001-05	Tromble Bay Farms II, LLC	5299 Tromble Drive, Cheboygan, MI	14.96
151-006-100-004-00	Tromble Bay Farms II, LLC	5299 Tromble Drive, Cheboygan, MI	62.22
151-006-300-001-02	Tromble Bay Farms II, LLC	5299 Tromble Drive, Cheboygan, MI	55.89
151-006-100-005-00	Tromble Bay Farms II, LLC	5299 Tromble Drive, Cheboygan, MI	2.14
151-006-200-003-00	Tromble Bay Farms II, LLC	5299 Tromble Drive, Cheboygan, MI	28.49
151-006-200-005-00	Tromble Bay Farms II, LLC	5299 Tromble Drive, Cheboygan, MI	76.66
151-006-400-001-05	Tromble Bay Farms II, LLC	5299 Tromble Drive, Cheboygan, MI	149.63
151-008-400-003-00	Tromble Bay Farms III, LLC	Rick and Michele Tromble, 5299 Tromble Drive, Cheboygan, MI	39.05
151-008-400-004-00	Tromble Bay Farms III, LLC	Rick and Michele Tromble, 5299 Tromble Drive, Cheboygan, MI	39.11
151-008-100-004-00	Beethem Properties, a Michigan partnership	12688 Hill Road, Cheboygan, MI	78.19
151-008-300-006-00	Beethem Properties, a Michigan partnership	12688 Hill Road, Cheboygan, MI	19.41
151-008-300-007-00	Tromble Bay Farms III, LLC	Rick and Michele Tromble, 5299 Tromble Drive, Cheboygan, MI	19.32
151-008-400-001-00	Tromble Bay Farms III, LLC	Rick and Michele Tromble, 5299 Tromble Drive, Cheboygan, MI	71.81
151-008-200-001-02	Beethem Properties, a Michigan partnership	12688 Hill Road, Cheboygan, MI	117.21
151-009-300-001-00	Tromble Bay Farms III, LLC	Rick and Michele Tromble, 5299 Tromble Drive, Cheboygan, MI	30.84
151-009-100-003-00	David Wolf and Michele Wolf	8152 Twin Lakes Road, Cheboygan, MI	71.14
151-009-300-004-00	Tromble Bay Farms III, LLC	Rick and Michele Tromble, 5299 Tromble Drive, Cheboygan, MI	78.35
151-009-400-004-00	Tromble Bay Farms III, LLC	Rick and Michele Tromble, 5299 Tromble Drive, Cheboygan, MI	8.95
151-009-400-003-00	Tromble Bay Farms III, LLC	Rick and Michele Tromble, 5299 Tromble Drive, Cheboygan, MI	30.11
151-009-200-001-07	Tromble Bay Farms II, LLC	5299 Tromble Drive, Cheboygan, MI	13.30
151-009-300-003-00	Tromble Bay Farms II, LLC	5299 Tromble Drive, Cheboygan, MI	37.73
151-009-100-004-03	Tromble Bay Farms II, LLC	5299 Tromble Drive, Cheboygan, MI	68.00
151-009-400-002-00	Tromble Bay Farms II, LLC	5299 Tromble Drive, Cheboygan, MI	76.94
151-009-200-002-00	Tromble Bay Farms II, LLC	5299 Tromble Drive, Cheboygan, MI	39.03
151-009-400-001-00	Tromble Bay Farms II, LLC	5299 Tromble Drive, Cheboygan, MI	38.04
151-009-200-003-00	Tromble Bay Farms II, LLC	5299 Tromble Drive, Cheboygan, MI	38.77
151-004-401-001-00	Tromble Bay Farms II, LLC	5299 Tromble Drive, Cheboygan, MI	68.63
151-005-100-001-00	Tromble Bay Farms II, LLC	5299 Tromble Drive, Cheboygan, MI	60.43
151-005-300-004-00	Tromble Bay Farms II, LLC	5299 Tromble Drive, Cheboygan, MI	47.82
151-005-300-008-00	Lisa A. Herron	7393 Twin Lakes Road, Cheboygan, MI	79.30
151-006-200-002-00	Tromble Bay Farms II, LLC	5299 Tromble Drive, Cheboygan, MI	4.23

EXHIBIT B

HEALTH AND SAFETY IMPACTS OF SOLAR PHOTOVOLTAICS

NC CLEAN ENERGY
TECHNOLOGY CENTER

Health and Safety Impacts of Solar Photovoltaics

MAY 2017

NC STATE UNIVERSITY

Health and Safety Impacts of Solar Photovoltaics

The increasing presence of utility-scale solar photovoltaic (PV) systems (sometimes referred to as solar farms) is a rather new development in North Carolina's landscape. Due to the new and unknown nature of this technology, it is natural for communities near such developments to be concerned about health and safety impacts. Unfortunately, the quick emergence of utility-scale solar has cultivated fertile grounds for myths and half-truths about the health impacts of this technology, which can lead to unnecessary fear and conflict.

Photovoltaic (PV) technologies and solar inverters are not known to pose any significant health dangers to their neighbors. The most important dangers posed are increased highway traffic during the relative short construction period and dangers posed to trespassers of contact with high voltage equipment. This latter risk is mitigated by signage and the security measures that industry uses to deter trespassing. As will be discussed in more detail below, risks of site contamination are much less than for most other industrial uses because PV technologies employ few toxic chemicals and those used are used in very small quantities. Due to the reduction in the pollution from fossil-fuel-fired electric generators, the overall impact of solar development on human health is overwhelmingly positive. This pollution reduction results from a partial replacement of fossil-fuel fired generation by emission-free PV-generated electricity, which reduces harmful sulfur dioxide (SO_2), nitrogen oxides (NO_x), and fine particulate matter ($PM_{2.5}$). Analysis from the National Renewable Energy Laboratory and the Lawrence Berkeley National Laboratory, both affiliates of the U.S. Department of Energy, estimates the health-related air quality benefits to the southeast region from solar PV generators to be worth 8.0 ¢ per kilowatt-hour of solar generation.[1] This is in addition to the value of the electricity and suggests that the air quality benefits of solar are worth more than the electricity itself.

Even though we have only recently seen large-scale installation of PV technologies, the technology and its potential impacts have been studied since the 1950s. A combination of this solar-specific research and general scientific research has led to the scientific community having a good understanding of the science behind potential health and safety impacts of solar energy. This paper utilizes the latest scientific literature and knowledge of solar practices in N.C. to address the health and safety risks associated with solar PV technology. These risks are extremely small, far less than those associated with common activities such as driving a car, and vastly outweighed by health benefits of the generation of clean electricity.

This paper addresses the potential health and safety impacts of solar PV development in North Carolina, organized into the following four categories:

(1) Hazardous Materials
(2) Electromagnetic Fields (EMF)
(3) Electric Shock and Arc Flash
(4) Fire Safety

1. Hazardous Materials

One of the more common concerns towards solar is that the panels (referred to as “modules” in the solar industry) consist of toxic materials that endanger public health. However, as shown in this section, solar energy systems may contain small amounts of toxic materials, but these materials do not endanger public health. To understand potential toxic hazards coming from a solar project, one must understand system installation, materials used, the panel end-of-life protocols, and system operation. This section will examine these aspects of a solar farm and the potential for toxicity impacts in the following subsections:

(1.2) Project Installation/Construction
(1.2) System Components
- 1.2.1 Solar Panels: Construction and Durability
- 1.2.2 Photovoltaic technologies
  - (a) Crystalline Silicon
  - (b) Cadmium Telluride (CdTe)
  - (c) CIS/CIGS
- 1.2.3 Panel End of Life Management
- 1.2.4 Non-panel System Components

(1.3) Operations and Maintenance

1.1 Project Installation/Construction

The system installation, or construction, process does not require toxic chemicals or processes. The site is mechanically cleared of large vegetation, fences are constructed, and the land is surveyed to layout exact installation locations. Trenches for underground wiring are dug and support posts are driven into the ground. The solar panels are bolted to steel and aluminum support structures and wired together. Inverter pads are installed, and an inverter and transformer are installed on each pad. Once everything is connected, the system is tested, and only then turned on.

Figure 1: Utility-scale solar facility (5 MW_{AC}) located in Catawba County. Source: Strata Solar

1.2 System Components

1.2.1 Solar Panels: Construction and Durability

Solar PV panels typically consist of glass, polymer, aluminum, copper, and semiconductor materials that can be recovered and recycled at the end of their useful life.[2] Today there are two PV technologies used in PV panels at utility-scale solar facilities, silicon, and thin film. As of 2016, all thin film used in North Carolina solar facilities are cadmium telluride (CdTe) panels from the US manufacturer First Solar, but there are other thin film PV panels available on the market, such as Solar Frontier's CIGS panels. Crystalline silicon technology consists of silicon wafers which are made into cells and assembled into panels, thin film technologies consist of thin layers of semiconductor material deposited onto glass, polymer or metal substrates. While there are differences in the components and manufacturing processes of these two types of solar technologies, many aspects of their PV panel construction are very similar. Specifics about each type of PV chemistry as it relates to toxicity are covered in subsections a, b, and c in section 1.2.2; on crystalline silicon, cadmium telluride, and CIS/CIGS respectively. The rest of this section applies equally to both silicon and thin film panels.

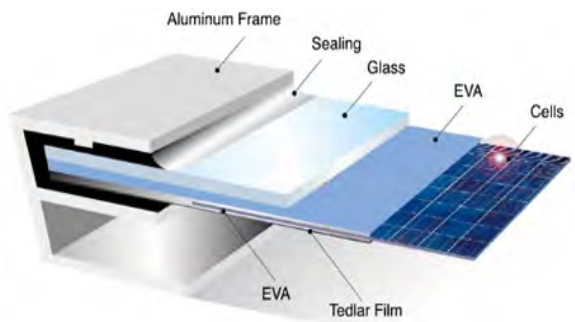


Figure 2: Components of crystalline silicon panels. The vast majority of silicon panels consist of a glass sheet on the topside with an aluminum frame providing structural support. Image Source: www.riteksolar.com.tw

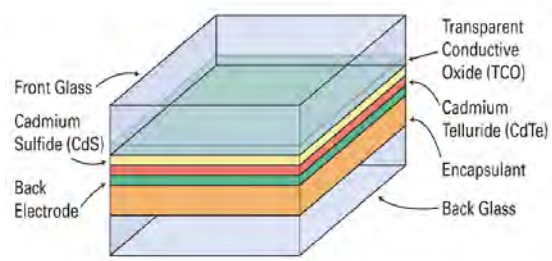


Figure 3: Layers of a common frameless thin-film panel (CdTe). Many thin film panels are frameless, including the most common thin-film panels, First Solar's CdTe. Frameless panels have protective glass on both the front and back of the panel. Layer thicknesses not to scale. Image Source: www.homepower.com

To provide decades of corrosion-free operation, PV cells in PV panels are encapsulated from air and moisture between two layers of plastic. The encapsulation layers are protected on the top with a layer of tempered glass and on the backside with a polymer sheet. Frameless modules include a protective layer of glass on the rear of the panel, which may also be tempered. The plastic ethylene-vinyl acetate (EVA) commonly provides the cell encapsulation. For decades, this same material has been used between layers of tempered glass to give car windshields and hurricane windows their great strength. In the same way that a car windshield cracks but stays intact, the EVA layers in PV panels keep broken panels intact (see Figure 4). Thus, a damaged module does not generally create small pieces of debris; instead, it largely remains together as one piece.

Figure 4: The mangled PV panels in this picture illustrate the nature of broken solar panels; the glass cracks but the panel is still in one piece. Image Source: http://img.alibaba.com/photo/115259576/broken_solar_panel.jpg

PV panels constructed with the same basic components as modern panels have been installed across the globe for well over thirty years.[3] The long-term durability and performance demonstrated over these decades, as well as the results of accelerated lifetime testing, helped lead to an industry-standard 25-year power production warranty for PV panels. These power warranties warrant a PV panel to produce at least 80% of their original nameplate production after 25 years of use. A recent SolarCity and DNV GL study reported that today's quality PV panels should be expected to reliably and efficiently produce power for thirty-five years.[4]

Local building codes require all structures, including ground mounted solar arrays, to be engineered to withstand anticipated wind speeds, as defined by the local wind speed requirements. Many racking products are available in versions engineered for wind speeds of up to 150 miles per hour, which is significantly higher than the wind speed requirement anywhere in North Carolina. The strength of PV mounting structures were demonstrated during Hurricane Sandy in 2012 and again during Hurricane Matthew in 2016. During Hurricane Sandy, the many large-scale solar facilities in New Jersey and New York at that time suffered only minor damage.[5] In the fall of 2016, the US and Caribbean experienced destructive winds and torrential rains from Hurricane Matthew, yet one leading solar tracker manufacturer reported that their numerous systems in the impacted area received zero damage from wind or flooding.[6]

In the event of a catastrophic event capable of damaging solar equipment, such as a tornado, the system will almost certainly have property insurance that will cover the cost to cleanup and repair the project. It is in the best interest of the system owner to protect their investment against such risks. It is also in their interest to get the project repaired and producing full power as soon as possible. Therefore, the investment in adequate insurance is a wise business practice for the system owner. For the same

reasons, adequate insurance coverage is also generally a requirement of the bank or firm providing financing for the project.

1.2.2 Photovoltaic (PV) Technologies

a. **Crystalline Silicon**

This subsection explores the toxicity of silicon-based PV panels and concludes that they do not pose a material risk of toxicity to public health and safety. Modern crystalline silicon PV panels, which account for over 90% of solar PV panels installed today, are, more or less, a commodity product. The overwhelming majority of panels installed in North Carolina are crystalline silicon panels that are informally classified as Tier I panels. Tier I panels are from well-respected manufacturers that have a good chance of being able to honor warranty claims. Tier I panels are understood to be of high quality, with predictable performance, durability, and content. Well over 80% (by weight) of the content of a PV panel is the tempered glass front and the aluminum frame, both of which are common building materials. Most of the remaining portion are common plastics, including polyethylene terephthalate in the backsheet, EVA encapsulation of the PV cells, polyphenyl ether in the junction box, and polyethylene insulation on the wire leads. The active, working components of the system are the silicon photovoltaic cells, the small electrical leads connecting them together, and to the wires coming out of the back of the panel. The electricity generating and conducting components makeup less than 5% of the weight of most panels. The PV cell itself is nearly 100% silicon, and silicon is the second most common element in the Earth's crust. The silicon for PV cells is obtained by high-temperature processing of quartz sand (SiO_2) that removes its oxygen molecules. The refined silicon is converted to a PV cell by adding extremely small amounts of boron and phosphorus, both of which are common and of very low toxicity.

The other minor components of the PV cell are also generally benign; however, some contain lead, which is a human toxicant that is particularly harmful to young children. The minor components include an extremely thin antireflective coating (silicon nitride or titanium dioxide), a thin layer of aluminum on the rear, and thin strips of silver alloy that are screen-printed on the front and rear of cell.[7] In order for the front and rear electrodes to make effective electrical contact with the proper layer of the PV cell, other materials (called glass frit) are mixed with the silver alloy and then heated to etch the metals into the cell. This glass frit historically contains a small amount of lead (Pb) in the form of lead oxide. The 60 or 72 PV cells in a PV panel are connected by soldering thin solder-covered copper tabs from the back of one cell to the front of the next cell. Traditionally a tin-based solder containing some lead (Pb) is used, but some manufacturers have switched to lead-free solder. The glass frit and/or the solder may contain trace amounts of other metals, potentially including some with human toxicity such as cadmium. However, testing to simulate the potential for leaching from broken panels, which is discussed in more detail below, did not find a potential toxicity threat from these trace elements. Therefore, the tiny amount of lead in the grass frit and the solder is the only part of silicon PV panels with a potential to create a negative health impact. However, as described below, the very limited amount of lead involved and its strong physical and chemical attachment to other components of the PV panel means that even in worst-case scenarios the health hazard it poses is insignificant.

As with many electronic industries, the solder in silicon PV panels has historically been a lead-based solder, often 36% lead, due to the superior properties of such solder. However, recent advances in lead-free solders have spurred a trend among PV panel manufacturers to reduce or remove the lead in their panels. According to the 2015 Solar Scorecard from the Silicon Valley Toxics Coalition, a group that tracks environmental responsibility of photovoltaic panel manufacturers, fourteen companies (increased from twelve companies in 2014) manufacture PV panels certified to meet the European Restriction of

Hazardous Substances (RoHS) standard. This means that the amount of cadmium and lead in the panels they manufacture fall below the RoHS thresholds, which are set by the European Union and serve as the world's de facto standard for hazardous substances in manufactured goods.[8] The Restriction of Hazardous Substances (RoHS) standard requires that the maximum concentration found in any homogenous material in a produce is less than 0.01% cadmium and less than 0.10% lead, therefore, any solder can be no more than 0.10% lead.[9]

While some manufacturers are producing PV panels that meet the RoHS standard, there is no requirement that they do so because the RoHS Directive explicitly states that the directive does not apply to photovoltaic panels.[10] The justification for this is provided in item 17 of the current RoHS Directive: "The development of renewable forms of energy is one of the Union's key objectives, and the contribution made by renewable energy sources to environmental and climate objectives is crucial. Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources (4) recalls that there should be coherence between those objectives and other Union environmental legislation. Consequently, this Directive should not prevent the development of renewable energy technologies that have no negative impact on health and the environment and that are sustainable and economically viable."

The use of lead is common in our modern economy. However, only about 0.5% of the annual lead consumption in the U.S. is for electronic solder for all uses; PV solder makes up only a tiny portion of this 0.5%. Close to 90% of lead consumption in the US is in batteries, which do not encapsulate the pounds of lead contained in each typical automotive battery. This puts the lead in batteries at great risk of leaching into the environment. Estimates for the lead in a single PV panel with lead-based solder range from 1.6 to 24 grams of lead, with 13g (less than half of an ounce) per panel seen most often in the literature.[11] At 13 g/panel[12], each panel contains one-half of the lead in a typical 12-gauge shotgun shell. This amount equates to roughly 1/750th of the lead in a single car battery. In a panel, it is all durably encapsulated from air or water for the full life of the panel.[14]

As indicated by their 20 to 30-year power warranty, PV modules are designed for a long service life, generally over 25 years. For a panel to comply with its 25-year power warranty, its internal components, including lead, must be sealed from any moisture. Otherwise, they would corrode and the panel's output would fall below power warranty levels. Thus, the lead in operating PV modules is not at risk of release to the environment during their service lifetime. In extreme experiments, researchers have shown that lead can leach from crushed or pulverized panels.[15, 16] However, more real-world tests designed to represent typical trash compaction that are used to classify waste as hazardous or non-hazardous show no danger from leaching.[17, 18] For more information about PV panel end-of-life, see the Panel Disposal section.

As illustrated throughout this section, silicon-based PV panels do not pose a material threat to public health and safety. The only aspect of the panels with potential toxicity concerns is the very small amount of lead in some panels. However, any lead in a panel is well sealed from environmental exposure for the operating lifetime of the solar panel and thus not at risk of release into the environment.

b. Cadmium Telluride (CdTe) PV Panels

This subsection examines the components of a cadmium telluride (CdTe) PV panel. Research demonstrates that they pose negligible toxicity risk to public health and safety while significantly reducing the public's exposure to cadmium by reducing coal emissions. As of mid-2016, a few hundred MWs of

cadmium telluride (CdTe) panels, all manufactured by the U.S. company First Solar, have been installed in North Carolina.

Questions about the potential health and environmental impacts from the use of this PV technology are related to the concern that these panels contain cadmium, a toxic heavy metal. However, scientific studies have shown that cadmium telluride differs from cadmium due to its high chemical and thermal stability.[19] Research has shown that the tiny amount of cadmium in these panels does not pose a health or safety risk.[20] Further, there are very compelling reasons to welcome its adoption due to reductions in unhealthy pollution associated with burning coal. Every GWh of electricity generated by burning coal produces about 4 grams of cadmium air emissions.[21] Even though North Carolina produces a significant fraction of our electricity from coal, electricity from solar offsets much more natural gas than coal due to natural gas plants being able to adjust their rate of production more easily and quickly. If solar electricity offsets 90% natural gas and 10% coal, each 5-megawatt (5 MW_{AC}, which is generally 7 MW_{DC}) CdTe solar facility in North Carolina keeps about 157 grams, or about a third of a pound, of cadmium *out of* our environment.[22, 23]

Cadmium is toxic, but all the approximately 7 grams of cadmium in one CdTe panel is in the form of a chemical compound cadmium telluride,[24] which has 1/100th the toxicity of free cadmium.[25] Cadmium telluride is a very stable compound that is non-volatile and non-soluble in water. Even in the case of a fire, research shows that less than 0.1% of the cadmium is released when a CdTe panel is exposed to fire. The fire melts the glass and encapsulates over 99.9% of the cadmium in the molten glass.[27]

It is important to understand the source of the cadmium used to manufacture CdTe PV panels. The cadmium is a byproduct of zinc and lead refining. The element is collected from emissions and waste streams during the production of these metals and combined with tellurium to create the CdTe used in PV panels. If the cadmium were not collected for use in the PV panels or other products, it would otherwise either be stockpiled for future use, cemented and buried, or disposed of.[28] Nearly all the cadmium in old or broken panels can be recycled which can eventually serve as the primary source of cadmium for new PV panels.[29]

Similar to silicon-based PV panels, CdTe panels are constructed of a tempered glass front, one instead of two clear plastic encapsulation layers, and a rear heat strengthened glass backing (together >98% by weight). The final product is built to withstand exposure to the elements without significant damage for over 25 years. While not representative of damage that may occur in the field or even at a landfill, laboratory evidence has illustrated that when panels are ground into a fine powder, very acidic water is able to leach portions of the cadmium and tellurium,[30] similar to the process used to recycle CdTe panels. Like many silicon-based panels, CdTe panels are reported (as far back ask 1998[31]) to pass the EPA's Toxic Characteristic Leaching Procedure (TCLP) test, which tests the potential for crushed panels in a landfill to leach hazardous substances into groundwater.[32] Passing this test means that they are classified as non-hazardous waste and can be deposited in landfills.[33, 34] For more information about PV panel end-of-life, see the Panel Disposal section.

There is also concern of environmental impact resulting from potential catastrophic events involving CdTe PV panels. An analysis of worst-case scenarios for environmental impact from CdTe PV panels, including earthquakes, fires, and floods, was conducted by the University of Tokyo in 2013. After reviewing the extensive international body of research on CdTe PV technology, their report concluded, "Even in the worst-case scenarios, it is unlikely that the Cd concentrations in air and sea water will exceed the environmental regulation values."[35] In a worst-case scenario of damaged panels abandoned on the ground, insignificant amounts of cadmium will leach from the panels. This is because this scenario is

much less conducive (larger module pieces, less acidity) to leaching than the conditions of the EPA's TCLP test used to simulate landfill conditions, which CdTe panels pass.[36]

First Solar, a U.S. company, and the only significant supplier of CdTe panels, has a robust panel take-back and recycling program that has been operating commercially since 2005.[37] The company states that it is "committed to providing a commercially attractive recycling solution for photovoltaic (PV) power plant and module owners to help them meet their module (end of life) EOL obligation simply, cost-effectively and responsibly." First Solar global recycling services to their customers to collect and recycle panels once they reach the end of productive life whether due to age or damage. These recycling service agreements are structured to be financially attractive to both First Solar and the solar panel owner. For First Solar, the contract provides the company with an affordable source of raw materials needed for new panels and presumably a diminished risk of undesired release of Cd. The contract also benefits the solar panel owner by allowing them to avoid tipping fees at a waste disposal site. The legal contract helps provide peace of mind by ensuring compliance by both parties when considering the continuing trend of rising disposal costs and increasing regulatory requirements.

c. **CIS/CIGS and other PV technologies**

Copper indium gallium selenide PV technology, often referred to as CIGS, is the second most common type of thin-film PV panel but a distant second behind CdTe. CIGS cells are composed of a thin layer of copper, indium, gallium, and selenium on a glass or plastic backing. None of these elements are very toxic, although selenium is a regulated metal under the Federal Resource Conservation and Recovery Act (RCRA).[38] The cells often also have an extremely thin layer of cadmium sulfide that contains a tiny amount of cadmium, which is toxic. The promise of high efficiency CIGS panels drove heavy investment in this technology in the past. However, researchers have struggled to transfer high efficiency success in the lab to low-cost full-scale panels in the field.[39] Recently, a CIGS manufacturer based in Japan, Solar Frontier, has achieved some market success with a rigid, glass-faced CIGS module that competes with silicon panels. Solar Frontier produces the majority of CIS panels on the market today.[40] Notably, these panels are RoHS compliant,[41] thus meeting the rigorous toxicity standard adopted by the European Union even thought this directive exempts PV panels. The authors are unaware of any completed or proposed utility-scale system in North Carolina using CIS/CIGS panels.

1.2.3 Panel End-of-Life Management

Concerns about the volume, disposal, toxicity, and recycling of PV panels are addressed in this subsection. To put the volume of PV waste into perspective, consider that by 2050, when PV systems installed in 2020 will reach the end of their lives, it is estimated that the global annual PV panel waste tonnage will be 10% of the 2014 global e-waste tonnage.[42] In the U.S., end-of-life disposal of solar products is governed by the Federal Resource Conservation and Recovery Act (RCRA), as well as state policies in some situations. RCRA separates waste into hazardous (not accepted at ordinary landfill) and solid waste (generally accepted at ordinary landfill) based on a series of rules. According to RCRA, the way to determine if a PV panel is classified as hazardous waste is the Toxic Characteristic Leaching Procedure (TCLP) test. This EPA test is designed to simulate landfill disposal and determine the risk of hazardous substances leaching out of the landfill.[43, 44, 45] Multiple sources report that most modern PV panels (both crystalline silicon and cadmium telluride) pass the TCLP test.[46, 47] Some studies found that some older (1990s) crystalline silicon panels, and perhaps some newer crystalline silicon panels (specifics are not given about vintage of panels tested), do not pass the lead (Pb) leachate limits in the TCLP test.[48, 49]

The test begins with the crushing of a panel into centimeter-sized pieces. The pieces are then mixed in an acid bath. After tumbling for eighteen hours, the fluid is tested for forty hazardous substances that all must be below specific threshold levels to pass the test. Research comparing TCLP conditions to conditions of damaged panels in the field found that simulated landfill conditions provide overly conservative estimates of leaching for field-damaged panels.[50] Additionally, research in Japan has found no detectable Cd leaching from cracked CdTe panels when exposed to simulated acid rain.[51]

Although modern panels can generally be landfilled, they can also be recycled. Even though recent waste volume has not been adequate to support significant PV-specific recycling infrastructure, the existing recycling industry in North Carolina reports that it recycles much of the current small volume of broken PV panels. In an informal survey conducted by the NC Clean Energy Technology Center survey in early 2016, seven of the eight large active North Carolina utility-scale solar developers surveyed reported that they send damaged panels back to the manufacturer and/or to a local recycler. Only one developer reported sending damaged panels to the landfill.

The developers reported at that time that they are usually paid a small amount per panel by local recycling firms. In early 2017, a PV developer reported that a local recycler was charging a small fee per panel to recycle damaged PV panels. The local recycling firm known to authors to accept PV panels described their current PV panel recycling practice as of early 2016 as removing the aluminum frame for local recycling and removing the wire leads for local copper recycling. The remainder of the panel is sent to a facility for processing the non-metallic portions of crushed vehicles, referred to as "fluff" in the recycling industry.[52] This processing within existing general recycling plants allows for significant material recovery of major components, including glass which is 80% of the module weight, but at lower yields than PV-specific recycling plants. Notably almost half of the material value in a PV panel is in the few grams of silver contained in almost every PV panel produced today. In the long-term, dedicated PV panel recycling plants can increase treatment capacities and maximize revenues resulting in better output quality and the ability to recover a greater fraction of the useful materials.[53] PV-specific panel recycling technologies have been researched and implemented to some extent for the past decade, and have been shown to be able to recover over 95% of PV material (semiconductor) and over 90% of the glass in a PV panel.[54]

A look at global PV recycling trends hints at the future possibilities of the practice in our country. Europe installed MW-scale volumes of PV years before the U.S. In 2007, a public-private partnership between the European Union and the solar industry set up a voluntary collection and recycling system called PV CYCLE. This arrangement was later made mandatory under the EU's WEEE directive, a program for waste electrical and electronic equipment.[55] Its member companies (PV panel producers) fully finance the association. This makes it possible for end-users to return the member companies' defective panels for recycling at any of the over 300 collection points around Europe without added costs. Additionally, PV CYCLE will pick up batches of 40 or more used panels at no cost to the user. This arrangement has been very successful, collecting and recycling over 13,000 tons by the end of 2015.[56]

In 2012, the WEEE Directive added the end-of-life collection and recycling of PV panels to its scope.[57] This directive is based on the principle of extended-producer-responsibility. It has a global impact because producers that want to sell into the EU market are legally responsible for end-of-life management. Starting in 2018, this directive targets that 85% of PV products "put in the market" in Europe are recovered and 80% is prepared for reuse and recycling.

The success of the PV panel collection and recycling practices in Europe provides promise for the future of recycling in the U.S. In mid-2016, the US Solar Energy Industry Association (SEIA) announced that they are starting a national solar panel recycling program with the guidance and support of many

leading PV panel producers.[58] The program will aggregate the services offered by recycling vendors and PV manufacturers, which will make it easier for consumers to select a cost-effective and environmentally responsible end-of-life management solution for their PV products. According to SEIA, they are planning the program in an effort to make the entire industry landfill-free. In addition to the national recycling network program, the program will provide a portal for system owners and consumers with information on how to responsibly recycle their PV systems.

While a cautious approach toward the potential for negative environmental and/or health impacts from retired PV panels is fully warranted, this section has shown that the positive health impacts of reduced emissions from fossil fuel combustion from PV systems more than outweighs any potential risk. Testing shows that silicon and CdTe panels are both safe to dispose of in landfills, and are also safe in worst case conditions of abandonment or damage in a disaster. Additionally, analysis by local engineers has found that the current salvage value of the equipment in a utility scale PV facility generally exceeds general contractor estimates for the cost to remove the entire PV system.[59, 60, 61]

1.2.4 Non-Panel System Components (racking, wiring, inverter, transformer)

While previous toxicity subsections discussed PV panels, this subsection describes the non-panel components of utility-scale PV systems and investigates any potential public health and safety concerns. The most significant non-panel component of a ground-mounted PV system is the mounting structure of the rows of panels, commonly referred to as “racking”. The vertical post portion of the racking is galvanized steel and the remaining above-ground racking components are either galvanized steel or aluminum, which are both extremely common and benign building materials. The inverters that make the solar generated electricity ready to send to the grid have weather-proof steel enclosures that protect the working components from the elements. The only fluids that they might contain are associated with their cooling systems, which are not unlike the cooling system in a computer. Many inverters today are RoHS compliant.

The electrical transformers (to boost the inverter output voltage to the voltage of the utility connection point) do contain a liquid cooling oil. However, the fluid used for that function is either a non-toxic mineral oil or a biodegradable non-toxic vegetable oil, such as BIOTEMP from ABB. These vegetable transformer oils have the additional advantage of being much less flammable than traditional mineral oils. Significant health hazards are associated with old transformers containing cooling oil with toxic PCBs. Transfers with PCB-containing oil were common before PCBs were outlawed in the U.S. in 1979. PCBs still exist in older transformers in the field across the country.

Other than a few utility research sites, there are no batteries on- or off-site associated with utility-scale solar energy facilities in North Carolina, avoiding any potential health or safety concerns related to battery technologies. However, as battery technologies continue to improve and prices continue to decline we are likely to start seeing some batteries at solar facilities. Lithium ion batteries currently dominate the world utility-scale battery market, which are not very toxic. No non-panel system components were found to pose any health or environmental dangers.

1.4 Operations and Maintenance – Panel Washing and Vegetation Control

Throughout the eastern U.S., the climate provides frequent and heavy enough rain to keep panels adequately clean. This dependable weather pattern eliminates the need to wash the panels on a regular basis. Some system owners may choose to wash panels as often as once a year to increase production, but most in N.C. do not regularly wash any PV panels. Dirt build up over time may justify panel washing a few times over the panels' lifetime; however, nothing more than soap and water are required for this activity.

The maintenance of ground-mounted PV facilities requires that vegetation be kept low, both for aesthetics and to avoid shading of the PV panels. Several approaches are used to maintain vegetation at NC solar facilities, including planting of limited-height species, mowing, weed-eating, herbicides, and grazing livestock (sheep). The following descriptions of vegetation maintenance practices are based on interviews with several solar developers as well as with three maintenance firms that together are contracted to maintain well over 100 of the solar facilities in N.C. The majority of solar facilities in North Carolina maintain vegetation primarily by mowing. Each row of panels has a single row of supports, allowing sickle mowers to mow under the panels. The sites usually require mowing about once a month during the growing season. Some sites employ sheep to graze the site, which greatly reduces the human effort required to maintain the vegetation and produces high quality lamb meat.[62]

In addition to mowing and weed eating, solar facilities often use some herbicides. Solar facilities generally do not spray herbicides over the entire acreage; rather they apply them only in strategic locations such as at the base of the perimeter fence, around exterior vegetative buffer, on interior dirt roads, and near the panel support posts. Also unlike many row crop operations, solar facilities generally use only general use herbicides, which are available over the counter, as opposed to restricted use herbicides commonly used in commercial agriculture that require a special restricted use license. The herbicides used at solar facilities are primarily 2-4-D and glyphosate (Round-up®), which are two of the most common herbicides used in lawns, parks, and agriculture across the country. One maintenance firm that was interviewed sprays the grass with a class of herbicide known as a growth regulator in order to slow the growth of grass so that mowing is only required twice a year. Growth regulators are commonly used on highway roadsides and golf courses for the same purpose. A commercial pesticide applicator license is required for anyone other than the landowner to apply herbicides, which helps ensure that all applicators are adequately educated about proper herbicide use and application. The license must be renewed annually and requires passing of a certification exam appropriate to the area in which the applicator wishes to work. Based on the limited data available, it appears that solar facilities in N.C. generally use significantly less herbicides per acre than most commercial agriculture or lawn maintenance services.

2. Electromagnetic Fields (EMF)

PV systems do not emit any material during their operation; however, they do generate electromagnetic fields (EMF), sometimes referred to as radiation. EMF produced by electricity is non-ionizing radiation, meaning the radiation has enough energy to move atoms in a molecule around (experienced as heat), but not enough energy to remove electrons from an atom or molecule (ionize) or to damage DNA. As shown below, modern humans are all exposed to EMF throughout our daily lives without negative health impact. Someone outside of the fenced perimeter of a solar facility is not exposed to significant EMF from the solar facility. Therefore, there is no negative health impact from the EMF

produced in a solar farm. The following paragraphs provide some additional background and detail to support this conclusion.

Since the 1970s, some have expressed concern over potential health consequences of EMF from electricity, but no studies have ever shown this EMF to cause health problems.[63] These concerns are based on some epidemiological studies that found a slight increase in childhood leukemia associated with average exposure to residential power-frequency magnetic fields above 0.3 to 0.4 µT (microteslas) (equal to 3.0 to 4.0 mG (milligauss)). µT and mG are both units used to measure magnetic field strength. For comparison, the average exposure for people in the U.S. is one mG or 0.1 µT, with about 1% of the population with an average exposure in excess of 0.4 µT (or 4 mG).[64] These epidemiological studies, which found an association but not a causal relationship, led the World Health Organization's International Agency for Research on Cancer (IARC) to classify ELF magnetic fields as "possibly carcinogenic to humans". Coffee also has this classification. This classification means there is limited evidence but not enough evidence to designate as either a "probable carcinogen" or "human carcinogen". Overall, there is very little concern that ELF EMF damages public health. The only concern that does exist is for long-term exposure above 0.4 µT (4 mG) that may have some connection to increased cases of childhood leukemia. In 1997, the National Academies of Science were directed by Congress to examine this concern and concluded:

> "Based on a comprehensive evaluation of published studies relating to the effects of power-frequency electric and magnetic fields on cells, tissues, and organisms (including humans), the conclusion of the committee is that the current body of evidence does not show that exposure to these fields presents a human-health hazard. Specifically, no conclusive and consistent evidence shows that exposures to residential electric and magnetic fields produce cancer, adverse neurobehavioral effects, or reproductive and developmental effects."[65]

There are two aspects to electromagnetic fields, an electric field and a magnetic field. The electric field is generated by voltage and the magnetic field is generated by electric current, i.e., moving electrons. A task group of scientific experts convened by the World Health Organization (WHO) in 2005 concluded that there were no substantive health issues related to *electric* fields (0 to 100,000 Hz) at levels generally encountered by members of the public.[66] The relatively low voltages in a solar facility and the fact that electric fields are easily shielded (i.e., blocked) by common materials, such as plastic, metal, or soil means that there is no concern of negative health impacts from the electric fields generated by a solar facility. Thus, the remainder of this section addresses magnetic fields. Magnetic fields are not shielded by most common materials and thus can easily pass through them. Both types of fields are strongest close to the source of electric generation and weaken quickly with distance from the source.

The direct current (DC) electricity produced by PV panels produce stationary (0 Hz) electric and magnetic fields. Because of minimal concern about potential risks of stationary fields, little scientific research has examined stationary fields' impact on human health.[67] In even the largest PV facilities, the DC voltages and currents are not very high. One can illustrate the weakness of the EMF generated by a PV panel by placing a compass on an operating solar panel and observing that the needle still points north.

While the electricity throughout the majority of a solar site is DC electricity, the inverters convert this DC electricity to alternating current (AC) electricity matching the 60 Hz frequency of the grid. Therefore, the inverters and the wires delivering this power to the grid are producing non-stationary EMF, known as extremely low frequency (ELF) EMF, normally oscillating with a frequency of 60 Hz. This frequency is at the low-energy end of the electromagnetic spectrum. Therefore, it has less energy than

other commonly encountered types of non-ionizing radiation like radio waves, infrared radiation, and visible light.

The wide use of electricity results in background levels of ELF EMFs in nearly all locations where people spend time – homes, workplaces, schools, cars, the supermarket, etc. A person's average exposure depends upon the sources they encounter, how close they are to them, and the amount of time they spend there.[68] As stated above, the average exposure to magnetic fields in the U.S. is estimated to be around one mG or 0.1 µT, but can vary considerably depending on a person's exposure to EMF from electrical devices and wiring.[69] At times we are often exposed to much higher ELF magnetic fields, for example when standing three feet from a refrigerator the ELF magnetic field is 6 mG and when standing three feet from a microwave oven the field is about 50 mG.[70] The strength of these fields diminish quickly with distance from the source, but when surrounded by electricity in our homes and other buildings moving away from one source moves you closer to another. However, unless you are inside of the fence at a utility-scale solar facility or electrical substation it is impossible to get very close to the EMF sources. Because of this, EMF levels at the fence of electrical substations containing high voltages and currents are considered "generally negligible".[71, 72]

The strength of ELF-EMF present at the perimeter of a solar facility or near a PV system in a commercial or residential building is significantly lower than the typical American's average EMF exposure.[73, 74] Researchers in Massachusetts measured magnetic fields at PV projects and found the magnetic fields dropped to very low levels of 0.5 mG or less, and in many cases to less than background levels (0.2 mG), at distances of no more than nine feet from the residential inverters and 150 feet from the utility-scale inverters.[75] Even when measured within a few feet of the utility-scale inverter, the ELF magnetic fields were well below the International Commission on Non-Ionizing Radiation Protection's recommended magnetic field level exposure limit for the general public of 2,000 mG.[76] It is typical that utility scale designs locate large inverters central to the PV panels that feed them because this minimizes the length of wire required and shields neighbors from the sound of the inverter's cooling fans. Thus, it is rare for a large PV inverter to be within 150 feet of the project's security fence.

Anyone relying on a medical device such as pacemaker or other implanted device to maintain proper heart rhythm may have concern about the potential for a solar project to interfere with the operation of his or her device. However, there is no reason for concern because the EMF outside of the solar facility's fence is less than 1/1000 of the level at which manufacturers test for ELF EMF interference, which is 1,000 mG.[77] Manufacturers of potentially affected implanted devices often provide advice on electromagnetic interference that includes avoiding letting the implanted device get too close to certain sources of fields such as some household appliances, some walkie-talkies, and similar transmitting devices. Some manufacturers' literature does not mention high-voltage power lines, some say that exposure in public areas should not give interference, and some advise not spending extended periods of time close to power lines.[78]

3. Electric Shock and Arc Flash Hazards

There is a real danger of electric shock to anyone entering any of the electrical cabinets such as combiner boxes, disconnect switches, inverters, or transformers; or otherwise coming in contact with voltages over 50 Volts.[79] Another electrical hazard is an arc flash, which is an explosion of energy that can occur in a short circuit situation. This explosive release of energy causes a flash of heat and a shockwave, both of which can cause serious injury or death. Properly trained and equipped technicians and electricians know how to safely install, test, and repair PV systems, but there is always some risk of

injury when hazardous voltages and/or currents are present. Untrained individuals should not attempt to inspect, test, or repair any aspect of a PV system due to the potential for injury or death due to electric shock and arc flash, The National Electric Code (NEC) requires appropriate levels of warning signs on all electrical components based on the level of danger determined by the voltages and current potentials. The national electric code also requires the site to be secured from unauthorized visitors with either a six-foot chain link fence with three strands of barbed wire or an eight-foot fence, both with adequate hazard warning signs.

4. Fire Safety

The possibility of fires resulting from or intensified by PV systems may trigger concern among the general public as well as among firefighters. However, concern over solar fire hazards should be limited because only a small portion of materials in the panels are flammable, and those components cannot self-support a significant fire. Flammable components of PV panels include the thin layers of polymer encapsulates surrounding the PV cells, polymer backsheets (framed panels only), plastic junction boxes on rear of panel, and insulation on wiring. The rest of the panel is composed of non-flammable components, notably including one or two layers of protective glass that make up over three quarters of the panel's weight.

Heat from a small flame is not adequate to ignite a PV panel, but heat from a more intense fire or energy from an electrical fault can ignite a PV panel.[80] One real-world example of this occurred during July 2015 in an arid area of California. Three acres of grass under a thin film PV facility burned without igniting the panels mounted on fixed-tilt racks just above the grass.[81] While it is possible for electrical faults in PV systems on homes or commercial buildings to start a fire, this is extremely rare.[82] Improving understanding of the PV-specific risks, safer system designs, and updated fire-related codes and standards will continue to reduce the risk of fire caused by PV systems.

PV systems on buildings can affect firefighters in two primary ways, 1) impact their methods of fighting the fire, and 2) pose safety hazard to the firefighters. One of the most important techniques that firefighters use to suppress fire is ventilation of a building's roof. This technique allows superheated toxic gases to quickly exit the building. By doing so, the firefighters gain easier and safer access to the building, Ventilation of the roof also makes the challenge of putting out the fire easier. However, the placement of rooftop PV panels may interfere with ventilating the roof by limiting access to desired venting locations.

New solar-specific building code requirements are working to minimize these concerns. Also, the latest National Electric Code has added requirements that make it easier for first responders to safely and effectively turn off a PV system. Concern for firefighting a building with PV can be reduced with proper fire fighter training, system design, and installation. Numerous organizations have studied fire fighter safety related to PV. Many organizations have published valuable guides and training programs. Some notable examples are listed below.

- The International Association of Fire Fighters (IAFF) and International Renewable Energy Council (IREC) partnered to create an online training course that is far beyond the PowerPoint click-and-view model. The self-paced online course, "Solar PV Safety for Fire Fighters," features rich video content and simulated environments so fire fighters can practice the knowledge they've learned. www.iaff.org/pvsafetytraining
- Photovoltaic Systems and the Fire Code: Office of NC Fire Marshal
- Fire Service Training, Underwriter's Laboratory

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- Guidelines for Fire Safety Elements of Solar Photovoltaic Systems, Orange County Fire Chiefs Association
- Solar Photovoltaic Installation Guidelines, California Department of Forestry & Fire Protection, Office of the State Fire Marshall
- PV Safety & Firefighting, Matthew Paiss, Homepower Magazine
- PV Safety and Code Development: Matthew Paiss, Cooperative Research Network

Summary

The purpose of this paper is to address and alleviate concerns of public health and safety for utility-scale solar PV projects. Concerns of public health and safety were divided and discussed in the four following sections: (1) Toxicity, (2) Electromagnetic Fields, (3) Electric Shock and Arc Flash, and (4) Fire. In each of these sections, the negative health and safety impacts of utility-scale PV development were shown to be negligible, while the public health and safety benefits of installing these facilities are significant and far outweigh any negative impacts.

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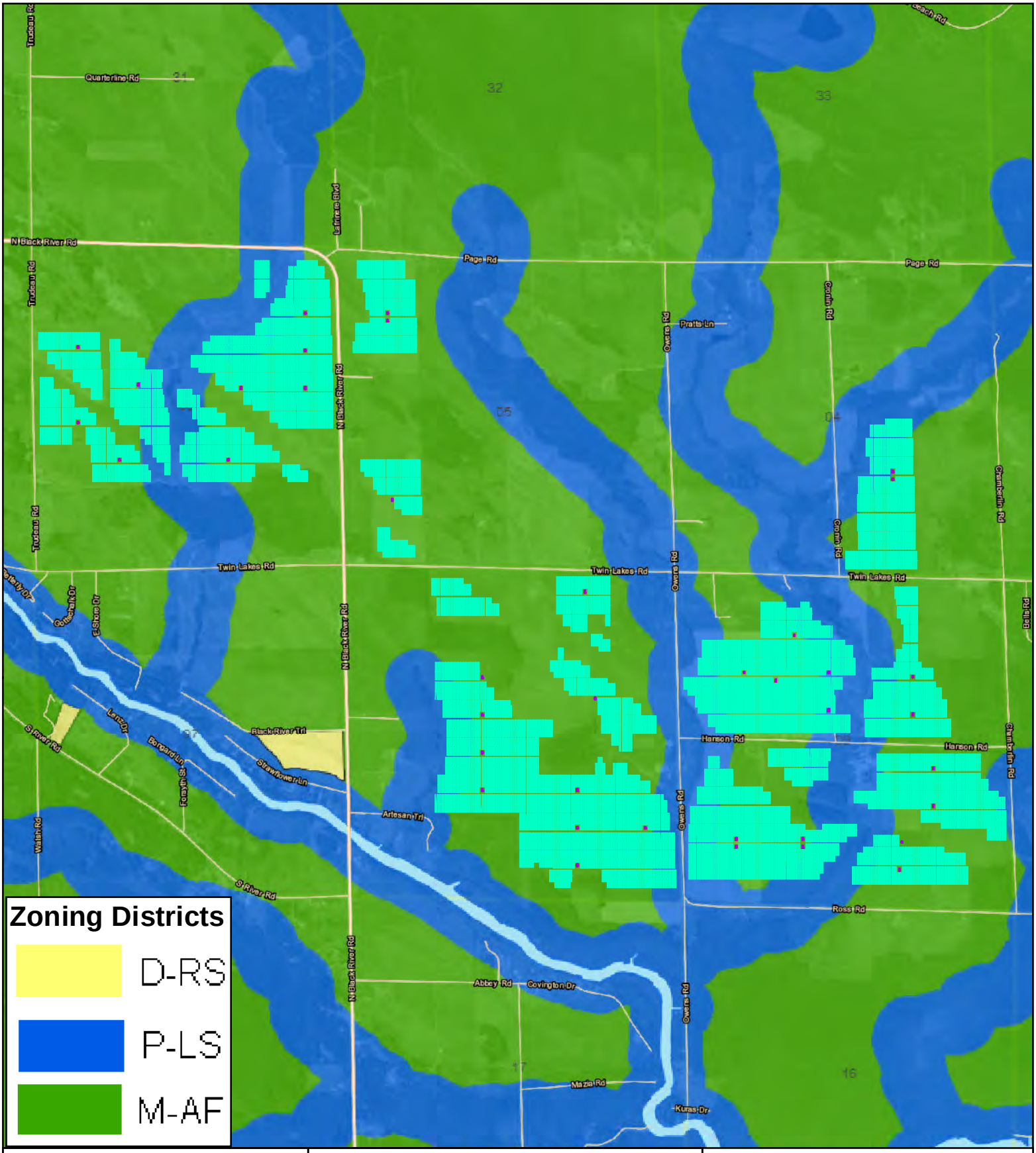
EXHIBIT C

ZONING OVERLAY DETAIL MAP



Zoning Districts

Cheboygan Solar Energy Project
Grant Townships
Cheboygan County, Michigan

Legend

Proposed Electric Inverters

Proposed Solar Panels

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ORION RENEWABLE ENERGY GROUP LLC

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EXHIBIT D

SOUND SIMULATIONS

Orion Renewables

SOUND MODELING OF CHEBOYGAN SOLAR

Report | February 13, 2020

PREPARED FOR:
ORION RENEWABLES

SUBMITTED BY:
RSG

55 Railroad Row
White River Junction, VT 05001
802.295.4999
www.rsginc.com

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1.0 INTRODUCTION

The Cheboygan Solar project, proposed by Orion Renewable Energy, is a 91 MWAC solar power project proposed for Grant Township in Cheboygan County, Michigan. The Project includes solar panels that convert sunlight to electricity and associated infrastructure that distribute the power onto the local electrical grid.

This report describes sound levels produced by the project at adjacent homes and properties. It assesses the sound emissions from tracking motors, DC to AC inverters, and medium and high voltages transformers. It then uses these sound emissions to models sound levels at project property lines to compare with the Cheboygan County noise limit.

The report includes:

1) A description of the Project and surrounding are,
2) A discussion of applicable noise standards,
3) Sound propagation modeling procedures and results, and
4) Summary and conclusions.

2.0 PROJECT DESCRIPTION

As mentioned above, the Cheboygan Solar project is located in Grant Township in Cheboygan County, Michigan. The Project is bounded by Ross Road to the south, Page Road to the north, Chamberlin Road to the East and Trudeau Road to the west (Figure 1). The area is primarily rural agricultural and rural residential, with about 30 residences located within 650 feet (200 meters) of any solar panel.

The project will include photovoltaic panels that convert sunlight into direct current (DC) electricity. The angle of the panels relative to the sun is controlled by tracking motors that can tilt a row of panels in one dimension. While the panels themselves do not generate any sound, the tracking motors emit some sound for a short period as they adjust the tilt of the panels. The closest home is about 260 feet (80 meters) from any tracking motor.

The DC electricity is then fed underground to 3,550 kW inverters that convert the direct current (DC) power to alternating current (AC) power. The inverter generates sound through its electrical components as well as cooling fans. In this project, there are approximately 40 inverters scattered around the project. The closest home is approximately 670 feet (205 meters) from any inverter.

Integrated with the inverters are medium-voltage transformers that step up the inverter output voltage to a higher (medium) voltage. These transformers generate sound through magneto-restriction of the core. The sound is generally tonal in nature, with a fundamental frequency of 120 Hz and its harmonics.

Power from the transformers is routed underground to a point-of-interconnect (POI) substation. This substation contains a larger transformer to step up the medium voltage to the high voltage (138 kV) of the adjacent transmission line. This relatively larger transformer also generates tonal sound at 120 Hz and its harmonics, but also has cooling fans, which are used at higher loads and higher outside temperatures. The closest home to the high voltage transformer is about 850 feet (260 meters) away.

The Project is rated at a maximum electrical output of 91 MW AC. A map of the project area can be seen in Figure 1

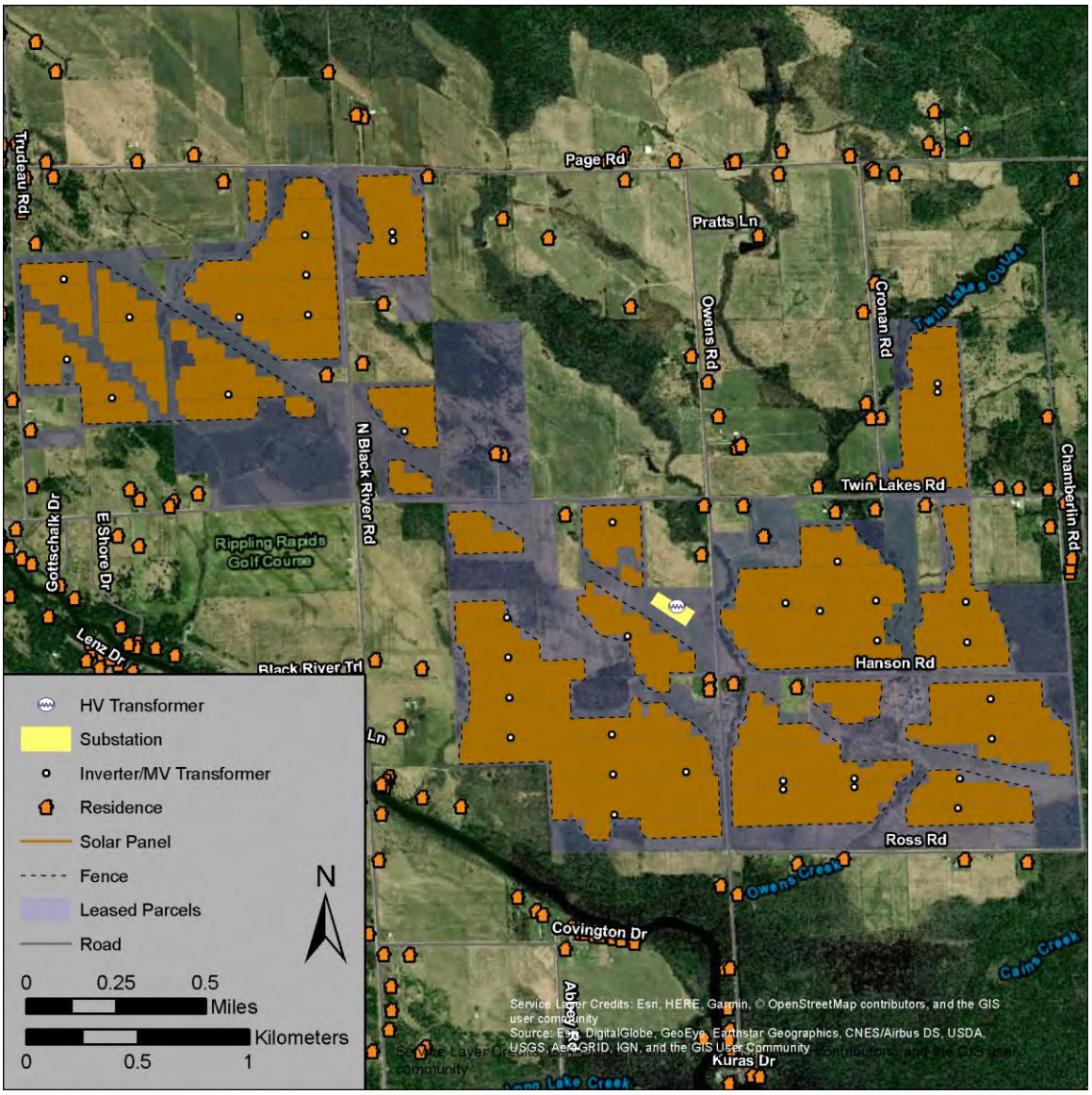

FIGURE 1: PROJECT AREA MAP

3.0 APPLICABLE NOISE STANDARDS

There are no national or Michigan state noise standards that apply to the Project.

The Cheboygan County Zoning Ordinance No. 200 has a performance standard for noise. Section 17.30.6.C has standards for “Level 3 Solar Energy Systems – Photovoltaic (SES-PV)”. Paragraph C of this section sets out the noise limits, as follows:

> No Level 3 SES-PV facility shall generate noise that, when measured at the Level 3 SES-PV Facility's perimeter, shall exceed 60 decibels (dBA). This standard does not apply during construction, routine equipment maintenance, repair or replacement, or at the time of decommissioning and reclamation.

As a result, the design goal for this project is a property line limit of 60 dBA.

4.0 SOUND PROPAGATION MODELING

4.1 MODELLING PROCEDURES

Sound propagation modeling for the project is conducted in accordance with the international standard ISO 9613-2, “Acoustics – Attenuation of sound during propagation outdoors, Part 2: General Method of Calculation.” The ISO standard states,

> This part of ISO 9613 specifies an engineering method for calculating the attenuation of sound during propagation outdoors in order to predict the levels of environmental noise at a distance from a variety of sources. The method predicts the equivalent continuous A-weighted sound pressure level … under meteorological conditions favorable to propagation from sources of known sound emissions. These conditions are for downwind propagation … or, equivalently, propagation under a well-developed moderate ground-based temperature inversion, such as commonly occurs at night.

The model takes into account source sound power levels, ground surface reflection and absorption, atmospheric absorption, geometric divergence, meteorological conditions, walls, barriers, berms, and terrain. The model does not consider sound dampening effects of solar panels within the property boundary. ISO 9613-2 also assumes downwind sound propagation between every source and every receiver, consequently, all wind directions, including the prevailing wind directions, are taken into account. The acoustical modeling software used here was CadnaA, from Datakustik GmbH. CadnaA is a widely accepted acoustical propagation modeling tool, used by many noise control professionals in the United States and internationally.

For this analysis, we used porous ground (G = 1) except within the substation, which was assumed to be half porous and half hard (G = 0.5). Other sound propagation model parameters are shown in Appendix B.

Note that these modeling procedures assume that local weather conditions are favorable to sound propagation, with a clear sky and a temperature inversion. This condition, which typically occurs at night and near dawn or dusk, causes sound to bend towards the ground, increasing sound levels at ground-located receivers. Temperature inversions do not occur during full sunlight conditions. Modeling performed for this project assumes full sound emissions from the equipment. This condition will only occur during full sunlight conditions. As a result, the combination of full equipment sound emissions and worst-case sound propagation conditions that is modeled for this project, will rarely or never occur. This effect is illustrated in Figure 2. The result is that modeling shown here is conservative, overestimating actual sound levels.

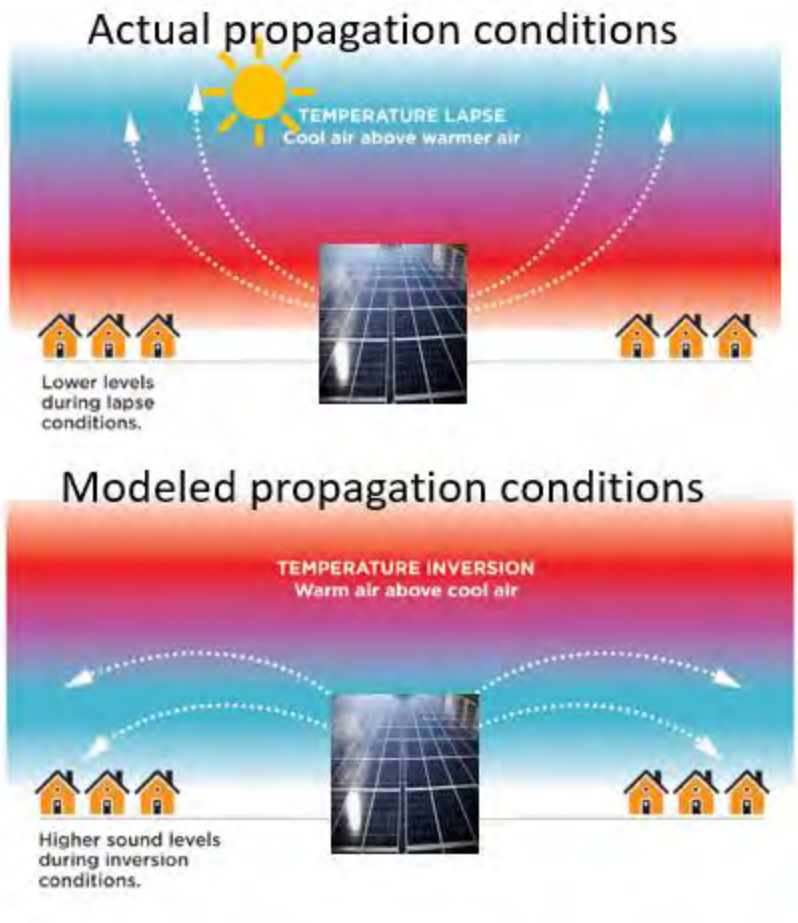

FIGURE 2: ACTUAL SOUND PROPAGATION CONDITIONS ON A SUNNY DAY (TOP) VERSUS WHAT IS MODELED (BOTTOM)

Modeling was done at every point in a 20-meter by 20-meter (66-foot by 66-foot) grid, with receivers placed at a height of 1.5-meters (13-feet). Discrete residences are modeled at a height of 4-meters

The modeling included the following sound sources:

- Tracking motors – 5,789 tracking motors were included in the model, each with a sound power of 49 dBA assumed to be centered at 500 Hz.
- Inverters/Medium-voltage transformers – The inverters and medium voltage transformers are in an integrated unit, rated at no more than a sound pressure level of 79 dBA at 1 foot. This translates into a sound power of 99 dBA.
- High-voltage POI transformer – The high voltage transformer is modeled at the rated NEMA TR-1 sound standard for this size of transformer (110 MVA, 345 kV BIL) minus 5 dB. This translates to a sound power of 99 dBA, with all fans operating at maximum

capacity. The spectrum of the transformer is derived from RSG measurements of similarly-sized transformers

4.2 SOUND MODELING RESULTS

The results of the modeling are shown as iso-decibel contour lines in Figure 3. Note that tracking motor locations are not shown in these graphics to prevent obscuring of the modeling results.

The maximum property line sound level is 49 dBA and occurs on the northern property line near the proposed substation. This is 11 dB below the Cheboygan County noise limit of 60 dBA.

The highest sound level at any home is 45 dBA. This occurs at 8190 Hanson Road, Cheyboygan MI, 49721.

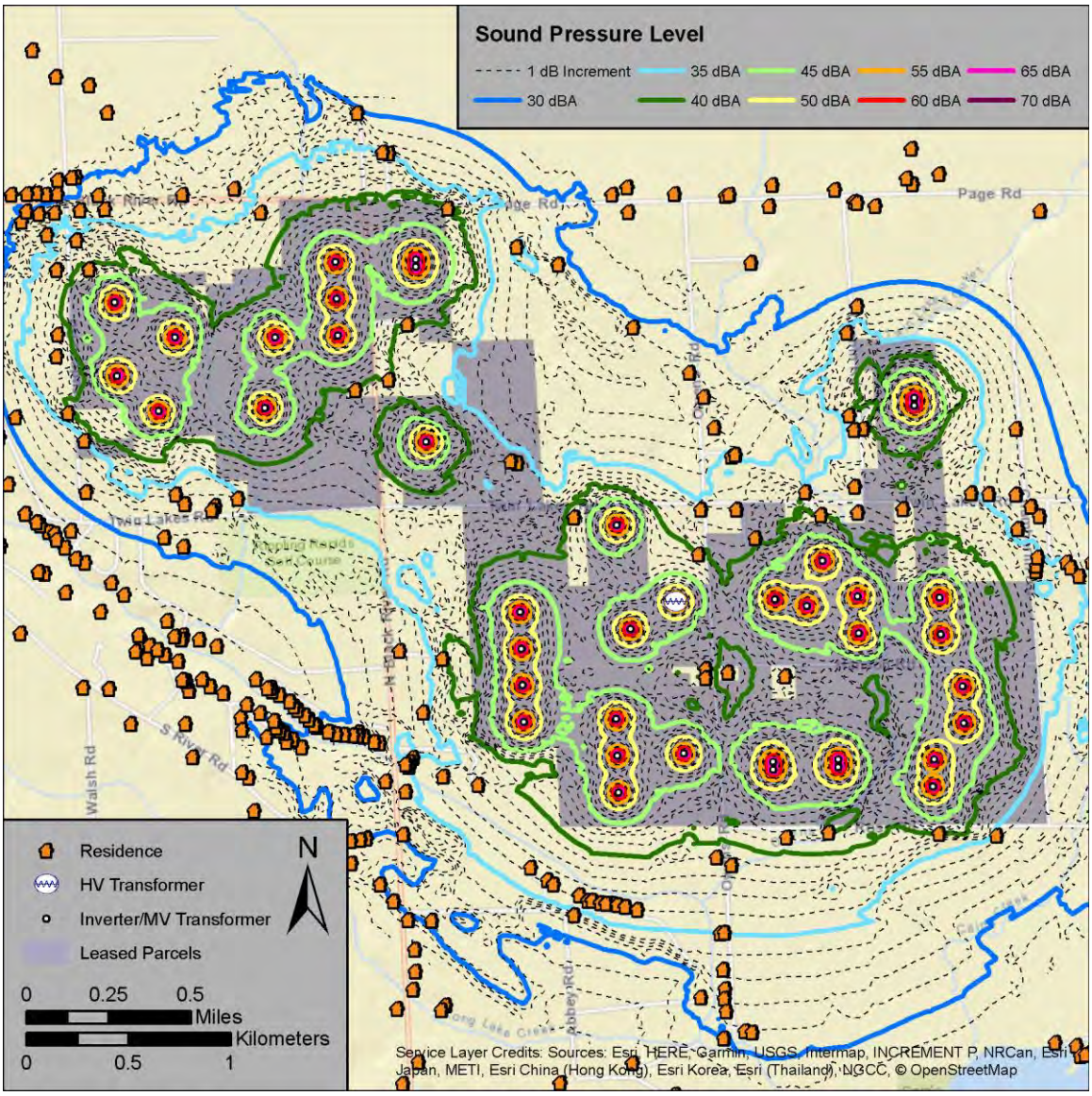

FIGURE 3: SOUND MODELING RESULTS MAP

5.0 SUMMARY AND CONCLUSIONS

The 91 MW Cheboygan Solar project is proposed for Cheboygan County, Michigan. While the solar panels themselves do not generate any sound, the tracking motors, integrated inverter/medium-voltage transformers, and POI high-voltage transformer generates some sound.

As a result, sound propagation modeling was conducted to assess whether the Project would meet the Cheboygan County 60 dBA property line noise limit. This modeling was conducted using an international standard for outdoor sound propagation, ISO 9613-2. The model assumes that the equipment will be operating at its maximum sound output, and that sound would propagate downwind from all sources to all receivers.

The results of the modeling show that the highest sound level at the property line of the Project is 49 dBA, 11 dB below the County noise limit. The highest sound level at any residence is 45 dBA, noticeably lower than the maximum at the property line.

Based on this modeling, we conclude that the Project as designed will meet the Cheboygan County noise limit.

APPENDIX A. ACOUSTICS PRIMER

Expressing Sound in Decibel Levels

The varying air pressure that constitutes sound can be characterized in many different ways. The human ear is the basis for the metrics that are used in acoustics. Normal human hearing is sensitive to sound fluctuations over an enormous range of pressures, from about 20 micropascals (the “threshold of audibility”) to about 20 pascals (the “threshold of pain”).[1] This factor of one million in sound pressure difference is challenging to convey in engineering units. Instead, sound pressure is converted to sound “levels” in units of “decibels” (dB, named after Alexander Graham Bell). Once a measured sound is converted to dB, it is denoted as a level with the letter “L”.

The conversion from sound pressure in pascals to sound level in dB is a four-step process. First, the sound wave’s measured amplitude is squared and the mean is taken. Second, a ratio is taken between the mean square sound pressure and the square of the threshold of audibility (20 micropascals). Third, using the logarithm function, the ratio is converted to factors of 10. The final result is multiplied by 10 to give the decibel level. By this decibel scale, sound levels range from 0 dB at the threshold of audibility to 120 dB at the threshold of pain.

Typical sound sources, and their sound pressure levels, are listed on the scale in Figure 4.

Human Response to Sound Levels: Apparent Loudness

For every 20 dB increase in sound level, the sound pressure increases by a *factor* of 10; the sound *level* range from 0 dB to 120 dB covers 6 factors of 10, or one million, in sound *pressure*. However, for an increase of 10 dB in sound *level* as measured by a meter, humans perceive an approximate doubling of apparent loudness: to the human ear, a sound level of 70 dB sounds about “twice as loud” as a sound level of 60 dB. Smaller changes in sound level, less than 3 dB up or down, are generally not perceptible.

[1] The pascal is a measure of pressure in the metric system. In Imperial units, they are themselves very small: one pascal is only 145 millionths of a pound per square inch (psi). The sound pressure at the threshold of audibility is only 3 one-billionths of one psi: at the threshold of pain, it is about 3 one-thousandths of one psi.

FIGURE 4: A SCALE OF SOUND PRESSURE LEVELS FOR TYPICAL SOUND SOURCES

Frequency Spectrum of Sound

The “frequency” of a sound is the rate at which it fluctuates in time, expressed in Hertz (Hz), or cycles per second. Very few sounds occur at only one frequency: most sound contains energy at many different frequencies, and it can be broken down into different frequency divisions, or bands. These bands are similar to musical pitches, from low tones to high tones. The most common division is the standard octave band. An octave is the range of frequencies whose upper frequency limit is twice its lower frequency limit, exactly like an octave in music. An octave band is identified by its center frequency: each successive band’s center frequency is twice as high (one octave) as the previous band. For example, the 500 Hz octave band includes all sound whose frequencies range between 354 Hz (Hertz, or cycles per second) and 707 Hz. The next band is centered at 1,000 Hz with a range between 707 Hz and 1,414 Hz. The range of human hearing is divided into 10 standard octave bands: 31.5 Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1,000 Hz, 2,000 Hz, 4,000 Hz, 8,000 Hz, and 16,000 Hz. For analyses that require finer frequency detail, each octave-band can be subdivided. A commonly-used subdivision creates three smaller bands within each octave band, or so-called 1/3-octave bands.

Human Response to Frequency: Weighting of Sound Levels

The human ear is not equally sensitive to sounds of all frequencies. Sounds at some frequencies seem louder than others, despite having the same decibel level as measured by a sound level meter. In particular, human hearing is much more sensitive to medium pitches (from about 500 Hz to about 4,000 Hz) than to very low or very high pitches. For example, a tone measuring 80 dB at 500 Hz (a medium pitch) sounds quite a bit louder than a tone measuring 80 dB at 60 Hz (a very low pitch). The frequency response of normal human hearing ranges from 20 Hz to 20,000 Hz. Below 20 Hz, sound pressure fluctuations are not “heard”, but sometimes can be “felt”. This is known as “infrasound”. Likewise, above 20,000 Hz, sound can no longer be heard by humans; this is known as “ultrasound”. As humans age, they tend to lose the ability to hear higher frequencies first; many adults do not hear very well above about 16,000 Hz. Most natural and man-made sound occurs in the range from about 40 Hz to about 4,000 Hz. Some insects and birdsongs reach to about 8,000 Hz.

To adjust measured sound pressure levels so that they mimic human hearing response, sound level meters apply filters, known as “frequency weightings”, to the signals. There are several defined weighting scales, including “A”, “B”, “C”, “D”, “G”, and “Z”. The most common weighting scale used in environmental noise analysis and regulation is A-weighting. This weighting represents the sensitivity of the human ear to sounds of low to moderate level. It attenuates sounds with frequencies below 1000 Hz and above 4000 Hz; it amplifies very slightly sounds between 1000 Hz and 4000 Hz, where the human ear is particularly sensitive. The C-weighting scale is sometimes used to describe louder sounds. The B- and D- scales are seldom used. All of these frequency weighting scales are normalized to the average human hearing response at

1000 Hz: at this frequency, the filters neither attenuate nor amplify. When a reported sound level has been filtered using a frequency weighting, the letter is appended to “dB”. For example, sound with A-weighting is usually denoted “dBA”. When no filtering is applied, the level is denoted “dB” or “dBZ”. The letter is also appended as a subscript to the level indicator “L”, for example “L_A” for A-weighted levels.

Time Response of Sound Level Meters

Because sound levels can vary greatly from one moment to the next, the time over which sound is measured can influence the value of the levels reported. Often, sound is measured in real time, as it fluctuates. In this case, acousticians apply a so-called “time response” to the sound level meter, and this time response is often part of regulations for measuring sound. If the sound level is varying slowly, over a few seconds, “Slow” time response is applied, with a time constant of one second. If the sound level is varying quickly (for example, if brief events are mixed into the overall sound), “Fast” time response can be applied, with a time constant of one-eighth of a second.[2] The time response setting for a sound level measurement is indicated with the subscript “S” for Slow and “F” for Fast: L_S or L_F. A sound level meter set to Fast time response will indicate higher sound levels than one set to Slow time response when brief events are mixed into the overall sound, because it can respond more quickly.

In some cases, the maximum sound level that can be generated by a source is of concern. Likewise, the minimum sound level occurring during a monitoring period may be required. To measure these, the sound level meter can be set to capture and hold the highest and lowest levels measured during a given monitoring period. This is represented by the subscript “max”, denoted as “L_{max}”. One can define a “max” level with Fast response L_{Fmax} (1/8-second time constant), Slow time response L_{Smax} (1-second time constant), or Continuous Equivalent level over a specified time period L_{EQmax}.

Accounting for Changes in Sound Over Time

A sound level meter’s time response settings are useful for continuous monitoring. However, they are less useful in summarizing sound levels over longer periods. To do so, acousticians apply simple statistics to the measured sound levels, resulting in a set of defined types of sound level related to averages over time. An example is shown in **Figure 5**. The sound level at each instant of time is the grey trace going from left to right. Over the total time it was measured (1 hour in the figure), the sound energy spends certain fractions of time near various levels, ranging from the minimum (about 27 dB in the figure) to the maximum (about 65 dB in the figure). The simplest descriptor is the average sound level, known as the Equivalent Continuous

[2] There is a third-time response defined by standards, the “Impulse” response. This response was defined to enable use of older, analog meters when measuring very brief sounds; it is no longer in common use.

Sound Level. Statistical levels are used to determine for what percentage of time the sound is louder than any given level. These levels are described in the following sections.

Equivalent Continuous Sound Level - Leq

One straightforward, common way of describing sound levels is in terms of the Continuous Equivalent Sound Level, or L_{EQ}. The L_{EQ} is the average sound pressure level over a defined period of time, such as one hour or one day. L_{EQ} is the most commonly used descriptor in noise standards and regulations. L_{EQ} is representative of the overall sound to which a person is exposed. Because of the logarithmic calculation of decibels, L_{EQ} tends to favor higher sound levels: loud and infrequent sources have a larger impact on the resulting average sound level than quieter but more frequent sounds. For example, in Figure 5, even though the sound levels spends most of the time near about 34 dBA, the L_{EQ} is 41 dBA, having been “inflated” by the maximum level of 65 dBA and other occasional spikes over the course of the hour.

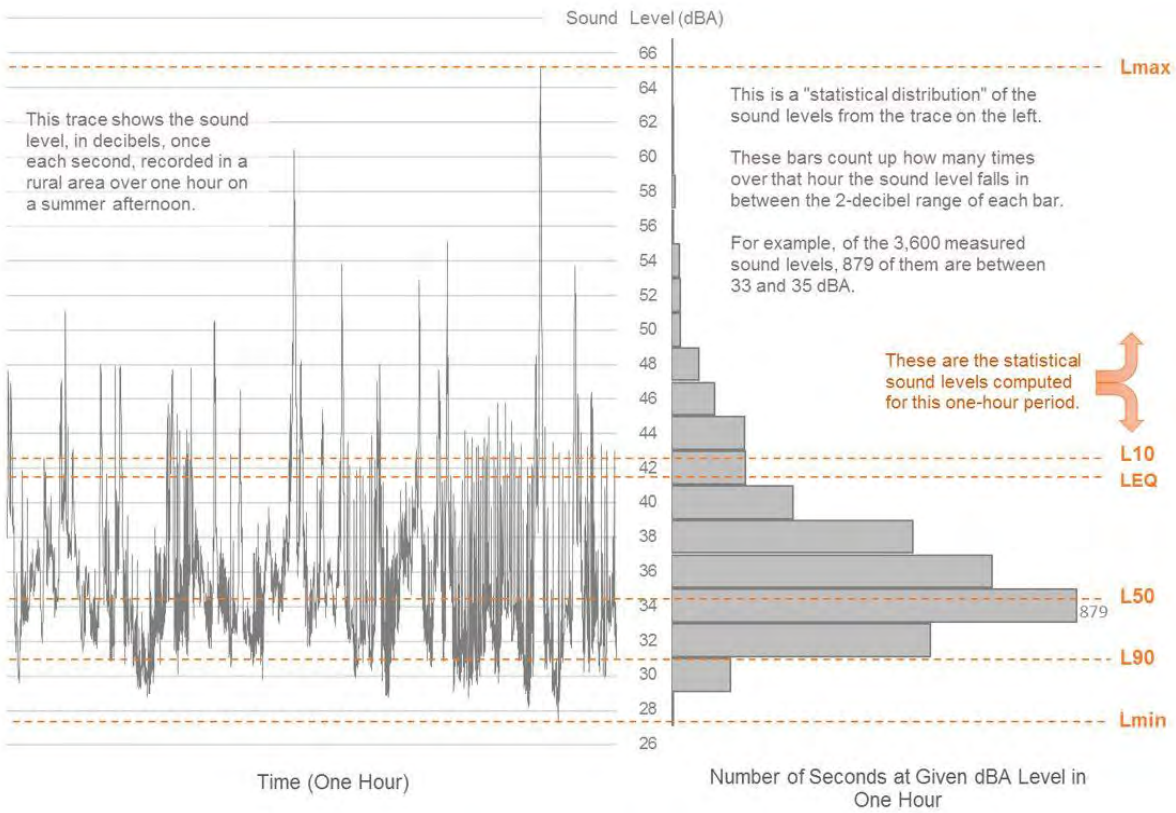

FIGURE 5: EXAMPLE OF DESCRIPTIVE TERMS OF SOUND MEASUREMENT OVER TIME

Percentile Sound Levels – Ln

Percentile sound levels describe the statistical distribution of sound levels over time. "L_N" is the level above which the sound spends "N" percent of the time. For example, L_{90} (sometimes called the "residual base level") is the sound level exceeded 90% of the time: the sound is louder than L_{90} most of the time. L_{10} is the sound level that is exceeded only 10% of the time. L_{50} (the "median level") is exceeded 50% of the time: half of the time the sound is louder than L_{50}, and half the time it is quieter than L_{50}. Note that L_{50} (median) and L_{EQ} (mean) are not always the same, for reasons described in the previous section.

L_{90} is often a good representation of the "ambient sound" in an area. This is the sound that persists for longer periods, and below which the overall sound level seldom falls. It tends to filter out other short-term environmental sounds that aren't part of the source being investigated. L_{10} represents the higher, but less frequent, sound levels. These could include such events as barking dogs, vehicles driving by and aircraft flying overhead, gusts of wind, and work operations. L_{90} represents the background sound that is present when these event sounds are excluded.

Note that if one sound source is very constant and dominates the soundscape in an area, all of the descriptive sound levels mentioned here tend toward the same value. It is when the sound is varying widely from one moment to the next that the statistical descriptors are useful.

APPENDIX B. SOUND SOURCE INFORMATION

TABLE 1: SOUND PROPAGATION MODELING PARAMETERS

Parameter	Setting
Ground Absorption	Spectral for all sources, Soft Ground (G=1), with mixed ground (G=0.5) for POI substation
Atmospheric Attenuation	Based on 10 Degrees Celsius, 70% Relative Humidity
Reflections	None
Receiver Height	4 meters for residences and grid
Search Distance	10,000 meters

TABLE 2: MODELED SOUND SOURCES (EXCEPT TRACKERS)

Sound Source	Modeled Sound Power (dBA)	Relative Height (m)	Coordinates (UTM NAD83 Z16N)		
			X (m)	Y (m)	Z (m)
HV Transformer	99	4	708273	5044648	199
Inverter/MV Transformer	99	2	707526	5044058	192
Inverter/MV Transformer	99	2	707981	5044073	193
Inverter/MV Transformer	99	2	707520	5044238	193
Inverter/MV Transformer	99	2	707514	5044418	194
Inverter/MV Transformer	99	2	707508	5044598	194
Inverter/MV Transformer	99	2	707987	5043893	191
Inverter/MV Transformer	99	2	707993	5043713	190
Inverter/MV Transformer	99	2	708751	5043825	191
Inverter/MV Transformer	99	2	708750	5043864	191
Inverter/MV Transformer	99	2	709071	5043836	192
Inverter/MV Transformer	99	2	709070	5043874	193
Inverter/MV Transformer	99	2	708761	5044661	197
Inverter/MV Transformer	99	2	709172	5044495	198
Inverter/MV Transformer	99	2	709167	5044675	197
Inverter/MV Transformer	99	2	709535	5043742	193
Inverter/MV Transformer	99	2	709543	5043874	194
Inverter/MV Transformer	99	2	709682	5044233	197
Inverter/MV Transformer	99	2	709688	5044053	195
Inverter/MV Transformer	99	2	709576	5044488	196
Inverter/MV Transformer	99	2	709570	5044668	197
Inverter/MV Transformer	99	2	707985	5045025	197
Inverter/MV Transformer	99	2	708050	5044514	194
Inverter/MV Transformer	99	2	709444	5045611	205
Inverter/MV Transformer	99	2	709443	5045649	204
Inverter/MV Transformer	99	2	708995	5044849	199
Inverter/MV Transformer	99	2	708313	5043904	191
Inverter/MV Transformer	99	2	705519	5046117	203
Inverter/MV Transformer	99	2	705531	5045757	200
Inverter/MV Transformer	99	2	706997	5046292	202
Inverter/MV Transformer	99	2	706996	5046329	202
Inverter/MV Transformer	99	2	706306	5045946	203

Sound Source	Modeled Sound Power (dBA)	Relative Height (m)	Coordinates (UTM NAD83 Z16N)		
			X (m)	Y (m)	Z (m)
Inverter/MV Transformer	99	2	706614	5045956	203
Inverter/MV Transformer	99	2	706608	5046136	202
Inverter/MV Transformer	99	2	706602	5046316	201
Inverter/MV Transformer	99	2	705814	5045947	199
Inverter/MV Transformer	99	2	705734	5045583	200
Inverter/MV Transformer	99	2	706256	5045600	198
Inverter/MV Transformer	99	2	707048	5045434	199
Inverter/MV Transformer	99	2	708916	5044629	197

55 Railroad Row
White River Junction, VT 05001
802.295.4999
www.rsginc.com

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EXHIBIT E

VISUAL SIMULATIONS

Existing View

Solar Equipment Shown

- 385 Watt Modules (Approximately 1m x 2m (40” x 80”).
- Mounted in Portrait on single-axis trackers.
- +/- 60 degrees rotation.
- Center height, approximately 1.8m (72”).
- Maximum height, approximately 2.7m (106”).

Viewpoint Data

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Longitude:	84.330° W
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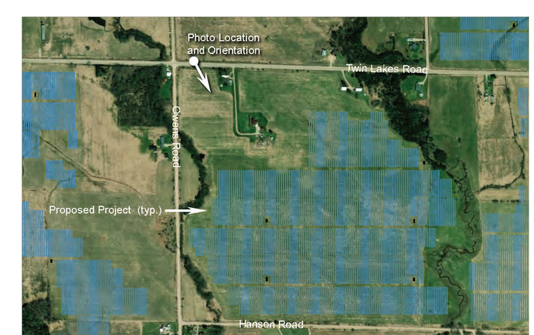

Cheboygan Solar Project

Grant Township, Cheboygan County, Michigan

Viewpoint Location #1: Twin Lakes Road

ORION RENEWABLE ENERGY GROUP LLC

SARATOGA ASSOCIATES

Existing View

Solar Equipment Shown

- 385 Watt Modules (Approximately 1m x 2m (40” x 80”).
- Mounted in Portrait on single-axis trackers.
- +/- 60 degrees rotation.
- Center height, approximately 1.8m (72”).
- Maximum height, approximately 2.7m (106”).

Viewpoint Data

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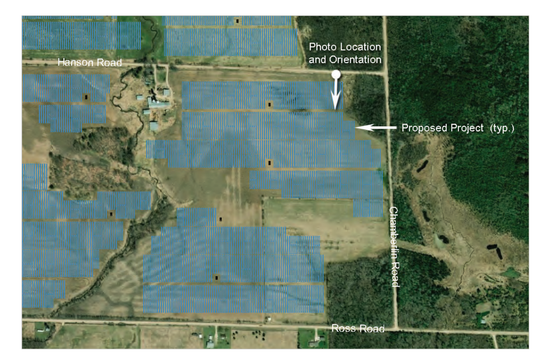
Viewpoint Location



Cheboygan Solar Project

Grant Township, Cheboygan County, Michigan

Viewpoint Location #2: Hanson Road

ORION RENEWABLE ENERGY GROUP LLC

SARATOGA ASSOCIATES

Existing View

Solar Equipment Shown

- 385 Watt Modules (Approximately 1m x 2m (40” x 80”).
- Mounted in Portrait on single-axis trackers.
- +/- 60 degrees rotation.
- Center height, approximately 1.8m (72”).
- Maximum height, approximately 2.7m (106”).

Viewpoint Data

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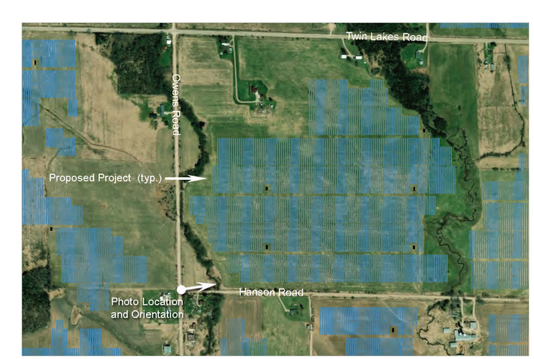
Viewpoint Location



Cheboygan Solar Project

Grant Township, Cheboygan County, Michigan

Viewpoint Location #3: Intersection of Hanson Road and Owens Road

ORION RENEWABLE ENERGY GROUP LLC

SARATOGA ASSOCIATES

Existing View

Solar Equipment Shown

- 385 Watt Modules (Approximately 1m x 2m (40” x 80”).
- Mounted in Portrait on single-axis trackers.
- +/- 60 degrees rotation.
- Center height, approximately 1.8m (72”).
- Maximum height, approximately 2.7m (106”).

Viewpoint Data

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Longitude:	84.331° W
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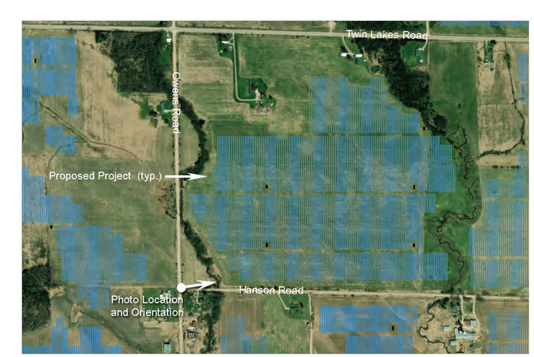
Viewpoint Location



Cheboygan Solar Project

Grant Township, Cheboygan County, Michigan

Viewpoint Location #3: Intersection of Hanson Road and Owens Road
(with landscape mitigation)

ORION RENEWABLE ENERGY GROUP LLC

SARATOGA ASSOCIATES

Existing View

Solar Equipment Shown

- 385 Watt Modules (Approximately 1m x 2m (40” x 80”).
- Mounted in Portrait on single-axis trackers.
- +/- 60 degrees rotation.
- Center height, approximately 1.8m (72”).
- Maximum height, approximately 2.7m (106”).

Viewpoint Data

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Longitude:	84.331° W
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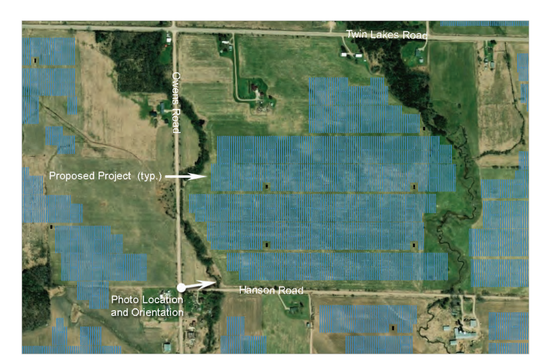
Distance from Project: (Within Frame of View)	~515 Feet

Viewpoint Location



Cheboygan Solar Project

Grant Township, Cheboygan County, Michigan

Viewpoint Location #3: Intersection of Hanson Road and Owens Road
(with 10 year landscape mitigation)

ORION RENEWABLE ENERGY GROUP LLC

SARATOGA ASSOCIATES

Existing View

Solar Equipment Shown

- 385 Watt Modules (Approximately 1m x 2m (40” x 80”).
- Mounted in Portrait on single-axis trackers.
- +/- 60 degrees rotation.
- Center height, approximately 1.8m (72”).
- Maximum height, approximately 2.7m (106”).

Viewpoint Data

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Longitude:	84.351° W
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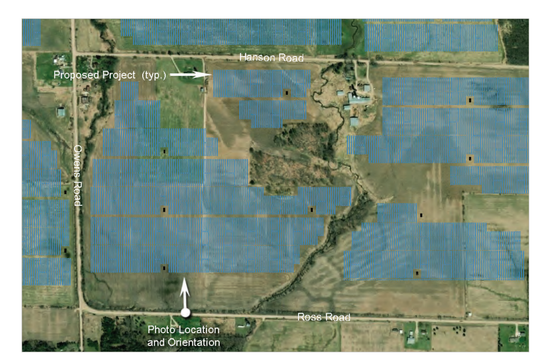
Viewpoint Location



Cheboygan Solar Project

Grant Township, Cheboygan County, Michigan

Viewpoint Location #4: Ross Road

ORION RENEWABLE ENERGY GROUP LLC

SARATOGA ASSOCIATES

Existing View

Solar Equipment Shown

- 385 Watt Modules (Approximately 1m x 2m (40” x 80”).
- Mounted in Portrait on single-axis trackers.
- +/- 60 degrees rotation.
- Center height, approximately 1.8m (72”).
- Maximum height, approximately 2.7m (106”).

Viewpoint Data

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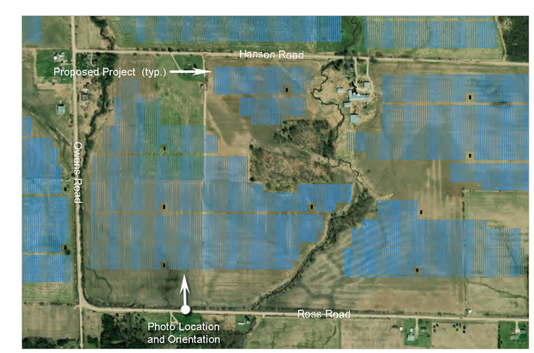
Viewpoint Location



Cheboygan Solar Project

Grant Township, Cheboygan County, Michigan

Viewpoint Location #4: Ross Road
(with landscape mitigation)

ORION RENEWABLE ENERGY GROUP LLC

SARATOGA ASSOCIATES

Existing View

Solar Equipment Shown

- 385 Watt Modules (Approximately 1m x 2m (40” x 80”).
- Mounted in Portrait on single-axis trackers.
- +/- 60 degrees rotation.
- Center height, approximately 1.8m (72”).
- Maximum height, approximately 2.7m (106”).

Viewpoint Data

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Longitude:	84.351° W
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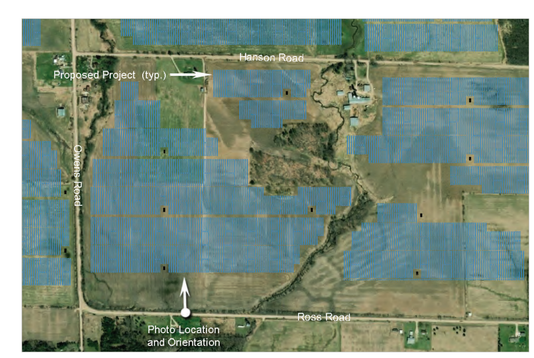
Viewpoint Location



Cheboygan Solar Project

Grant Township, Cheboygan County, Michigan

Viewpoint Location #4: Ross Road
(with 10 year landscape mitigation)

ORION RENEWABLE ENERGY GROUP LLC

SARATOGA ASSOCIATES

Existing View

Solar Equipment Shown

- 385 Watt Modules (Approximately 1m x 2m (40” x 80”).
- Mounted in Portrait on single-axis trackers.
- +/- 60 degrees rotation.
- Center height, approximately 1.8m (72”).
- Maximum height, approximately 2.7m (106”).

Viewpoint Data

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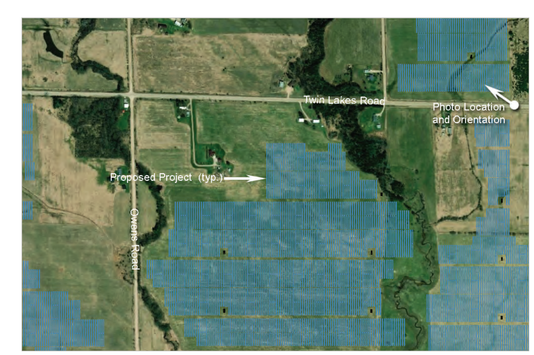

Cheboygan Solar Project

Grant Township, Cheboygan County, Michigan

Viewpoint Location #5: Twin Lakes Road

ORION RENEWABLE ENERGY GROUP LLC

SARATOGA ASSOCIATES

Existing View

Solar Equipment Shown

- 385 Watt Modules (Approximately 1m x 2m (40” x 80”).
- Mounted in Portrait on single-axis trackers.
- +/- 60 degrees rotation.
- Center height, approximately 1.8m (72”).
- Maximum height, approximately 2.7m (106”).

Viewpoint Data

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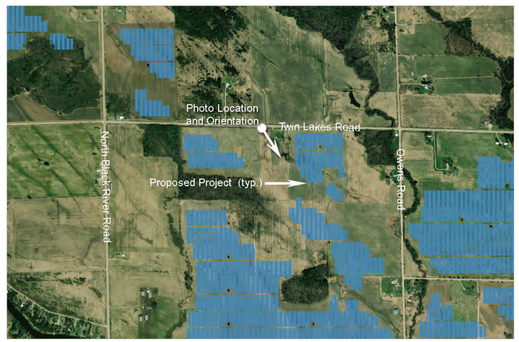
Distance from Project: (Within Frame of View)	~860 Feet

Viewpoint Location



Cheboygan Solar Project

Grant Township, Cheboygan County, Michigan

Viewpoint Location #6: Twin Lakes Road

ORION RENEWABLE ENERGY GROUP LLC

SARATOGA ASSOCIATES

Existing View

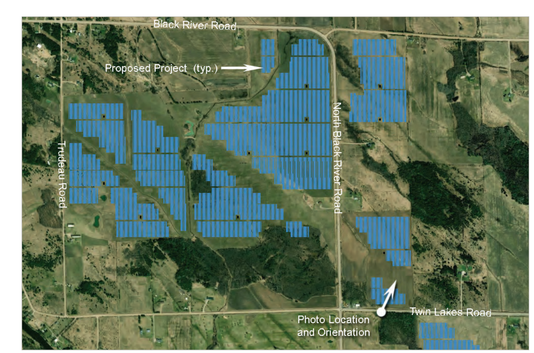
Solar Equipment Shown

- 385 Watt Modules (Approximately 1m x 2m (40” x 80”).
- Mounted in Portrait on single-axis trackers.
- +/- 60 degrees rotation.
- Center height, approximately 1.8m (72”).
- Maximum height, approximately 2.7m (106”).

Viewpoint Data

Latitude:	45.529° N
Longitude:	84.348° W
Focal Length:	9 MM
Camera Type:	Fuji FinePix
Date and Time:	5/29/2019 5:17 PM
Orientation of View:	Northeast
Distance from Project: (Within Frame of View)	~120 Feet

Viewpoint Location



Cheboygan Solar Project

Grant Township, Cheboygan County, Michigan

Viewpoint Location #7: Twin Lakes Road

ORION RENEWABLE ENERGY GROUP LLC

SARATOGA ASSOCIATES

Existing View

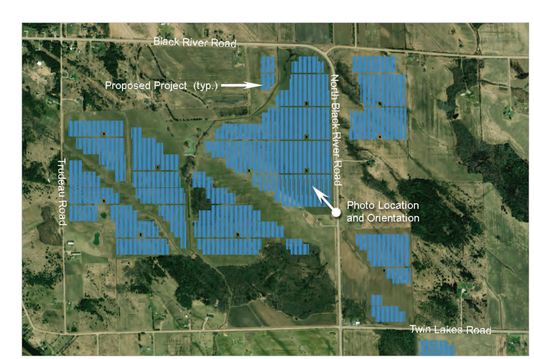
Solar Equipment Shown

- 385 Watt Modules (Approximately 1m x 2m (40” x 80”).
- Mounted in Portrait on single-axis trackers.
- +/- 60 degrees rotation.
- Center height, approximately 1.8m (72”).
- Maximum height, approximately 2.7m (106”).

Viewpoint Data

Latitude:	45.534° N
Longitude:	84.352° W
Focal Length:	9 MM
Camera Type:	Fuji FinePix
Date and Time:	5/29/2019 5:57 PM
Orientation of View:	Northwest
Distance from Project: (Within Frame of View)	~160 Feet

Viewpoint Location



Cheboygan Solar Project

Grant Township, Cheboygan County, Michigan

Viewpoint Location #8: North Black River Road

ORION RENEWABLE ENERGY GROUP LLC

SARATOGA ASSOCIATES

Existing View

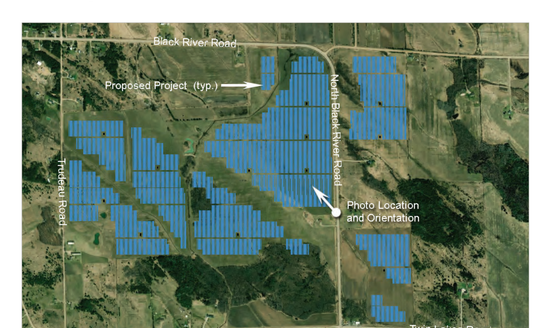
Solar Equipment Shown

- 385 Watt Modules (Approximately 1m x 2m (40" x 80").
- Mounted in Portrait on single-axis trackers.
- +/- 60 degrees rotation.
- Center height, approximately 1.8m (72").
- Maximum height, approximately 2.7m (106").

Viewpoint Data

Latitude:	45.534° N
Longitude:	84.352° W
Focal Length:	9 MM
Camera Type:	Fuji FinePix
Date and Time:	5/29/2019 5:57 PM
Orientation of View:	Northwest
Distance from Project: (Within Frame of View)	~160 Feet

Viewpoint Location



Cheboygan Solar Project

Grant Township, Cheboygan County, Michigan

Viewpoint Location #8: North Black River Road
(with landscape mitigation)

ORION RENEWABLE ENERGY GROUP LLC

SARATOGA ASSOCIATES

Existing View

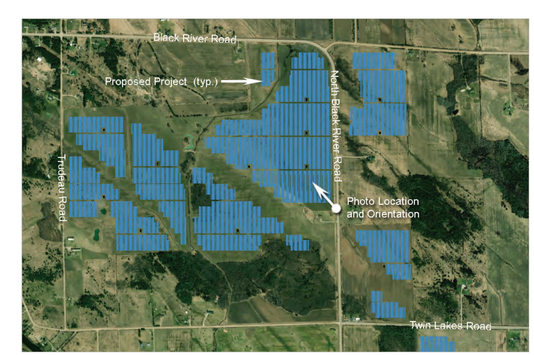
Solar Equipment Shown

- 385 Watt Modules (Approximately 1m x 2m (40” x 80”).
- Mounted in Portrait on single-axis trackers.
- +/- 60 degrees rotation.
- Center height, approximately 1.8m (72”).
- Maximum height, approximately 2.7m (106”).

Viewpoint Data

Latitude:	45.534° N
Longitude:	84.352° W
Focal Length:	9 MM
Camera Type:	Fuji FinePix
Date and Time:	5/29/2019 5:57 PM
Orientation of View:	Northwest
Distance from Project: (Within Frame of View)	~160 Feet

Viewpoint Location



Cheboygan Solar Project

Grant Township, Cheboygan County, Michigan

Viewpoint Location #8: North Black River Road
(with 10 year landscape mitigation)

ORION RENEWABLE ENERGY GROUP LLC

SARATOGA ASSOCIATES

EXHIBIT F

PROPERTY VALUATION REPORT

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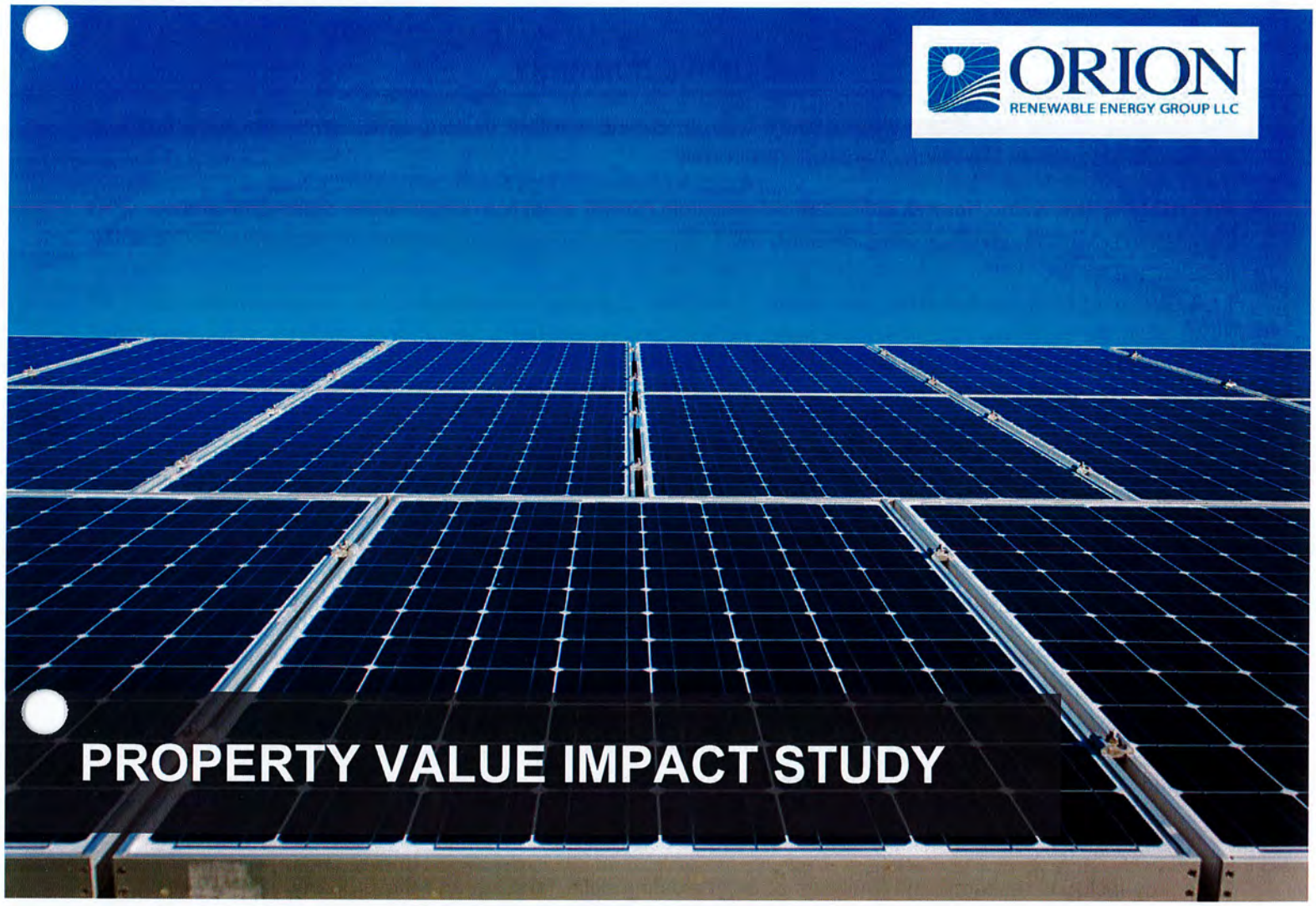

PROPERTY VALUE IMPACT STUDY

ADJACENT PROPERTY VALUES SOLAR IMPACT STUDY
A STUDY OF EIGHT EXISTING SOLAR FACILITIES

Located in Lapeer County, Michigan; Chisago County, Minnesota; Marion County, Indiana; LaSalle County, Illinois; Bladen, Cumberland, Rutherford and Wilson Counties, North Carolina; and Isle of Wight County, Virginia

PREPARED FOR:
Orion Renewable Energy Group
155 Grand Avenue, Suite 706
Oakland, CA 94612

SUBMITTED BY:
CohnReznick, LLP
Valuation Advisory Services
200 S Wacker Drive, Suite 2600
Chicago, IL 60606
(312) 508-5900

Andrew R. Lines, MAI
Patricia L. McGarr, MAI, CRE, FRICS

February 6, 2020

EXECUTIVE SUMMARY

The purpose of this real estate impact study is to determine whether existing solar farm uses have had any measurable impact on the value of adjacent properties.

According to the Solar Energy Industries Association (SEIA) statistics, utility-scale, solar photovoltaic (PV) installations over the next four years, through 2024, represent the largest percentage of deployment of solar PV installations for the United States in total and on an annual basis. The total installed solar capacity increased to 71.3 GW as of third quarter 2019, and the total installed capacity is expected to top 100 gigawatts ("GW") by 2021. With the increase of utility-scale solar installations across the country, solar projects have become a common and understood feature of the landscape and will continue to do so with the projected additional capacity to come online in the coming years.

The proposed solar energy site is located in Cheboygan County, Michigan, with a weighted-average Overall NCCPI[1] of 32.3, reflecting a rating classification of moderately low inherent productivity where conditions are generally not favorable for crop production, and none of the site is considered prime farmland in its current state. Land values for agricultural land also have a direct relationship with productivity of the soil. Agricultural land values in Delta County, where soil productivity is lower than state averages, are one third to two-thirds less than the average for the State of Michigan since the area is not generally favorable for crop production.

We have included eight established solar farms in our study, focusing on similar rural and suburban areas with neighboring residential homes, that are comparable to the proposed solar farm location in Michigan. Solar farms with a variety of output capacities have been studied because of their proximity to residential properties. We have studied the sales of property located adjacent to the solar farms in order to see if proximity to this use results in any consistent and measurable impact on property values.

Study Features

Our study includes research and analyses of eight existing solar facilities and the property value trends of the adjacent land uses, including agricultural, single family and residential properties; review of published studies, and discussions with market participants, summarized as follows:

- Solar Farm 1 (DTE's Lapeer Michigan Solar Projects) is a two-farm project, the Demille Solar Farm and the Turrill Solar Farm, located in the City of Lapeer, Michigan. Demille is a 27.4 MW solar farm that is situated on approximately 170 acres of land and is surrounded by agricultural land uses and residential uses. Turrill is a 19.6 MW solar farm situated on approximately 200 acres. We found four adjoining properties that qualified for a paired sales analysis.

1 National Commodity Crop Productivity Index (NCCPI)

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- Solar Farm 2 (North Star Solar Farm) is located near the City of North Branch, in unincorporated Chisago County, Minnesota. This is a 100 MW solar farm that is situated on approximately 1,000 acres of land and is surrounded by agricultural land uses and some residential uses. We found five adjoining properties that qualified for a paired sales analysis.

- Solar Farm 3 (Dominion Indy Solar Farm III) is located in a suburban, yet rural area outside of Indianapolis, in Marion County, Indiana, on a parcel totaling 134 acres. The solar farm has a capacity of 11.9 MW of power and the surrounding uses consist of agricultural land to the east, west and south, and a single-family subdivision to the north. We found ten adjoining properties that qualified for a paired sales analysis.

- Solar Farm 4 (Grand Ridge Solar Farm) is located near the City of Streator in LaSalle County, Illinois, in a primarily rural area, on two contiguous parcels totaling 160 acres. The solar farm has a capacity of 23 MW of power and the surrounding uses consist of agricultural land, some with homesteads, and single family homes. We found one adjoining property that qualified for a paired sales analysis.

- Solar Farm 5 (Innovative Solar 42) is located near the City of Fayetteville in Bladen and Cumberland Counties, North Carolina on 414 acres. The solar farm has a capacity of 71 MW of power and the surrounding uses consist of agricultural land, forests, and single family homes. We found one adjoining property that qualified for a paired sales analysis.

- Solar Farm 6 (Rutherford Solar Farm) is located near the city of Forest City in Rutherford County, North Carolina in a primarily rural area, on a 489-acre parcel of land. The solar farm has a capacity of 61 MW of power and the surrounding uses consist of agricultural land, vacant land, and single family homes. We found one adjoining property that qualified for a paired sales analysis.

- Solar Farm 7 (Elm City Solar Facility) is located in the City of Elm City in Wilson County, North Carolina, in a primarily rural area, on 354 acres. The solar farm has a capacity of 40 MW of power and the surrounding uses consist of forest, industrial, vacant, and single family homes. We found one adjoining property that qualified for a paired sales analysis.

- Solar Farm 8 (Woodland Solar Farm) is located near the City of Windsor in unincorporated Isle of Wight County, Virginia, in a primarily rural area, on 204 acres. The solar farm has a capacity of 19 MW of power and the surrounding uses consist of agricultural land, forest land, and single family homes. We found one adjoining property that qualified for a paired sales analysis.

- We performed a paired sales analysis for each adjoining property that fit the criteria for analysis that were adjacent to the solar farms we studied. The sales adjacent to solar farms, or Test Areas, were compared to comparable agricultural land sales or single family home sales not adjacent to solar farms within the same county or geographical area as the studied solar farms, or Control Areas.
- **We analyzed 24 adjoining property sales in Test Areas and 81 comparable sales in Control Areas,** collectively, for these identified solar facilities, over the past five years.

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Methodology

The basic premise of this comparative analysis is that if there is any impact on the value of adjacent properties, by virtue of their proximity to a solar farm, it would be reflected by such factors as the range of sale prices, differences in unit sale prices, conditions of sale, and overall marketability. When comparing these factors for properties near the solar farm to properties locationally removed from the solar farm, we would expect to see some emerging and consistent pattern of substantial difference in these comparative elements – if, in fact, there was an effect.

Results

With regard to their impact on nearby property values, our studies of facilities of various sizes demonstrate that there is no measurable and consistent difference in property values for properties adjacent to solar farms when compared to similar properties locationally removed from their influence. This is supported by our interviews with local real estate brokers who have stated that there is no difference in price, marketing periods or demand for the homes directly adjacent to the solar farm facilities in Michigan, Illinois, Indiana, Minnesota, North Carolina, and Virginia.

We have also interviewed market participants, including County and Township Assessors (with solar facilities in their districts), to give us additional insight as to how the market evaluates farm land and single family homes located adjacent to solar farms. Local assessors have noted that there is no evidence of negative property value impacts due to proximity to a solar farm, and local brokers have noted that there has been no effect on pricing, marketing time, nor conditions of sale.

We performed two Before and After Analyses, in which we compared sales that occurred prior to the announcement and subsequent development of the solar farm project with sales that occurred after completion of the solar farm project for one solar farm in Indiana and one in Minnesota both adjoining and non-adjoining properties. No measurable impact on property values was demonstrated in these analyses.

We have also reviewed studies prepared by other real estate valuation experts that specifically analyzed the impact of solar facilities on nearby property values. These studies found little to no measurable or consistent difference in value between the Test Area Sales and the Control Area Sales attributed to the proximity to solar farms.

Considering all of this information, we can conclude that since the property values of the Adjoining Property Sales (Test Area Sales) for the existing solar farms analyzed were not adversely affected by their proximity to solar farms, that properties surrounding other solar farms operating in compliance with all regulatory standards will similarly not be adversely affected, in either the short- or long-term.

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February 6, 2020

Orion Renewable Energy Group
155 Grand Avenue, Suite 706
Oakland, CA 94612

SUBJECT: Property Value Impact Study
Proposed Cheboygan Solar Energy Use
Grant Township, Unincorporated Cheboygan County, Michigan 49721

To Whom It May Concern:

CohnReznick is pleased to submit the accompanying adjacent property values impact study of the above referenced proposed solar energy use. Per the client's request, we have researched the proposed solar farm use to be located on the property located to the northwest and southeast of the intersection of North Black River Road (F-05) and Twin Lakes Road, in Grant Township, unincorporated Cheboygan County, Michigan. The proposed solar use called Cheboygan Solar project will have a capacity of 91 MW AC (megawatts alternating current). The power generated from the solar energy system will be sold to a regional power provider.

In forming this report, we have researched the identified existing solar farms, researched articles and other published studies, and interviewed real estate professionals and Township/County Assessors active in the market where solar farms are located, to gain an understanding of market perceptions.

The purpose of the assignment is to determine whether the proximity of the proposed renewable energy facility use (solar farm) will result in any significant measurable and consistent impact on adjacent property values, given the existing uses and zoning of nearby property at the time of development. The intended use of our opinions and conclusions is to assist the client in addressing local concerns regarding a solar farm's potential impact on surrounding property values, in addition to addressing the required criteria for obtaining approvals for this proposed solar energy use, such as minimizing the impact on adjacent property values. We have not been asked to value any specific property, and we have not done so.

The client and intended user for the assignment is Orion Renewable Energy Group. Additional intended users of our findings include Cheboygan County officials. The report may be used only for the aforementioned purpose and may not be distributed without the written consent of CohnReznick LLP ("CohnReznick").

The assignment is intended to conform to the Uniform Standards of Professional Appraisal Practice (USPAP), the Code of Professional Ethics and Standards of Professional Appraisal Practice of the Appraisal Institute as well as applicable state appraisal regulations. Based on the analysis in the accompanying report, and subject to the definitions, assumptions, and limiting conditions expressed in the report, our findings follow below.

CONCLUSIONS

We analyzed 24 adjoining property sales and over 81 comparable sales, collectively, for the DTE's Lapeer Michigan Solar Projects, North Star Solar Farm, the Dominion Indy III Solar Farm, the Grand Ridge Solar Farm, Innovative 42 Solar Farm, Rutherford Solar Farm, the Elm City Solar Facility, and the Woodland Solar Farm, over the past five years. We note that proximity to the solar farms has not deterred sales of nearby agricultural land and residential single family homes nor has it deterred the development of new single family homes on adjacent land.

No empirical evidence evolved that indicated a more favorable real estate impact on the Control Area Sales as compared to the adjoining, Test Area Sales with regard to such market elements as:

1. Range of sale prices
2. Differences in unit sale prices
3. Conditions of sale
4. Overall marketability
5. New Development
6. Rate of Appreciation

We have also reviewed studies prepared by other real estate valuation experts that specifically analyzed the impact of solar facilities that on nearby property values. These studies found little to no measurable and consistent difference in value attributed to the proximity to solar farms between unit prices for Test Area Sales and Control Area Sales, and noted that solar energy uses are generally considered a compatible use. We have also interviewed market participants, including County and Township Assessors, to give us additional insight as to how the market evaluates farm land and single family homes with views of the solar farm.

Considering all of this information, we can conclude that since the Adjoining Property Sales (Test Area Sales) for the existing solar farms analyzed were not adversely affected by their proximity to solar farms, that properties surrounding other solar farms operating in compliance with all regulatory standards will similarly not be adversely affected, in either the short- or long-term periods.

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If you have any questions or comments, please contact the undersigned. Thank you for the opportunity to be of service.

Very truly yours,

CohnReznick, LLP

Andrew R. Lines, MAI
Principal
Certified General Real Estate Appraiser
Illinois License No. #553.001841
Expires 9/30/2021

Patricia L. McGarr, MAI, CRE, FRICS
National Director - Valuation Advisory Services
Certified General Real Estate Appraiser
Michigan License No. 1201072979
Expires 7/31/2020
Virginia License No. 4001016998
Expires 3/31/2020
North Carolina License No. A8131
Expires 6/30/2020
Illinois License No. #553.000621
Expires 9/30/2021
Indiana License No. #CG49600131
Expires 6/30/2020

Sonia K. Singh
Senior Manager
Certified General Real Estate Appraiser
VA License No. #4001017615
Expires 3/31/2020
DC License No. #GA2002063
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Expires 4/16/2021

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SCOPE OF WORK

CLIENT

Orion Renewable Energy Group

INTENDED USERS

Orion Renewable Energy Group; other intended users may include the client's legal, accounting, and site development professionals. Additional intended users of our findings include all relevant permitting authorities with the Cheboygan Solar project (located in Cheboygan County).

INTENDED USE

The intended use of our findings and conclusions is to address certain criteria required for the granting of approvals for the proposed solar energy use, known as Cheboygan Solar to be located in Cheboygan County, Michigan, including the minimization of impact on nearby or adjacent property values. The report may be used only for the aforementioned purpose and may not be distributed without the written consent of CohnReznick LLP ("CohnReznick").

PURPOSE

The purpose of the assignment is to determine whether the proximity of the studied facilities (solar farms) resulted in any significant measurable and consistent impact on adjacent property values, given the existing uses and zoning of nearby property at the time of development; address local concerns regarding a solar farm use having a perceived impact on surrounding property values; and, provide a consulting report that can address the required criteria for obtaining approvals for the proposed Cheboygan Solar generating facility.

EFFECTIVE DATE

February 6, 2020

DATE OF REPORT

February 6, 2020

PRIOR SERVICES

USPAP requires appraisers to disclose to the client any services they have provided in connection with the subject property in the prior three years, including valuation, consulting, property management, brokerage, or any other services.

INSPECTION

Patricia L. McGarr, MAI, Andrew R. Lines, MAI, and Sonia K. Singh have viewed the exterior of all comparable data referenced in this report in person, via photographs, or aerial imagery.

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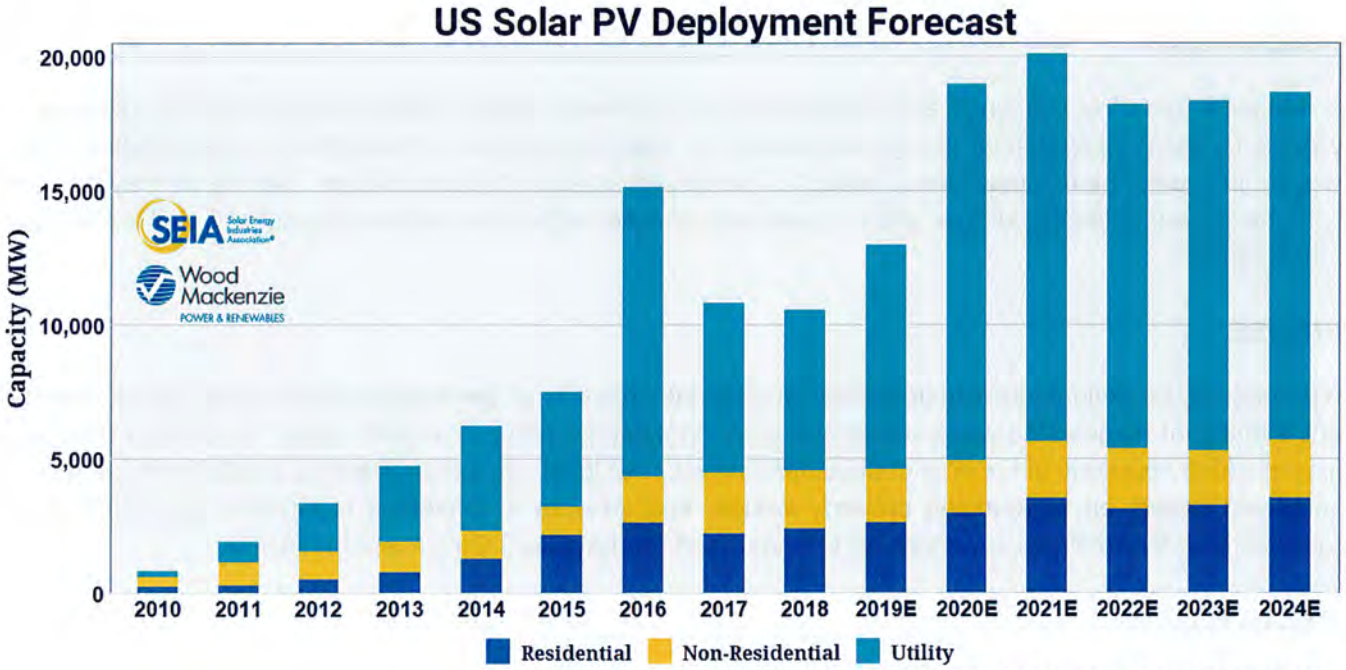
OVERVIEW OF SOLAR DEVELOPMENT

Solar development increased almost exponentially over the past ten years in the United States as technology and the economic incentives (Solar Investment Tax Credits or ITC) made the installation of solar farms economically reasonable. The cost to install solar panels has dropped nationally by 70 percent since 2010, which has been one cause that led to the increase in installations. A majority of these solar farm installations are attributed to larger-scale solar farm developments for utility purposes. The chart below portrays the historical increase on an annual basis of solar installations in the US as a whole, courtesy of research by Solar Energy Industries Association (SEIA) and Wood Mackenzie, and projects solar photovoltaic (PV) deployment for the next four years through 2024, with the largest percentage of installations attributed to utility-scale projects.



Source: SEIA/Wood Mackenzie - Solar Market Insight

The United States installed 2.6 Gigawatts DC (GW) of solar photovoltaic capacity in the third quarter of 2019, representing a 45 percent increase from third quarter 2018, and a 25 percent increase from the prior quarter in 2019. The total installed capacity increased nationally to 71.3 GW, and the total installed solar capacity is expected to top 100 GW by 2021.[2] The pipeline for Utility PV, as of quarter-end Q3 2019, includes capacity of 45.5 GW combined from contracted projects (including those under construction) as well as announced but pre-contract sources. With the increase of utility-scale solar installations across the country, solar projects have become a common and understood feature of the landscape and will continue to do so with the projected additional capacity to come online in the coming years.

According to the U.S. Energy Information Administration (EIA) through November 2019, there were approximately 44 solar facilities in operation that generate more than 100 MW AC of power. The vast majority of

[2] *Solar Energy Industries Association, Solar Market Insight Report 2019 Q4, released December 12, 2019.*

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these solar facilities are located in California, with some in Texas, Nevada, Arizona, Georgia, and one in Colorado, Virginia, Minnesota and Illinois. Many of these installations are in outlying areas where home sales activity is minimal. As a result, the majority are not good candidates for a paired sales analysis.

There are only two 100+ MW solar installations in the Midwest, the 100 MW North Star Solar Farm in Chisago County in Minnesota, and the 100 MW Grand Ridge Solar Farm in LaSalle County, Illinois, both of which we have studied in this analysis. Based on our previous assessment of solar development, we have studied established solar farms in the Midwest, including Michigan, specifically, because of their size and the way that regional soil conditions, climate, and topography contribute to property values and their potential for impact on property values in addition to the adjacent uses and development trends. Large installations of solar panels are limited in the Midwestern United States.

Because of the limited number of large solar installations in the Midwest, we expanded our analysis and reviewed other large solar farms in other states. However, most large solar installations are located in outlying areas or did not have sufficient adjoining sales that qualified for a paired sales analysis either due to limited sale activity or the newer age of the solar farm.

The selected solar sites in this analysis were considered based on their similarities in surrounding areas, size, and availability of arm's length adjoining property transaction data that were available for analysis.

In total, we identified eight solar farms to study with comparable sales where generally the only difference was the attribute under study: proximity to a solar farm.

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IDENTIFICATION AND DESCRIPTION OF THE PROPOSED SUBJECT USE

The proposed solar farm use is to be located on 31 parcels located to the northwest and southeast of the intersection of North Black River Road (F-05) and Twin Lakes Road, in Grant Township, unincorporated Cheboygan County, Michigan. The proposed solar use called Cheboygan Solar Project will have a capacity of 91 MW AC (megawatts alternating current). The power generated from the solar energy system will be sold to a regional power provider.

The proposed Cheboygan solar farm use will be situated on the agricultural land parcels which total approximately 1,572 acres. The subject land parcel is shaded in blue below.

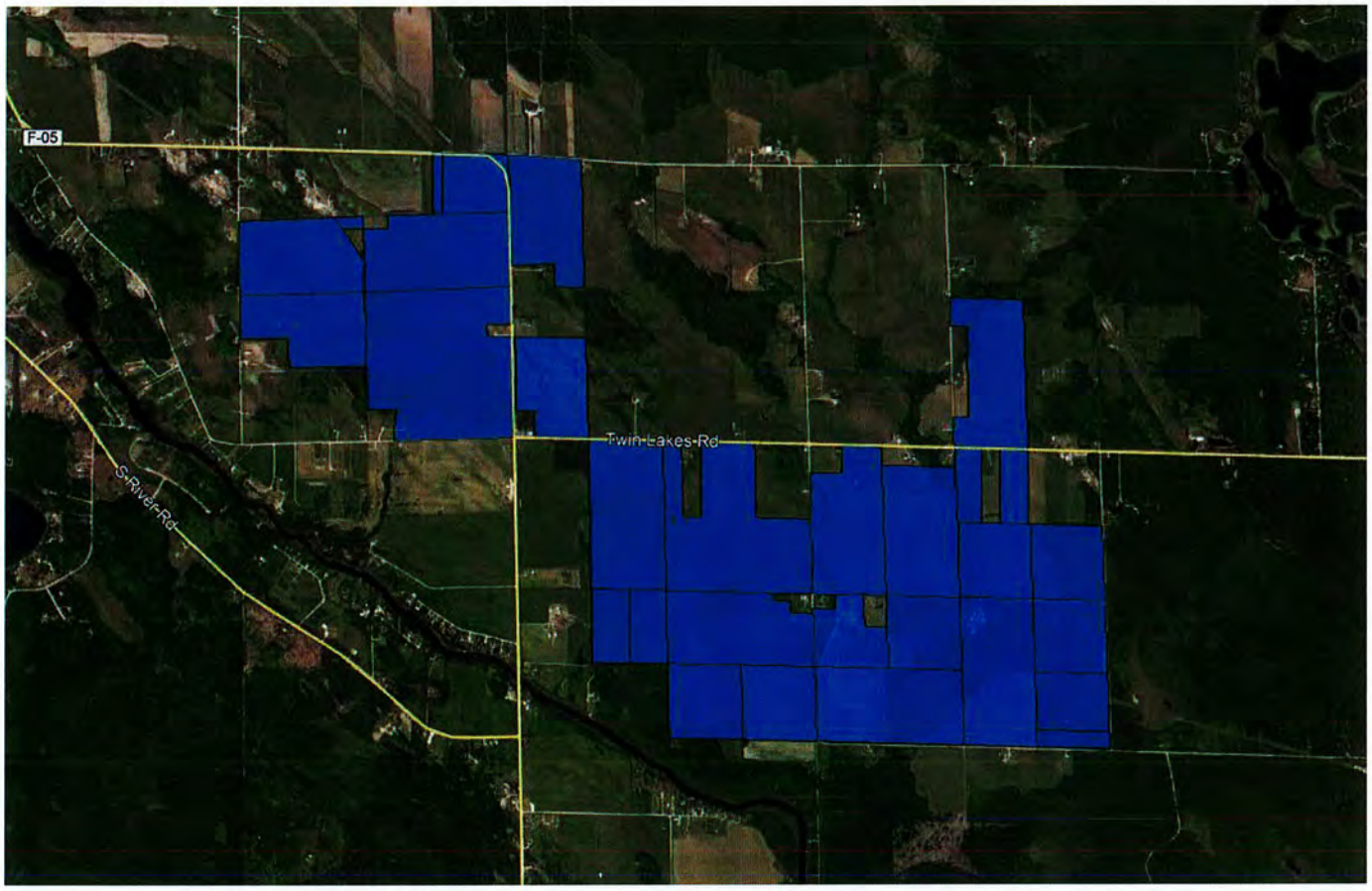

Image above provided by Orion Renewable Energy Group. Subject site area outlined and shaded in blue.

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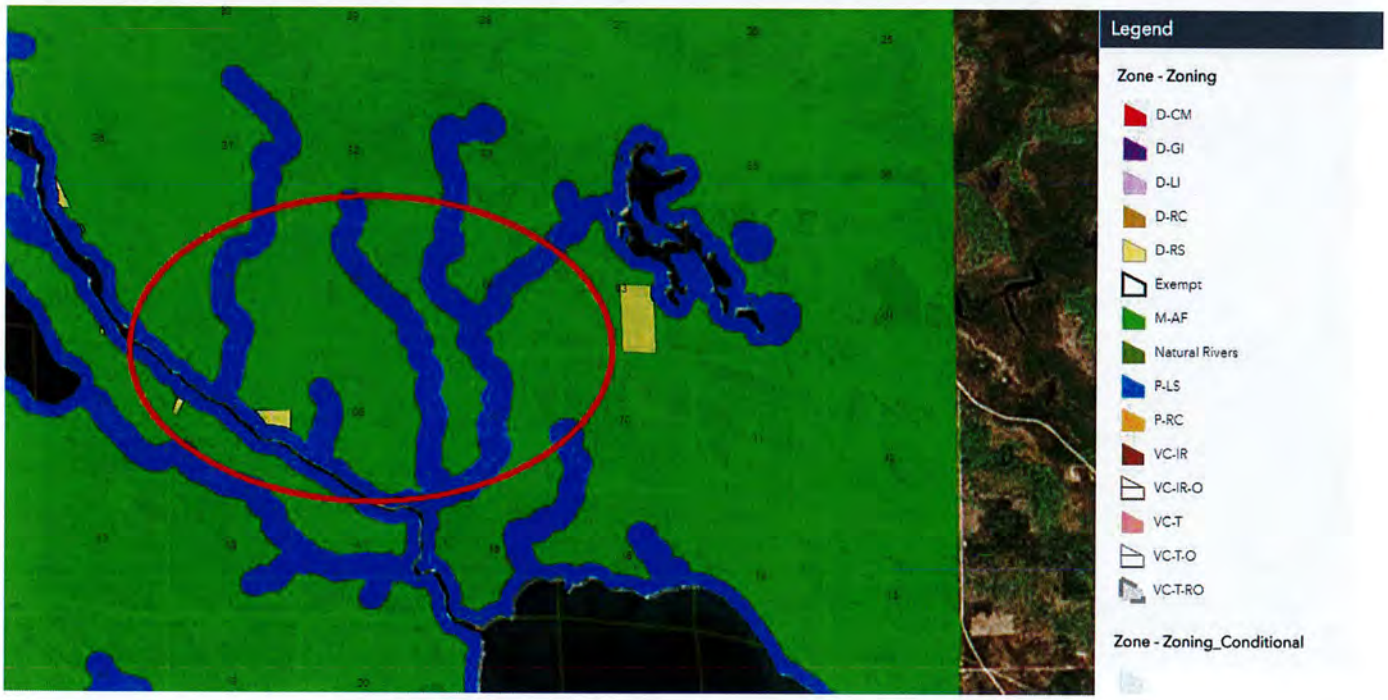
The proposed Cheboygan Solar project is to be located on 31 parcels located to the northwest and southeast of the intersection of North Black River Road (F-05) and Twin Lakes Road, in Grant Township, unincorporated Cheboygan County, Michigan. Construction on the proposed solar farm sites will take approximately 9 months, depending on weather conditions. During operations, technicians and contractors will typically drive to the site for maintenance and security purposes. Due to its low maintenance requirements during operation, road traffic associated with the project is expected to be less than for a typical domestic residence or farm. The site will not require any municipal water, sewer, or other services.

The entire subject site is zoned M-AF, Agriculture/Forestry, under the jurisdiction of Cheboygan County, as seen below in green. The subject site is currently being used as agricultural farmland with one residential home, and the uses are allowed under the current zoning. The subject site is bordered primarily by farmland with a few residential homesteads. Surrounding uses are also zoned Agricultural/Forestry (green), as seen in the exhibit below.



Approximate location of site area circled in red

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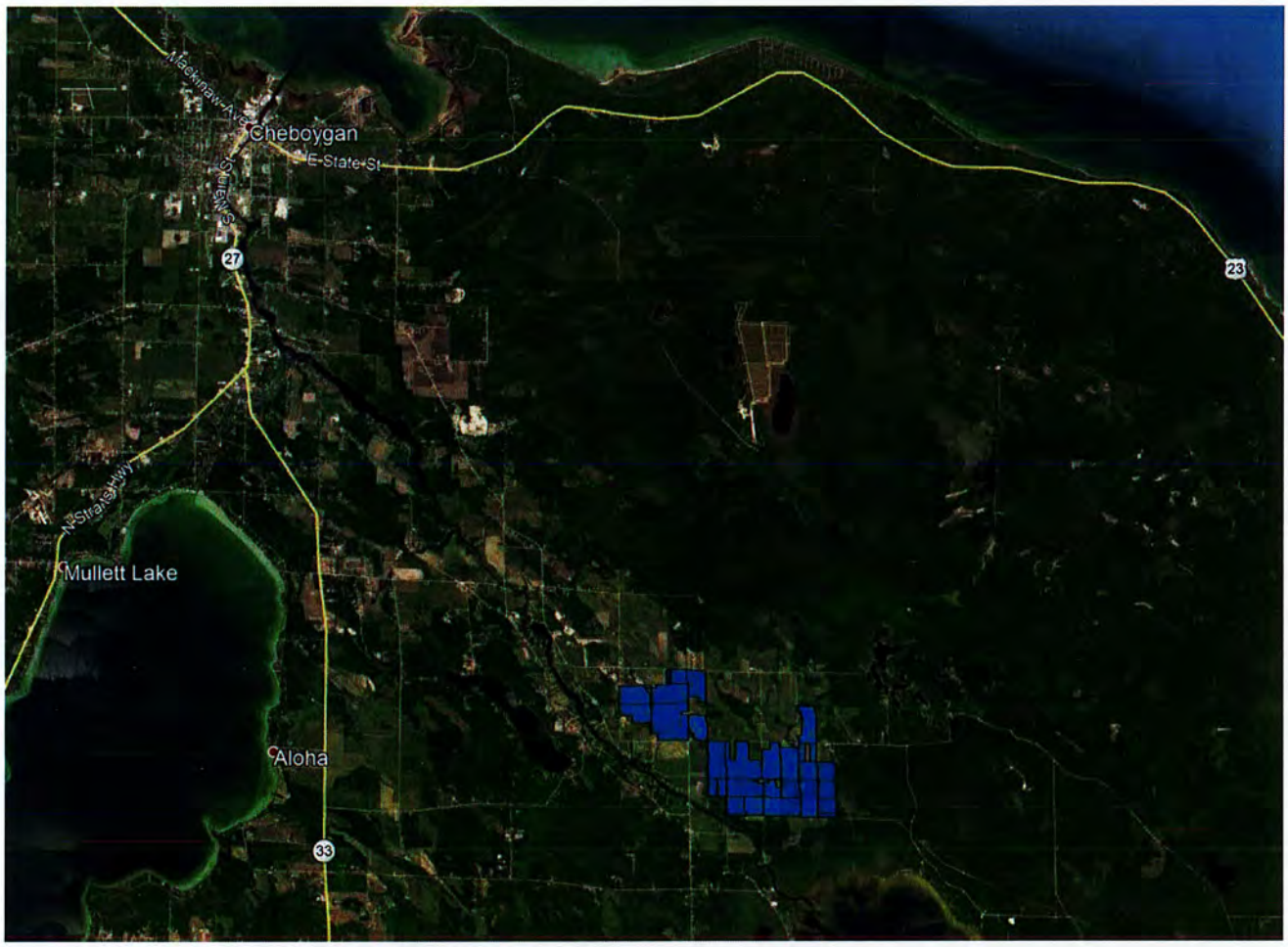
OVERVIEW OF PROPOSED SOLAR FARM IN CHEBOYGAN COUNTY, MICHIGAN

Orion Renewable Energy Group's proposed development consists of a utility-scale, solar energy use in Cheboygan County, Michigan, known as the Cheboygan Solar project. The 31 parcels to be leased for the subject site consist of approximately 1,572 acres. The aerial map of parcels in the subject site (shaded in blue) is presented below.



Aerial imagery of site area provided by Orion Renewable Energy Group

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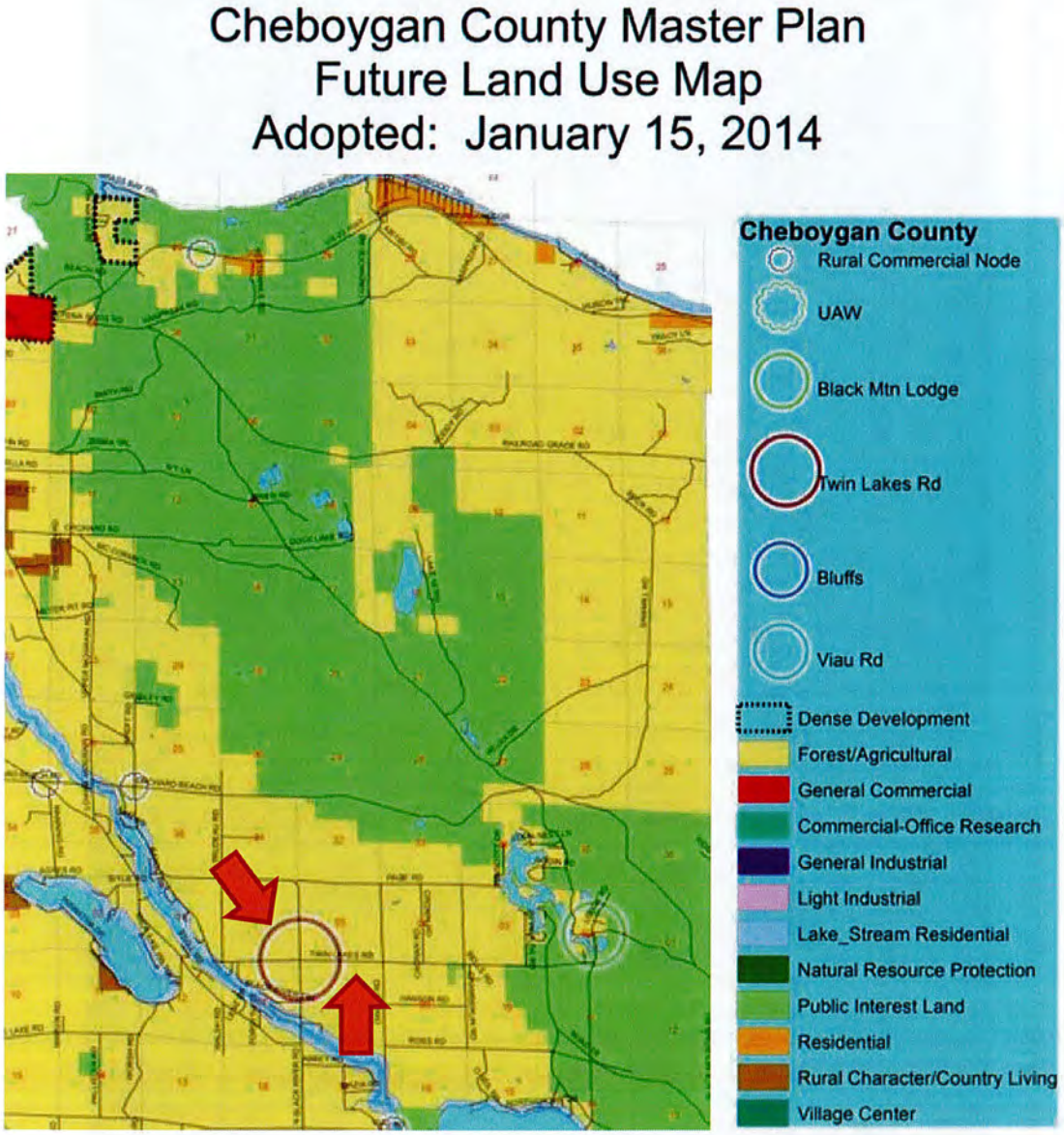
CHEBOYGAN COUNTY FUTURE LAND USE PLAN

The Future Land Use Plan for Cheboygan County was adopted in January 2014, which identifies planning goals for the following 10 to 20 years. Presented below is the Cheboygan County Future Land Use Plan, and the approximate subject solar farm site is identified by the orange arrows. The land parcels for the subject proposed solar farm use is identified as within a forest/agricultural area.



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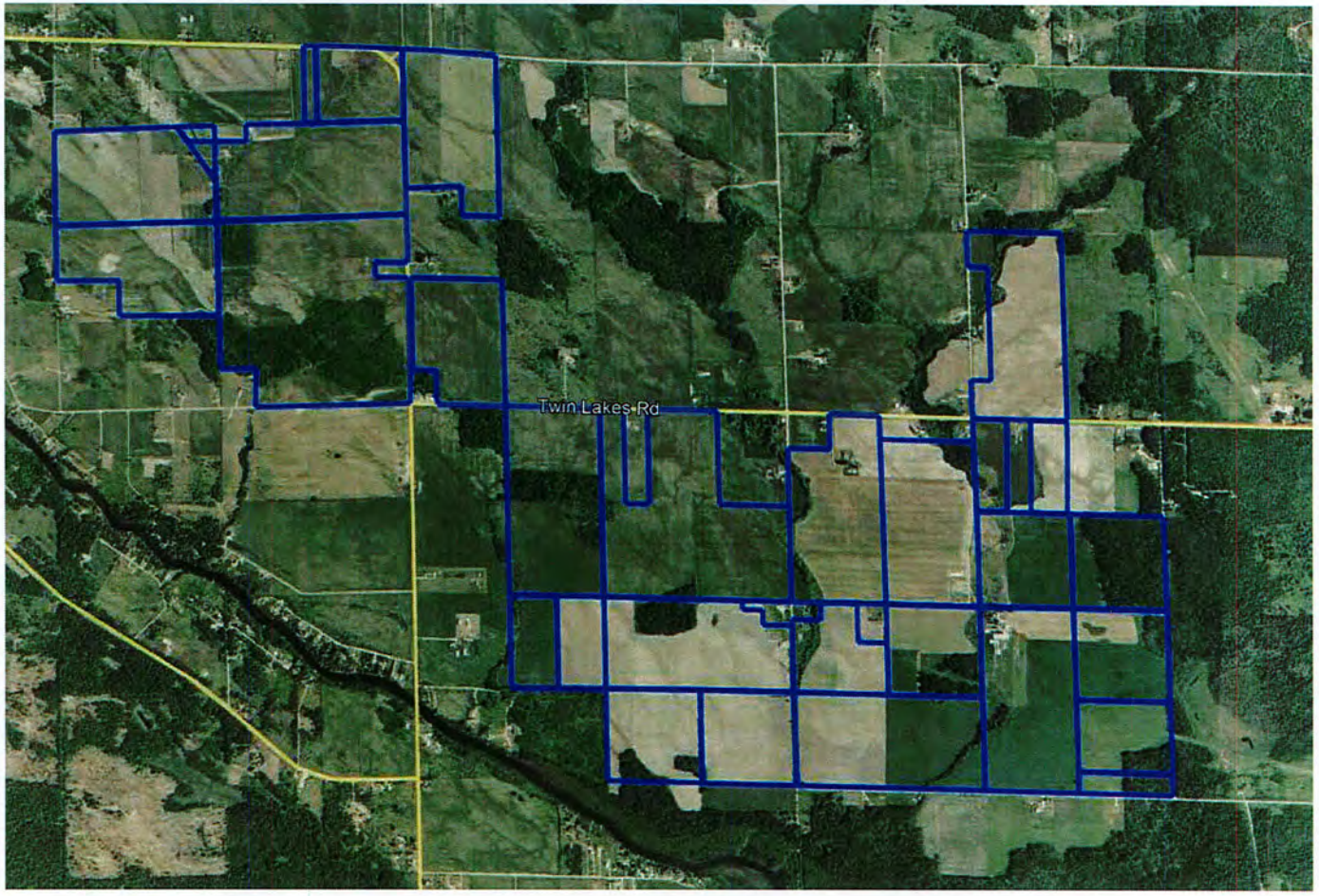
According to historical aerial imagery retrieved from Google Earth, presented on the following pages, there has been no noticeable change in land use in the last 14 years. Given this lack of development, it is unlikely that considerable residential development would occur in the near future.



Google Earth aerial imagery from August 2006

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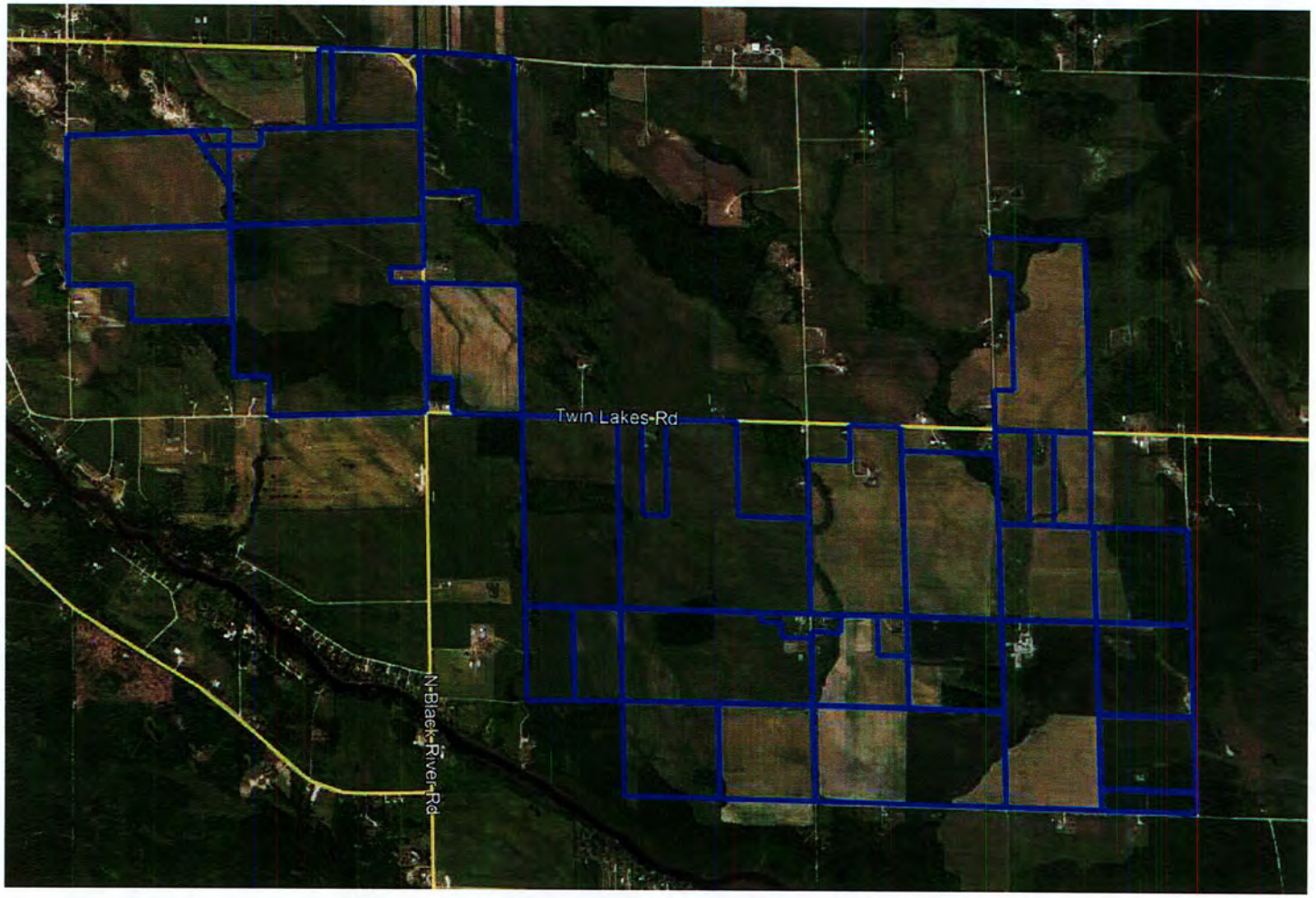

Google Earth aerial imagery from January 2020

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TRAFFIC PATTERNS AND CONNECTIVITY

The proposed solar farm subject site is located on the eastern side of the Black River, and north of the shores of Black Lake. The subject site extends from its western-most point at Trudeau Road between North Black River Road (F-05)/Page Road and Twin Lakes Road, to the eastern-most points at Chamberlain Road, between Twin Lakes Road and Ross Road, with one parcel north of Twin Lakes Road on the east side of the site.

Both North Black River Road and Twin Lakes Road are main arterials in the subject's immediate area. Approximately 3.5 miles northwest of the subject site is Alverno, in Benton Township, along North Black River Road. The subject site is located approximately 12 miles southeast from the City of Cheboygan, the County Seat. Twin Lakes Road traverses east from the subject site to the Black Mountain Forest Preserve Area approximately three miles to the east. Other major roads include M-23, which travels along the shores of Lake Huron, north of the subject site. Interstate-75 runs north-south and is approximately 30 minutes or 25 miles west of the subject site by local roads. The subject site is approximately 280 miles north of Detroit on I-75.

DEMOGRAPHIC FACTORS

Demographic data is presented below, as compiled by ESRI, which indicates a stable community in the subject's Township and County, albeit with a slight decline in population and number of households. Population and household growth are expected to continue to shrink at a slow pace over the next five years. Median household income is lower than state figures, indicating a moderate economic base.

DEMOGRAPHIC PROFILE			
	Grant Township	Cheboygan County	Michigan
Population			
2024 Projection	819	26,050	10,233,588
2019 Estimate	828	25,886	10,097,897
2010 Census	846	26,152	9,883,640
Growth 2019 - 2024	-1.09%	0.63%	1.34%
Growth 2010 - 2019	-2.13%	-1.02%	2.17%
Households			
2024 Projection	392	11,076	4,047,627
2019 Estimate	396	11,132	3,983,294
2010 Census	403	11,133	3,872,508
Growth 2019 - 2024	-1.01%	-0.50%	1.62%
Growth 2010 - 2019	-1.74%	-0.01%	2.86%
2019 Owner Occupied (%)	90.66%	82.89%	70.44%
2019 Renter Occupied (%)	9.34%	17.11%	35.21%
2019 Med. Household Income	$51,273	$46,948	$55,885
2019 Avg. Household Income	$62,565	$61,660	$78,237

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CONCLUSION

Land uses in Cheboygan County can be categorized as predominantly recreation, woodland areas, forest preserve, then residential use, and some areas of farm land. The recreation areas and access to various inland rivers and lakes, and Lake Huron, attract many visitors during tourist season. Cheboygan County's population is heavily influenced by warmer season vacationers and second-home residents. The preceding demographic figures represent the smaller population of full-time residents only. The area surrounding the subject site has not seen any significant development or attempt at development in the last 14 years. These factors indicate that the proposed solar use would not be incompatible with surrounding uses, and would not negatively impact surrounding properties.

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SOIL PRODUCTIVITY IN MICHIGAN AND LAND VALUE TRENDS

NCCPI PRODUCTIVITY INDEX

Crop yields have been the basis for establishing a soil productivity index, and is used by county assessors, farmers, and market participants in assessing agricultural land. While crop yields are an integral part in assessing soil qualities, it is not an appropriate metric to rely on because "yields fluctuate from year to year, and absolute yields mean little when comparing different crops. Productivity indices provide a single scale on which soils may be rated according to their suitability for several major crops under specified levels of management such as an average level."[1] The productivity index, therefore, not crop yields, is best suited for applications in land appraisal and land-use planning.

The United States Department of Agriculture's (USDA) National Resources Conservation Services (NRCS) developed and utilizes the National Commodity Crop Productivity Index (NCCPI) as a national soil interpreter and is used in the National Soil Information System (NASIS), but it is not intended to replace other crop production models developed by individual states.[3] The focus of the model is on identifying the best soils for the growth of commodity crops, as the best soils for the growth of these crops are generally the best soils for the growth of other crops.[4] The NCCPI model describes relative productivity ranking over a period of years and not for a single year where external influences such as extreme weather or change in management practices may have affected production. At the moment the index only describes non-irrigated crops, and will later be expanded to include irrigated crops, rangeland, and forestland productivity.[5]

Yields are influenced by a variety of different factors including environmental traits and management inputs. Tracked climate and soil qualities have been proven by researchers to directly explain fluctuations in crop yields, especially those qualities that relate to moisture-holding capacity. Some states such as Illinois have developed a soil productivity model that considers these factors to describe "optimal" productivity of farmed land. Except for these factors, "inherent soil quality or inherent soil productivity varies little over time or from place to place for a specific soil (map unit component) identified by the National Cooperative Soil Survey (NCSS)."[6] The NRCS Web Soil Survey website has additional information on how the ratings are determined. The **State of Michigan** does not have its own crop production model and utilizes the NCCPI.

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3 Agricultural land rental payments are typically tied to crop production of the leased agricultural land and is one of the primary reasons the NCCPI was developed, especially since the model needed to be consistent across political boundaries.
4 Per the User Guide for the National Commodity Crop Productivity Index, the NCCPI uses natural relationships of soil, landscape and climate factors to model the response of commodity crops in soil map units. The present use of the land is not considered in the ratings.
5 AgriData Inc. Docs: http://support.agridatainc.com/NationalCommodityCropProductivityIndex(NCCPI).ashx
6 USDA NRCS's User Guide National Commodity Crop Productivity Index (NCCPI)

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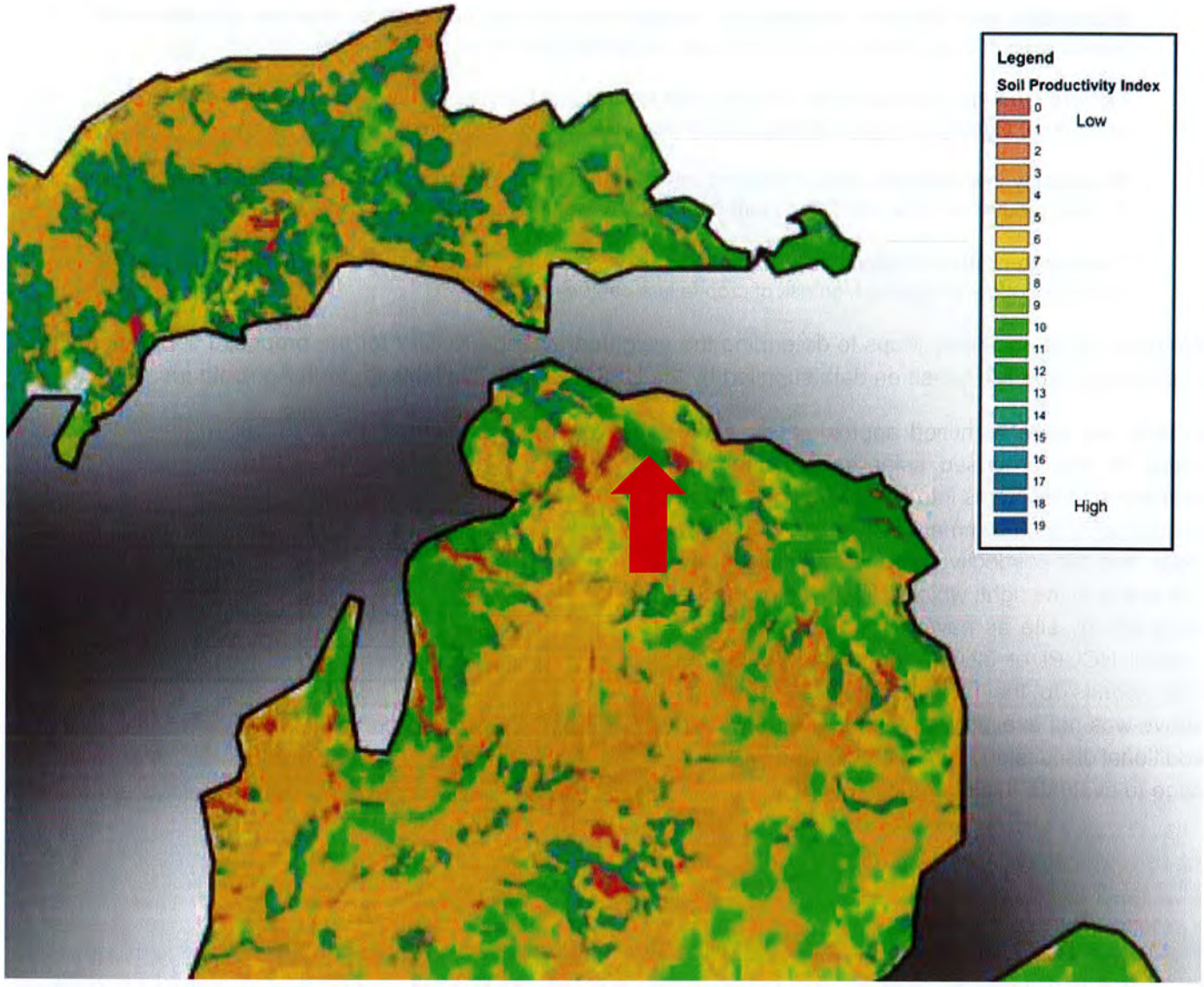
The proposed solar energy facility will be located in Cheboygan County, Michigan, in northern Michigan. An excerpt of a soil productivity gradient map is presented below retrieved from the Michigan State University (MSU) website, which provides an illustration of the variation in soil productivity across northern Michigan that is based on the NCCPI and MSU's own color ramp symbology.[7] The approximate location of the proposed solar energy facility is indicated by the red arrow. The general site area for the project is within the green-colored ranges, in the middle of the soil productivity scale.



7 Miller, Bradley A, et al. The Soil Productivity Index: Taxonomically Based, Ordinal Estimates of Soil Productivity. Michigan State University, 5 Mar. 2012.

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Per the NCCPI, soil productivity is measured on both a numerical scale from 0 to 100, with 0 being the worst and 100 being the best,[8] and by qualitative ratings. The qualitative rating classifications below are determined by the USDA NRCS and provide general comments on the productivity of the soil.

High inherent productivity indicates that the soil, site, and climate have features that are very favorable for crop production. High yields and low risk of crop failure can be expected if a high level of management is employed.

Moderately high inherent productivity indicates that the soil has features that are generally quite favorable for crop production. Good yields and moderately low risk of crop failure can be expected.

Moderate inherent productivity indicates that the soil has features that are generally favorable for crop production. Good yields and moderate risk of crop failure can be expected.

Moderately low inherent productivity indicates that the soil has features that are generally not favorable for crop production. Low yields and moderately high risk of crop failure can be expected.

Low inherent productivity indicates that the soil has one or more features that are unfavorable for crop production. Low yields and high risk of crop failure can be expected.

We have relied on Surety Maps to determine the weighted-average NCCPI for the proposed solar energy site. The Surety Maps are based on data supplied by the USDA NRCS, available through AgriData Inc.

In total, we have identified approximately 1,470 acres for the proposed solar energy site and delineated those acres into six soil maps included in Addendum B. A summary of the soil productivity maps and the respective productivity indices are presented to the right, which reflects the proposed solar energy site as having a weighted-average Overall NCCPI of 32.3. A numerical scale that corresponds to the indicated qualitative ratings above was not available for the NCCPI; however, additional discussion is presented on the following page to evaluate this numerical rating.

Cheboygan Solar Soil Maps with Productivity Indices

Map Number	Location	Acreage	Percentage	Overall NCCPI
1	6-36N-1E	378	25.74%	26.2
2	5-36N-1E	59	4.04%	23.4
3	5-36N-1E	46	3.15%	31.4
4	9-36N-1E	431	29.32%	34.9
5	8-36N-1E	488	33.19%	35.5
6	4-36N-1E	67	4.56%	35.9
	Total Acerage:	1,470	Weighted Average NCCPI:	32.3

8 Quantitative ratings are also show in ranges of 0.00 to 1.00. AgriData Inc. presents the NCCPI index rating multiplied by 100 in a range of 0.00 to 100.00 to show up to four significant figures.

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Each soil map shows multiple types of soil present in each area. These soil types are numbered and have descriptions and ratings associated with them, as well as Overall NCCPI values. We have grouped the different soil types by soil rating description and have calculated the weighted average of the Overall NCCPI values as well, in the table below.

None of the subject site area can be considered prime farmland. While 23 percent of the subject site is represented by either Moderate inherent productivity and Low inherent productivity, respectively (see table to the right), a majority of the subject site is considered to have Moderately low inherent productivity (54 percent).

Cheboygan Solar Soil Productivity Rating			
	Land Area (Acres)	% of Field	Weighted-Average Overall NCCPI
High inherent productivity	0.00	0%	N/A
Moderately high inherent productivity	0.00	0%	N/A
Moderate inherent productivity	338.45	23%	54.28
Moderately low inherent productivity	795.15	54%	31.39
Low inherent productivity	336.10	23%	12.39
Not rated	0.00	0%	N/A
Total	**1,469.70**		**32.3**

According to the qualitative scale on the prior page, land with the Moderately low inherent productivity classification is generally unfavorable for crop production.

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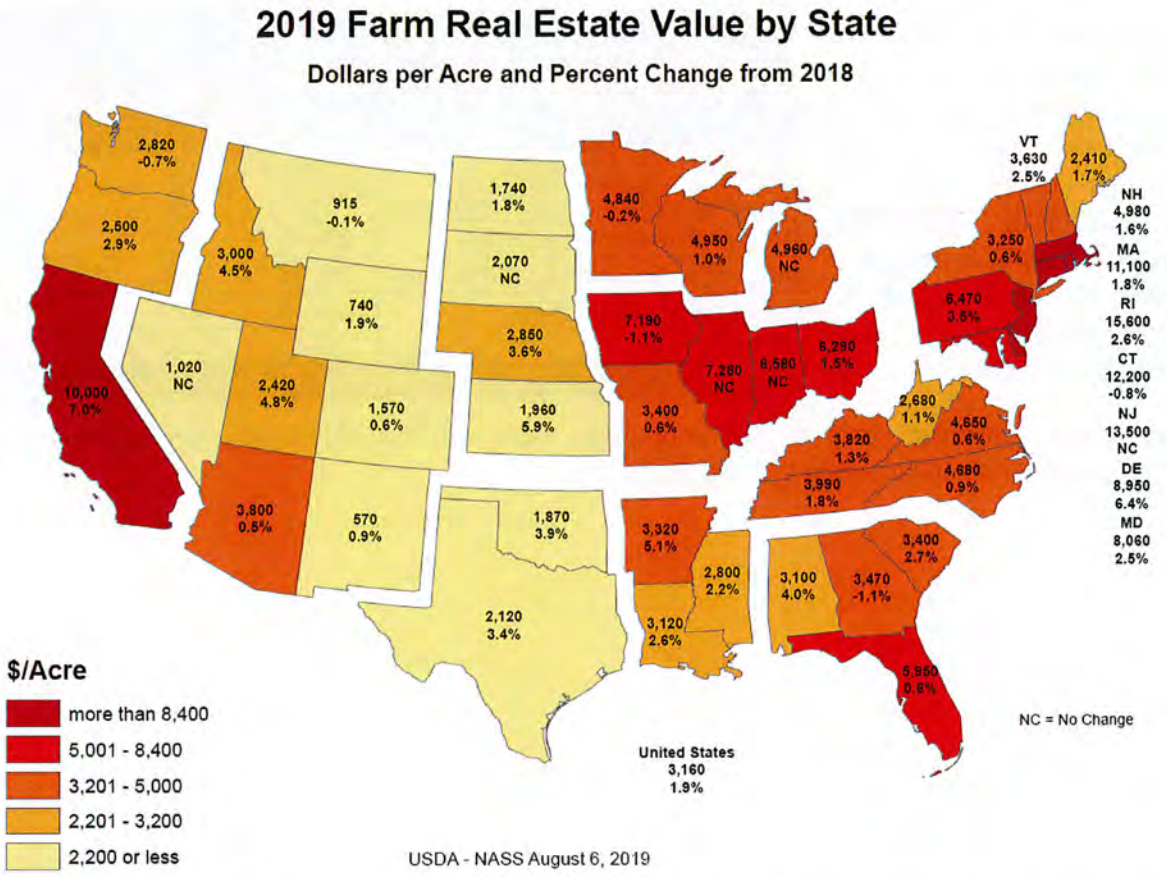
AREA VALUE TRENDS

Agricultural land values are heavily influenced by relative crop production yields. The following exhibit compiled by the USDA National Agricultural Statistics Service (NASS) provides an illustration of how regional conditions such as weather conditions, geographies, and soil conditions can affect farm real estate values.



Based on the exhibit above, the average value of farmland in Michigan for 2019 is $4,960 per acre, which is unchanged from 2018. We reviewed a 2019 study prepared by Michigan State University that analyzed agricultural land values for various districts in Michigan. In general, land prices have consistently increased in price, when inflation is not considered. From 1992 through 2019, Michigan field crop farmland value increased at an average rate of 6.3 percent per year. The average values trended upward at an increased rate from 2011 to 2013 but had adjustment downward from 2014 to 2017, before an overall increase in 2018.[9]

[9] *Wolf, Christopher. (2019). 2019 Michigan Agricultural Land Values and Leasing Rates. 10.13140/RG.2.2.23036.08329.*

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The vacant land in Cheboygan County is largely wooded and best used for recreation purposes like hunting. An agricultural land appraiser and brokers in the area noted that there is little farmland in the County and most land is used for hunting or other recreation purposes. There is a relatively large amount of state-owned forest preserve land in the County as well that can be used for public recreation purposes. Land that is adjacent to state-owned land is most sought after by buyers for recreation purposes as it allows access to a larger area from the private property. The subject site is not adjacent to state-owned land and does not possess the attributes for good hunting land (i.e. rolling topography with high ground, wooded) therefore we conclude that it would best be used for agricultural purposes.

Local brokers familiar with land values in the area reported that land that is actively being farmed, or that was recently farmed, with high quality soil, sells for between $1,800 per acre and $2,800 per acre in Cheboygan County. Land in the southern portions of Michigan dominate the farming market in the state. The average price per acre of farmland sold in 2019 in the state of Michigan was $4,395 and had an average Overall NCCPI rating of 42, according to data from farmland sale aggregator, AcreValue. The weighted average Overall NCCPI rating for the subject site is 32.3, or 23 percent below the state average. The land values quoted by brokers align with the conclusion that agricultural land in Cheboygan County is of a lower quality and lower value than farmland in the state as a whole.

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MARKET ANALYSIS OF THE IMPACT ON VALUE FROM SOLAR FARMS

METHODOLOGY

According to Randall Bell, PhD, MAI, author of text *Real Estate Damages,* published by the Appraisal Institute in 2016, the paired sales analysis is an effective method of determining if there is a detrimental impact on surrounding properties.

> *"This type of analysis may compare the subject property or similarly impacted properties called* ***Test Areas*** *(at Points B, C, D, E, or F) with unimpaired properties called* ***Control Areas*** *(Point A). A comparison may also be made between the unimpaired value of the subject property before and after the discovery of a detrimental condition. If a legitimate detrimental condition exists, there will likely be a* ***measurable and consistent difference*** *between the two sets of market data; if not, there will likely be no significant difference between the two sets of data. This process involves the study of a group of sales with a detrimental condition, which are then compared to a group of otherwise similar sales without the detrimental condition."*[10]

As an approved method, this technique can be utilized to extract the effect of a single characteristic on value. By definition, paired data analysis is "a quantitative technique used to identify and measure adjustments to the sale prices or rents of comparable properties; to apply this technique, sales or rental data on nearly identical properties is analyzed to isolate a single characteristic's effect on value or rent."[11] The text further describes that this method is theoretically sound when an abundance of market data is available for analysis. It may be impractical for those property types that do not frequently sell, such as commercial properties. *The Appraisal of Real Estate* states that the lack of data can reduce the strength of the analysis, and that "an adjustment derived from a single pair of sales is not necessarily indicative" of the value of the single difference.

We also utilized a Trend Analysis to adjust our comparable Control Sales to a constant valuation date, the date of the Test Area sale. According to the *Dictionary of Real Estate Appraisal, 6th edition,* a Trend Analysis is defined as:

> *"A quantitative technique used to identify and measure trends in the sale prices of comparable properties; useful when sales data on highly comparable properties is lacking but a broad database on properties with less similar characteristics is available. Market sensitivity is investigated by testing various factors that influence sale prices."*

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[10] *Bell, Randall, PhD, MAI. Real Estate Damages. Third ed. Chicago, IL: Appraisal Institute, 2016.*
[11] *The Appraisal of Real Estate 14th Edition. Chicago, IL: Appraisal Institute, 2013.*

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We utilized a Trend Analysis to adjust the Control Sales for market conditions (the time between sales), as this is a variable that affects all properties similarly and can be adjusted for. Given the reduced amount of sale data and sales with highly similar characteristics to the Test Area sales, we concluded that adjusting only for market conditions is reasonable as this is explainable by a linear regression analysis, a form of Trend Analysis. This involved plotting our Control Sales unit sale prices against their sale dates and plotting a "Line of Best Fit" to explain market condition trends. We extracted a monthly appreciation rate for each set of Control Sales and applied that to each respective grouping to normalize the sales to a common valuation date.

PUBLISHED STUDIES

We have also considered various studies that consider the impact of solar farms on surrounding property values. The studies range from survey-based formal research to less formal analyses.

The studies show that over the past decade, the solar industry has experienced unprecedented growth. Among the factors contributing to its growth were government incentives, significant capacity additions from existing and new entrants and continual innovation. The incentives made the solar photovoltaic (PV) industry economically attractive for many consumers and as a result, set the conditions for the boom. A significant amount of farmland trades have been to solar developers, transaction prices for these deals were reported to be between 30 to 50 percent above normal agricultural land prices in 2016. Clean Energy Trends, a publication developed by Clean Edge, reported in 2013 that investments in new capacity of solar farms increased from approximately $3 billion USD in 2000 to approximately $91 billion USD in 2013, just short of the record of $92 billion USD in 2011. Solar PV installations increased from 31 Gigawatts (GW) in 2012 to a record of approximately 37 GW in 2013. As a result, annual solar PV installations exceed annual wind installations for the first time. Before 2011, annual wind installations were double annual solar PV installations.

Solar farms offer a wide array of economic and environmental benefits to surrounding properties. Unlike other energy sources, solar energy does not produce emissions that may cause negative health effects or environmental damage. Solar farms produce a lower electromagnetic field exposure than most household appliances, such as TV and refrigerators, and studies have confirmed there are no health issues related to solar farms.[12] The Solar Foundation measured that the solar industry employed 22 percent more workers in the period from 2013 to 2015. Solar farm construction in rural areas has also dramatically increased the tax value of the land on which they are built, which has provided a financial boost to some counties. According to Duke University's Center on Globalization, Governance, and Competitiveness ("DUCGCC"), a study of solar projects in North Carolina indicated despite the 80% tax abatement, the taxable value of a parcel with a solar farm is significantly larger than the taxable value of that same land under agricultural zoning.

[12] *"Electromagnetic Field and Public Health." Media Centre (2013): 1-4. World Health Organization.*

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Beyond creating jobs, solar farms are also benefiting the overall long-term agricultural health of the community. As explained by ReThink Energy, a conservation foundation, a typical solar farm has more than two-thirds of the field left open and uncovered by solar panels. This unused land, and also all the land beneath the solar panels, will be left to repair naturally. In the long run this is a better use of land since the soil is allowed to recuperate instead of being ploughed and fertilized year in and year out.

A solar farm can greatly increase the value of land, offering some financial security for the property owner over 20 to 25 years. Once solar panel racking systems are removed, the land can revert to its original use.[13]

Studies have also noted that the installation of utility-scale solar on a property has no negative impact on adjoining property's value. According to a report titled "Mapleton Solar Impact Study" from Kirkland Appraisals, LLC, conducted in Murfreesboro, North Carolina in September 2017, the study found that the proposed solar farm had no impact to adjacent vacant residential, agricultural land, or residential homes. The adjoining land for the paired data sales analysis in the report was primarily low density residential and agricultural uses, although there was one case where the solar farm adjoined to two dense subdivisions of homes.

[13] *NC State Extension. (May 2016). Landowner Solar Leasing: Contract Terms Explained. Retrieved from: https://content.ces.ncsu.edu/landowner-solar-leasing-contract-terms-explained*

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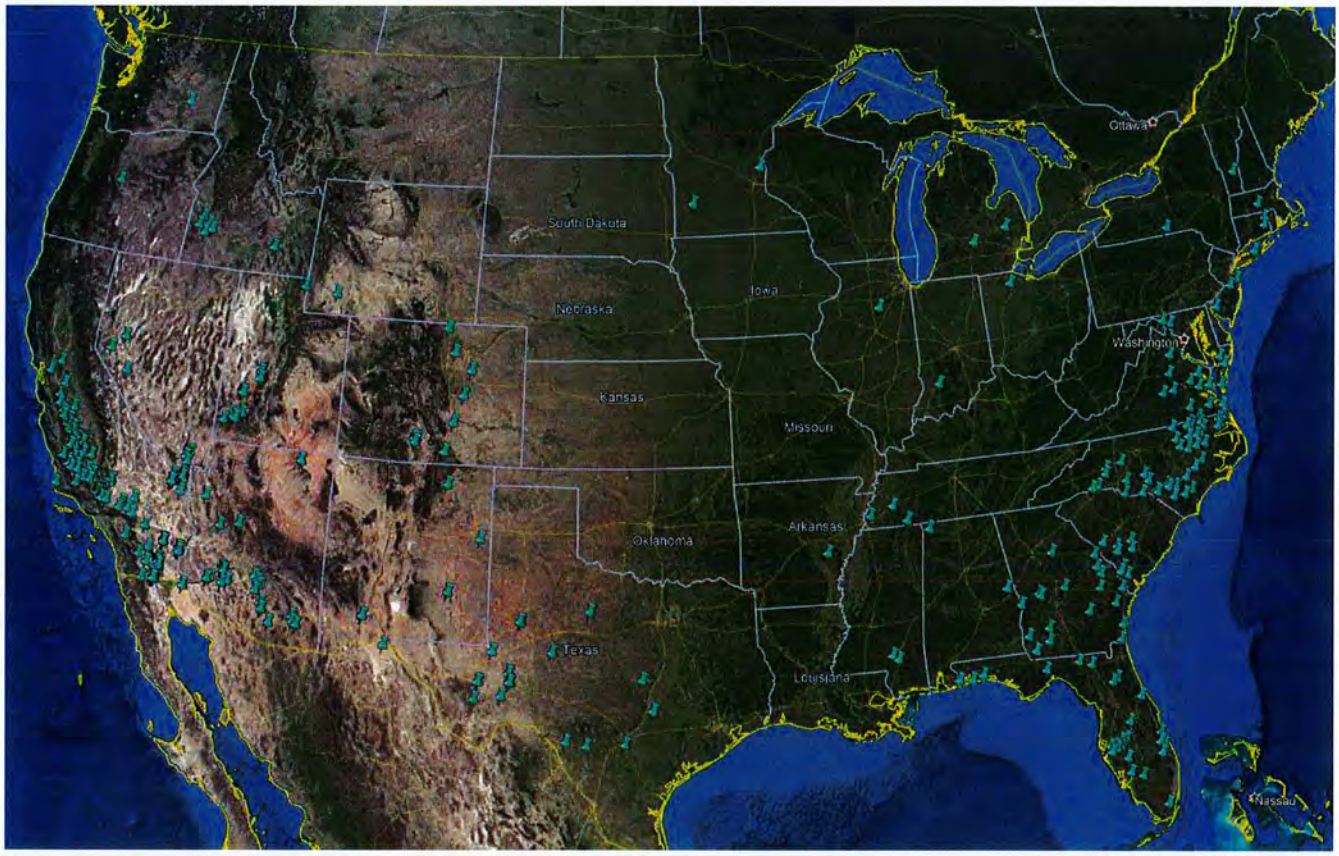
ADJACENT PROPERTY VALUES IMPACT STUDY

SELECTION OF SITES AND ANALYSES

In our analysis of existing solar farms, we have included eight, large-scale solar energy facilities on the following pages. We analyzed one solar farm in Michigan, one in Minnesota, one in Indiana, one in Illinois, three in North Carolina, and one in Virginia. We reviewed other solar farms located in Michigan; however, they were smaller, community solar or municipal projects, or were not candidates for a paired sale analysis due to external factors (e.g., proximity to an airport).

We have studied established solar farms in the Midwest specifically, because of the way that regional soil conditions, climate, and topography contribute to property values and their potential for impact on property values. Large installations of solar panels are limited in the Midwestern United States.

Through November 2019, there have been only two major solar installations over 100 MW in the Midwest: North Star Solar in Chisago County, Minnesota and Grand Ridge Solar in LaSalle County, Illinois. A map illustrating existing solar farms with capacities greater than 15 MW is presented below (blue pins), using data retrieved from the Energy Information Administration (EIA).



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Because of the limited number of large solar installations in the Midwest, we expanded our analysis and reviewed other large solar farms in other states. However, most large solar installations are located in outlying areas or did not have sufficient adjoining sales that qualified for a paired sales analysis either due to limited sale activity or the newer age of the solar farm.

In total, we identified eight solar farms to study with comparable sales where generally the only difference was the attribute under study: proximity to a solar farm.

Ownership and sales history for each adjoining property to an existing solar farm through the effective date of this report is maintained within our workfile. Adjoining properties with no sales data or that sold prior to the announcement of the solar farm were excluded from further analysis. Adjoining properties that sold in a non-arm's length transaction (such as a transaction between related parties, bank-owned transaction, or between adjacent owners) were excluded from analysis as these are not considered to be reflective of market price levels. The adjoining properties that remained after exclusions were considered for a paired sale analysis.

The difference in price is considered to be the impact of the proximity to the solar farm. Two types of paired sales analyses were considered based on the availability of data:

- Comparing sales of adjoining properties prior to the announcement of the solar farm to sales of adjoining properties after announcement and subsequent development of the solar farm (a "Before and After Analysis").
- Comparing sales of adjoining properties after the announcement and subsequent development of the solar farm to sales of comparable properties that are locationally removed from their influence.

We have considered both types of paired sales analyses in this study. We performed two "Before and After Analyses", in which we compared sales that occurred prior to the announcement and subsequent development of the solar farm project with sales that occurred after completion of the solar farm project for one solar farm in Indiana, for both adjoining and non-adjoining properties. The remaining existing solar farms studied did not qualify for this Before and After Analysis. All eight solar farms qualified for the second type of paired sales analysis, which was comparing sales of properties locationally removed from the solar farm (Control Area) to sales of adjoining properties that occurred after the announcement and subsequent development of the solar farm project (Test Area).

We have found Control Area sales data through the local Multiple Listing Service (MLS) and other real estate broker databases and verified these sales through county records, conversations with brokers, the individual county's GIS services, and the county assessor's office. It is important to note that these Control Area Sales are not adjoining to any solar farm, nor do they have a view of a solar farm from the property. Therefore, neither the announcement nor the completion of the solar farm use could not have impacted the sale price of these properties.

To make direct comparisons, the sale price of the Control Area sales will need to be adjusted for market conditions to a common date. In this analysis, the common date is the date of the Adjoining Property Sale after the completion of the solar farm. After adjustment, any measurable difference between the sale prices would be indicative of a possible price impact by the solar farm, if any.

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For the eight existing solar farms in Minnesota, Indiana, Illinois, North Carolina, and Virginia, a summary of the analysis completed for each of solar farms studied is presented on the following pages is. Details of these analyses are retained within our workfile.

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SOLAR FARM 1: DTE'S LAPEER SOLAR PROJECTS, LAPEER, MICHIGAN

Coordinates: Latitude 43.03, Longitude -83.32

PINs: Multiple

Owner of Record: DTE Electric Company & City of Lapeer

Total Land Size: ±270 Acres

Date Project Announced: 2016

Date Project Completed: May, 2017

Output: 48 MW AC

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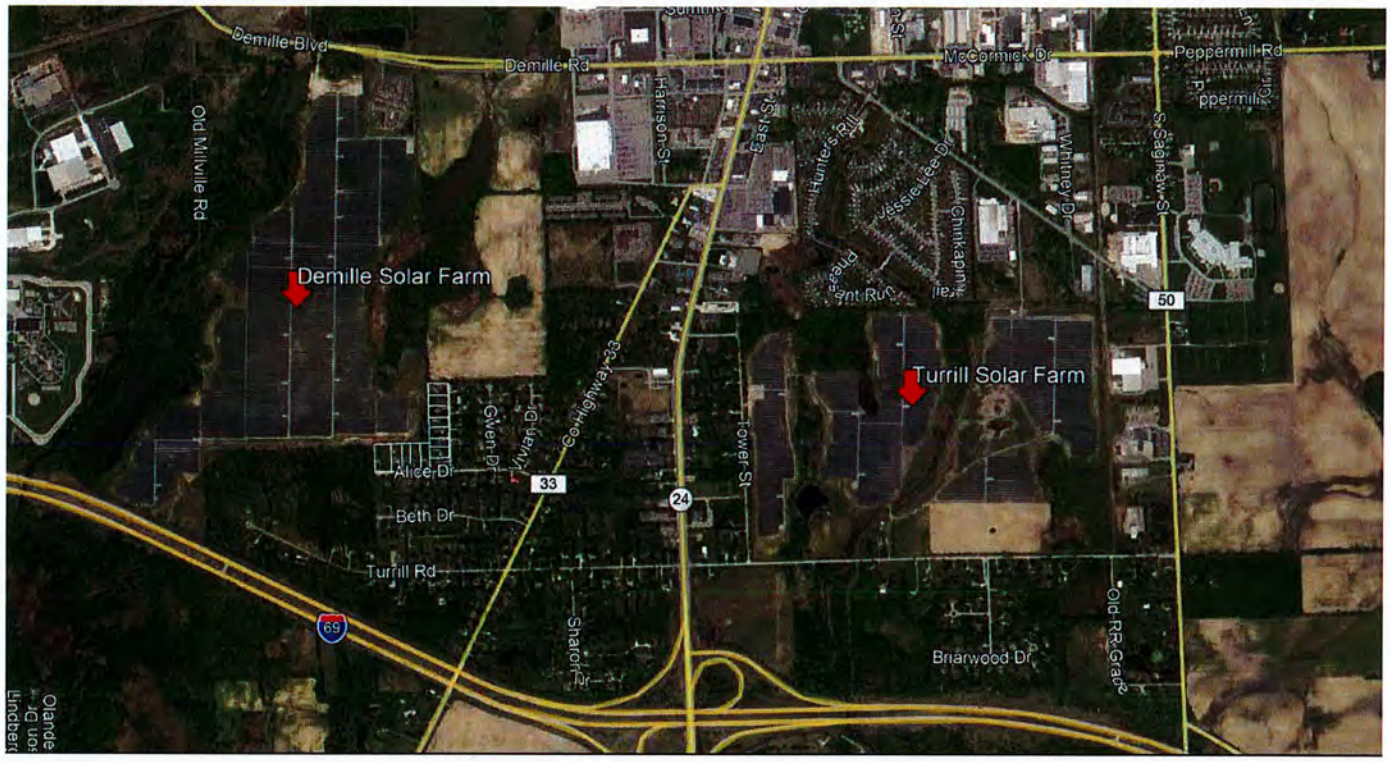
This solar farm is located just south of the City of Lapeer, Michigan, in the township of Lapeer, Michigan and is a joint project between the City of Lapeer and DTE Electric Company. The solar farm was developed with Inovateus Solar MI, LLC to meet Michigan renewable energy standards. The solar farm features over 200,000 panels, a power outlet of 48 MW, and produces enough energy to power 14,000 homes. The solar farm is surrounded by residential houses, agricultural land, and public lands. It was developed in two stages: The Demille Solar installation and the Turrill Solar installation. For purposes of our study, taken together, both installations are considered one solar farm.



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As a part of our research, we interviewed three local real estate brokers that sold homes adjacent to the Lapeer Solar farm. According the brokers, there was no impact on the home prices or marketability due to the homes' proximity to the solar arrays.

Anne Pence of National Realty Centers, the selling broker for 1126 Don Wayne Drive, a single-family home adjacent to the Demille solar farm, reported that "the solar farm did not have any effect on the sale of this home. The buyers did not care one bit about the solar field in the back yard. The fact is that you know no one is going to be behind you when they develop a solar farm in your back yard. And there they put up trees to block the view. My in-laws also actually live at end of that street, even though they haven't sold or put their house on market, they don't mind the solar panels either. It's not an eyesore. And another house sold on that block, a raised ranch home, and it sold with no problems."

Renee Voss of Coldwell Banker, selling broker of the raised ranch at 1138 Don Wayne Drive, which is adjacent to the Demille solar farm at the southeast corner, noted that there was no impact on this sale from the solar farm located to the rear. The home, which has a pool in the backyard, sold quickly with multiple offers, Voss stated.

Josh Holbrook, the selling broker of 1408 Turrill Rd, located just south of the Demille Solar Farm, said the solar farm had no impact on the sale and that the community takes pride in the solar farm.

We identified seven adjacent properties that sold since the solar farm started operations in May of 2017: Parcels 3, 4, 7, 9, and 16 for the Demille Solar Farm, and parcels 3 and 4 for the Turrill Solar Farm. Of these properties, three were considered atypical for the area.

Parcel 16 just south of the Demille Solar Farm is a 10.1-acre lot that is buffered by trees. It is atypical for the area, as most homes are situated on lots between 1-acre and 1.5-acres in size and were built before 1980. This home was built in 2008. We interviewed the broker Josh Holbrook (see above comments) who confirmed the atypical nature of this property.

Parcel 7 adjacent to the Demille Solar farm is a split-level home with a finished walk out basement with a pool. The typical home in the area has a traditional basement and pools are atypical. The unusual nature of this sale was confirmed with the selling broker, Renee Voss (see above comments).

Parcel 3 just west of the Turrill Solar Farm was a ranch home with 1,348 square feet on a lot that was just over an acre. Comparables for homes of this size, type, and lot size were not available in the immediate market area. It should be noted that the price per square foot for this home ($108.01/sf) is significantly higher than median price per square foot of either data set we studied.

The maps on the following pages display the adjoining properties.

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Demille Solar Farm

Solar Farm 1 Adjoining Properties

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Solar Farm 1 Adjoining Properties

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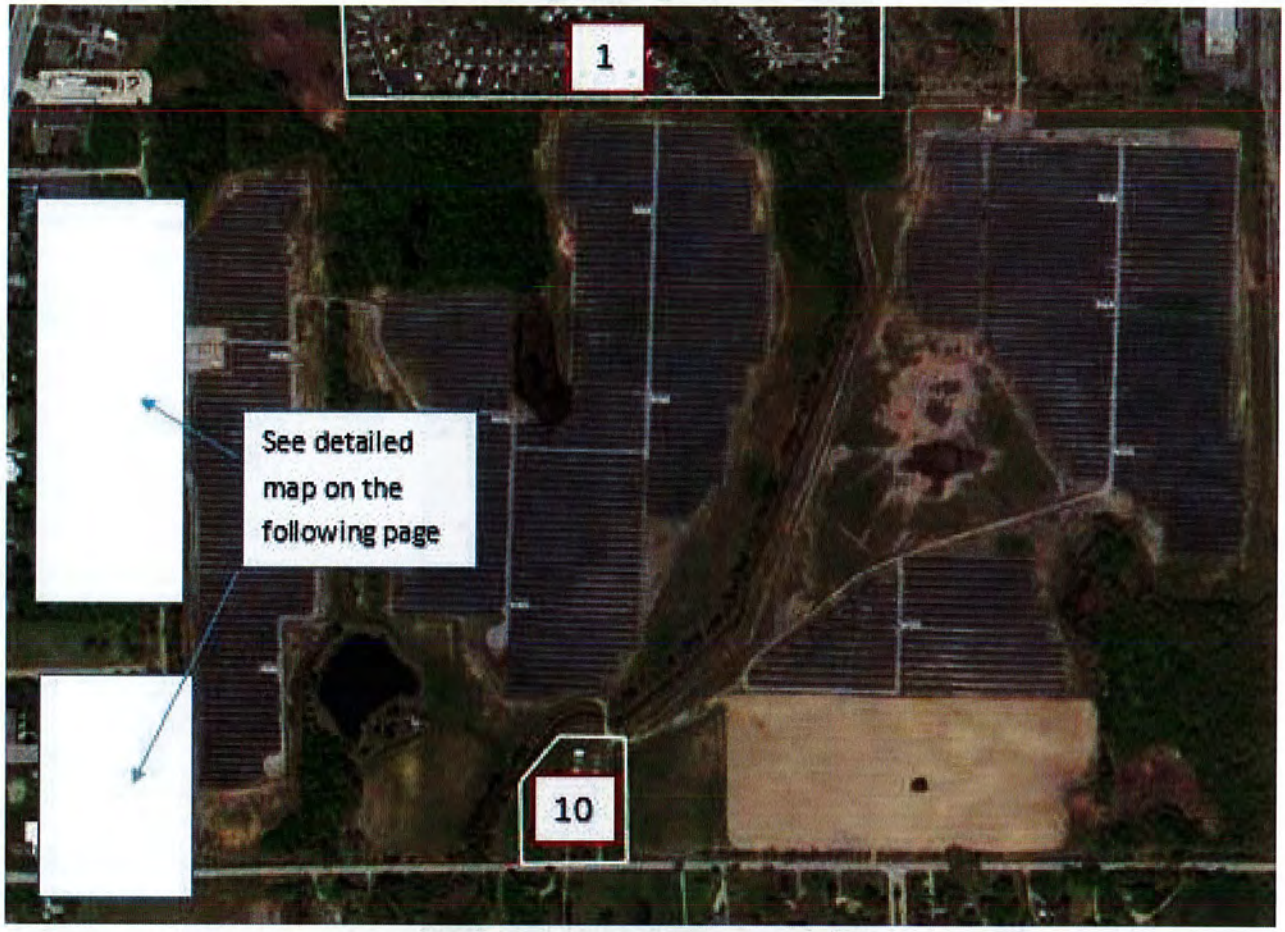
Turrill Solar Farm



Solar Farm 1 Adjoining Properties

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Solar Farm 1 Adjoining Properties

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Adjoining Properties 3, 4, and 9 for the Demille Solar Farm were considered for a paired sales analysis, and we analyzed these properties as single-family home uses. We analyzed seven Control Area single family home sales with similar construction that sold within a reasonable time frame from the median sale date of the Test Area Group 1, and adjusted the Control Area sales for market conditions using a regression analysis to identify the appropriate monthly market conditions adjustment. The result of our analysis for Solar Farm 1 - Group 1 is presented below.

CohnReznick Paired Sale Analysis - Solar Farm 1 Group 1		
	Potentially Impacted by Solar Farm	Adjusted Median Price Per SF
Control Area Sales (7)	No: Not adjoining solar farm	$85.92
Test Area Sales (3)	Adjoining solar farm	$86.12
Difference		**0.24%**

Adjoining Property 4 for the Turrill Solar Farm was analyzed separately since it is a two-story home on a larger lot. We analyzed four Control Area single family homes sales with similar construction that sold within a reasonable time frame from Adjoining Property 4's sale date, and adjusted the Control Area sales for market conditions using a regression analysis to identity the appropriate monthly market conditions adjustment. The result of our analysis for Solar Farm 2 – Group 2 is presented below.

CohnReznick Paired Sale Analysis - Solar Farm 1 - Group 2		
	Potentially Impacted by Solar Farm	Adjusted Median Price Per SF
Control Area Sales (4)	No: Not adjoining solar farm	$91.80
Test Area Sales (1)	Adjoining solar farm	$94.84
Difference		**3.31%**

Noting no negative price differential, with the Test Area Groups having a higher unit sale price than the Control Area sales, it does not appear that Solar Farm 1 had any negative impact on adjacent property values.

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SOLAR FARM 2: NORTH STAR SOLAR FARM, CHISAGO COUNTY, MN

Coordinates: Latitude 45.47, Longitude -92.91

PINs: Multiple

Owner of Record: Renewable Energy Asset Co, L.L.C.

Total Land Size: ±1,000 Acres

Date Project Announced: 2014

Date Project Completed: October, 2016

Output: 100 MW AC

This solar farm is located approximately four miles southeast of the City of North Branch in unincorporated Chisago County, near the intersection of Route 69 and Route 72. The solar farm was developed by North Star and is the largest solar farm in the Midwest. The solar facility features 440,000 solar panels and a power output capacity of 100 MW, which is enough to power 20,000 homes. The solar farm has agricultural land to the north and west. To the south and east of the project there are several residential properties, some of which are nestled within the actual solar farm.

While assembling the solar development site, the developer of the solar farm acquired five homes along 367th Street, Adjoining Properties 41, 42, 43, 46, and 47, which are surrounded by the solar arrays. According to conversations with the developer, they purchased the homes prior to development at a premium above the appraised values, and subsequently sold all five homes after development to new buyers at market levels. The exception being Adjoining Property 47, which was purchased by the original owner. This indicates that the development of the North Star Solar Farm ***did not deter transactions nor affect sale prices*** in the surrounding area.

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Clifford Sheppeck of Keller Williams Classic was hired by Renewable Energy Asset Co, L.L.C. to market and sell the remaining four properties. We discussed these transactions with Mr. Sheppeck who indicated they all sold within two months, which is in line with the market.

In addition to the four homes sold by Mr. Sheppeck, we identified four other properties: Adjoining Properties 17, 37, 44 and 48, all which sold since the construction of the solar farm. This sums to be a total of six identified adjoining properties.

One of the sales, Adjoining Property 43, is an above-grade, two-story home with an atypical floor design. Most the homes in the area, while having similar gross living areas, are one-story, single-family homes with basements. We conducted a search in the area for comparable above-grade, two-story homes, but did not find sufficient data. Mr. Sheppeck was the listing broker for this property and confirmed its atypical nature. He indicated that it sold at a price that was in line with the market even though two-story homes are considered to be rare. Due to limited sales in the area, Adjoining Property 43 was excluded from further analysis.

Another sale, Adjoining property 37 is a home designed specifically as a passive solar home, taking advantage of the same renewable energy potential of the North Star solar farm. The property is set back behind five acres of agricultural land and is secluded behind trees and operates as mixed-use "hobby farm." This is a highly atypical use with no comparable sales. For these reasons, Adjoining property 37 was excluded from further analysis.

Another sale, Adjoining property 44 is a rambler-style home with an inferior quality of construction and an inferior basement. Listing material indicate deferred maintenance. Most comparable sales either have completed or walk-out basements and average to above-average construction and condition quality. Due to limited comparable sales for this type of property, Adjoining Property 44 was excluded from further analysis.

The map on the follow pages below display the adjoining properties.

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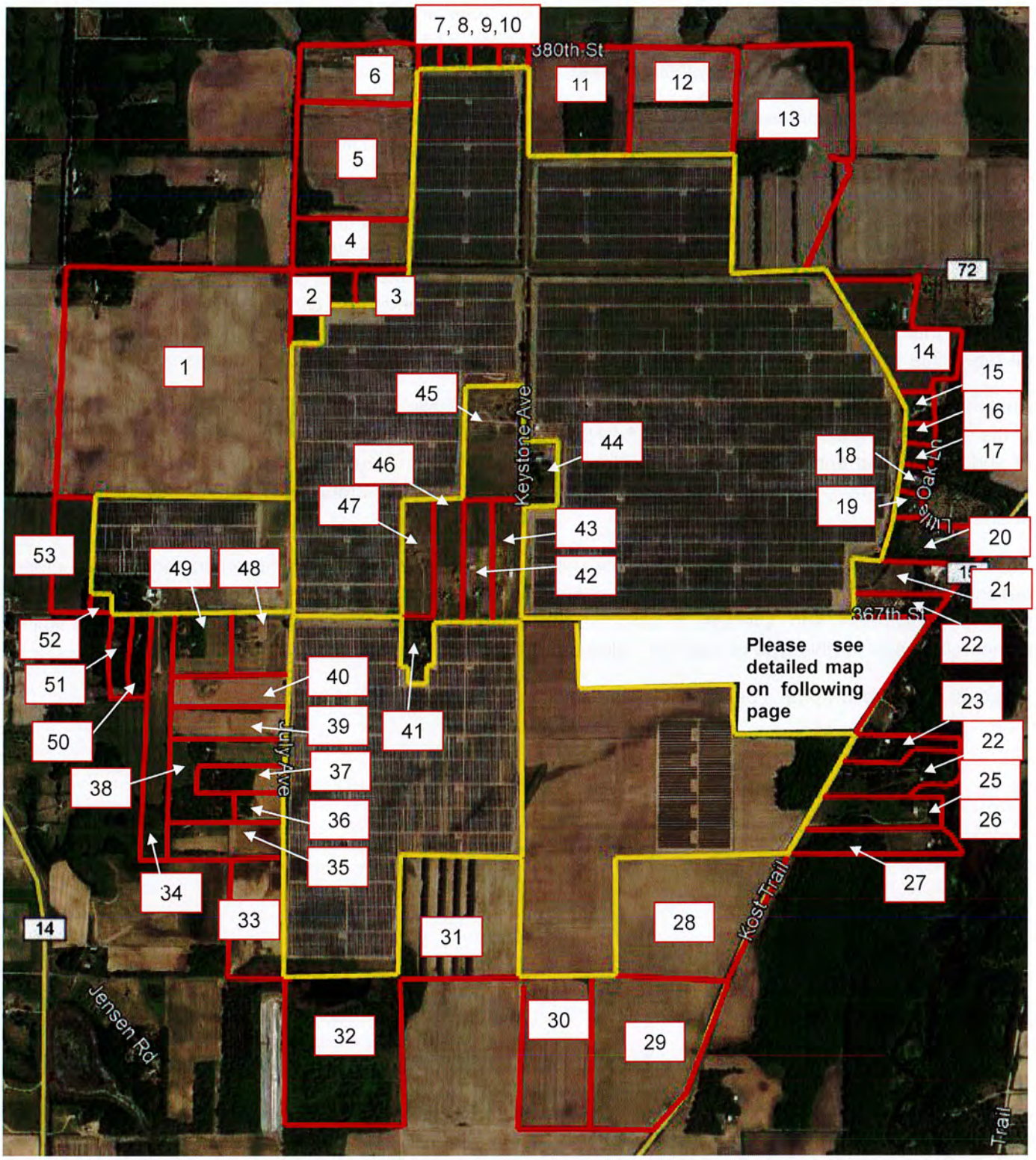

Solar Farm 2 Adjoining Properties

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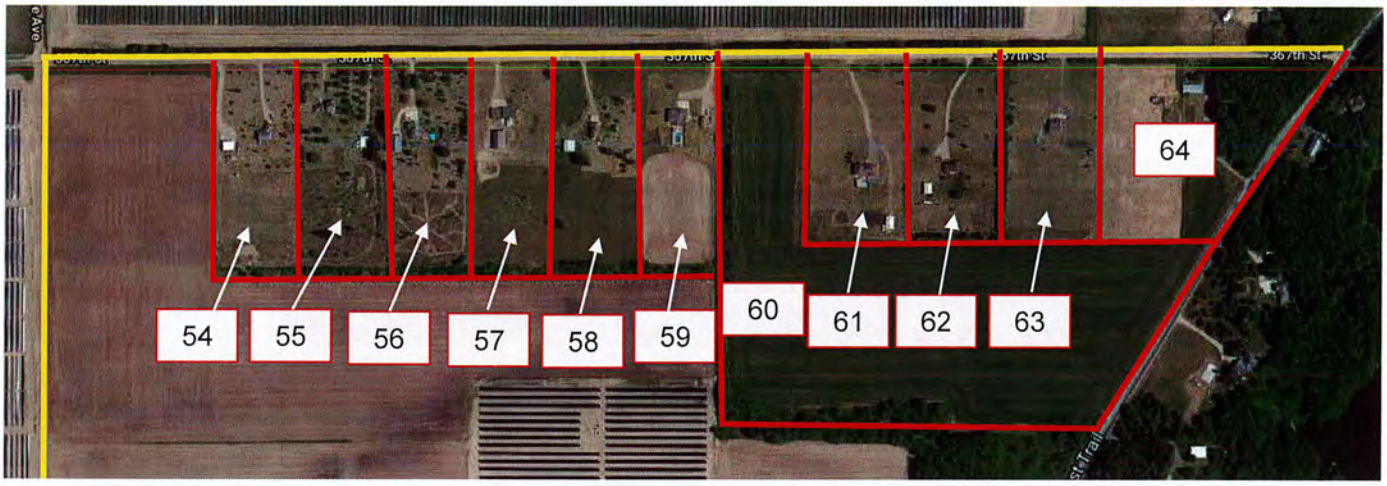

Solar Farm 2 Adjoining Properties

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Adjoining Properties 17, 41, 42 ,46, and 48 (Group 1) were considered for a paired sales analysis, and we analyzed these properties as single-family home uses. We analyzed twelve Control Area single family home sales with similar construction that sold within a reasonable time frame from the median sale date of the Test Area Group, and adjusted the Control Area sales for market conditions using a regression analysis to identify the appropriate monthly market conditions adjustment. The result of our analysis for Solar Farm 2 is presented below.

CohnReznick Paired Sale Analysis - Solar Farm 2		
	Potentially Impacted by Solar Farm	**Adjusted Median Price Per SF**
Control Area Sales (12)	No: Not adjoining solar farm	$136.00
Group 1 (Test Area Group – 5 Sales)	Yes: Solar Farm was completed by the sale date	$137.83
Difference		**1.35%**

Noting no negative price differential, with the Test Area Group having a higher unit sale price than the Control Area sales, it does not appear that Solar Farm 2 had any negative impact on adjacent property values.

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A Repeat Sales Study (Before and After Construction of the Solar Farm Analysis):

In a 2017 study conducted by Chisago County Assessor John Keefe, Keefe analyzed the numbers for 15 parcels alongside or near the North Star Solar Farm that sold between January 2016 and October 2017. Based on trends exhibited by 750+ sales throughout the county, Keefe concluded that the homes, located on 375th, 367th, Keystone, Little Oak, Lincoln Trail, and Kost Trail were all "in excess of assessed" and reported that "valuation hasn't suffered."[14]

Considering Keefe's 2017 study, we conducted a supplemental analysis in which we compared the sale prices of eight recently sold parcels that are adjacent to the North Star Solar Farm (Test Area Group) to the previous sale price of the home, commonly known as a "Repeat Sales Analysis" utilizing a sale and resale of the same property. In our comparison for each property analyzed, we calculated the total appreciation between each sale, the number of months that elapsed between each sale, and determined the monthly appreciation rate for the property. We conducted the same analysis for nine parcels that are not within proximity to the North Star Solar Farm (Control Area Group), but are within the North Branch, MN market. The tables below show the results of this study.

Test Area Group							
Address	Most Recent Sale Date	Most Recent Sale Price	Prior Sale Date	Prior Sale Price	Total Appreciation	Months Elapsed between Sales	Monthly Appreciation Rate
10505 367th Avenue	8/19/2016	$260,500	4/30/1999	$123,294	111.28%	208	0.36%
10132 367th Street	10/20/2017	$333,000	7/2/2001	$226,800	46.83%	196	0.20%
10200 367th Street	11/28/2017	$330,000	10/27/2004	$309,900	6.49%	157	0.04%
10009 375th Street	3/30/2016	$219,900	3/4/2005	$163,000	34.91%	133	0.23%
10254 367th Street	10/27/2017	$335,000	11/23/2005	$373,000	-10.19%	143	-0.08%
37096 Little Oak Drive	4/11/2017	$289,000	1/27/2006	$308,000	-6.17%	134	-0.05%
10095 367th Street	6/16/2017	$336,667	7/9/2010	$299,000	12.60%	83	0.14%
37206 Keystone Avenue	6/22/2017	$290,000	8/20/2012	$212,000	36.79%	58	0.54%
Median - All Test Area							*0.17%*
Median - All Except Negative Appreciation							*0.21%*

14 https://www.cleanenergyresourceteams.org/chisago-county-boards-real-estate-update-shows-solar-has-no-impact-property-values

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Control Area Group							
Address	Most Recent Sale Date	Most Recent Sale Price	Prior Sale Date	Prior Sale Price	Total Appreciation	Months Elapsed between Sales	Monthly Appreciation Rate
4359 Elk Court	1/10/2017	$263,000	11/25/1998	$175,365	49.97%	218	0.19%
4737 377th Street	6/28/2017	$230,000	7/20/1999	$138,400	66.18%	215	0.24%
40956 Greystone Avenue	8/26/2016	$267,776	8/18/2005	$285,900	-6.34%	132	-0.05%
39088 More Ferry Road	1/27/2017	$229,000	9/29/2005	$185,000	23.78%	136	0.16%
5183 366th Street	7/28/2016	$201,000	4/13/2007	$207,000	-2.90%	112	-0.03%
10589 Wilcox Road	7/6/2016	$262,500	9/26/2007	$223,700	17.34%	105	0.15%
6417 360th Street	7/7/2017	$325,010	5/16/2008	$270,000	20.37%	110	0.17%
8628 380th Street	7/10/2017	$275,000	4/23/2010	$203,000	35.47%	87	0.35%
4625 412th Street	3/21/2019	$295,000	9/28/2017	$275,000	7.27%	18	0.40%
Median - All Test Area							*0.17%*
Median - All Except Negative Appreciation							*0.19%*

The table below illustrates the change in the Federal Housing Authority Housing Index annual and monthly basis in Minnesota's 55056 area code (where the studied homes are located).

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55056 Area Code - Housing Index Change (Year Over Year) Seasonally Adjusted					
Year	January 1 Index	Annual Change (%)	Compounded Monthly Change (%)	Cummulative Change (%)	Cummulative Monthly Change (%)
1991	100.00				
1992	100.79	0.79%	0.07%	0.79%	0.07%
1993	105.04	4.22%	0.34%	5.04%	0.21%
1994	109.85	4.58%	0.37%	9.85%	0.26%
1995	121.61	10.71%	0.85%	21.61%	0.41%
1996	126.82	4.28%	0.35%	26.82%	0.40%
1997	133.89	5.57%	0.45%	33.89%	0.41%
1998	140.46	4.91%	0.40%	40.46%	0.41%
1999	150.11	6.87%	0.56%	50.11%	0.42%
2000	168.93	12.54%	0.99%	68.93%	0.49%
2001	187.35	10.90%	0.87%	87.35%	0.52%
2002	200.52	7.03%	0.57%	100.52%	0.53%
2003	212.90	6.17%	0.50%	112.90%	0.53%
2004	227.02	6.63%	0.54%	127.02%	0.53%
2005	246.19	8.44%	0.68%	146.19%	0.54%
2006	252.09	2.40%	0.20%	152.09%	0.51%
2007	242.87	-3.66%	-0.31%	142.87%	0.46%
2008	222.73	-8.29%	-0.72%	122.73%	0.39%
2009	196.67	-11.70%	-1.03%	96.67%	0.31%
2010	178.91	-9.03%	-0.79%	78.91%	0.26%
2011	162.98	-8.90%	-0.77%	62.98%	0.20%
2012	155.47	-4.61%	-0.39%	55.47%	0.18%
2013	164.16	5.59%	0.45%	64.16%	0.19%
2014	175.11	6.67%	0.54%	75.11%	0.20%
2015	186.01	6.22%	0.50%	86.01%	0.22%
2016	203.39	9.34%	0.75%	103.39%	0.24%
2017	218.69	7.52%	0.61%	118.69%	0.25%
2018	232.70	6.41%	0.52%	132.70%	0.26%
2019					

In the Test Group, there were two sales with negative appreciation rates that originally sold in 2005 and 2006 (10254 367th Street and 37096 Little Oak Drive, respectively). In the Control Group, there were also two sales with negative appreciation rates that originally sold in 2005 and 2007 (39088 More Ferry Road and 40956 Greystone Avenue, respectively). During the calendar years of 2005 to 2007, housing index levels in the United States were reaching their peaks. Considering the rapid growth in housing prices that occurred during these years prior to the market crash, from which the local market has not yet recovered, the negative appreciation rate exhibited by these sales is explainable by economic conditions, as demonstrated above in the red boxes.

Furthermore, the prior sales of 37206 Keystone Avenue, 10254 367th Street, 10095 367th Street, 10505 367th Avenue, 10200 367th Street, and 10132 367th Street have a sale between the most recent sale and the prior sale.

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As mentioned earlier in the report, the developer of the solar farm purchased these houses at an above market rate due to an assemblage of the solar farm site. Because of these circumstances, we excluded the non-market assemblage sales in this analysis and only considered market-oriented transactions.

The Test Area Group's and the Control Area Group's median monthly appreciation rate are nearly identical. As such, we concur with Keefe's conclusion that there does not appear to be a consistent detrimental impact that has occurred to adjacent property to the North Star Solar Farm.

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SOLAR FARM 3: DOMINION INDY SOLAR III, MARION COUNTY, IN

Coordinates: Latitude 39.3914.16, Longitude -86.153485

PIN: 49-13-13-113-001.000-200

Recorded Owner: PLH Inc

Total Land Size: 134 acres

Date Project Announced: August 2012

Date Project Completed: December 2013

Output: 8.6 MW AC (11.9 MW DC)

This solar farm is located on the southern side of West Southport Road, located approximately eight and a half miles from the heart of Indianapolis. The solar farm was developed by Dominion Renewable Energy. This solar farm is ground mounted has the capacity for 11.9 Megawatts (MW) of power. The panels are mounted in a fixed tilt fashion and there are 12 inverters in this solar farm. The solar farm is lined by a chain link fence that surrounds all of the solar panels. Additionally, there are some natural bushes and trees on all sides of the property; this vegetation has been in place since before development of the solar farm.

The maps on the following pages display the parcels within the solar farm is located (outlined in blue). Properties adjoining this site are numbered for subsequent analysis.

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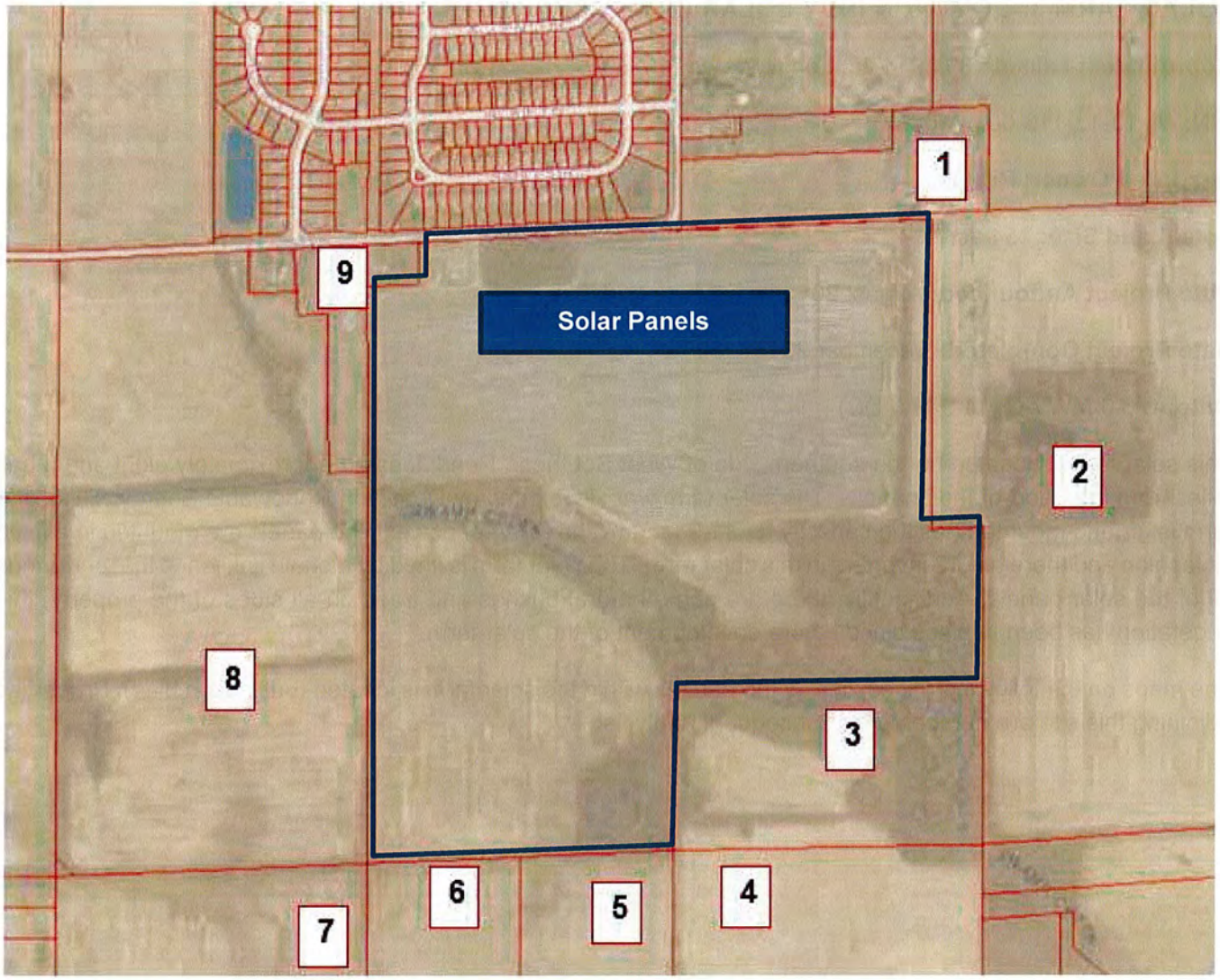

Solar Farm 3 Adjoining Properties

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Solar Farm 3 Adjoining Properties

We identified a total of nine adjoining properties that were considered for a paired sale analysis. Adjoining Property 2 (Test Area Goup 3) was analyzed agricultural land. Adjoining Properties 11, 13, 14, 18, 20, 22, 24 and 26 were analyzed as single-family home uses (Test Area Groups 1 and 2).

Adjoining Property 2 was a vacant agricultural parcel and we identified and analyzed four Control Area Sales that were comparable in location and use. The Control Area Sales for Adjoining Property 2 are land tracts that were larger than 20 acres and utilized specifically as farmland. We excluded sales between related parties, split transactions, and those with significant improvements.

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Control Area sales for Adjoining Property 2 were adjusted for market conditions using a regression and trend analysis to identify the appropriate monthly market condition adjustment. Using the sale data published in the *Land Sales Bulletin*, from January 2016 through December 2017, which includes reliable and credible data for analysis, we extracted a monthly rate of change of 0.50 percent. The results of our analysis for Adjoining Property 2 for Solar Farm 3 is presented below.

Ag Land Matched Pair Analysis

CohnReznick Paired Sale Analysis - Solar Farm 3		
	Potentially Impacted by Solar Farm	Adjusted Median Price Per Acre
Control Area Sales (4)	No: Not adjoining solar farm	$8,091
Group 3 Adjoining Property 2 (Test Area)	Yes: Solar Farm was completed by the sale date	$8,210
Difference		**1.47%**

Crossfield Subdivision: The remaining eight of the Adjoining Properties (Test Areas) were considered for a paired sales analysis consisted of single-family homes. The adjoining properties that were included in our paired sales analysis were divided into two groupings, based on the sale dates of the Control Sales, as detailed below.

Group	Adj. Property #	Address	Sale Price	Site Size (AC)	Beds	Baths	Year Built	Square Feet	Sale Date	PSF
1	11	5933 SABLE DR	$ 140,000	0.31	3	1.5	2006	2,412	12/9/2015	$ 58.04
1	20	5829 SABLE DR	$ 131,750	0.23	4	2.5	2011	2,190	12/9/2015	$ 60.16
1	22	5813 SABLE DR	$ 127,000	0.23	4	1.5	2005	2,080	3/4/2015	$ 61.06
1	24	5737 SABLE DR	$ 120,000	0.23	3	2.5	2010	2,136	2/3/2014	$ 56.18
2	26	5731 SABLE DR	$ 174,900	0.25	4	3.5	2005	2,424	8/29/2018	$ 72.15
2	11	5933 SABLE DR	$ 170,000	0.31	3	1.5	2006	2,412	7/31/2018	$ 70.48
2	18	5841 SABLE DR	$ 149,000	0.23	3	2.5	2009	1,962	10/3/2017	$ 75.94
2	13	5921 SABLE DR	$ 160,000	0.24	4	1.5	2006	2,412	9/6/2017	$ 66.33
2	14	5915 SABLE DR	$ 147,000	0.23	3	2.5	2009	2,028	5/10/2017	$ 72.49

For Group 1 (Sales in 2014 – 2015), we analyzed eight Control Area sales that sold within a reasonable time frame from the median sale date of the Group 1 Test Area sales. For Group 2 (Sales in 2017 and 2018), we

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analyzed a separate grouping of ten Control Area sales that sold within a reasonable time frame from the median sale date of the Group 2 Test Area sales.

Control Area sales in Groups 1 and 2 were adjusted for market conditions using a regression analysis to identify the appropriate monthly market condition adjustment. The results of our study are presented below:

CohnReznick Paired Sale Analysis - Solar Farm 3		
	Potentially Impacted by Solar Farm	Adjusted Median Price Per SF
Control Area Sales (8)	No: Not adjoining solar farm	$57.84
Group 1 (Test Area)	Yes: Solar Farm was completed by the sale date	$59.10
Difference		**2.18%**

CohnReznick Paired Sale Analysis - Solar Farm 3		
	Potentially Impacted by Solar Farm	Adjusted Median Price Per SF
Control Area Sales (10)	No: Not adjoining solar farm	$71.42
Group 2 (Test Area)	Yes: Solar Farm was completed by the sale date	$72.15
Difference		**1.03%**

Noting the relatively low price differential, in which the Test Area Sales were higher than the median for the Control Areas Sales, it does not appear that Solar Farm 3 had any negative impact on adjoining property values. In addition, the homes in both groups were appreciating at consistent rates.

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Summary of Before Announcement and After Construction of the Solar Farm Analysis:

Due to the velocity of sales in the Crossfield subdivision, we were able to conduct an analysis on the prices of single-family homes before the solar farm announcement date in comparison to the prices of single-family homes after the construction of the solar farm. We have provided our conclusions from the data below and the following page contains a chart with the data.

- 21 Test area sales were identified from 2006 to 2017 and 38 Control area sales were identified from 2008 to 2017.
    - The Test area sales are located adjoining to the Dominion Indy III Solar Farm in the Crossfield subdivision.
    - The Control area sales are located in the remainder of the Crossfield subdivision.
- In both the Test (ORANGE) and Control (BLUE) areas, new construction homes sold through 2011, prior to announcement of the solar farm.
- The dotted lines are polynomial trend lines plotted by Microsoft Excel in order to illustrate and approximate the "average" trend of each set of data. After construction of the solar farm, in parallel with the improving economic climate (as depicted by the Federal Housing Finance Agency's House Price Index for the East North Central region that includes Indiana), it appears that unit prices for both the test and control areas appreciated at a similar rate over the period from 2013 to 2017. A difference in appreciation rates does not appear to exist between homes in the Test area versus homes in the Control area.

Sale prices of single-family homes after the construction of the solar farm exhibit a similar appreciation trend as sales prior to the solar farm announcement. Overall, our findings indicate that there *is not a consistent and measurable difference* that exists in association with proximity to a solar farm.

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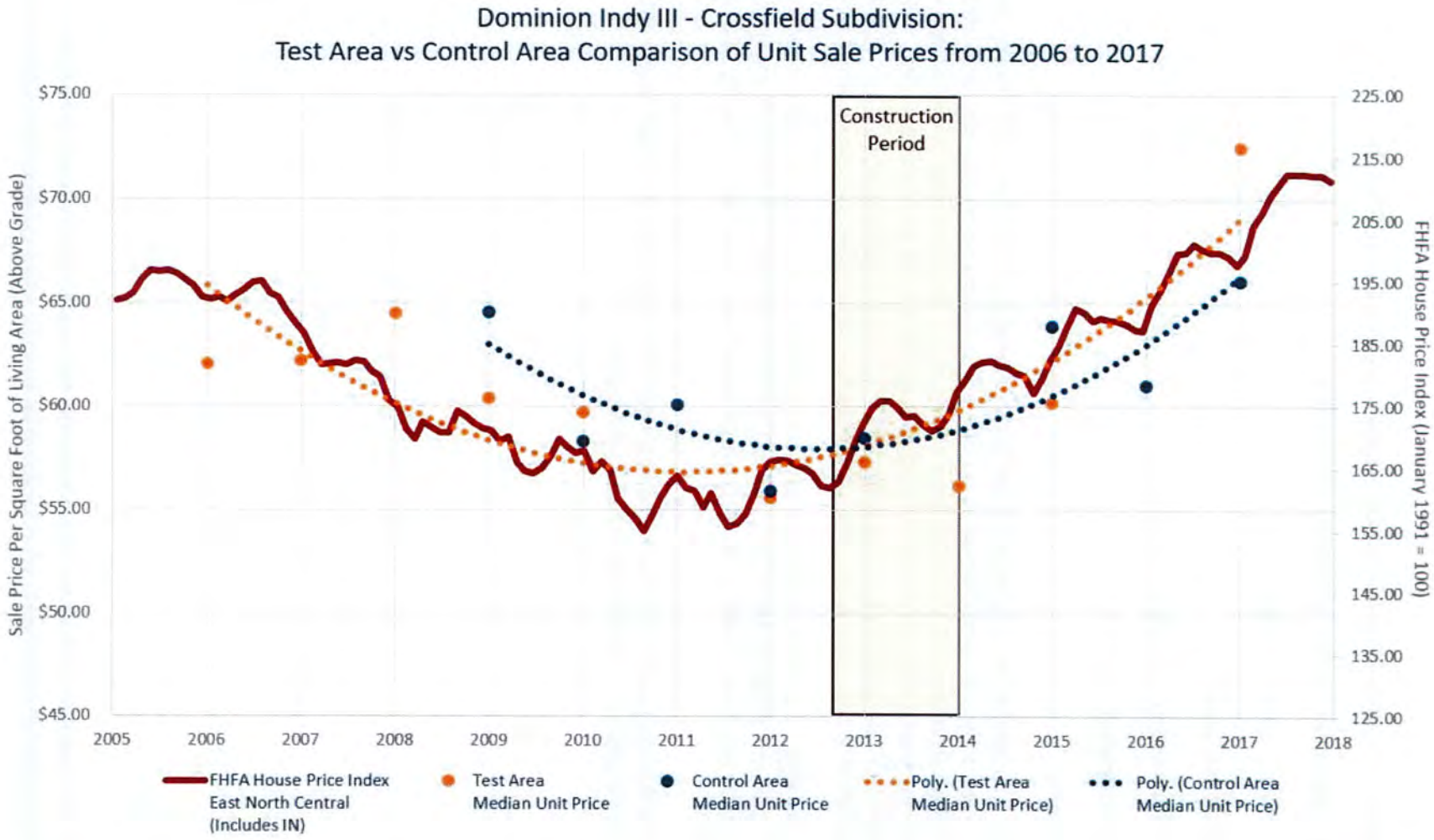
Before Announcement and After Construction of the Solar Farm Analysis:



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SOLAR FARM 4: GRAND RIDGE SOLAR FARM, LASALLE COUNTY, IL

Coordinates: Latitude 41.143421, Longitude -88.758340

PINs: 34-22-100-000, 34-22-101-000

Total Land Size: 160 acres

Date Project Announced: December 31, 2010

Date Project Completed: July 2012

Output: 23 MW AC

This solar farm is located at the southeast corner at the intersection of 21st and 15th Roads. The solar farm was developed by Invenergy and is considered to be one of the largest renewable energy centers in the world. It includes a 210 MW wind farm, 20 MW AC project solar and 1.5 MW advanced-energy storage project all in one location. The solar facility consists of twenty individual one MW solar inverters and over 155,000 photovoltaic modules supplied by General Electric. The solar farm has vacant agricultural land to the north and east, and natural vegetation to the east and south. The solar plant is located adjacent to Invenergy's wind farm.

Real Estate Tax Info: Prior to development of the solar farm, during the period between 2009 and 2011, this 160-acre farm paid real estate taxes of about $1,500 per 80-acre parcel ($3,000 per year in total). In the 5 years since the solar farm has been operating, the real estate taxes have increased to about $1,600 per acre ($255,000 per year in total).

The map on the following page displays the parcels within the solar farm is located (outlined in red). Properties adjoining these parcels are numbered for subsequent analysis.

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Solar Farm 4 Adjoining Properties

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Adjoining Property 12 (Test Area) was considered for a paired sales analysis, and we analyzed this property as a single-family home use. We analyzed five Control Area single family home sales on similar lot sizes that sold within a reasonable time frame from the sale date of Adjoining Property 12, and adjusted the Control Area sales for market conditions using a regression analysis to identify the appropriate monthly market conditions adjustment. The result of our analysis for Solar Farm 4 is presented below.

CohnReznick Paired Sale Analysis - Solar Farm 4		
	Potentially Impacted by Solar Farm	**Adjusted Median Price Per SF**
Control Area Sales (5)	No: Not adjoining solar farm	$74.35
Adjoining Property 12 (Test Area)	Yes: Solar Farm was completed by the sale date	$79.90
Difference		**7.46%**

The unit sale price of Adjoining Property 12 was slightly higher than the median adjusted unit sale price of the Control Sales.

We contacted the selling broker, Tina Sergenti with Coldwell Banker, and were told that the proximity of the solar farm had no impact on the marketing time or selling price of the property.

Noting no negative price differential, it does not appear that Solar Farm 4 impacted the sales price of Adjoining Property 12. This was confirmed by the real estate agent who marketed and sold this home.

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SOLAR FARM 5: INNOVATIVE SOLAR 42, BLADEN AND CUMBERLAND COUNTIES, NC

Coordinates: Latitude 34.847627, Longitude -78.877360

Cumberland County PIN: 0339-67-3814

Bladen County PINs: 033900553698, 033900751483, 033900658763

Total Land Size: 414 acres

Date Project Announced: May 5, 2014

Date Project Completed: September 2017

Output: 71 MW AC

Innovative Solar Farm 42 is located in unincorporated Bladen and Cumberland Counties, NC. The solar farm was developed by Innovative Solar Systems and went operational in September 2017. There are over 271,000 solar modules on the farm that can generate power for approximately 12,000 homes. The solar farm has residential land to the north, residential and forest land to the west, and agricultural and forest land to the south and east.

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Real Estate Tax Info: The chart below shows the increase from 2017 to 2018 in the assessed value of the parcels and the total real estate taxes.

	2017 Taxes Paid	2018 Taxes Paid	Tax Increase	2017 Assessed Value	2018 Assessed Value	Value Increase
Cumberland County PIN						
0339-67-3814	$ 5,263	$ 37,699	616%	$ 541,500	$ 3,920,850	624%
Bladen County PINs						
33900553698	$ 920	$ 947	2.96%	$ 108,870	$ 108,870	0.00%
33900751483	$ 234	$ 241	2.96%	$ 27,690	$ 27,690	0.00%
033900658763	$ 622	$ 640	2.96%	$ 73,600	$ 73,600	0.00%
TOTAL	**$ 7,039**	**$ 39,527**	**462%**	**$ 751,660**	**$ 4,131,010**	**450%**

We found one adjoining property that qualified for a paired sales analysis. The map on the following page displays the parcels adjacent to the solar farm panels (outlined in red). Properties adjoining these parcels are numbered for subsequent analysis. Note, that the GIS map views do not have updated aerial imagery that displays the solar panels.

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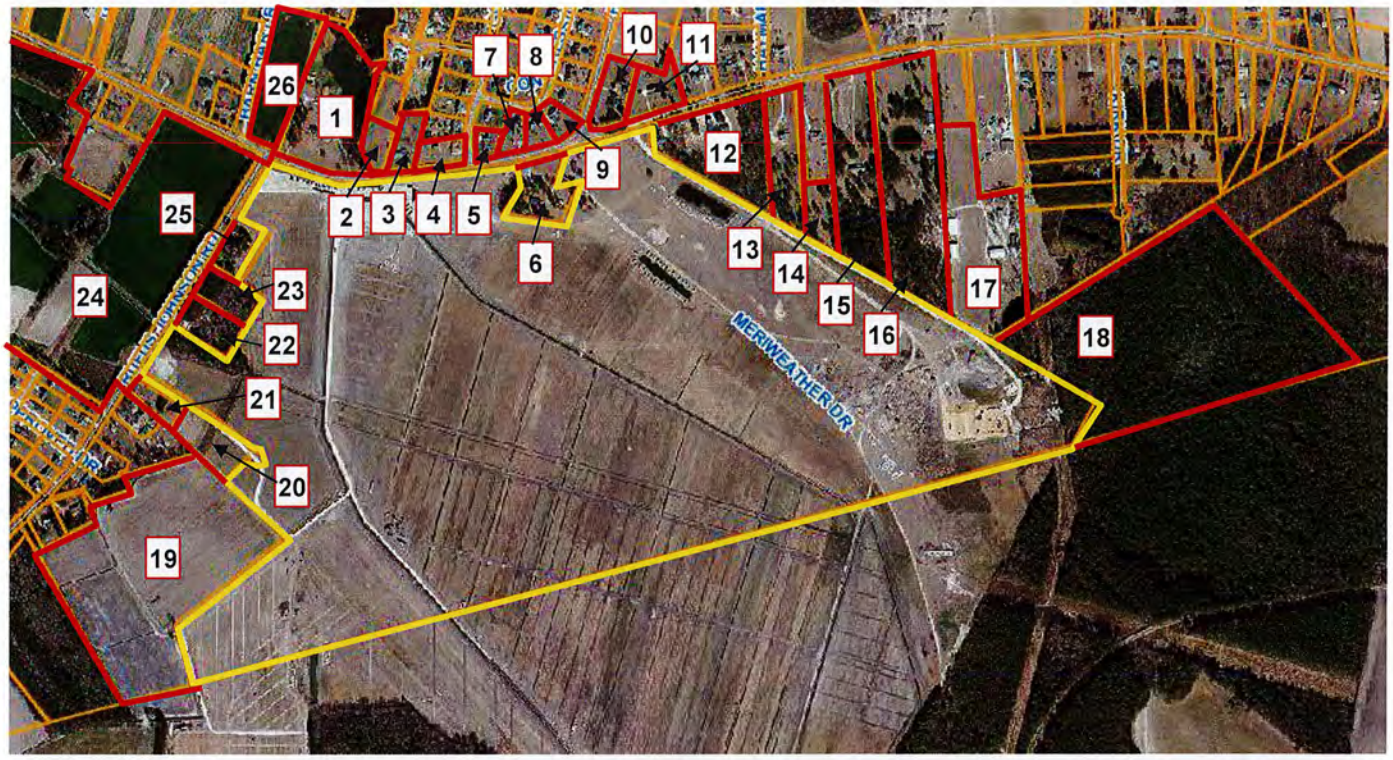
Cumberland County Map



Solar Farm 5 Adjoining Properties

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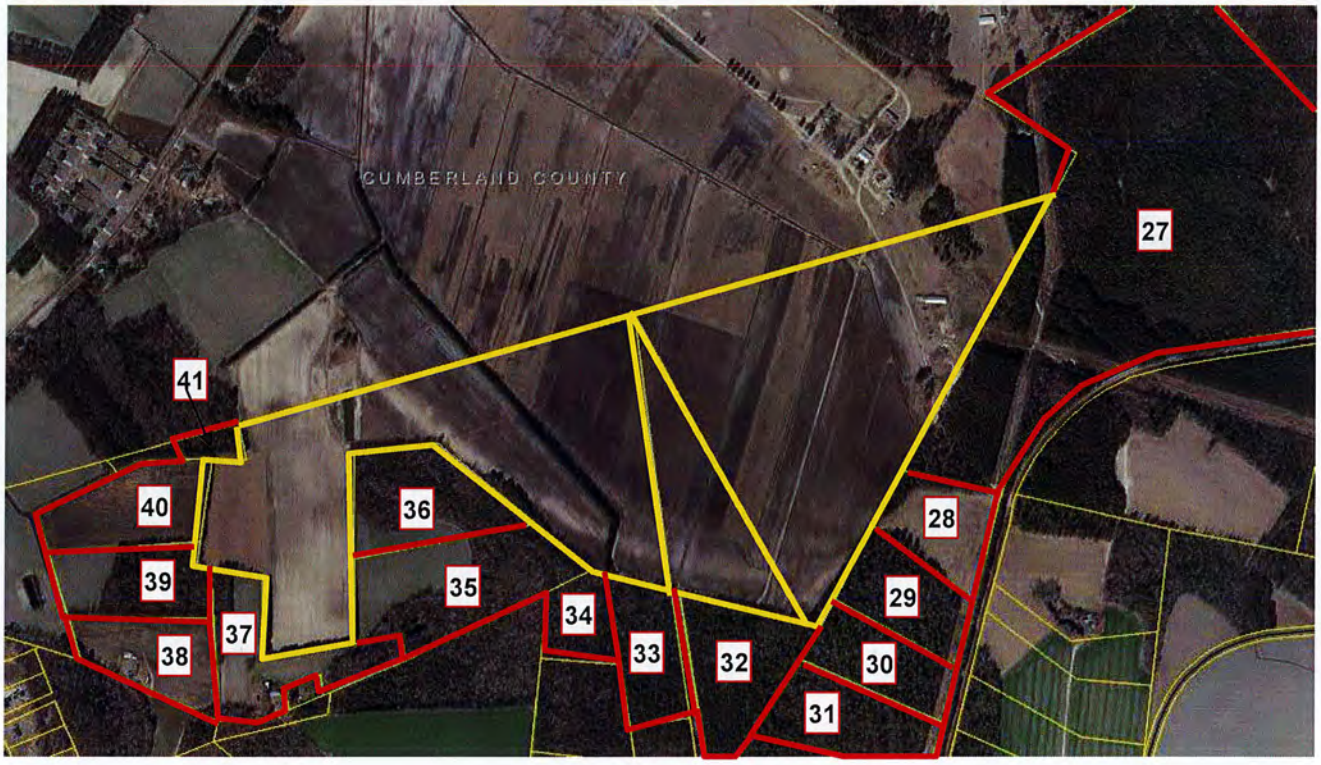
Bladen County Map



Solar Farm 5 Adjoining Properties

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Adjoining Property 11 (Test Area) was considered for a paired sales analysis, which sold during the construction period of the solar farm. The property was analyzed as a single-family home use.

For Adjoining Property 11, we analyzed eight Control Area Sales that sold within a reasonable time frame from the sale date of Adjoining Property 11. All Control area sales were adjusted for market conditions using regression analysis to identify the appropriate monthly market conditions adjustment.

The result of our analysis for Solar Farm 5 is presented below.

CohnReznick Paired Sale Analysis - Solar Farm 5		
	Potentially Impacted by Solar Farm	**Adjusted Median Price Per SF**
Control Area Sales (8)	No: Not adjoining solar farm	$100.32
Test Area Sale (Adjoining Property 11)	Adjoining solar farm	$107.09
Difference		**6.75%**

Noting no negative price differential, with the Test Area Sale having a higher unit sale price than the median adjusted unit sale price of the Control Sales, it does not appear that Solar Farm 5 had any negative impact on adjacent property values.

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SOLAR FARM 6: RUTHERFORD FARM, RUTHERFORD COUNTY, NC

Coordinates: Latitude 35.257778, Longitude -81.830560

PIN: 916036

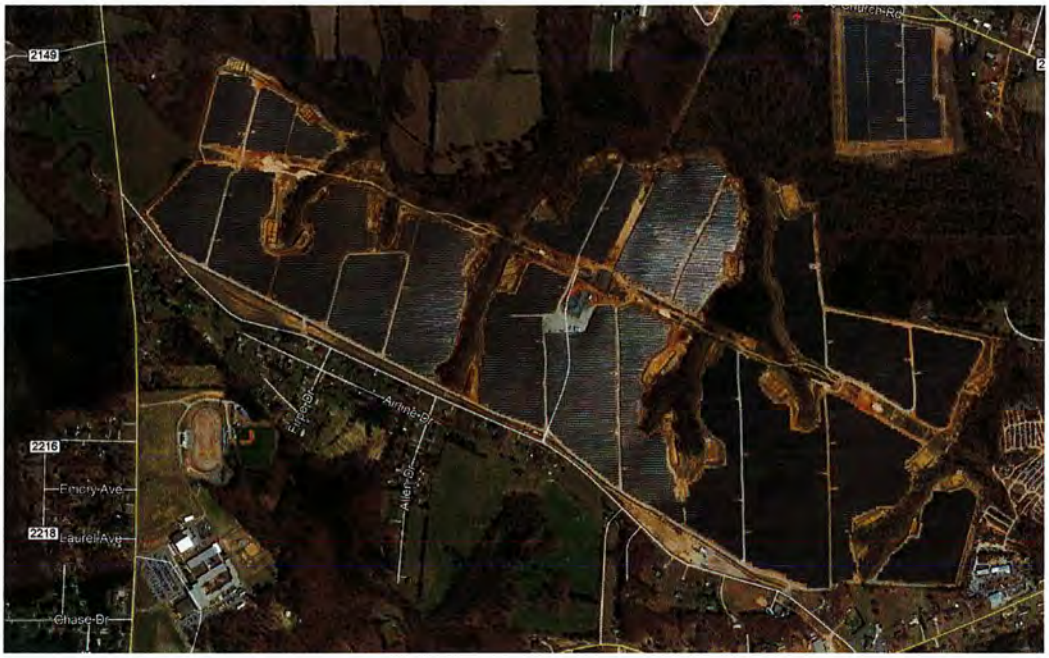
Total Land Size: 489 acres

Date Project Announced: November 24, 2015

Date Project Completed: December 2016

Output: 61 MW AC

The Rutherford Solar Farm is located in unincorporated Rutherford County, NC. The solar farm was developed by Cypress Creek Renewables and went operational in December 2016. Southern Power and Turner Renewable Energy purchased the farm on July 8, 2016. The solar farm has over 289,000 solar modules that can generate power for approximately 12,000 homes. Surrounding land uses consists of residential and forest land to the north, forest and commercial to the east, vacant and forest land to the south.



Real Estate Tax Info: Prior to development of the solar farm, the assessed value of the property was $466,200 and ownership paid $3,156. In 2018, after the completion of the solar farm, the assessed value of the property increased to $1,075,800 and taxes increased to $7,391.

We found one adjoining property that qualified for a paired sales analysis. The map on the following page displays the parcels adjacent to the solar farm parcel (outlined in red). Properties adjoining this parcel are numbered for subsequent analysis

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Solar Farm 6 Adjoining Properties

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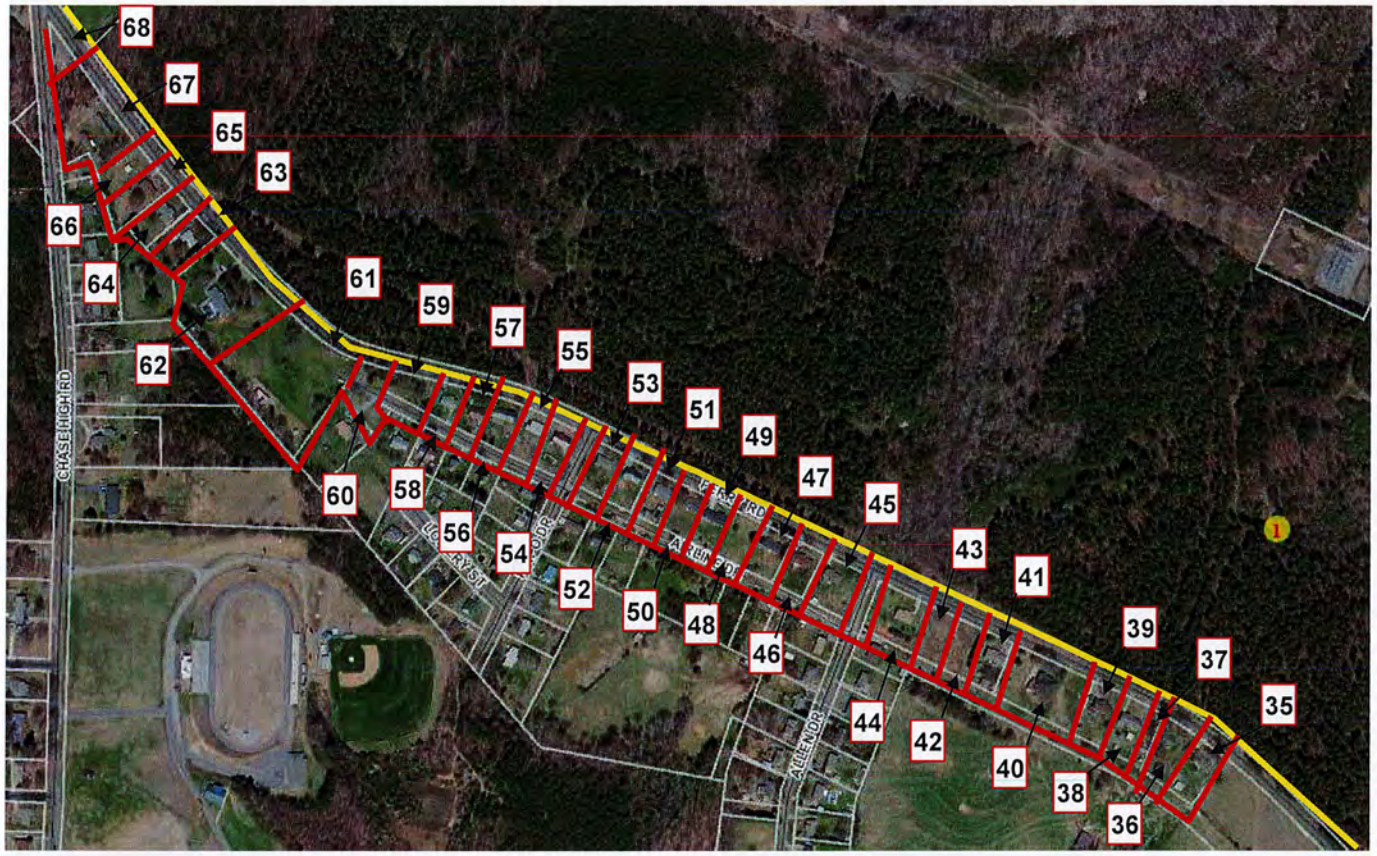

Solar Farm 6 Adjoining Properties

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Adjoining Property 46 (Test Area) was considered for a paired sales analysis. The property was analyzed as a single-family home use. It should be noted that this sale occurred after announcement but prior to construction. We spoke with the selling broker for this property, Brent Washburn, who confirmed that the solar farm had not been constructed at the time of sale, and *said the announcement had no impact on the sale.*

For Adjoining Property 46, we analyzed six Control Area Sales that sold within a reasonable time frame from the sale date of Adjoining Property 46. All Control area sales were adjusted for market conditions using regression analysis to identify the appropriate monthly market conditions adjustment.

The result of our analysis for Solar Farm 6 is presented below.

CohnReznick Paired Sale Analysis - Solar Farm 6		
	Potentially Impacted by Solar Farm	**Adjusted Median Price Per SF**
Control Area Sales (6)	No: Not adjoining solar farm	$55.39
Test Area Sale (Adjoining Property 46)	Adjoining solar farm	$53.46
Difference		**-3.48%**

Noting no significant price differential, with the Control Area Group having a slightly higher unit sale price than the unit sale price of the Test Area Sale. It should be noted that the mean unit sale price for the Control Area Group is $53.47 per square foot, a difference of 0.01%.

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SOLAR FARM 7: ELM CITY SOLAR FACILITY, WILSON COUNTY, NC

Coordinates: Latitude 35.781111, Longitude -77.846940

PINs: 3744-33-6758.01, 3744-11-9000.000

Total Land Size: 354 acres

Date Project Announced: September 15, 2014

Date Project Completed: March 2016

Output: 40 MW AC

The Elm City Solar Facility is located in Elm City, NC. Duke Energy owns the solar facility and selected HelioSage Energy to develop it. The solar farm went into operation in March 2016 and can generate power for approximately 7,000 homes. Surrounding land uses consist of residential and forest land to the north; forest and agricultural land to the east; vacant, forest, and residential land to the south; and residential, industrial, vacant, and forest land to the west.

Real Estate Tax Info: In 2016, prior to the property being assessed as a solar farm, the assessed value of the property was $206,220 and ownership paid $2,805 in real estate taxes. In 2017, the assessed value increased to $1,779,830 and the real estate tax increased to $24,506.

The map on the following page displays the parcels within the solar farm is located (outlined in red). Properties adjoining these parcels are numbered for subsequent analysis.

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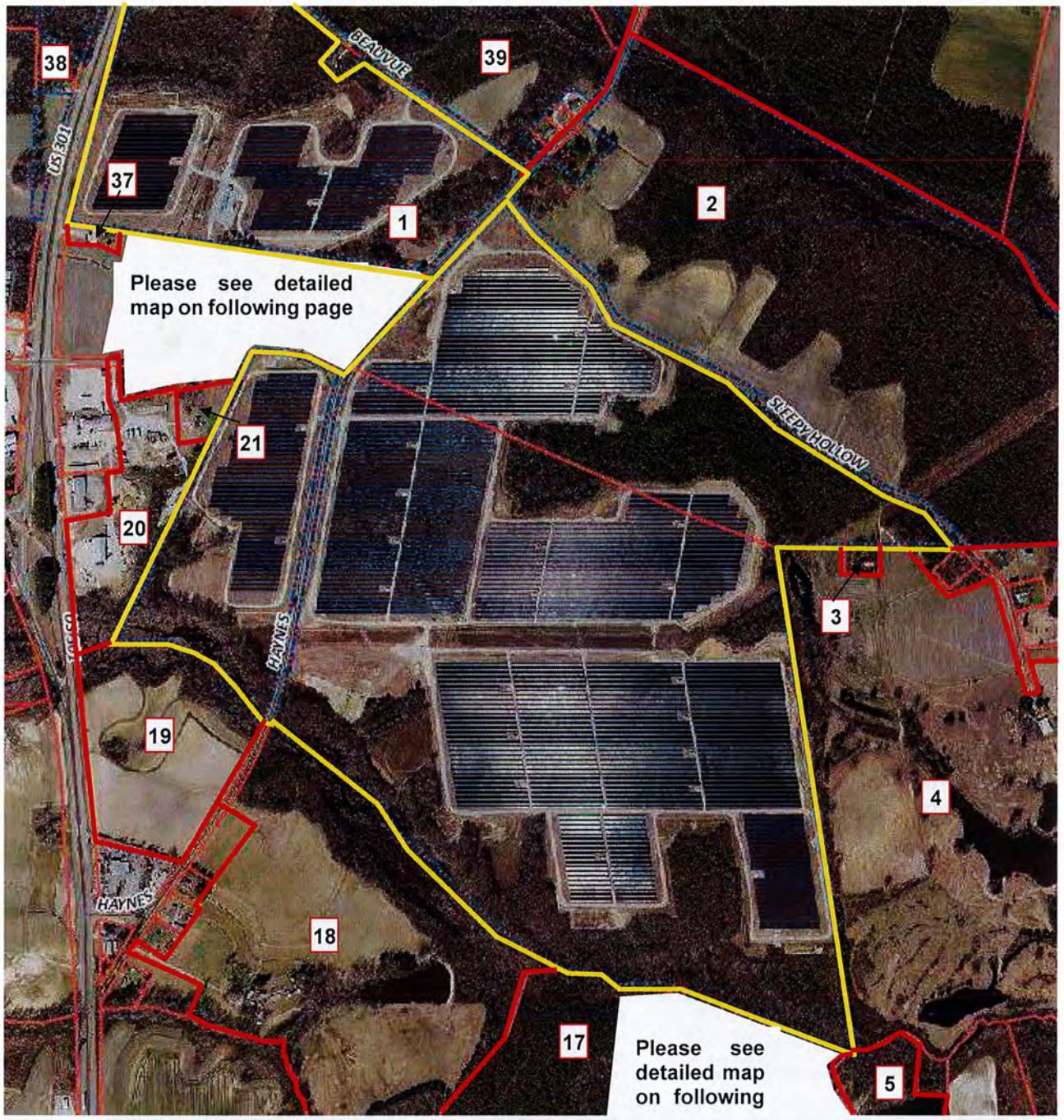

Solar Farm 7 Adjoining Properties

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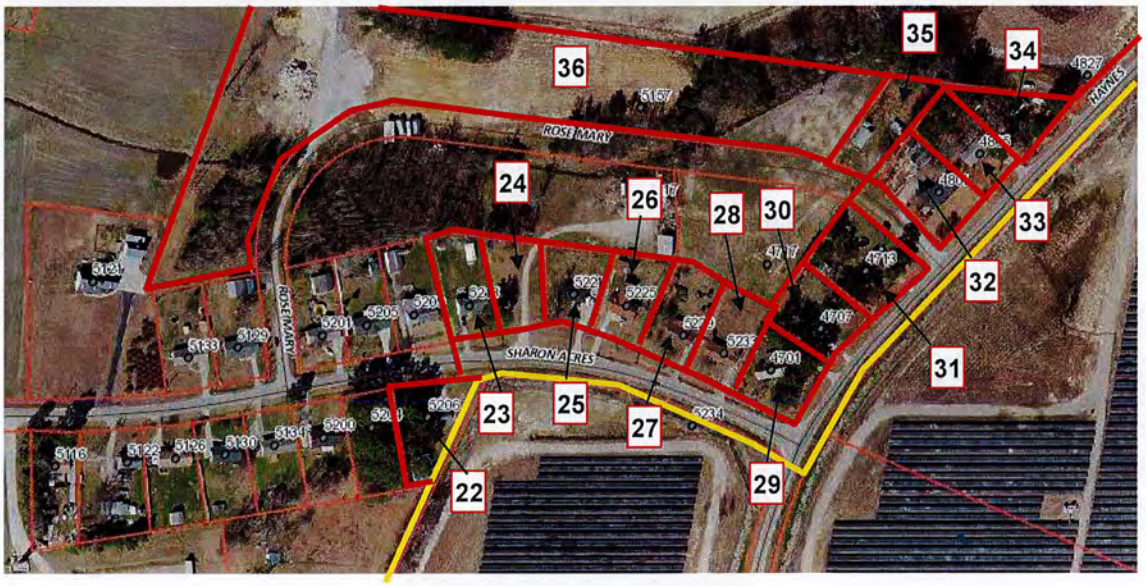
Solar Farm 7 Adjoining Properties



Solar Farm 7 Adjoining Properties

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Adjoining Property 23 (Test Area) was considered for a paired sales analysis, which sold after development of the solar farm. The property was analyzed as a single-family home use. We discussed this sale with Selby Brewer with First Wilson Properties, Inc who sold the property. He said the buyers "did not even mention" the solar farm, and he saw ***no market difference.***

For Adjoining Property 23, we analyzed eight Control Area Sales that sold within a reasonable time frame from the sale date of Adjoining Property 23. All Control area sales were adjusted for market conditions using regression analysis to identify the appropriate monthly market conditions adjustment.

The result of our analysis for Solar Farm 7 is presented below.

CohnReznick Paired Sale Analysis - Solar Farm 7		
	Potentially Impacted by Solar Farm	**Adjusted Median Price Per SF**
Control Area Sales (8)	No: Not adjoining solar farm	$55.49
Test Area Sale (Adjoining Property 23)	Adjoining solar farm	$56.60
Difference		**2.00%**

Noting no negative price differential, with the Test Area Sale having a slightly higher unit sale price than the median adjusted unit sale price of the Control Sales, it does not appear that Solar Farm 7 had any negative impact on adjacent property values.

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SOLAR FARM 8: WOODLAND SOLAR FARM, ISLE OF WIGHT COUNTY, VA

Coordinates: Latitude 36.890000, Longitude -76.611000

PINs: 41-02-004, 41-02-001, 41-02-001A, 41-02-005

Total Land Size: 204 acres

Date Project Announced: August 4, 2015

Date Project Completed: December 2016

Output: 19.0 MW AC

The Woodland Solar Farm is located in unincorporated Isle of Wight County and was developed by Dominion Virginia Power in 2016. This solar farm has a capacity of 19.0 Megawatts (MW) of power, which is enough to power 4,700 homes. The solar farm sits on 204 acres. Surrounding land uses consist of forests and agricultural land to the north, west, and south and residential and farm land to the east.

Real Estate Tax Info: The most recent real estate tax assessment on the Woodland Solar Farm occurred on July 1, 2015 and the assessed value of the solar farm was $3,021,600. The Isle of Wight county tax rate is $0.85 per $100 of value which results in a total property tax of $25,684. The county will reassess real estate values in 2019 and the new rates will take effect on July 1, 2019.

We found one adjoining property that qualified for a paired sales analysis. The map on the following page displays the parcels adjacent to the solar farm (outlined in red). Properties adjoining the solar farm parcels are numbered for subsequent analysis

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Solar Farm 8 Adjoining Properties

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Adjoining Property 3 (Test Area) was considered for a paired sales analysis, which sold during the construction period of the solar farm. The property was analyzed as a single-family home use.

For Adjoining Property 3, we analyzed nine Control Area Sales that sold within a reasonable time frame from the sale date of Adjoining Property 3. All Control area sales were adjusted for market conditions using regression analysis to identify the appropriate monthly market conditions adjustment.

The result of our analysis for Solar Farm 8 is presented below.

CohnReznick Paired Sale Analysis - Solar Farm 8		
	Potentially Impacted by Solar Farm	**Adjusted Median Price Per SF**
Control Area Sales (9)	No: Not adjoining solar farm	$140.81
Test Area Sale (Adjoining Property 3)	Adjoining solar farm	$144.63
Difference		**2.71%**

Noting no negative price differential, with the Test Area Sale having a slightly higher unit sale price than the median adjusted unit sale price of the Control Sales, it does not appear that Solar Farm 8 had any negative impact on adjacent property values.

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SUMMARY OF ADJOINING USES

The table below summarizes each subject solar farm's adjoining uses.

Solar Farm	Parcel ID	Owner	Acreage % of Surrounding Agricultural Uses	Acreage % of Surrounding Residential Uses	Acreage % of Surrounding Industrial Uses	Acreage % of Surrounding Office Uses	Acreage % of Surrounding Other Uses	Average Distance from Panels to Improvements
Lapeer	Multiple	DTE Electric Company & City of Lapeer	60.00%	35.00%	0.00%	0.00%	5.00%	260
North Star	Multiple	Renewable Energy Asset Co, L.L.C.	75.00%	15.00%	0.00%	0.00%	10.00%	350
Indy Solar III	49-13-13-113-001.000-200	Indy Solar Development LLC	97.70%	2.30%	0.00%	0.00%	0.00%	474
Grand Ridge	34-22-100-000; 32-22-101-000	Missel, Eugene / Dorothy Ttee	97.60%	1.40%	0.00%	0.00%	1.00%	553
Innovative Solar 42	0339-67-3814- 033900553698 033900751483 033900658763	Grays Greek Properties LLC	20.00%	25.00%	0.00%	0.00%	55.00%	405
Rutherford Farm	916036	Dogwood Creek Land Holdings, LLC	10.00%	40.00%	10.00%	0.00%	40.00%	180
Elm City Solar	3744-33-6758.01 3744-11-9000.000	NAN Properties LLC & Happy Trail Famrs LLC	20.00%	15.00%	10.00%	0.00%	50.00%	295
Woodland Solar	41-02-004 41-02-001 41-02-001A 41-02-005	Oliver Jesse V III & Oliver James N Jr	25.00%	5.00%	0.00%	0.00%	60.00%	615

Overall, the vast majority of the surrounding acreage for each comparable solar farm is made up of agricultural land, some of which have homesteads. There are also smaller single-family home sites that adjoin to the solar farms we have studied. We have found that these comparable solar farms are sound comparables in terms of adjoining uses, location, and size.

Ten of the eleven paired sales analyses reflected sales of property adjoining an existing solar farm in which the unit sale prices were effectively the same or higher (+0.24% percent to +7.46 percent) than the comparable Control Area sales that were not near any solar farms.

Considering this analysis, we conclude that there was no demonstrated measurable and consistent impact on adjacent property values that was associated with proximity to solar farms.

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MARKET COMMENTARY

Additionally, we have contacted market participants such as appraisers, brokers, and developers familiar with property values around solar farms in Michigan, Virginia, North Carolina, Illinois, and Indiana. Our conversations with these market participants are noted below.

Anne Pence of National Realty Centers in Lapeer, Michigan reported that "*the solar farm did not have any effect on the sale of this home*. The buyers did not care one bit about the solar field in the back yard. The fact is that you know no one is going to be behind you when they develop a solar farm in your back yard. And there they put up trees to block the view. My in-laws also actually live at end of that street, even though they haven't sold or put their house on market, they don't mind the solar panels either. It's not an eyesore. And another house sold on that block, a raised ranch home, and it sold with no problems."

Renee Voss of Coldwell Banker in Lapeer, Michigan noted the home she sold that backed to a solar farm *sold quickly with multiple offers*.

Josh Holbrook of The Brokaw Group in Lapeer, Michigan said that *solar farms had no impact on value and, in Lapeer, the community takes pride in the solar farm*.

Candace Rindahl of ReMax Results, a real estate broker with 16 years of experience in the North Branch, MN area, said that she has been in most of the homes surrounding the **North Star Solar Farm** and personally sold two of them. She reported that the neighboring homes sold at market rates comparable to other homes in the area not influenced by the solar farm, and they sold within 45 days of offering, at the end of 2017, *which was in line with the market.*

Dan Squires, Chisago County Tax Assessor, confirmed that the Chisago County Assessor's Office completed their own study on property values adjacent to and in close vicinity to the solar farm from January 2016 to October 2017. From the study, the assessor determined the residential homes adjacent to the **North Star Solar Farm** *were in line with the market and were appreciating at the same rate as the market.*[15]

We interviewed Missy Tetrick, a Commercial Valuation Analyst for the Marion County Indiana Assessor. She mentioned the **Indy Solar III sites** and stated that she saw *no impact on land or property prices from proximity to this solar farm*.

We spoke with Dorene Greiwe, Decatur County Indiana Assessor, and she stated that solar farms have only been in the county a couple of years but she has seen *no impact on land or property prices due to proximity to this solar farm*.

Connie Gardner, First Deputy Assessor for Madison County Indiana, stated that there are three solar farms in her county, and she has seen *no impact on land or property prices due to proximity to these solar farms*.

We spoke with Tara Shaver, Director of Administration for Marion County Assessor/Certified Assessor, and she stated that she has seen *no impact on land or property prices due to proximity to solar farms*.

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15 Chisago County Press: County Board Real Estate Update Shows No "Solar Effects" (11/03/2017)

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We spoke with Ken Surface, a Senior Vice President of Nexus Group. Nexus Group is a large valuation group in Indiana and has been hired by 20 counties in Indiana regarding property assessments. Mr. Surface is familiar with the solar farm sites in Harrison County (**Lanesville Solar Farm**) and Monroe County (**Ellettsville Solar Farm**) and stated he has noticed *no impact on property values from proximity to these sites*.

In Otter Creek Township, in LaSalle County, Illinois, we spoke with Viki Crouch, the Township Assessor, and she said that *there has been no impact on property values due to their proximity to the **Grand Ridge Solar Farm***.

We also contacted the selling broker of the Adjoining Property 12 of the **Grand Ridge Solar Farm**, Tina Sergenti with Coldwell Banker, and were told that the proximity of the solar farm had no impact on the marketing time or selling price of the property.

We spoke with Ken Crowley, Rockford Township Assessor in Winnebago County, Illinois, who stated that he has seen *no impact on property values in his township as an effect of proximity to the **Rockford Solar Farm***.

Jeff Benenhaley, Real Estate Appraiser Supervisor for Cumberland County, North Carolina, stated there are seven solar farms in his county and he *has seen no effects on property values in regards to proximity the solar farm.* Additionally, he mentioned that sales at the Roslin Farms West subdivision have been "brisk." This subdivision is in close proximity to the 531-acre Innovative Solar 46 solar farm.

Renee Davis, Tax Administrator for Bladen County, stated that she *has not seen any effect on property values due to proximity to a solar farm.*

We spoke with Jim Brown, an appraiser for Scotland County, North Carolina, who stated that he *has seen no effect on property values due to proximity to a solar farm.*

We spoke with Gary Rose, a tax assessor for Duplin County, North Carolina, who stated that *he has seen no effect on property values in regards to proximity to a solar farm.*

Kathy Renn, a property Valuation Manager for Vance County, North Carolina, stated that she has *not noticed any effect on property values due to proximity to a solar farm.*

Larry Newton, a Tax Assessor for Anson County, North Carolina, stated that there are six solar farms in the county ranging from 20 to 40 acres and he *has not seen any evidence that solar farms have had any effect on property values due to proximity to a solar farm.*

We spoke with Patrice Stewart, a Tax Administrator for Pasquotank County, North Carolina, and she has seen *no effect on land or residential property values due to proximity to the solar farms in Pasquotank County.*

We spoke with the selling broker of the Adjoining Property for **Elm City Solar**, Selby Brewer, who said the solar farm *did not impact the buyer's motivation.*

We spoke with Amy Carr, Commissioner of Revenue in Southampton County, Virginia, who stated that most of the solar farms are in rural areas but she *has not seen any effect or made any adjustments on property values.* They have evaluated the solar farm land considering a more intense use, which increased the assessed value.

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SOLAR FARM FACTORS ON HARMONY OF USE

The data from the solar farms included in this Property Value Impact Study, clearly indicates that solar farms are generally a compatible use with agricultural and residential uses.

The following section analyzes specific physical characteristics of solar farms and is based on research and our solar farm site visits.

Appearance: Most solar panels have a similar appearance to a greenhouse or single story residence and are usually not more than 10 feet high. As previously mentioned, developers generally surround a solar farm with a fence and often leave existing perimeter foliage, which minimizes the visibility of the farm. The physical characteristics of solar farms are compatible with adjoining agricultural and residential uses.

Sound: Solar panels in general are effectively silent and noise levels are minimal, like ambient noise. There are limited sound-emitting pieces of equipment on-site, which only produce a quiet hum. However, these sources are not typically heard outside the facility fence

Odor: Solar panels do not produce any byproduct or odor.

Traffic: The solar farm does not require regular maintenance from on-site employees and thus does not attract traffic during daily operation aside from the initial construction and installation of the farm.

Hazardous Material: Modern solar panel arrays are constructed to U.S. government standards. Testing shows that modern solar modules are both safe to dispose of in landfills, and are also safe in worst case conditions of abandonment or damage in a disaster.

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Innovative Solar 42 (2017)
Cumberland County, NC

Innovative Solar 42 (2019)
Cumberland County, NC

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Developer Built Home (2)
For Sale: $285,000 (118.70/sf)
Cumberland County, NC (adjacent to solar farm)

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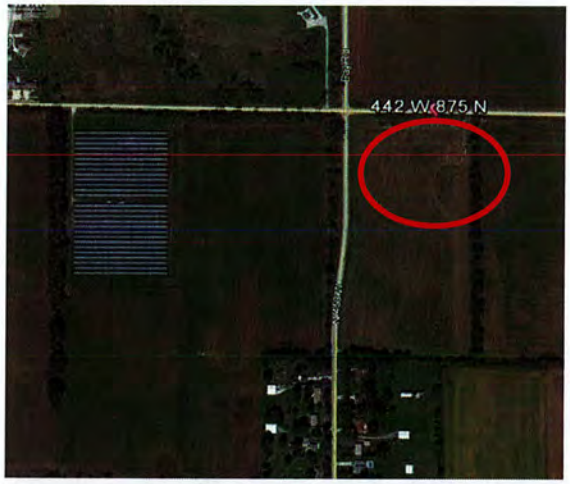

Portage Solar Farm, IN
October 2015

Portage Solar Farm, IN
October 2016

4,255 square foot estate home under construction, adjacent to Portage Solar Farm located in Indiana

On-site pond and attached garage (cost estimated at $465,000) April 2018

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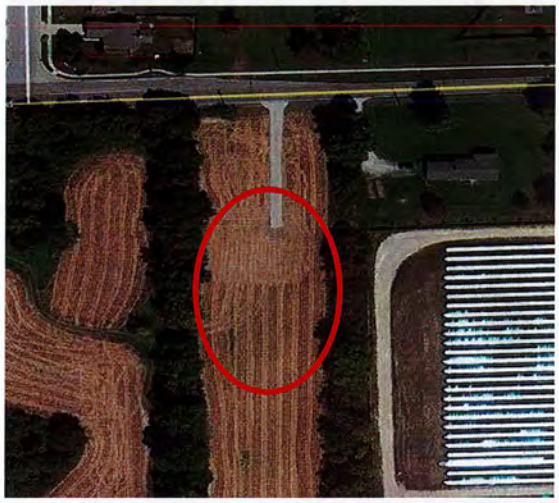
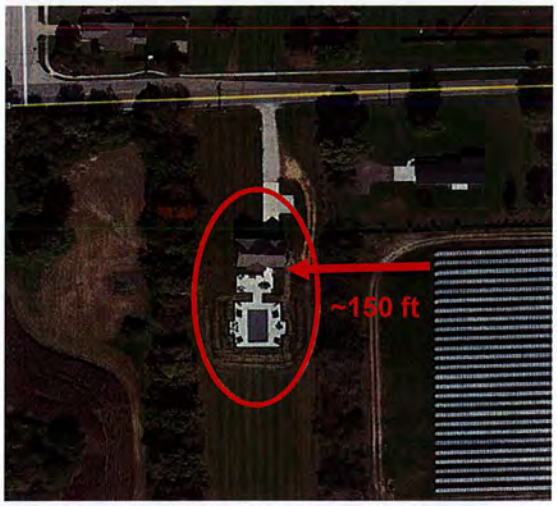
For Solar Farm 6, Dominion Indy III, the adjacent land to the west was acquired and subsequently developed with a large estate home – after the solar panels had been in operation for years.



Dominion Indy III Solar Farm (Solar Farm 3)
September 2014



Dominion Indy III Solar Farm (Solar Farm 3)
October 2016

Estate home adjacent to Dominion Indy III Solar Farm (Solar Farm 3)

On-site pool and attached garage (home cost estimated at $450,000 - October 2015)

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SUMMARY AND FINAL CONCLUSIONS

We have reviewed published methodology for measuring impact on property values as well as published studies that analyzed the impact of solar farms on property values. We have also interviewed market participants to give us additional insight as to how the market evaluates farm land and single family homes with views of the solar farm. These studies found little to no measurable and consistent difference between the Test Area Sales and the Control Area Sales attributed to the solar farms. We then can conclude that since the Adjoining Property Sales (Test Area Sales) were not adversely affected by their proximity to the solar farm, that properties surrounding other proposed solar farms operating in compliance with all regulatory standards will similarly not be adversely affected, in either the short or long term periods.

The purpose of this property value impact study is to determine whether the presence of a solar farm has caused a measurable and consistent difference in values between the Test Area Sales and the Control Area Sales. A summary of our findings for the paired sales analyses is presented below.

CohnReznick Solar Analysis Conclusions

	Solar Farm	Adj. Property Number	Adjoining Property Sale (Test Area) Price per Unit	Control Area Sales Median Price per Unit	Difference (%)	Feet from Panel to Lot	Feet from Panel to House	Impact Found
1	Lapeer Solar	Group 1 (3)	$86.12	$85.92	+0.24%	220	260	No Impact
		Group 2 (1)	$94.84	$91.80	+3.31%	165	250	No Impact
2	Northstar Solar	Group 1 (5)	$137.83	$136.00	+1.35%	100	350	No Impact
3	Indy Solar III	2	$8,210	$8,091	+1.47%	166	N/A	No Impact
	Indy Solar III	Group 1 (4)	$59.10	$57.84	+2.18%	157	230	No Impact
	Indy Solar III	Group 2 (5)	$72.15	$71.42	+1.03%	329	404	No Impact
4	Grand Ridge Solar	12	$79.90	$74.35	+7.46%	366	479	No Impact
5	Innovative Solar 42	11	$107.09	$100.32	+6.75%	175	405	No Impact
6	Rutherford Farm	46	$53.46	$55.39	-3.48%	135	180	No Impact
7	Elm City Solar	23	$56.60	$55.49	+2.00%	255	295	No Impact
8	Woodland Solar	3	$144.63	$140.81	+2.71%	420	615	No Impact
Average Variance in Sale Prices for Test to Control Areas					**+2.27%**			

24 Adjoining Test Sales studied and compared to 81 Control Sales

Based upon our examination, research, and analyses of the existing solar farm uses, the surrounding areas, and an extensive market database, we have concluded that ***no consistent negative impact has occurred to adjacent property that could be attributed to proximity to the adjacent solar farm***, with regard to unit sale prices or other influential market indicators. Additionally, in our workfile we have retained analyses of additional test subjects, each with their own set of matched control sales, which had consistent results, indicating no consistent and measurable impact on adjacent property values. This conclusion has been confirmed by numerous county assessors who have also investigated this use's potential impact on property values.

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If you have any questions or comments, please contact the undersigned. Thank you for the opportunity to be of service.

Respectfully submitted,

CohnReznick, LLP

Andrew R. Lines, MAI
Principal
Certified General Real Estate Appraiser
Illinois License No. #553.001841
Expires 9/30/2021

Patricia L. McGarr, MAI, CRE, FRICS
National Director - Valuation Advisory Services
Certified General Real Estate Appraiser
Michigan License No. 1201072979
Expires 7/31/2020
Virginia License No. 4001016998
Expires 3/31/2020
North Carolina License No. A8131
Expires 6/30/2020
Illinois License No. #553.000621
Expires 9/30/2021
Indiana License No. #CG49600131
Expires 6/30/2020

Sonia K. Singh
Senior Manager
Certified General Real Estate Appraiser
VA License No. #4001017615
Expires 3/31/2020
DC License No. #GA2002063
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CERTIFICATION

We certify that, to the best of our knowledge and belief:

1. The statements of fact and data reported are true and correct.
2. The reported analyses, findings, and conclusions in this consulting report are limited only by the reported assumptions and limiting conditions, and are our personal, impartial, and unbiased professional analyses, findings, and conclusions.
3. We have no present or prospective interest in the property that is the subject of this report and no personal interest with respect to the parties involved.
4. We have performed no services, as an appraiser or in any other capacity, regarding the property that is the subject of this report within the three-year period immediately preceding acceptance of this assignment.
5. We have no bias with respect to the property that is the subject of this report or the parties involved with this assignment.
6. Our engagement in this assignment was not contingent upon developing or reporting predetermined results.
7. Our compensation for completing this assignment is not contingent upon the development or reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value finding, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of this report.
8. Our analyses, findings, and conclusions were developed, and this report has been prepared, in conformity with the requirements of the Code of Professional Ethics and Standards of Professional Appraisal Practice of the Appraisal Institute, which includes the Uniform Standards of Professional Appraisal Practice (USPAP).
9. The use of this report is subject to the requirements of the Appraisal Institute relating to review by its duly authorized representatives.
10. Patricia L. McGarr, MAI, CRE, FRICS, Andrew R. Lines, MAI and Sonia K. Singh have viewed the exterior of all comparable data referenced in this report in person, via photographs, or aerial imagery.
11. We have not relied on unsupported conclusions relating to characteristics such as race, color, religion, national origin, gender, marital status, familial status, age, and receipt of public assistance income, handicap, or an unsupported conclusion that homogeneity of such characteristics is necessary to maximize value.
12. Michael F. Antypas, Amanda G. Edwards, Lydia D. Terry, TJ Schemmel, and Connor H. Martin, provided significant appraisal consulting assistance to the persons signing this certification.
13. We have experience in reviewing properties similar to the subject and are in compliance with the Competency Rule of USPAP.
14. As of the date of this report, Patricia L. McGarr, MAI, CRE, FRICS and Andrew R. Lines, MAI have completed the continuing education program of the Appraisal Institute.
15. As of the date of this report, Sonia K. Singh has completed the Standards and Ethics Education Requirements for Candidates of the Appraisal Institute.

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Expires 9/30/2021
Indiana License No. #CG49600131
Expires 6/30/2020

Sonia K. Singh
Senior Manager
Certified General Real Estate Appraiser
VA License No. #4001017615
Expires 3/31/2020
DC License No. #GA2002063
Expires 2/28/2020
MD License No. #33217
Expires 4/16/2021

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ASSUMPTIONS AND LIMITING CONDITIONS

This report is based on the following assumptions, except as otherwise noted in the report.

1. The title is marketable and free and clear of all liens, encumbrances, encroachments, easements and restrictions. The property is under responsible ownership and competent management and is available for its highest and best use.
2. There are no existing judgments or pending or threatened litigation that could affect the value of the property.
3. There are no hidden or undisclosed conditions of the land or of the improvements that would render the property more or less valuable. Furthermore, there is no asbestos in the property.
4. The revenue stamps placed on any deed referenced herein to indicate the sale price are in correct relation to the actual dollar amount of the transaction.
5. The property is in compliance with all applicable building, environmental, zoning, and other federal, state and local laws, regulations and codes.
6. The information furnished by others is believed to be reliable, but no warranty is given for its accuracy.

This report is subject to the following limiting conditions, except as otherwise noted in the report.

1. An appraisal is inherently subjective and represents our finding as to the value of the property appraised.
2. The conclusions stated in our appraisal apply only as of the effective date of the appraisal, and no representation is made as to the effect of subsequent events.
3. No changes in any federal, state or local laws, regulations or codes (including, without limitation, the Internal Revenue Code) are anticipated.
4. No environmental impact studies were either requested or made in conjunction with this appraisal, and we reserve the right to revise or rescind any of the value findings based upon any subsequent environmental impact studies. If any environmental impact statement is required by law, the appraisal assumes that such statement will be favorable and will be approved by the appropriate regulatory bodies.
5. Unless otherwise agreed to in writing, we are not required to give testimony, respond to any subpoena or attend any court, governmental or other hearing with reference to the property without compensation relative to such additional employment.
6. We have made no survey of the property and assume no responsibility in connection with such matters. Any sketch or survey of the property included in this report is for illustrative purposes only and should not be considered to be scaled accurately for size. The appraisal covers the property as described in this report, and the areas and dimensions set forth are assumed to be correct.
7. No finding is expressed as to the value of subsurface oil, gas or mineral rights, if any, and we have assumed that the property is not subject to surface entry for the exploration or removal of such materials, unless otherwise noted in our appraisal.
8. We accept no responsibility for considerations requiring expertise in other fields. Such considerations include, but are not limited to, legal descriptions and other legal matters such as legal title, geologic considerations such as soils and seismic stability, and civil, mechanical, electrical, structural and other engineering and environmental matters.

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9. The distribution of the total valuation in the report between land and improvements applies only under the reported highest and best use of the property. The allocations of value for land and improvements must not be used in conjunction with any other appraisal and are invalid if so used. The appraisal report shall be considered only in its entirety. No part of the appraisal report shall be utilized separately or out of context.
10. Neither all nor any part of the contents of this report (especially any conclusions as to value, the identity of the appraisers, or any reference to the Appraisal Institute) shall be disseminated through advertising media, public relations media, news media or any other means of communication (including without limitation prospectuses, private offering memoranda and other offering material provided to prospective investors) without the prior written consent of the person signing the report.
11. Information, estimates and findings contained in the report, obtained from third-party sources are assumed to be reliable and have not been independently verified.
12. Any income and expense estimates contained in the appraisal report are used only for the purpose of estimating value and do not constitute predictions of future operating results.
13. If the property is subject to one or more leases, any estimate of residual value contained in the appraisal may be particularly affected by significant changes in the condition of the economy, of the real estate industry, or of the appraised property at the time these leases expire or otherwise terminate.
14. No consideration has been given to personal property located on the premises or to the cost of moving or relocating such personal property; only the real property has been considered.
15. The current purchasing power of the dollar is the basis for the value stated in our appraisal; we have assumed that no extreme fluctuations in economic cycles will occur.
16. The value found herein is subject to these and to any other assumptions or conditions set forth in the body of this report but which may have been omitted from this list of Assumptions and Limiting Conditions.
17. The analyses contained in the report necessarily incorporate numerous estimates and assumptions regarding property performance, general and local business and economic conditions, the absence of material changes in the competitive environment and other matters. Some estimates or assumptions, however, inevitably will not materialize, and unanticipated events and circumstances may occur; therefore, actual results achieved during the period covered by our analysis will vary from our estimates, and the variations may be material.
18. The *Americans with Disabilities Act (ADA)* became effective January 26, 1992. We have not made a specific survey or analysis of any property to determine whether the physical aspects of the improvements meet the *ADA* accessibility guidelines. In as much as compliance matches each owner's financial ability with the cost to cure the non-conforming physical characteristics of a property, we cannot comment on compliance to *ADA*. Given that compliance can change with each owner's financial ability to cure non-accessibility, the value of the subject does not consider possible non-compliance. A specific study of both the owner's financial ability and the cost to cure any deficiencies would be needed for the Department of Justice to determine compliance.
19. The appraisal report is prepared for the exclusive benefit of the Client, its subsidiaries and/or affiliates. It may not be used or relied upon by any other party. All parties who use or rely upon any information in the report without our written consent do so at their own risk.
20. No studies have been provided to us indicating the presence or absence of hazardous materials on the subject property or in the improvements, and our valuation is predicated upon the assumption that the

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subject property is free and clear of any environment hazards including, without limitation, hazardous wastes, toxic substances and mold. No representations or warranties are made regarding the environmental condition of the subject property and the person signing the report shall not be responsible for any such environmental conditions that do exist or for any engineering or testing that might be required to discover whether such conditions exist. Because we are not experts in the field of environmental conditions, the appraisal report cannot be considered as an environmental assessment of the subject property.

21. The person signing the report may have reviewed available flood maps and may have noted in the appraisal report whether the subject property is located in an identified Special Flood Hazard Area. We are not qualified to detect such areas and therefore do not guarantee such determinations. The presence of flood plain areas and/or wetlands may affect the value of the property, and the value conclusion is predicated on the assumption that wetlands are non-existent or minimal.
22. CohnReznick is not a building or environmental inspector. CohnReznick does not guarantee that the subject property is free of defects or environmental problems. Mold may be present in the subject property and a professional inspection is recommended.
23. The appraisal report and value conclusion for an appraisal assumes the satisfactory completion of construction, repairs or alterations in a workmanlike manner.
24. CohnReznick an independently owned and operated company, has prepared the appraisal for the specific purpose stated elsewhere in the report. The intended use of the appraisal is stated in the General Information section of the report. The use of the appraisal report by anyone other than the Client is prohibited except as otherwise provided. Accordingly, the appraisal report is addressed to and shall be solely for the Client's use and benefit unless we provide our prior written consent. We expressly reserve the unrestricted right to withhold our consent to your disclosure of the appraisal report (or any part thereof including, without limitation, conclusions of value and our identity), to any third parties. Stated again for clarification, unless our prior written consent is obtained, no third party may rely on the appraisal report (even if their reliance was foreseeable).
25. The conclusions of this report are estimates based on known current trends and reasonably foreseeable future occurrences. These estimates are based partly on property information, data obtained in public records, interviews, existing trends, buyer-seller decision criteria in the current market, and research conducted by third parties, and such data are not always completely reliable. CohnReznick and the undersigned are not responsible for these and other future occurrences that could not have reasonably been foreseen on the effective date of this assignment. Furthermore, it is inevitable that some assumptions will not materialize and that unanticipated events may occur that will likely affect actual performance. While we are of the opinion that our findings are reasonable based on current market conditions, we do not represent that these estimates will actually be achieved, as they are subject to considerable risk and uncertainty. Moreover, we assume competent and effective management and marketing for the duration of the projected holding period of this property.
26. All prospective value estimates presented in this report are estimates and forecasts which are prospective in nature and are subject to considerable risk and uncertainty. In addition to the contingencies noted in the preceding paragraph, several events may occur that could substantially alter the outcome of our estimates such as, but not limited to changes in the economy, interest rates, and capitalization rates, behavior of consumers, investors and lenders, fire and other physical destruction, changes in title or

conveyances of easements and deed restrictions, etc. It is assumed that conditions reasonably foreseeable at the present time are consistent or similar with the future.

27. While this appraisal has been proofed for typographical errors, mathematical inaccuracies, and other discrepancies, others may be discovered in subsequent reviews performed by the client or their designated agent. We reserve the right to correct any typographical errors, mathematical inaccuracies, or other discrepancies that may affect the estimate of value contained in the report. These corrections will be corrected promptly upon the written request of the client.

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ADDENDUM A:
APPRAISER QUALIFICATIONS

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Patricia L. McGarr, MAI, CRE, FRICS, CRA

Principal,
National Director, Valuation Advisory Services

200 S. Wacker Drive, Suite 2600
Chicago, IL 60606
312-508-5802
patricia.mcgarr@cohnreznick.com
www.cohnreznick.com

Patricia L. McGarr, MAI, CRE, FRICS, CRA, is a principal and National Director of CohnReznick Advisory Group's Valuation Advisory Services practice who is based in Chicago. Pat's experience includes market value appraisals of varied property types for acquisition, condemnation, mortgage, estate, ad valorem tax, litigation, zoning, and other purposes. Pat has been involved in the real estate business since 1980. From June 1980 to January 1984, she was involved with the sales and brokerage of residential and commercial properties. Her responsibilities during this time included the formation, management, and training of sales staff in addition to her sales, marketing, and analytical functions. Of special note was her development of a commercial division for a major Chicago-area brokerage firm.

Since January 1984, Pat has been exclusively involved in the valuation of real estate. Her experience includes the valuation of a wide variety of property types including residential, commercial, industrial, and special purpose properties including such diverse subjects as quarries, marinas, riverboat gaming sites, shopping centers, manufacturing plants, and office buildings. She is also experienced in the valuation of leasehold and leased fee interests. Pat has performed appraisal assignments throughout Illinois and the Chicago Metropolitan area as well as Wisconsin, Indiana, Michigan, New York, New Jersey, California, Nevada, Florida, Utah, Texas, and Ohio. Pat has gained substantial experience in the study and analysis of the establishment and expansion of sanitary landfills in various metropolitan areas including the preparation of real estate impact studies to address criteria required by Senate Bill 172. She has also developed an accepted format for allocating value of a landfill operation between real property, landfill improvements, and franchise (permits) value.

Over the past several years, Pat has developed a valuation group that specializes in serving utility companies establish new utility corridors for electric power transmission and pipelines. This includes determining acquisition budgets, easement acquisitions, and litigation support. Pat has considerable experience in performing valuation impact studies on potential detrimental conditions and has studied properties adjoining landfills, waste transfer stations, stone quarries, cellular towers, schools, electrical power transmission lines, "Big Box" retail facilities, levies, properties with restrictive covenants, landmark districts, environmental contamination, airports, material defects in construction, stigma, and loss of view amenity for residential high rises.

Pat has qualified as an expert valuation witness in numerous local, state and federal courts.

Pat has participated in specialized real estate appraisal education and has completed more than 50 courses and seminars offered by the Appraisal Institute totaling more than 600 classroom hours, including real estate transaction courses as a prerequisite to obtaining a State of Illinois Real Estate Salesman License.

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Pat has earned the professional designations of Counselors of Real Estate (CRE), Member of the Appraisal Institute (MAI), Fellow of Royal Institution of Chartered Surveyors (FRICS) and Certified Review Appraiser (CRA). She is also a certified general real estate appraiser with active licenses in numerous states.

Education

- North Park University: Bachelor of Science, General Studies

Professional Affiliations

- National Association of Realtors
- CREW Commercial Real Estate Executive Women
- IRWA International Right of Way Association

Appointments

Appointed by the Governor in 2017 to the State of Illinois' Department of Financial & Professional Regulation's Real Estate Appraisal Board; Vice-Chairman - 2018

Licenses and Accreditations

- Member of the Appraisal Institute (MAI)
- Counselors of Real Estate, designated CRE
- Fellow of Royal Institution of Chartered Surveyors (FRICS)
- Certified Review Appraiser (CRA)
- Alabama State Certified General Real Estate Appraiser
- California State Certified General Real Estate Appraiser
- Connecticut State Certified General Real Estate Appraiser
- District of Columbia State Certified General Real Estate Appraiser
- Illinois State Certified General Real Estate Appraiser
- Indiana State Certified General Real Estate Appraiser
- Louisiana State Certified General Real Estate Appraiser
- Maryland State Certified General Real Estate Appraiser
- Massachusetts State Certified General Real Estate Appraiser
- Michigan State Certified General Real Estate Appraiser
- Nevada State Certified General Real Estate Appraiser
- New Jersey State Certified General Real Estate Appraiser
- New York State Certified General Real Estate Appraiser
- North Carolina State Certified General Real Estate Appraiser
- Pennsylvania State Certified General Real Estate Appraiser
- South Carolina State Certified General Real Estate Appraiser
- Tennessee State Certified General Real Estate Appraiser
- Texas State Certified General Real Estate Appraiser
- Virginia State Certified General Real Estate Appraiser
- Wisconsin State Certified General Real Estate Appraiser

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Andrew R. Lines, MAI

Principal – Real Estate Valuation, Valuation Advisory Services

200 S. Wacker Drive, Suite 2600
Chicago, IL 60606
312-508-5892
andrew.lines@cohnreznick.com
www.cohnreznick.com

Andrew R. Lines, MAI, is a partner for CohnReznick Advisory Group's Valuation Advisory practice who is based in the Chicago office and has been a CohnReznick employee for over six years. Andrew has been involved in the real estate business for more than 15 years and has performed valuations on a wide variety of real property types including single- and multi-unit residential (including LIHTC), student housing, office, retail, industrial, mixed-use and special purpose properties including landfills, waste transfer stations, marinas, hospitals, universities, telecommunications facilities, data centers, self- storage facilities, racetracks, CCRCs, and railroad corridors. He is also experienced in the valuation of leasehold, leased fee, and partial interests, as well as purchase price allocations (GAAP, IFRS and IRC 1060) for financial reporting.

Valuations have been completed nationwide for a variety of assignments including mortgage financing, litigation, tax appeal, estate gifts, asset management, workouts, and restructuring, as well as valuation for financial reporting including purchase price allocations (ASC 805), impairment studies, and appraisals for investment company guidelines and REIS standards. Andrew has qualified as an expert witness, providing testimony for eminent domain cases in the states of IL and MD. Andrew has also performed appraisal review assignments for accounting purposes (audit support), asset management, litigation and as an evaluator for a large Midwest regional bank.

Andrew has earned the professional designation of Member of the Appraisal Institute (MAI). He has also qualified for certified general commercial real estate appraiser licenses in Arizona, California, Maryland, Florida, Wisconsin, Georgia, Illinois, Indiana, New Jersey and New York. Temporary licenses have been granted in Connecticut, Colorado, Ohio, Pennsylvania, Idaho, Kansas, Minnesota and South Carolina.

Education

- Syracuse University: Bachelor of Fine Arts

Professional Affiliations

- Chicago Chapter of the Appraisal Institute - Alternate Regional Representative (2016 – Present)
- International Real Estate Management (IREM)
- National Council of Real Estate Investment Fiduciaries (NCREIF)

Community Involvement

- Fellows Alumni Network - World Business Chicago, Founding member
- Syracuse University Regional Council – Active Member
- Syracuse University Alumni Association of Chicago, Past Board member
- Chicago Friends School – Board Member

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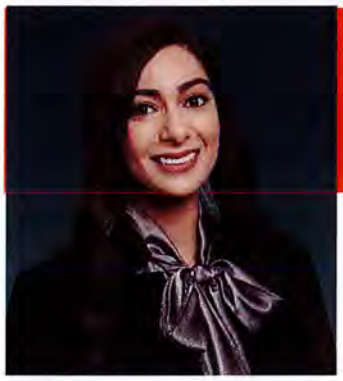

Sonia K. Singh

Senior Manager – Real Estate Valuation

7501 Wisconsin Avenue, Suite 400E
Bethesda, Maryland 20814
301-280-5193
sonia.singh@cohnreznick.com
www.cohnreznick.com

Sonia K. Singh is a senior manager in CohnReznick Advisory Group's Valuation Advisory practice who is based in the Bethesda office. She has been engaged in real estate valuation and other real estate consulting services for the past six years and has valued over $3.5 billion in real property.

She is adept at valuing a variety of real estate property types across the United States, including the following: right-of-way acquisitions for utility corridors; single- and multi-tenant industrial buildings; historic redevelopment projects; freestanding and retail shopping centers; trophy, class A office buildings; continuing care retirement communities; marinas; car dealerships; athletic clubs; boutique and luxury flag hotels with for-sale residential villas; and medical office buildings with a surgical center. Real estate appraisals have been prepared for pending litigation matters, estate planning, estate & gift tax purposes, and asset management.

In addition to real estate appraisal services, she has completed over 2,500 hours related to generating purchase price allocations for the acquisition of tangible and intangible assets for financial reporting purposes under the guidance of ASC 805 and early adoption of ASU 2017-01. Other experienced real estate consulting services include appraisal review and statistical analysis. Several impact studies were prepared by her and her peers measuring the impact, if any, of economic and environmental influences on property values.

Other services she provided significant assistance with include useful life analysis of real estate assets and valuation of minority interests for gift and estate tax purposes. In addition, she has developed several financial forecasts for proposed real estate development to illustrate profit measures as well as return on capital for potential investors.

Sonia is a certified general real estate appraiser with active licenses in the District of Columbia, Maryland, and Virginia. She has also completed the following actuarial exams: Probability, Financial Mathematics, and Models for Financial Economics.

Education

- University of Illinois: Bachelor of Science, Actuarial Science

Professional Affiliations and Licenses

- Appraisal Institute, Candidate for Designation
- Urban Land Institute, Associate Member
- Certified General Real Estate Appraiser Licenses in the States of DC, MD, and VA

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Michael F. Antypas

Senior Consultant, Valuation Advisory Services

7501 Wisconsin Avenue, Suite 400E
Bethesda, Maryland 20814
301-280-2741
michael.antypas@cohnreznick.com
www.cohnreznick.com

Michael Antypas is a senior consultant in CohnReznick Advisory Group's Valuation Advisory Services practice and is based in the Bethesda office. He has assisted other associates and appraisers in the valuation of a variety of retail shopping centers, hotels, market rate and restricted rental apartment properties, Class A office complexes with GSA tenants, mixed-use properties, developable land, and single family rental home portfolios owned by REITs. He has also completed solar farm impact studies, appraisals for eminent domain disputes, as well as purchase price allocations on various senior living facilities, medical office buildings, and retail centers. In addition, Michael is certified in working with Argus Enterprise valuation software. He is a practicing affiliate in the Appraisal Institute and is working towards becoming a Certified General Real Estate Appraiser.

He graduated from the Villanova School of Business in May of 2016. Some of his other experience working in Real Estate originated through interning with commercial brokers. Throughout his senior year in college, Michael interned with Newmark Grubb Knight Frank as a Capital Markets intern. There he helped create and revise many marketing packages for the firm's senior managing directors. He also assisted in developing underwriting models and projections for offering memorandums. He also worked with a boutique restaurant broker in Washington D.C, Papadopoulos Properties where he compiled market research for his client's use and surveyed prospective restaurants to gauge their interest in expanding to the Washington D.C. market.

Education

- Villanova University: Bachelor of Business Administration, Finance and Real Estate, Minor in Business Analytics

Certifications

- Argus Enterprise Certified

Professional Affiliations

- Appraisal Institute, Practicing Affiliate

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Amanda G. Edwards

Consultant, Valuation Advisory Services

200 S. Wacker Drive, Suite 2600
Chicago, Illinois 60606
312-508-5453
amanda.edwards@cohnreznick.com
www.cohnreznick.com

Amanda Edwards is a consultant in CohnReznick's Valuation Advisory Services practice group and is based in Chicago. Amanda has assisted other appraisers in the valuation of a variety of industrial properties, medical offices, hotels, multifamily properties, condominium developments, retail and mixed-use properties, developable and open space land, and single family subdivisions. She has also assisted with appraisals and continuing consulting for eminent domain litigation. Additionally, Amanda has provided audit support for Assurance clients of the firm. Amanda is a licensed Associate Real Estate Trainee Appraiser in Illinois, working toward becoming a Certified General Real Estate Appraiser.

Before joining CohnReznick, Amanda worked at the Inland Group of companies valuing properties and underwriting, as well as assisting in the closing of, commercial mortgage loans, nationwide. Property types included industrial, office, multi-family, retail, and hotel, with an emphasis on value-add properties and new construction projects. Amanda has also worked as a commercial lender for builder-developer housing at Fifth Third Bank, specializing in the Chicago metro area. She has also worked valuing senior housing properties and associated business models for acquisition purposes at a senior housing developer/operator.

Amanda has spent considerable time in the consulting environment, developing and conducting in-depth interviews for primary research in a variety of industries such as technology, financial institutions, and industrial manufacturing for private equity clients.

Education

- Bryn Mawr College, Bachelor of Arts

Other Affiliations

- Practicing Affiliate – Appraisal Institute
- Chicago Real Estate Council - Member

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Lydia D. Terry

Consultant, Valuation Advisory Services

200 S. Wacker Drive, Suite 2600
Chicago, IL 60606
312-508-5397
lydia.terry@cohnreznick.com
www.cohnreznick.com

Lydia Terry is a consultant in CohnReznick Advisory Group's Valuation Advisory Services practice and is based in the Chicago office. She has worked in real estate valuation, acquisition, and sales for the past 14 years, primarily working in residential mortgage collateral and eminent domain.

Prior to, and during the great recession (2004-2010), Lydia appraised residential properties in the California central valley (Bakersfield and Fresno) which saw some of the highest appreciation and declines in the country. As such, Lydia helped develop the industry standard market conditions report, which is now required for all FannieMae backed residential mortgages. Additionally, she has appraised farmland, gas stations, broadcast towers, commercial signs and other sites typically found along interstate and state highways.

Beyond appraisal, she has experience in mortgage debt negotiation, bank REOs, foreclosures and short sales.

Lydia is currently working towards obtaining her Certified General Real Estate Appraiser License.

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TJ Schemmel

Senior Consultant, Valuation Advisory Services

200 S. Wacker Drive, Suite 2600
Chicago, IL 60606
312-854-1270
TJ.Schemmel@cohnreznick.com
www.cohnreznick.com

TJ Schemmel is a senior consultant in CohnReznick Advisory Group's Valuation Advisory Services practice and is based in the Chicago office. His scope of experience includes assisting other appraisers in performing solar farm impact studies and various special use appraisals. He is currently working towards obtaining his Associate Real Estate Trainee Appraisal License.

Prior to joining CohnReznick, TJ was a financial analyst at Avison Young, specializing in office tenant representation and land development. Over the five years in this position, he participated in office lease negotiations and real estate transactions for companies ranging in size from small start-ups to large multinational corporations. His diverse skill set allowed him to help numerous teams at Avison Young close more than $150 million of lease transactions. He also supported the land development team on numerous multifamily and office projects for Chicago based investors.

Education

- University of Cincinnati: Bachelor of Business Administration

Other Affiliations

- Routes to Success, Incorporated (HOBY Ohio West) – Board President
- Chicago Tutoring - Associate Board Member

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Connor H. Martin

Consultant, Valuation Advisory Services

200 S. Wacker Drive, Suite 2600
Chicago, Illinois 60606
312-508-5399
connor.martin@cohnreznick.com
www.cohnreznick.com

Connor Martin is a consultant in CohnReznick's Valuation Advisory Services practice group and is based in Chicago, IL. Connor has assisted other appraisers in the valuation of a variety of properties, including but not limited to, office, retail, condominium developments and mixed-use developments. Additionally, Connor has aided with eminent domain and solar farm litigation. Connor is a licensed Associate Real Estate Trainee Appraiser in Illinois, working toward becoming a Certified General Real Estate Appraiser.

Before joining CohnReznick, Connor worked on the Valuation and Advisory Services group at Jones Lang LaSalle's Chicago headquarters, specializing in net lease portfolios in the Midwest for private equity firms, large financial institutions, and private investors.

During his time at Ohio State's Fisher College of Business, Connor completed both the Real Estate and Urban Planning specialization and the Marketing specialization. During his senior year, he worked as an Intern on Colliers International's Brokerage team, operating as an active broker and assisting with the incubation of the Healthcare Department. Connor also worked on Kaufman Development's Finance Analysis team, where he developed underwriting models and site selection analyses.

Education

- The Ohio State University – Fisher College of Business, Bachelor of Science

Professional Designations

- Associate Real Estate Trainee Appraiser in Illinois

Other Affiliations

- Practicing Affiliate – Appraisal Institute

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ADDENDUM B:
SOIL MAPS

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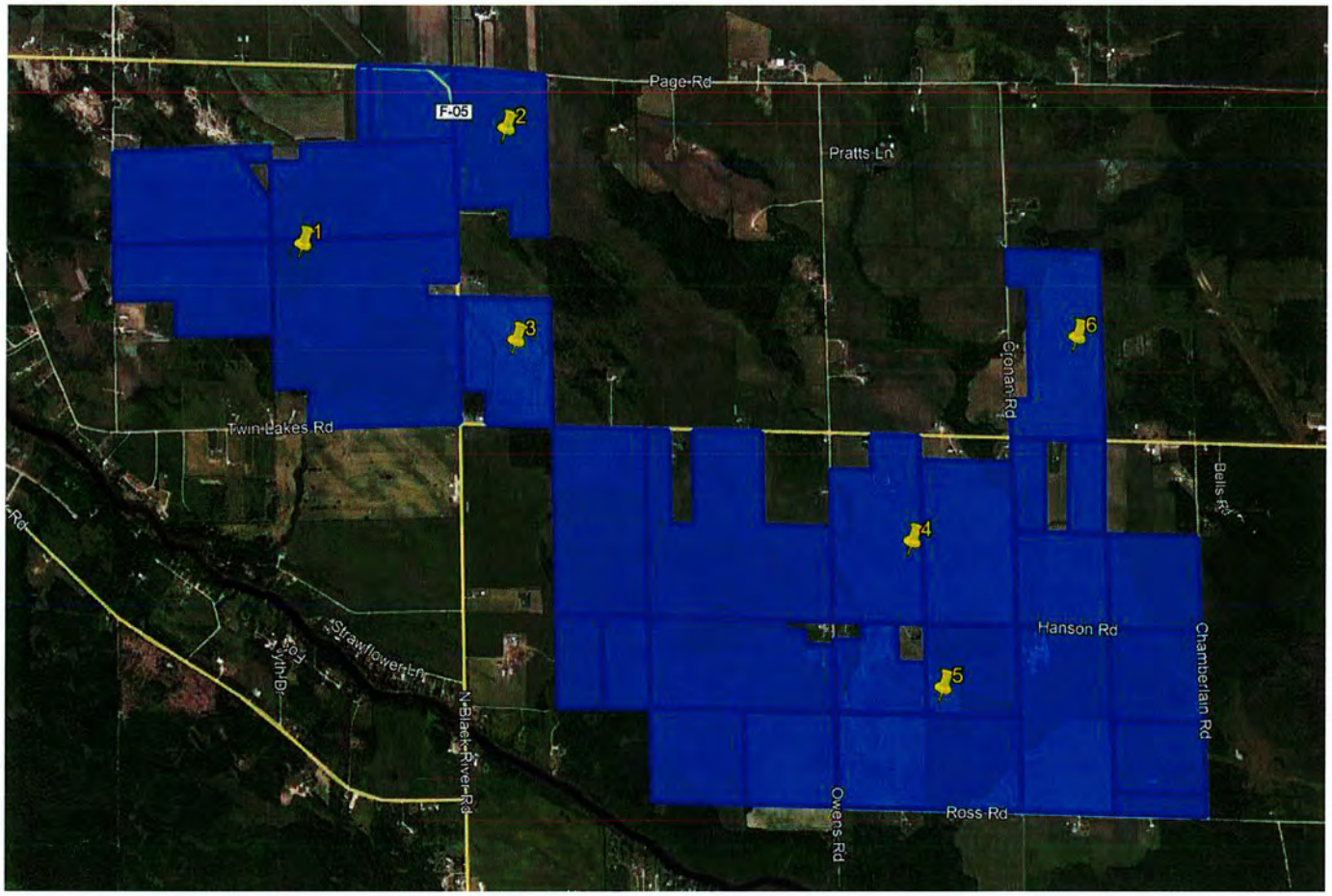
Soil Map Key



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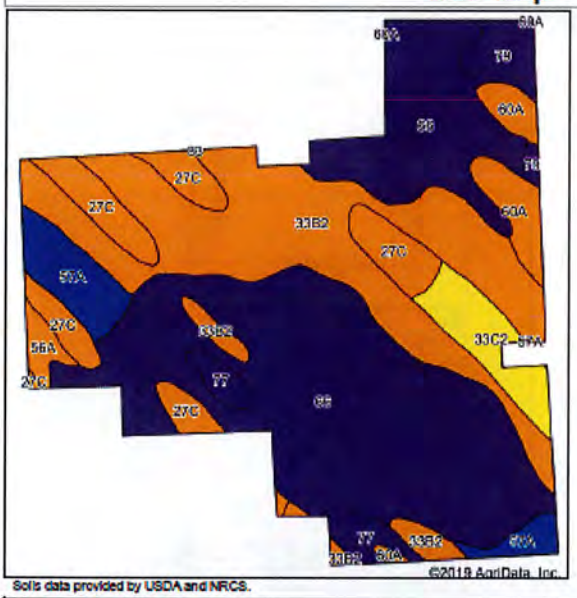
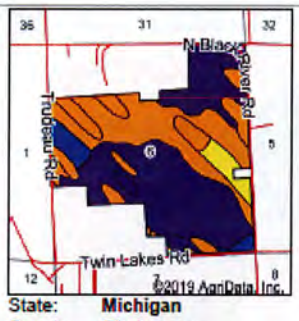
Map 1

Soils Map





State: Michigan
County: Cheboygan
Location: 6-36N-1E
Township: Grant
Acres: 378.36
Date: 2/4/2020

Soils data provided by USDA and NRCS.

Maps Provided By: surety

Area Symbol: MI031, Soil Area Version: 15

Code	Soil Description	Acres	Percent of field	Non-Irr Class Legend	Non-Irr Class *c	Alfalfa hay	Bromegrass hay	Bromegrass alfalfa hay	Corn	Corn silage	Dry beans	Oats	Red clover hay	Trefoil hay	Winter wheat	*n NCCPI Overall	*n NCCPI Corn	*n NCCPI Small Grains	*n NCCPI Soybeans
66	Pinconning mucky loamy sand	177.51	46.9%		Vw											18	11	2	18
33B2	Ontonagon silty clay loam, 2 to 6 percent slopes, eroded	98.48	26.0%		IIIe		1	2.4	75	14		75	2.3	2.6	37	34	34	32	34
27C	Cheboygan loamy sand, 6 to 12 percent slopes	32.46	8.6%		IIIe	3.8	2.3	3.5	65	11		65			30	28	28	25	19
57A	Brimley very fine sandy loam, 0 to 3 percent slopes	18.09	4.8%		IIw	4		4	95	16	40	85			48	57	57	51	55
33C2	Ontonagon silty clay loam, 6 to 18 percent slopes, eroded	15.19	4.0%		IVe		0.6						2	2		32	32	30	31
60A	Rudyard loam, 0 to 3 percent slopes	13.73	3.6%		IIIw		1.2					80		2.6		38	38	29	38

Code	Soil Description	Acres	Percent of field	Non-Irr Class Legend	Non-Irr Class *c	Alfalfa hay	Bromegrass hay	Bromegrass alfalfa hay	Corn	Corn silage	Dry beans	Oats	Red clover hay	Trefoil hay	Winter wheat	*n NCCPI Overall	*n NCCPI Corn	*n NCCPI Small Grains	*n NCCPI Soybeans
79	Charity fine sandy loam	9.60	2.5%		Vw											6	5	2	6
77	Bruce fine sandy loam	9.35	2.5%		Vw											22	14	3	22
56A	Riggsville loamy sand, 0 to 3 percent slopes	3.95	1.0%		IIIw	3.5	1.6	2.5	80	18		85	2.5			41	41	28	29
					Weighted Average	0.6	0.5	1.1	30.5	5.5	1.9	33	0.7	0.9	14.5	*n 26.2	*n 22.7	*n 16.5	*n 25.2

*n: The aggregation method is "Weighted Average using major components"
*c: Using Capabilities Class Dominant Condition Aggregation Method

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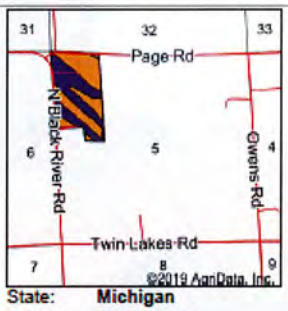
Map 2

Soils Map



State: **Michigan**
County: **Cheboygan**
Location: **5-36N-1E**
Township: **Grant**
Acres: **59.31**
Date: **2/4/2020**

Soils data provided by USDA and NRCS.

Area Symbol: MI031, Soil Area Version: 15

Code	Soil Description	Acres	Percent of field	Non-Irr Class Legend	Non-Irr Class *c	Alfalfa hay	Bromegrass hay	Bromegrass alfalfa hay	Corn	Corn silage	Oats	Trefoil hay	Winter wheat	*n NCCPI Overall	*n NCCPI Corn	*n NCCPI Small Grains	*n NCCPI Soybeans
60A	Rudyard loam, 0 to 3 percent slopes	30.80	51.9%		IIIw		1.2				80	2.6		38	38	29	38
79	Charity fine sandy loam	27.13	45.7%		Vw									6	5	2	6
37C	Emmet sandy loam, 6 to 12 percent slopes	0.65	1.1%		IIIe	3.6		2.5	70	14	60		35	42	42	32	36
27C	Cheboygan loamy sand, 6 to 12 percent slopes	0.39	0.7%		IIIe	3.8	2.3	3.5	65	11	65		30	28	28	25	19
37B	Emmet sandy loam, 1 to 6 percent slopes	0.34	0.6%		IIe	3.8		2.6	80	15	75		40	43	43	33	37
					Weighted Average	0.1	0.6	0.1	1.7	0.3	43.1	1.4	0.8	*n 23.4	*n 22.9	*n 16.7	*n 23.2

*n: The aggregation method is "Weighted Average using major components"
*c: Using Capabilities Class Dominant Condition Aggregation Method

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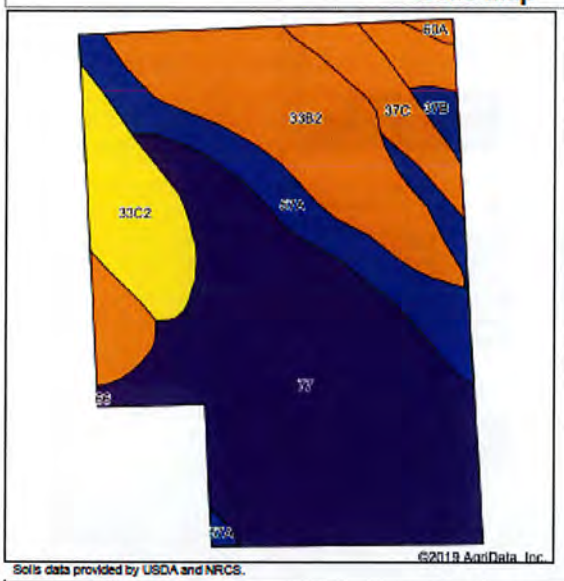
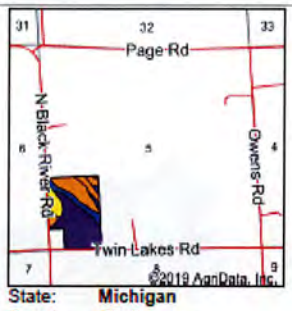
Map 3

Soils Map





State: Michigan
County: Cheboygan
Location: 5-36N-1E
Township: Grant
Acres: 46.35
Date: 2/4/2020

Soils data provided by USDA and NRCS.

Area Symbol: MI031, Soil Area Version: 15

Code	Soil Description	Acres	Percent of field	Non-Irr Class Legend	Non-Irr Class *c	Alfalfa hay	Bromegrass hay	Bromegrass alfalfa hay	Corn	Corn silage	Dry beans	Oats	Red clover hay	Trefoil hay	Winter wheat	*n NCCPI Overall	*n NCCPI Corn	*n NCCPI Small Grains	*n NCCPI Soybeans
77	Bruce fine sandy loam	21.96	47.4%		Vw											22	14	3	22
33B2	Ontonagon silty clay loam, 2 to 6 percent slopes, eroded	11.10	23.9%		IIIe		1	2.4	75	14		75	2.3	2.6	37	34	34	32	34
57A	Brimley very fine sandy loam, 0 to 3 percent slopes	5.27	11.4%		IIIw	4		4	95	16	40	85			48	57	57	51	55
33C2	Ontonagon silty clay loam, 6 to 18 percent slopes, eroded	4.25	9.2%		IVe		0.6						2	2		32	32	30	31
37C	Emmet sandy loam, 6 to 12 percent slopes	2.38	5.1%		IIIe	3.6		2.5	70	14		60			35	42	42	32	36
37B	Emmet sandy loam, 1 to 6 percent slopes	1.21	2.6%		IIe	3.8		2.6	80	15		75			40	43	43	33	37
Code	Soil Description	Acres	Percent of field	Non-Irr Class Legend	Non-Irr Class *c	Alfalfa hay	Bromegrass hay	Bromegrass alfalfa hay	Corn	Corn silage	Dry beans	Oats	Red clover hay	Trefoil hay	Winter wheat	*n NCCPI Overall	*n NCCPI Corn	*n NCCPI Small Grains	*n NCCPI Soybeans
60A	Rudyard loam, 0 to 3 percent slopes	0.18	0.4%		IIIw		1.2					80		2.6		38	38	29	38
					Weighted Average	0.7	0.3	1.2	34.4	6.3	4.5	33	0.7	0.8	17.2	*n 31.4	*n 27.6	*n 20.3	*n 30.6

*n: The aggregation method is "Weighted Average using major components"
*c: Using Capabilities Class Dominant Condition Aggregation Method

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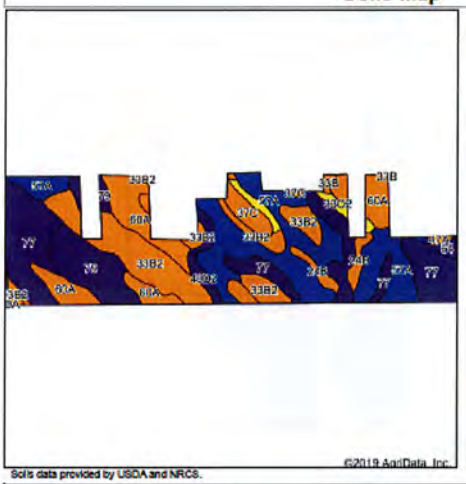
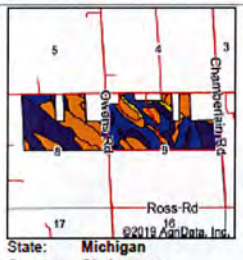
Map 4

Soils Map





State: Michigan
County: Cheboygan
Location: 9-36N-1E
Township: Grant
Acres: 430.88
Date: 2/4/2020

Soils data provided by USDA and NRCS.

Area Symbol: MI031, Soil Area Version: 15

Code	Soil Description	Acres	Percent of field	Non-Irr Class Legend	Non-Irr Class *c	Alfalfa hay	Bromegrass hay	Bromegrass alfalfa hay	Corn	Corn silage	Dry beans	Kentucky bluegrass	Oats	Red clover hay	Trefoil hay	Winter wheat	*n NCCPI Overall	*n NCCPI Corn	*n NCCPI Small Grains	*n NCCPI Soybeans
57A	Brimley very fine sandy loam, 0 to 3 percent slopes	108.01	25.1%		IIw	4		4	95	16	40		85			48	57	57	51	55
77	Bruce fine sandy loam	99.60	23.1%		Vw												22	14	3	22
33B2	Ontonagon silty clay loam, 2 to 6 percent slopes, eroded	78.04	18.1%		IIIe		1	2.4	75	14			75	2.3	2.6	37	34	34	32	34
60A	Rudyard loam, 0 to 3 percent slopes	57.49	13.3%		IIIw		1.2						80		2.6		38	38	29	38
79	Charity fine sandy loam	40.02	9.3%		Vw												6	5	2	6
37C	Emmet sandy loam, 6 to 12 percent slopes	10.86	2.5%		IIIe	3.6		2.5	70	14			60			35	42	42	32	36

Code	Soil Description	Acres	Percent of field	Non-Irr Class Legend	Non-Irr Class *c	Alfalfa hay	Bromegrass hay	Bromegrass alfalfa hay	Corn	Corn silage	Dry beans	Kentucky bluegrass	Oats	Red clover hay	Trefoil hay	Winter wheat	*n NCCPI Overall	*n NCCPI Corn	*n NCCPI Small Grains	*n NCCPI Soybeans
40D2	Ontonagon silty clay, 12 to 25 percent slopes, eroded	9.64	2.2%		VIe												28	28	24	24
24B	Ocqueoc fine sand, 0 to 6 percent slopes	9.24	2.1%		IIIs	3.5		2.5	70	12			70				38	38	31	28
33C2	Ontonagon silty clay loam, 6 to 18 percent slopes, eroded	8.06	1.9%		IVe		0.6							2	2		32	32	30	31
27C	Cheboygan loamy sand, 6 to 12 percent slopes	3.91	0.9%		IIIe	3.8	2.3	3.5	65	11			65			30	28	28	25	19
64	Burleigh mucky sand	2.80	0.6%		Vw												12	11	2	12
33B	Ontonagon silty clay loam, 2 to 6 percent slopes	1.69	0.4%		IIIe		1	2.4	80	15			75	2.3	2.6	40	41	40	41	40
47A	Ingalls loamy sand, 0 to 3 percent slopes	1.52	0.4%		IIIw	3.5		2.5	85	14		3	75			40	38	38	27	27
				Weighted Average		1.2	0.4	1.6	41.9	7.4	10	*-	49.7	0.5	0.9	20.2	*n 34.9	*n 32.9	*n 26.4	*n 33.8

*n: The aggregation method is "Weighted Average using major components"
*c: Using Capabilities Class Dominant Condition Aggregation Method

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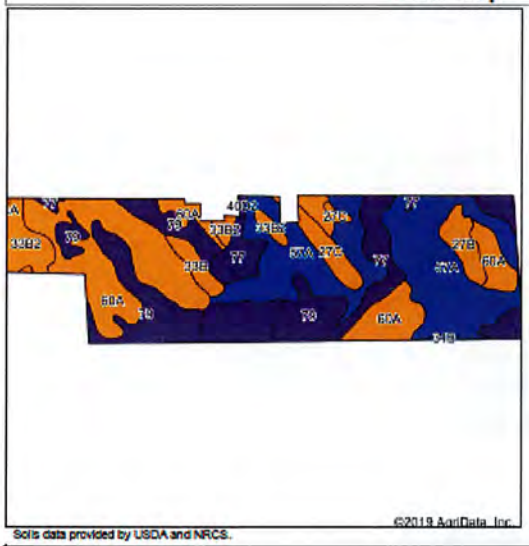
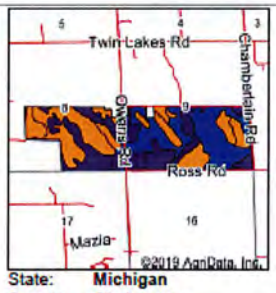
Map 5

Soils Map





State: Michigan
County: Cheboygan
Location: 8-36N-1E
Township: Grant
Acres: 487.78
Date: 2/4/2020

Soils data provided by USDA and NRCS.

Area Symbol: MI031, Soil Area Version: 15

Code	Soil Description	Acres	Percent of field	Non-Irr Class Legend	Non-Irr Class *c	Alfalfa hay	Bromegrass hay	Bromegrass alfalfa hay	Corn	Corn silage	Dry beans	Oats	Red clover hay	Trefoil hay	Winter wheat	*n NCCPI Overall	*n NCCPI Corn	*n NCCPI Small Grains	*n NCCPI Soybeans
57A	Brimley very fine sandy loam, 0 to 3 percent slopes	147.27	30.2%		IIw	4		4	95	16	40	85			48	57	57	51	55
60A	Rudyard loam, 0 to 3 percent slopes	121.81	25.0%		IIIw		1.2					80		2.6		38	38	29	38
79	Charity fine sandy loam	79.04	16.2%		Vw											6	5	2	6
77	Bruce fine sandy loam	72.35	14.8%		Vw											22	14	3	22
33B2	Ontonagon silty clay loam, 2 to 6 percent slopes, eroded	29.17	6.0%		IIIe		1	2.4	75	14		75	2.3	2.6	37	34	34	32	34
27C	Cheboygan loamy sand, 6 to 12 percent slopes	14.50	3.0%		IIIe	3.6	2.3	3.5	65	11		65			30	26	26	25	19
27B	Cheboygan loamy sand, 0 to 6 percent slopes	13.07	2.7%		IIIs	3.6	2.3	3.5	75	12		70			35	29	29	23	20
Code	Soil Description	Acres	Percent of field	Non-Irr Class Legend	Non-Irr Class *c	Alfalfa hay	Bromegrass hay	Bromegrass alfalfa hay	Corn	Corn silage	Dry beans	Oats	Red clover hay	Trefoil hay	Winter wheat	*n NCCPI Overall	*n NCCPI Corn	*n NCCPI Small Grains	*n NCCPI Soybeans
33B	Ontonagon silty clay loam, 2 to 6 percent slopes	8.56	1.8%		IIIe		1	2.4	80	15		75	2.3	2.6	40	41	40	41	40
40D2	Ontonagon silty clay, 12 to 25 percent slopes, eroded	1.07	0.2%		VIe											26	26	24	24
34B	Alcona very fine sandy loam, 0 to 6 percent slopes	0.94	0.2%		IIe	3.6		2.5	65	13	25	75			35	56	56	38	44
					Weighted Average	1.4	0.5	1.6	38.7	6.6	12.1	55.4	0.2	0.9	19.3	*n 35.5	*n 34.1	*n 27.5	*n 34.3

*n: The aggregation method is "Weighted Average using major components"
*c: Using Capabilities Class Dominant Condition Aggregation Method

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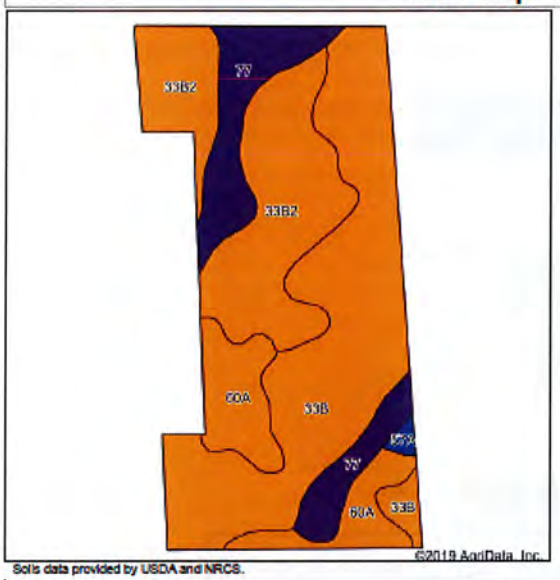
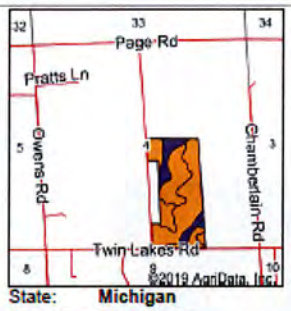
Map 6

Soils Map



Soils data provided by USDA and NRCS.



State: **Michigan**
County: **Cheboygan**
Location: **4-36N-1E**
Township: **Grant**
Acres: **67.02**
Date: **2/4/2020**

Maps Provided By: surety

Area Symbol: MI031, Soil Area Version: 15

Code	Soil Description	Acres	Percent of field	Non-Irr Class Legend	Non-Irr Class *c	Alfalfa hay	Bromegrass hay	Bromegrass alfalfa hay	Corn	Corn silage	Dry beans	Oats	Red clover hay	Trefoil hay	Winter wheat	*n NCCPI Overall	*n NCCPI Corn	*n NCCPI Small Grains	*n NCCPI Soybeans
33B	Ontonagon silty clay loam, 2 to 6 percent slopes	28.80	43.0%		IIIe		1	2.4	80	15		75	2.3	2.6	40	41	40	41	40
33B2	Ontonagon silty clay loam, 2 to 6 percent slopes, eroded	19.59	29.2%		IIIe		1	2.4	75	14		75	2.3	2.6	37	34	34	32	34
77	Bruce fine sandy loam	9.74	14.5%		Vw											22	14	3	22
60A	Rudyard loam, 0 to 3 percent slopes	8.46	12.6%		IIIw		1.2					80		2.6		38	38	29	38
57A	Brimley very fine sandy loam, 0 to 3 percent slopes	0.43	0.6%		IIw	4		4	95	16	40	85			48	57	57	51	55
				Weighted Average		*-	0.9	1.8	56.9	10.6	0.3	64.8	1.7	2.2	28.3	*n 35.9	*n 34.3	*n 31.4	*n 35.5

*n: The aggregation method is "Weighted Average using major components"
*c: Using Capabilities Class Dominant Condition Aggregation Method

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EXHIBIT G

EMERGENCY SAFETY AND FIRE PLAN

EMERGENCY, SAFETY AND FIRE PLAN

A written emergency response plan (ERP) would be developed in accordance with OSHA standards and other applicable federal, state and local occupational safety and health laws, regulations and standards. Contractor(s) would include the ERP in contractor's project safety plan (PSP). Contractor(s) will train all contractor representatives on the provisions of the ERP. The ERP would be consistent with applicable laws and regulations governing such emergencies. Safety of personnel is top priority of the construction, operations and contractor management staff. Required staff training will include environmental, cultural and health and safety training. Annual familiarity training would be conducted with the local authorities, including police and fire departments, as appropriate. Annual First Aid and CPR training would also be conducted. There would be continuing training conducted for all Project personnel on current industry issues as well as new changes to safety equipment and procedures. The construction, operations and contractor management staff will work to implement safety recommendations and assist in conducting site inspections.

In the event of an emergency response, the following measures would be conducted by the individual discovering the emergency. First, personnel would assess the situation to determine potential safety concerns and hazards posed to personnel and the environment. Protective actions for life safety are the first priority. All personnel would be moved or evacuated to a safe location. Access will be prohibited to the affected area to other employees or contractors. The final ERP will include a site-specific evacuation plan and a shelter in place plan. The second priority is the stabilization of the incident. Anyone who witnesses an unusual situation that cannot be corrected routinely must notify their supervisor immediately and, while respecting the jurisdiction and ability, he/she must take the necessary measures to control the situation until the arrival of the Emergency Coordinator or supervisor. The construction contractor will notify the Project construction supervisor and environmental monitor of any emergencies immediately. The Project will notify federal, state, and local authorities, as appropriate.

If an emergency threatens public or worker health:

The contractor will make appropriate notification(s) to emergency personnel.

- Emergency: 911
- [Other to be determined]

FIRE PREVENTION AND SUPPRESSION PROTOCOLS

Pursuant to the Code of Federal Regulations, Title 29, Part 1926.24 (29 CFR 1926.24), the Project operator shall be responsible for the development and maintenance of an effective fire protection and prevention program at the jobsite through all phases of construction, repair, alteration, or demolition work. The Project operator shall ensure the availability of the fire protection and suppression equipment required by this regulation. In addition to compliance with 29 CFR 1926.24 and BIO-1, the Project operator and or EPC contractor shall present basic fire-prevention training to all personnel working at the project site, and shall maintain documentation of all training and implement the following:

- All employees, contractors and employees of contractors to do everything reasonable within their power, expertise, and assessment of human safety to prevent and suppress fires resulting from Project construction or maintenance activities on the lands to be occupied under this permit. In case of fire suppressed by the operator, the operator will report its occurrence to the Fire Department. The operator is responsible for all suppression costs and resource damage rehabilitation costs resulting from the suppression of any fire resulting from its operations and practices.
- The operator is responsible to ensure that each employee, subcontractor, or any other individual or company working on the project site is aware of the provisions of this fire plan, is familiar with the location and proper use of firefighting equipment and conducts themselves in a fire-safe manner.
- No material will be disposed of by burning in open fires without a written permit.
- Exhaust systems of vehicles will have an acceptable muffler and will be in proper working condition. All motorized equipment and machinery will be equipped with spark arresters.
- Vehicles will be parked only in cleared areas.
- All smoking will be done only inside of vehicles or in areas cleared of flammable material.
- Fuels and flammable materials, if required, will be stored in accordance with the Hazardous Materials Plan and in accordance with all applicable state and federal laws.
- The proposed substation shall be equipped with fire extinguishers and other equipment sufficient to extinguish small fires.
- Welding operations are subject to the following additional provisions: There will be no welding when winds are over 15 miles per hour; and o Welding will occur only in areas cleared of all flammable vegetation and materials at a minimum radius of 30 feet from the welding operation.
- Fire rules shall be posted on the project bulletin board at the contractor's field office and areas visible to employees. All construction workers, plant personnel, and maintenance workers visiting the plant and/or transmission lines to perform maintenance activities shall receive training on the procedures to be followed in the event of a fire. Training records shall be maintained and be available for review.
- The Fire Department shall have access to the solar farm site. Access gates shall be a minimum of 12 feet to allow fire bulldozer access.
- Minimize fire risk by maintaining vegetation.

EXHIBIT H

VEGETATIVE MANAGEMENT PLAN

Preliminary Vegetation Management Plan

CHEBOYGAN SOLAR ENERGY PROJECT

CHEBOYGAN COUNTY, MICHIGAN

PREPARED FOR

Orion Renewable Energy
155 Grand Avenue, #706
Oakland, CA 94612

PREPARED BY

Lackawanna Executive Park
239 Main Street, Suite 301
Dickson City, PA 18519
www.shoener.com

February 11, 2020

Table of Contents

1 Introduction and Vegetation Management Plan Overview 1
1.1 Project Site Conditions 1
1.2 Vegetation Management Plan 1
1.3 Agency and Expert Group Coordination 2
2 Preliminary Plan Overview 2
2.1 Site Preparation 2
2.2 Seeding 2
2.3 Years 1–2 (Pre-Establishment) Maintenance 3
2.4 Long-Term Maintenance and Monitoring 3
3 References 4

List of Contributors

Ryan Pohle; Shoener Environmental, Inc.

Jeff Zirpoli: Shoener Environmental, Inc.

Isabel Gottlieb: Shoener Environmental, Inc.

1 INTRODUCTION AND VEGETATION MANAGEMENT PLAN OVERVIEW

Orion Renewable Energy Group, LLC (Orion) proposes to develop a solar photovoltaic energy facility, known as the Cheboygan Solar Project (Project), in Grant Township, Cheboygan County (County), Michigan on approximately 1,572 acres. The solar modules will be mounted on single-axis tracker tables that will following the path of the sun throughout the day. The Project is located southeast of the town of Cheboygan in a rural agricultural area consisting of hay, pasture and corn fields with scattered wood lots and wooded drainages.

This Preliminary Vegetation Management Plan (Plan) was developed to present an overview of the approach the Project proposes to employ that will avoid, minimize, and/or mitigate for impacts related to stormwater runoff/retention, soil quality, and vegetation resources resulting from Project development. Ultimately, the Plan will guide the development of the final, detailed vegetative management plan that the Project developer and operators will utilize to manage land cover within the proposed Project area.

1.1 PROJECT SITE CONDITIONS

The Project is in a rural setting, with the predominant land cover type within the Project Area consisting of agricultural fields, hay and pasture. Portions of the Project Area consist of forested land, primarily smaller patches of mixed and deciduous forests.

The Project area is within the U.S. Geologic Survey (USGS) 7.5' Manning topographic quadrangle. Topography within the Project area is relatively uniform and ranges from approximately 185 to 200 feet (ft; 56 to 61 meters [m]) above mean sea level. The highest elevations occur in the northwestern to the southeast corners of the Project area. The lower range of elevation occurs in the southwestern portions where the topography gently slopes downward toward the Black River.

1.2 VEGETATION MANAGEMENT PLAN

This preliminary Plan will provide the Township with information allowing an initial review of Project's proposed vegetation management plan. Ultimately, a final, detailed vegetation management plan will be developed based on this preliminary Plan to provide the Project with the information needed to implement vegetation management activities for the Project during construction, operations and maintenance.

The objectives of the Plan are to restore and maintain a healthy habitat with a diverse herbaceous native plant community, which is resistant to noxious weed invasions, within the Project site while preserving the land's aesthetic values to the fullest extent possible and allowing for safe and effective management and operations of the Project.

The plan is designed to reduce overall stormwater runoff, improve soil conditions at the site, and create habitat for pollinators (e.g., bees, butterflies) and local wildlife. In addition, there are long-term local community benefits from a native vegetative land cover. In contrast to a turf grass or graveled/rock land cover, nearby farmland can benefit in the from of increased insect pollinator activity which can, increase yields of crops (Walston et al. 2018). Furthermore, native vegetative land cover is likely to improve site conditions for potential future agriculture through improved water quality and retention, and improved soil structure and quality over time by replenishing soil nutrients often lost from long-term agricultural production (Schulte et al. 2017).

1.3 AGENCY AND EXPERT GROUP COORDINATION

This document will provide the Township with the information needed to evaluate the proposed Project's vegetation management plan. If appropriate, the final, detailed plan may be developed in consultation and cooperation with the Cheboygan County Conservation District, Michigan Department of Natural Resources (MIDNR), Michigan Department of Environment, Great Lakes and, Energy (EGLE) and other relevant agencies including organizations and/or non-profit groups experienced in native vegetation planting, establishment and maintenance.

2 PRELIMINARY PLAN OVERVIEW

2.1 SITE PREPARATION

1. The EGLE Soil Erosion and Sedimentation Control Program Part 91 (SESC) will be followed to control erosion and stormwater and to prevent the establishment of weedy species at the Project prior to seeding of mostly native plant seed mixes.
2. For areas within the Project with prior uses other than agriculture or with high prevalence of noxious weeds, control using herbicides may be advised, followed by one growing season of a temporary cover crop (e.g. oats, clover, etc.).
3. Native plant seedbeds will be established by disking/tilling followed by cultipacking or tracking perpendicular to slopes.

2.2 SEEDING

1. In areas with ground disturbance, areas previously used for row crop production, or following any herbicide treatment, seed mixes will be established to provide vegetation cover. Permanent seed mixes composed primarily of grasses will be established during the growing season (primarily between April and August). If any areas are seeded with native wildflower mixes, seeding may be delayed to the fall (October to December), as recommended (Xerces Society 2013).
    a. A mostly native seed mix will be broadcast over the site or mechanically spread between arrays and/or within the array perimeter.

b. Seed mixes and maintenance practices will be consistent with recommendations made by local/regional qualified natural resource professionals.
c. Seed mixes will be sourced from companies providing seed mixes native to the Project's region and will utilize locally sourced seed mixes where feasible.

2.3 YEARS 1–2 (PRE-ESTABLISHMENT) MAINTENANCE

1. Mowing will be employed to reduce weed growth in the first two growing seasons. Vegetation will be initially mowed to keep plants to a low height until native plants are well established, at which time mowing height will be increased to an appropriate height based on final panel design and height.
2. Appropriate herbicide treatments will be used only when deemed necessary to control woody plants and invasive weeds during the growing season and in accordance with EPA and applicable State and County guidelines.
3. Vegetation will be systematically monitored and maintained in the first two growing seasons to ensure establishment of native species.

2.4 LONG-TERM MAINTENANCE AND MONITORING

1. Mowing to curtail encroachment of woody species and weeds will occur as often as needed.
2. Aggressive or expansive species which reduce diversity may be controlled using a variety of mechanical or chemical methods.
3. The site will be evaluated for re-seeding annually to maintain appropriate ground cover throughout operations to adhere to the Michigan Department of Environment, Great Lakes and Energy (EGLE) Soil Erosion and Sedimentation Control Program Part 91 (SESC).

3 REFERENCES

[EGLE] Michigan Department of Environment, Great Lakes and Energy. Soil Erosion and Sedimentation Control Program Part 91

Schulte, L. et al. 2017. Prairie strips improve biodiversity and the delivery of multiple ecosystem services from corn–soybean croplands. Proceedings of the National Academy of Sciences 114(42): 11247-11252.

Walston, L. J., Mishra, S. K., Hartmann, H. M., Hlohowskyj, I., McCall, J., & Macknick, J. 2018. Examining the Potential for Agricultural Benefits from Pollinator Habitat at Solar Facilities in the United States. Environmental Science & Technology 52(13): 7566-7576.

Xerces Society for Invertebrate Conservation. 2013. Upper Midwest Pollinator Meadow Installation Guide and Checklist. Available at *<https://xerces.org/wp-content/uploads/2013/01/InstallGuideJobSheet_UpperMidwest_CnsrvCvr.pdf>. Accessed April 2019*.

Xerces Society for Invertebrate Conservation. 2017a. Pollinator Habitat Monitoring Form. Available at *<http://www.xerces.org/wp-content/uploads/2016/10/2017-003_PollHabMonitorForm_Jan2017_web.pdf>.* Accessed April 2019.

EXHIBIT I

STRUCTURAL SPECIFICATIONS

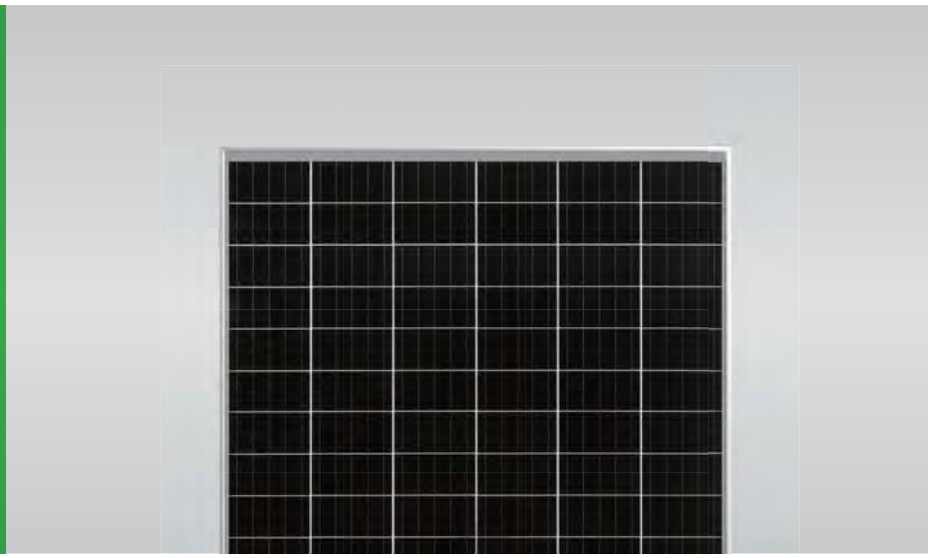
jinkosolar.us

Building Your Trust in Solar

Eagle Bifacial HC 72M G2 370-390 Watt

MONO PERC HALF CELL MODULE

Positive power tolerance of 0~+3%



KEY FEATURES

Innovative Solar Cells
5 busbar mono half cell technology

PID Free
World's 1st PID-free module

Higher Lifetime Power Yield
0.5% annual power degradation
30 year linear power warranty

Saving BOS Cost
Designed for high voltage systems of up to 1500 VDC, saving BOS cost

Higher power output
Module power increases 5-25% generally (per different reflective condition)
lower LCOE and higher IRR

Better low-light performance
Excellent performance in low-light environments
(e.g. early morning, dusk, and cloud, etc.)

Strengthened Mechanical Support
5400 Pa snow load, 2400 Pa wind load

- ISO9001:2008 Quality Standards
- ISO14001:2004 Environmental Standards
- OHSAS18001 Occupational Health & Safety Standards
- IEC61215, IEC61730 certified products

Nomenclature:

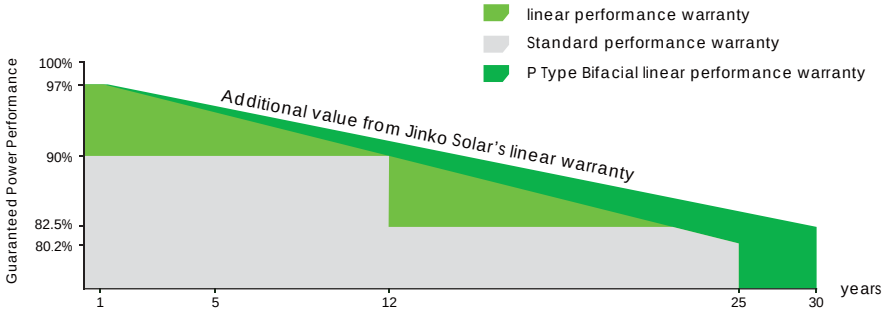
JKM390M-72H-BDVP

Code	Cell
null	Full
H	Half

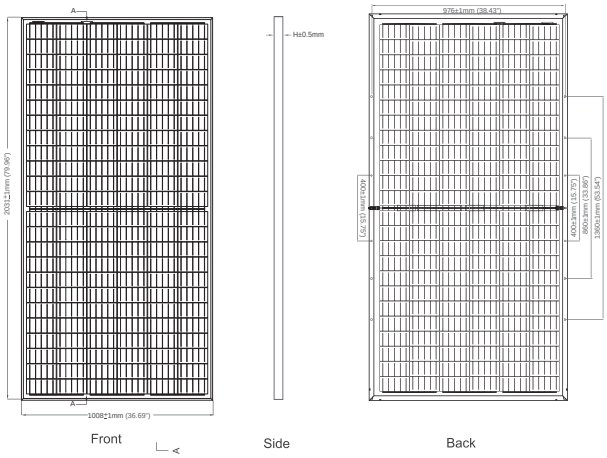
Code	Certification
null	N Type
P	P Type

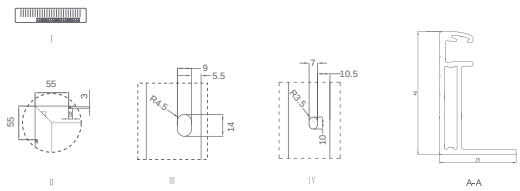
LINEAR PERFORMANCE WARRANTY

10 Year Product Warranty • 30 Year Linear Power Warranty
0.5% Annual Degradation Over 30 years

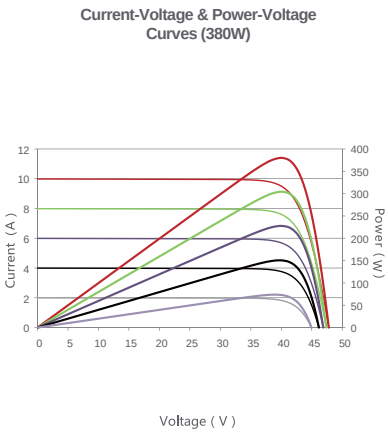


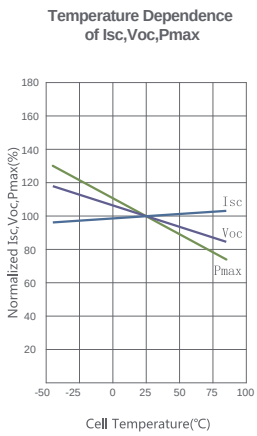
Engineering Drawings





Electrical Performance & Temperature Dependence





Mechanical Characteristics

Cell Type	Mono PERC Diamond Cell (158.75 x 158.75 mm)
No.of Half-cells	144 (6×24)
Dimensions	2031×1008×40mm (79.96×39.69×1.57 inch)
Weight	30.5 kg (67.2 lbs)
Front Glass	2.5mm, Anti-Reflection Coating
Back Glass	2.5mm heat strengthened glass
Frame	Anodized Aluminium Alloy
Junction Box	IP67 Rated
Output Cables	12 AWG, positive – 1400mm, negative - 1400mm or customized length

Packaging Configuration

(Two pallets = One stack)

26pcs/pallet, 52pcs/stack, 572pcs/40'HQ Container

SPECIFICATIONS

Module Type	JKM370M-72H-BDVP		JKM375M-72H-BDVP		JKM380M-72H-BDVP		JKM385M-72H-BDVP		JKM390M-72H-BDVP	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax)	370Wp	274Wp	375Wp	278Wp	380Wp	282Wp	385Wp	285Wp	390Wp	289Wp
Maximum Power Voltage (Vmp)	39.5V	35.9V	39.8V	36.2V	40.0V	36.4V	40.3V	36.6V	40.6V	36.8V
Maximum Power Current (Imp)	9.37A	7.64A	9.43A	7.69A	9.50A	7.75A	9.56A	7.80A	9.62A	7.86A
Open-circuit Voltage (Voc)	47.3V	43.5V	47.6V	43.8V	47.8V	44.0V	48.1V	44.2V	48.3V	44.4V
Short-circuit Current (Isc)	9.85A	7.98A	9.92A	8.03A	9.98A	8.08A	10.04A	8.13A	10.11A	8.18A
Module Efficiency STC (%)	18.07%		18.32%		18.56%		18.81%		19.05%	
Operating Temperature (℃)	-40℃~+85℃									
Maximum System Voltage	1500VDC(UL)									
Maximum Series Fuse Rating	20A									
Power Tolerance	0~+3%									
Temperature Coefficients of Pmax	-0.36%/℃									
Temperature Coefficients of Voc	-0.30%/℃									
Temperature Coefficients of Isc	0.05%/℃									
Nominal Operating Cell Temperature (NOCT)	45±2℃									

BIFACIAL OUTPUT-REARSIDE POWER GAIN

5%	Maximum Power (Pmax)	389Wp	394Wp	399Wp	404Wp	410Wp
	Module Efficiency STC (%)	18.98%	19.23%	19.49%	19.75%	20.00%
15%	Maximum Power (Pmax)	426Wp	431Wp	437Wp	443Wp	449Wp
	Module Efficiency STC (%)	20.78%	21.06%	21.35%	21.63%	21.91%
25%	Maximum Power (Pmax)	463Wp	469Wp	475Wp	481Wp	488Wp
	Module Efficiency STC (%)	22.59%	23.90%	23.20%	23.51%	23.81%

*STC: Irradiance 1000W/m² Cell Temperature 25°C AM=1.5

NOCT: Irradiance 800W/m² Ambient Temperature 20°C AM=1.5 Wind Speed 1m/s

* Power measurement tolerance: ± 3%

CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.

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JKM370-390M-72H-BDVP-F40-D2-US

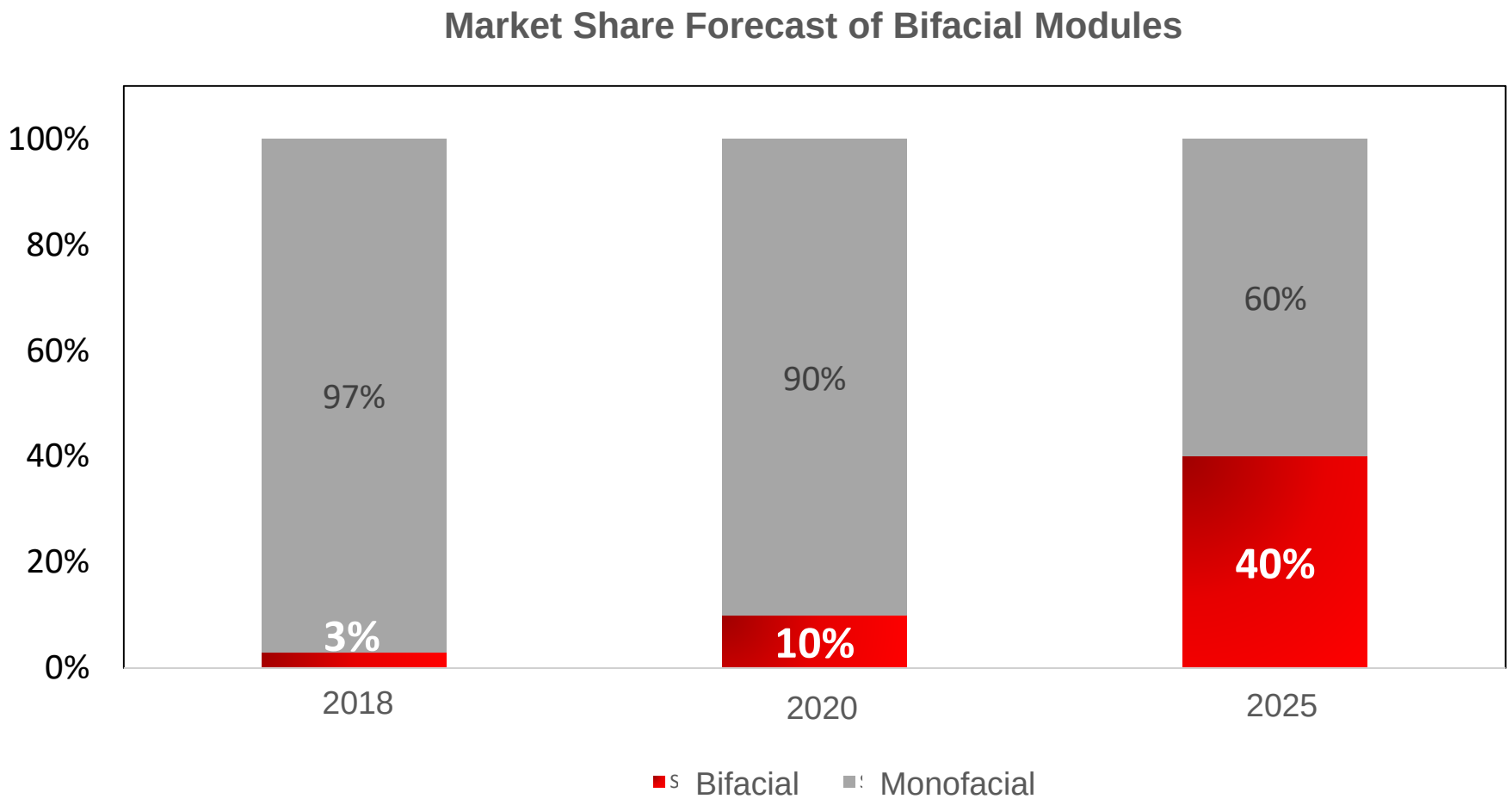
JinKO Solar

Building Your Trust in Solar

Bifacial Module with Transparent Backsheet

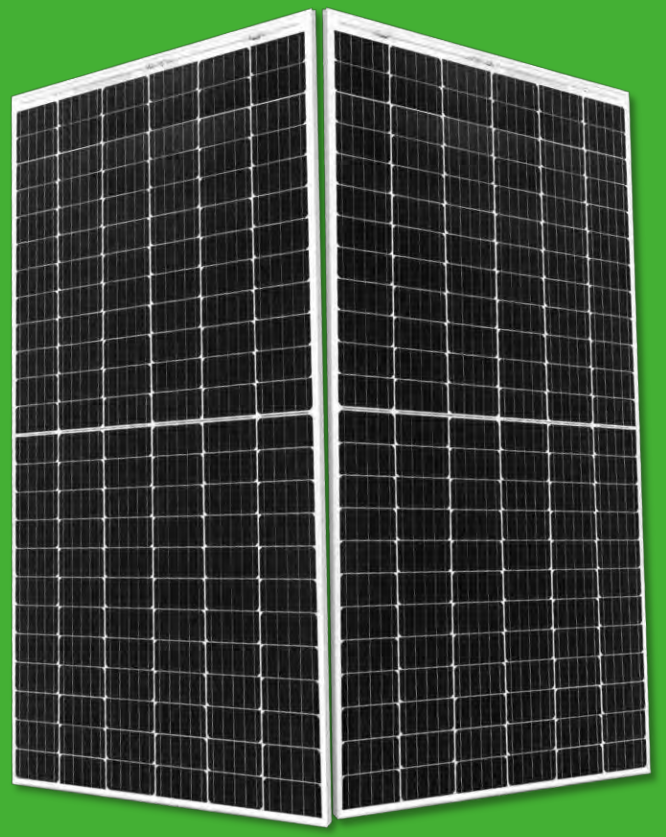
2019 January

Market Share Forecast of Bifacial Modules



Source: Bloomberg Bifacial Solar Modules See Both Sides

The market share of bifacial modules rises sharply from 2018 and will reach **40%** in 2025.

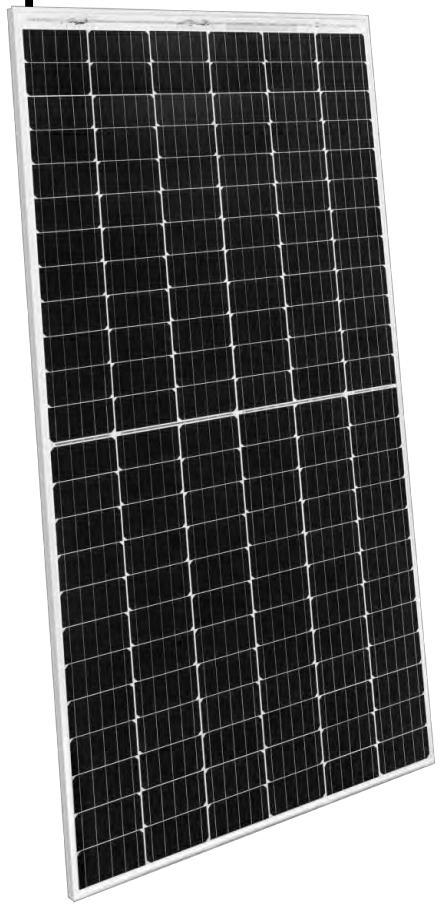


Bifacial with Transparent Backsheet

Multiple Benefits

Benefits

Bifacial with Transparent backsheet



Weight
Lighter

Installation
Standardized

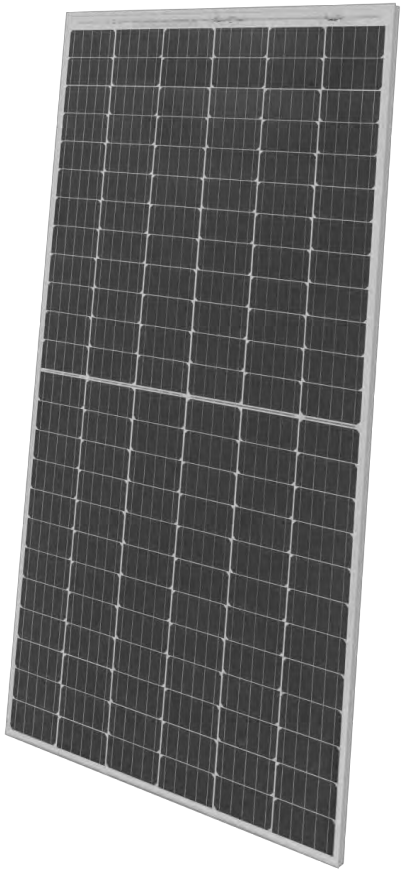
BOS Cost
Cheaper

Energy Gain
Equal

Warranty
30-year lifetime

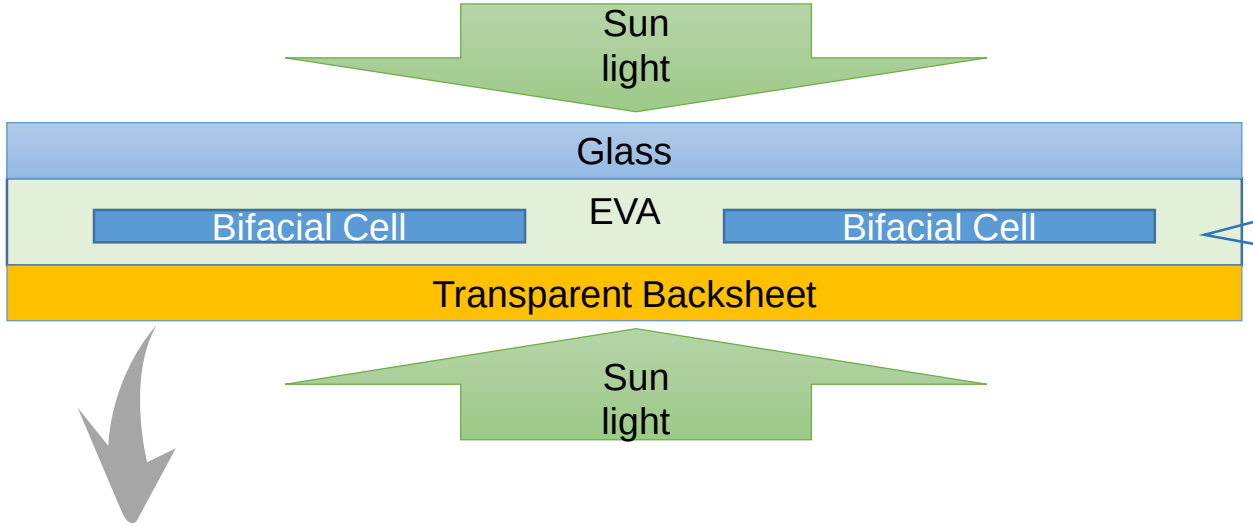
Vs

Bifacial with Dual glass

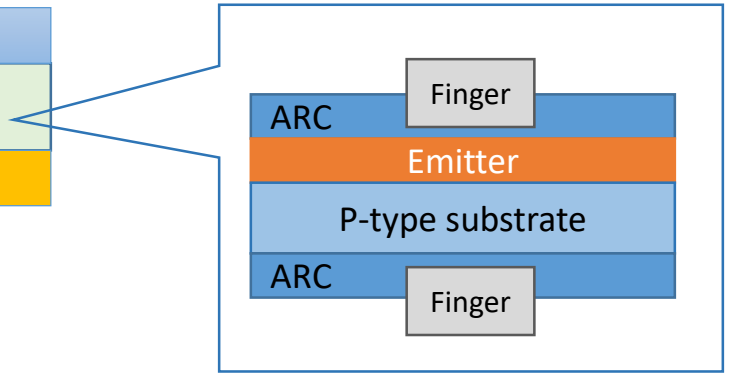


Dupont technology combined

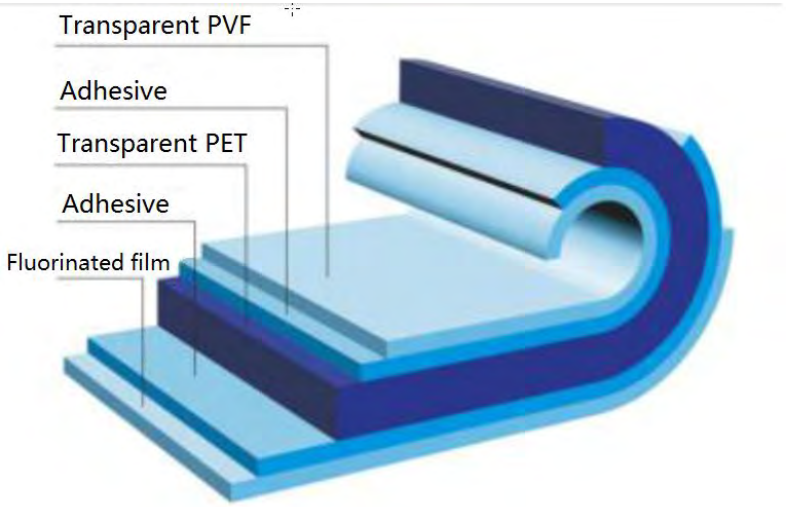
Structure



Bifacial cell



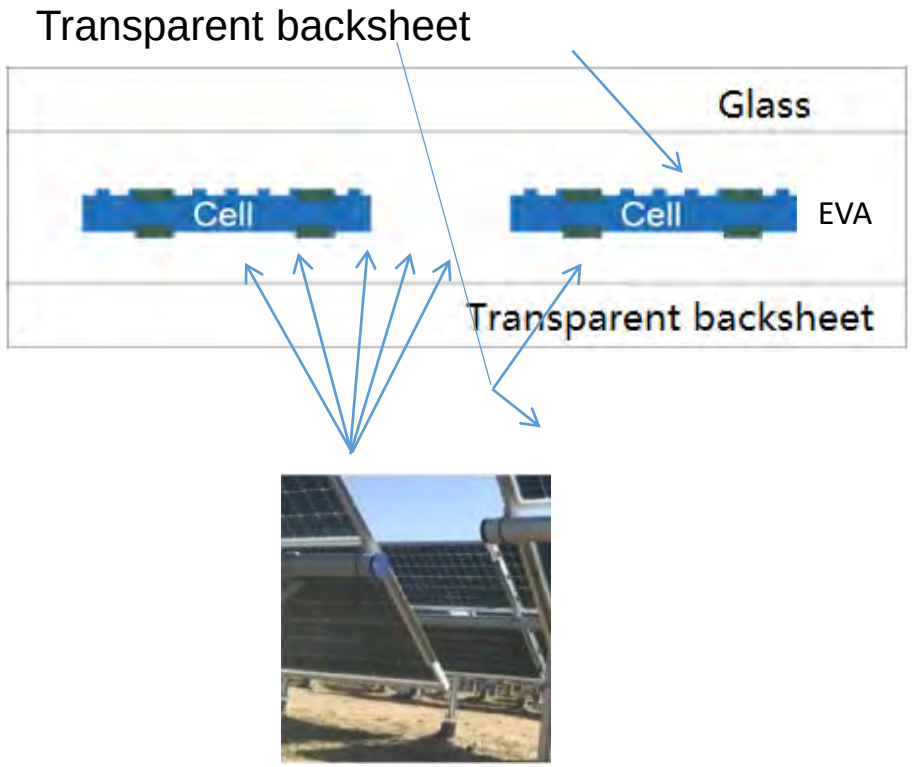
Transparent Backsheet TPX



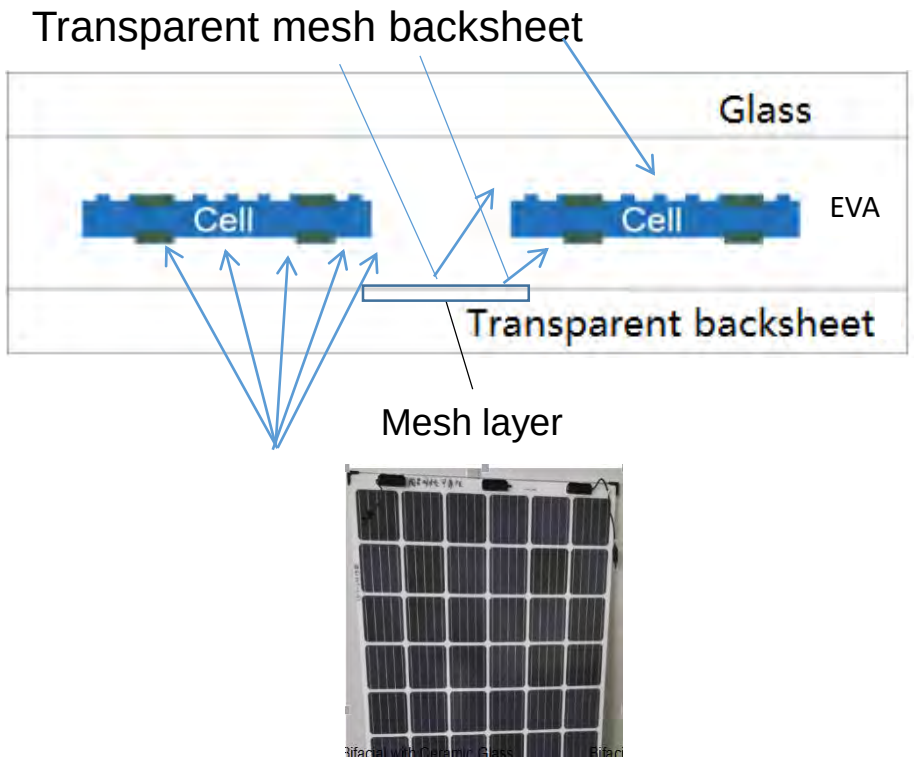
Key features of transparent backsheet

- ✓ **High transmission**
- ✓ **Excellent anti-UV capability**
- ✓ **Long using life**
- ✓ **Easy to clean**

Transparent Mesh Backsheet



375W / 380W / 385W / 390W



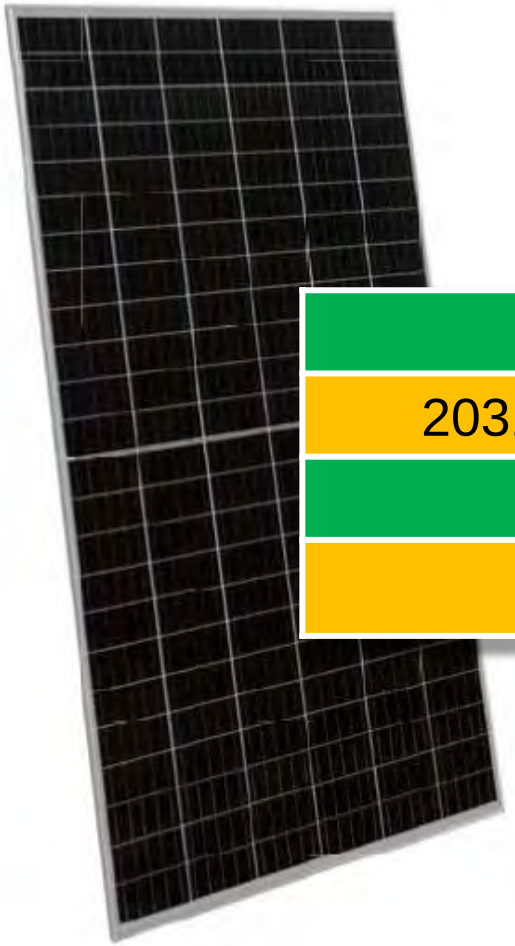
380W / 385W / 390W / 395W

Transparent mesh backsheet enhances front-side power generation: **5 Wp** improvement.

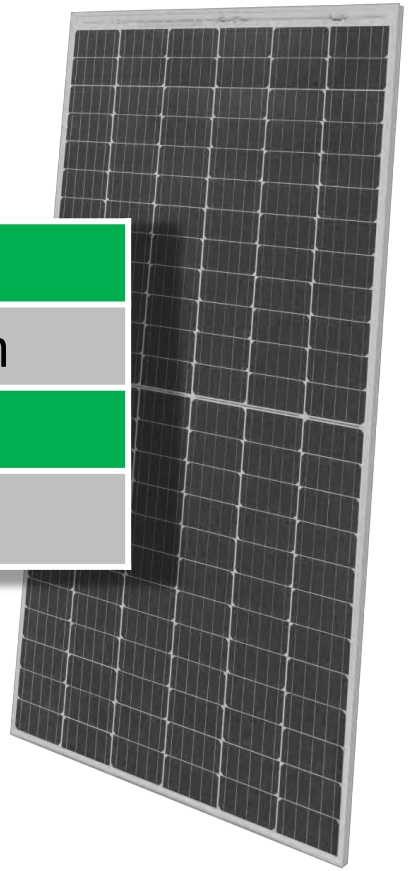
Notes: transparent mesh backsheet has one more mesh layer with high reflectivity and UV-resistance.

Bifacial size and weight

Bifacial with transparent backsheet Vs **Bifacial with dual glass**

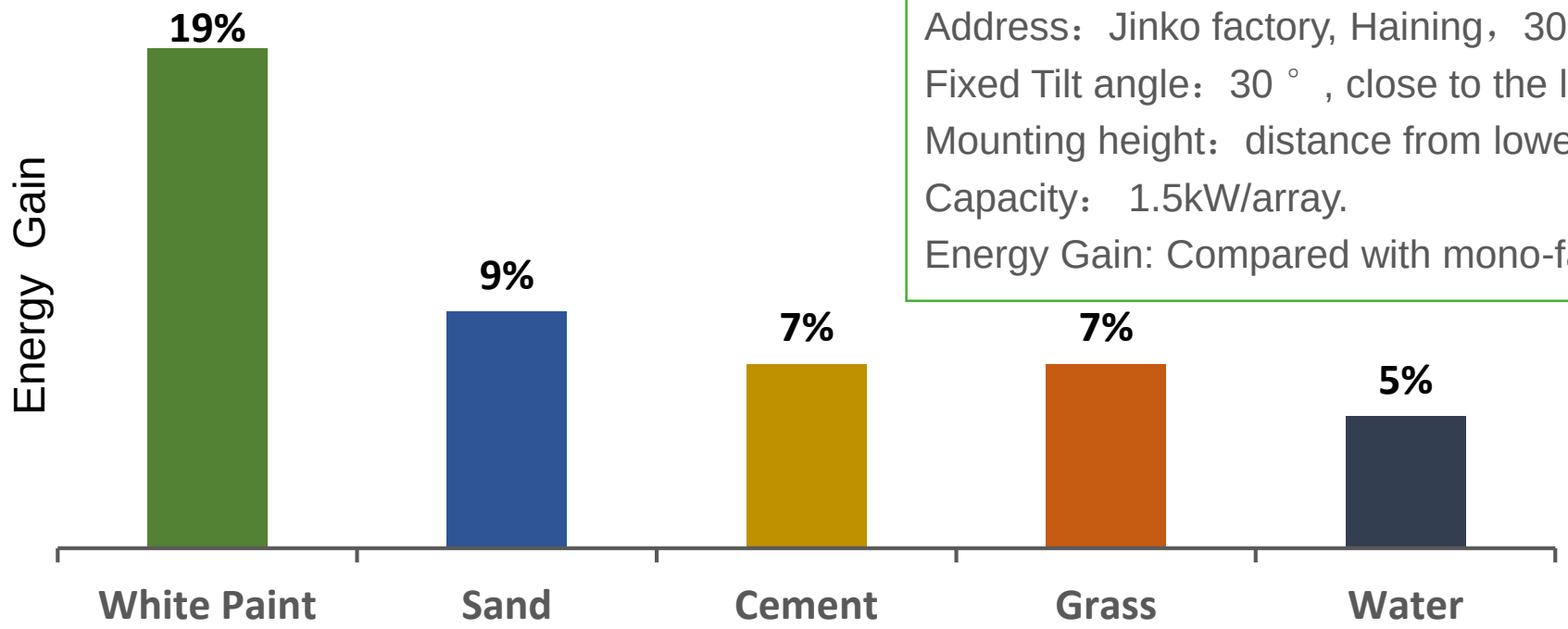


Module Size	
2031×1008×40mm	2031×1008×40mm
Module Weight	
23.3kg	31.8 Kg



Real Energy Generation Gain

Address：Jinko factory, Haining，30.3° N/ 120.4° E
Fixed Tilt angle：30 ° , close to the latitude；
Mounting height：distance from lower edge to ground is 1.2m；
Capacity： 1.5kW/array.
Energy Gain: Compared with mono-facial module in same condition



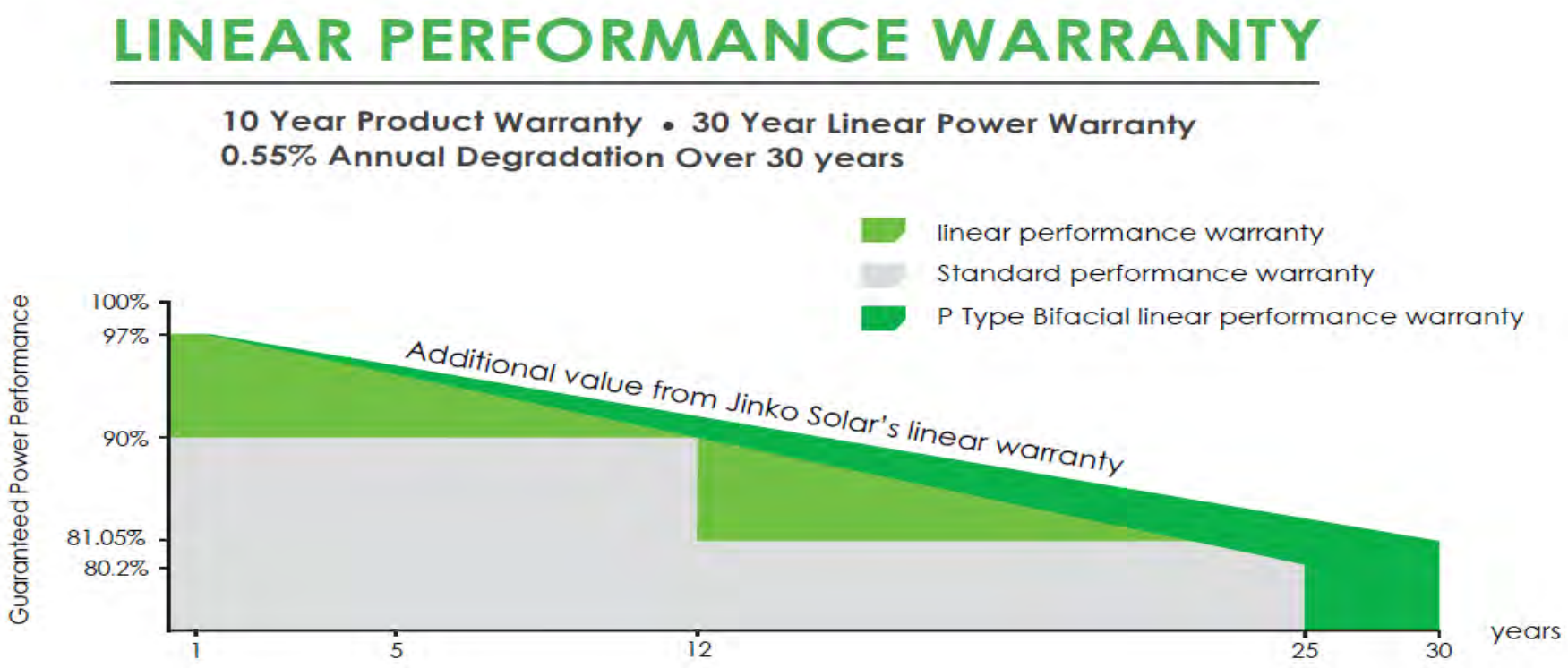
	White Paint	Sand	Cement	Grass	Water
Albedo	80%-85%	22%-25%	30%-33%	10%-20%	2%-5%

✓**The electric characteristics :** same as bifacial modules with dual glass

✓**Energy generation gain:** Consistent with bifacial modules with dual glass

*Note: The PR of sand is higher than cement, because the yellow light the sand reflect is the module energy gain need.
Bifacial with transparent backsheet have almost same bifacial factor as bifacial with dual glass.

Bifacial Benefits: longer life-time

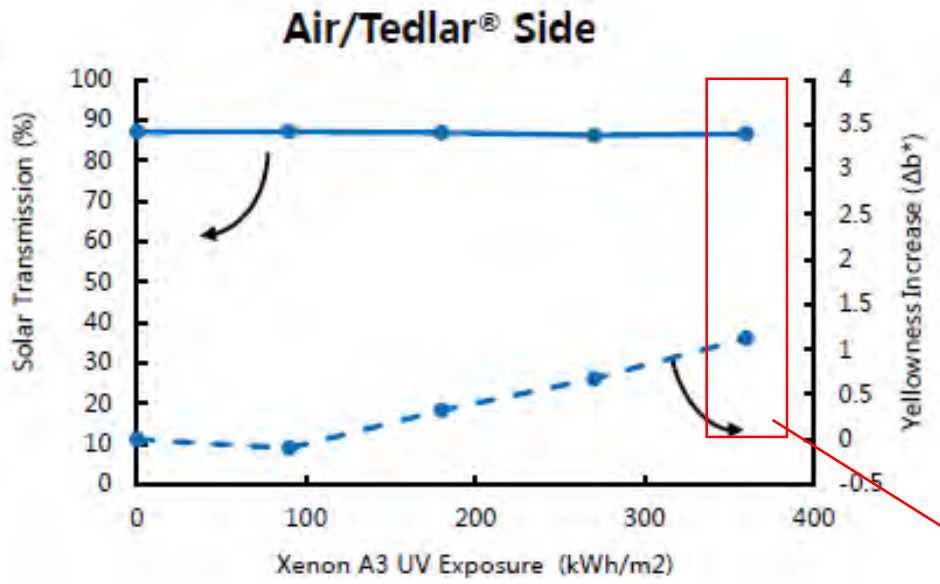


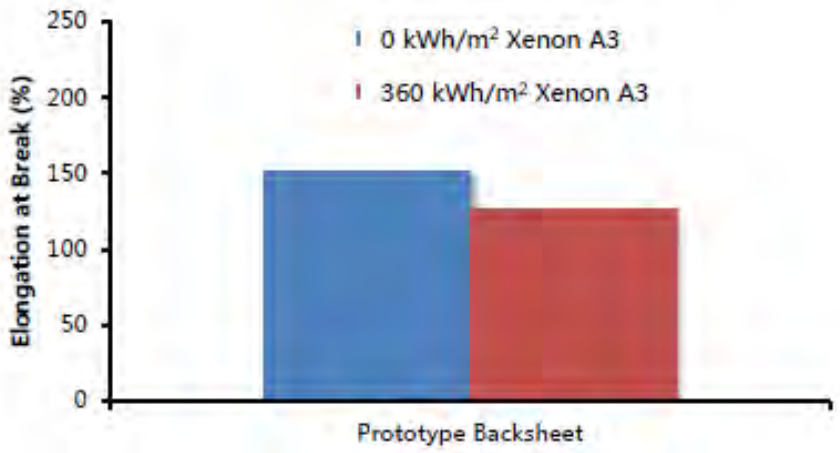
P-Type 30 years linear degradation

Performance Warranty

- ✓ **30** years linear power warranty
- ✓ **3%** for 1st year and **0.55%** from year 2nd to 30th

Reliability of Backsheet





Xenon Arc Lamp, boro/boro filter
0.8 W/m²-nm @ 340 nm, 90 °C BPT, 65 °C CHT

UV exposure on modules after 25 years outdoor

	Dessert	Tropic	Temperate
UV exposure on the front side (kWh/m⁺)	2293	1963	1423
UV exposure on the rear side (kWh/m⁺)	275	235	171

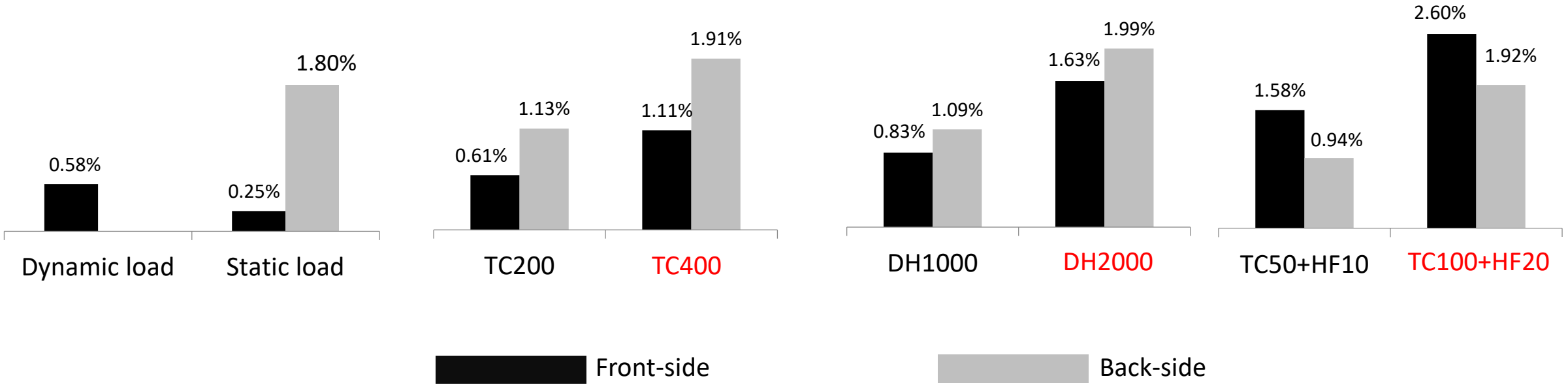
PVF film in transparent backsheet shows excellent transmission and mechanical property after 360 kWh/m² UV exposure, equal to **more than 30-year** using in dessert area.

→ **Excellent anti-aging property**

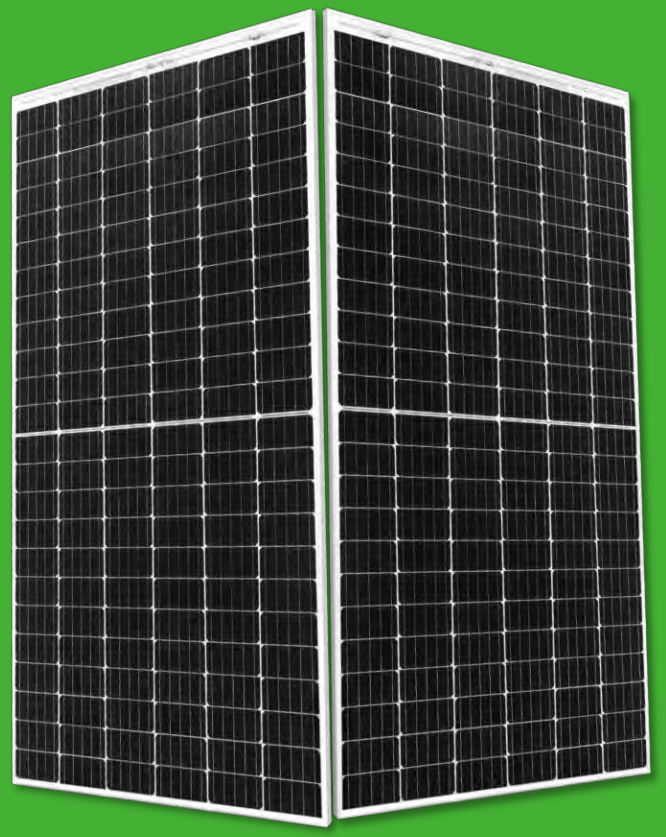
Extreme Reliability Testing Result

Degradation(%)

Double IEC testing condition



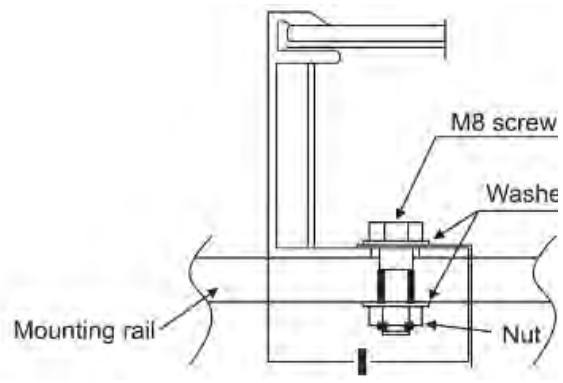
Internal Jinko

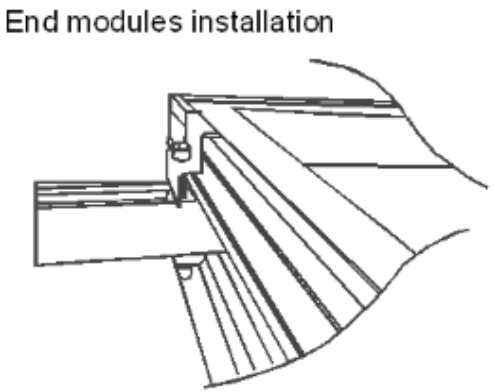


Bifacial with transparent backsheet

Specific Advantages

Installing and maintaining convenience





Frame Design
→**Common installation method**

Installation convenience ↗

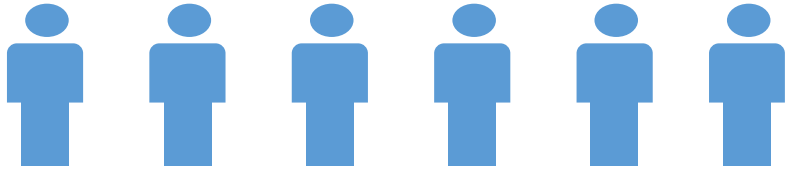
Labor Cost ↘

Mounting Construction Cost ↘

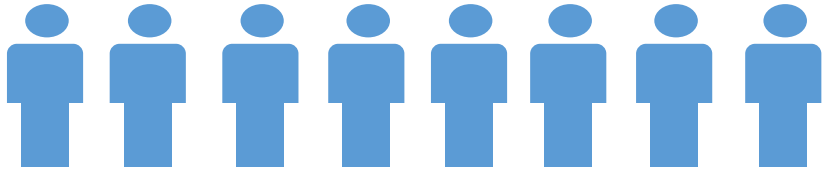
Bifacial modules with transparent backsheet can save **more than 3% BOS** cost to realize the low LCOE.

Labor cost saving

Bifacial with transparent backsheet



Bifacial modules with dual glass

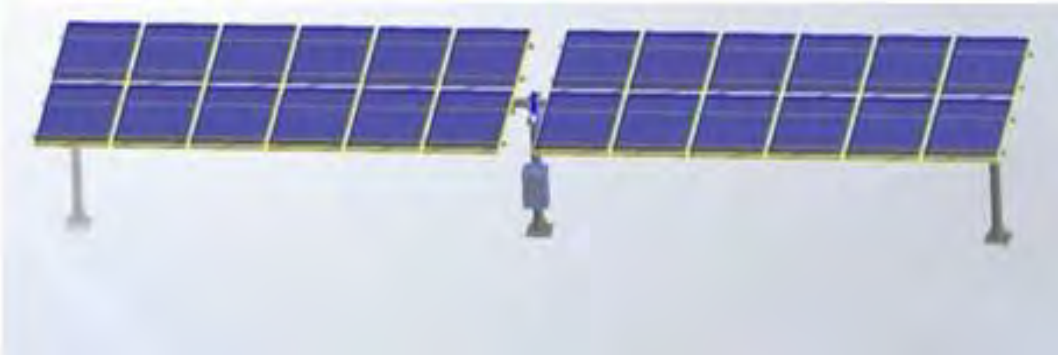


Saving **labor cost** related to module installation by **over 20%** using bifacial modules with transparent backsheet!

Note: lighter-weight bifacial with transparent backsheet helps to improve the installation efficiency, leading to the reduction of labor cost for module installation.

Installation system design

Bifacial with transparent backsheet



✓**Fewer** supporting structures

✓Compatible with the system of monofacial modules;

✓Saving **more than 15%**

mounting construction cost

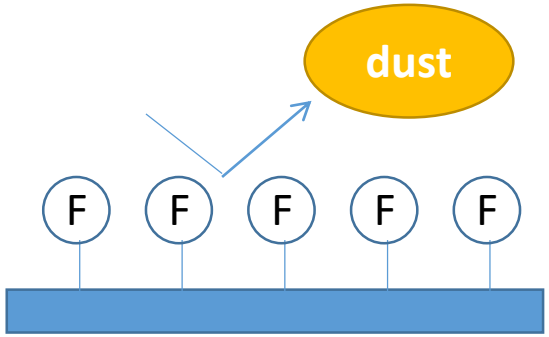
Bifacial with dual glass

✓**More** supporting structures

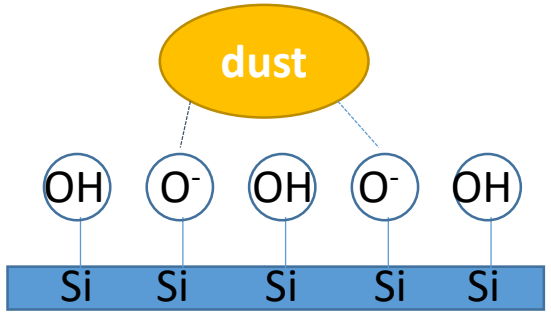
✓Incompatible with the system of monofacial modules;

✓Stronger load-bearing structure is requested

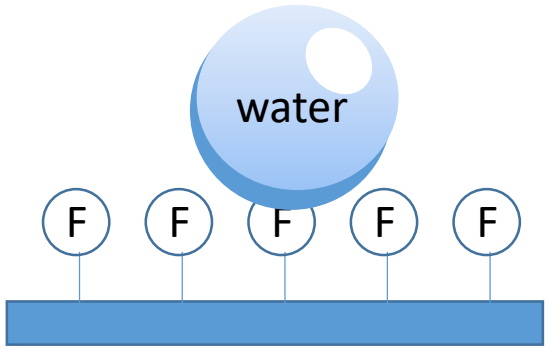
Stain-resistance and easy to clean



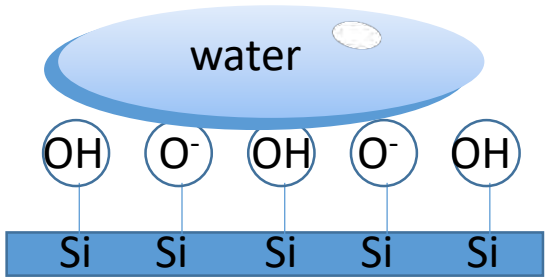
PVF film



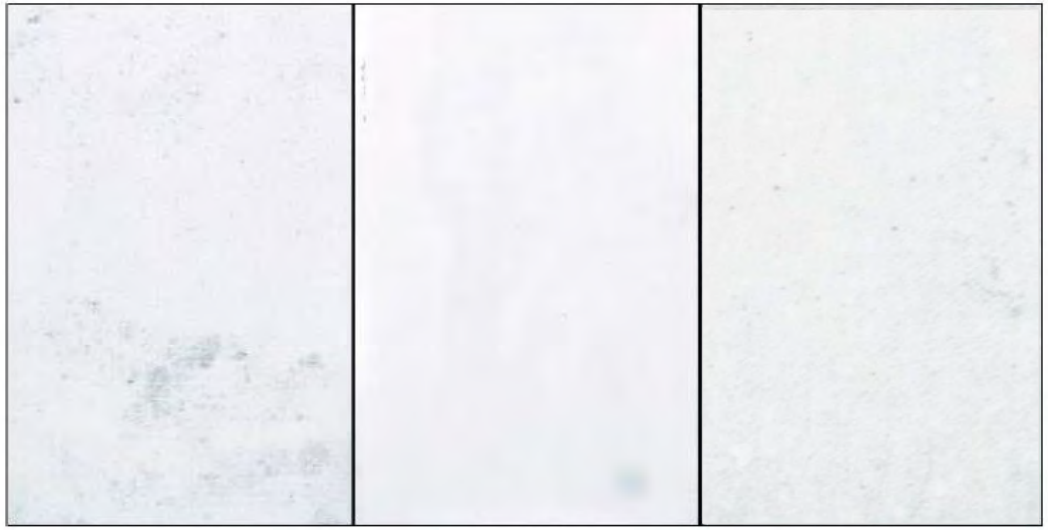
Glass



PVF film



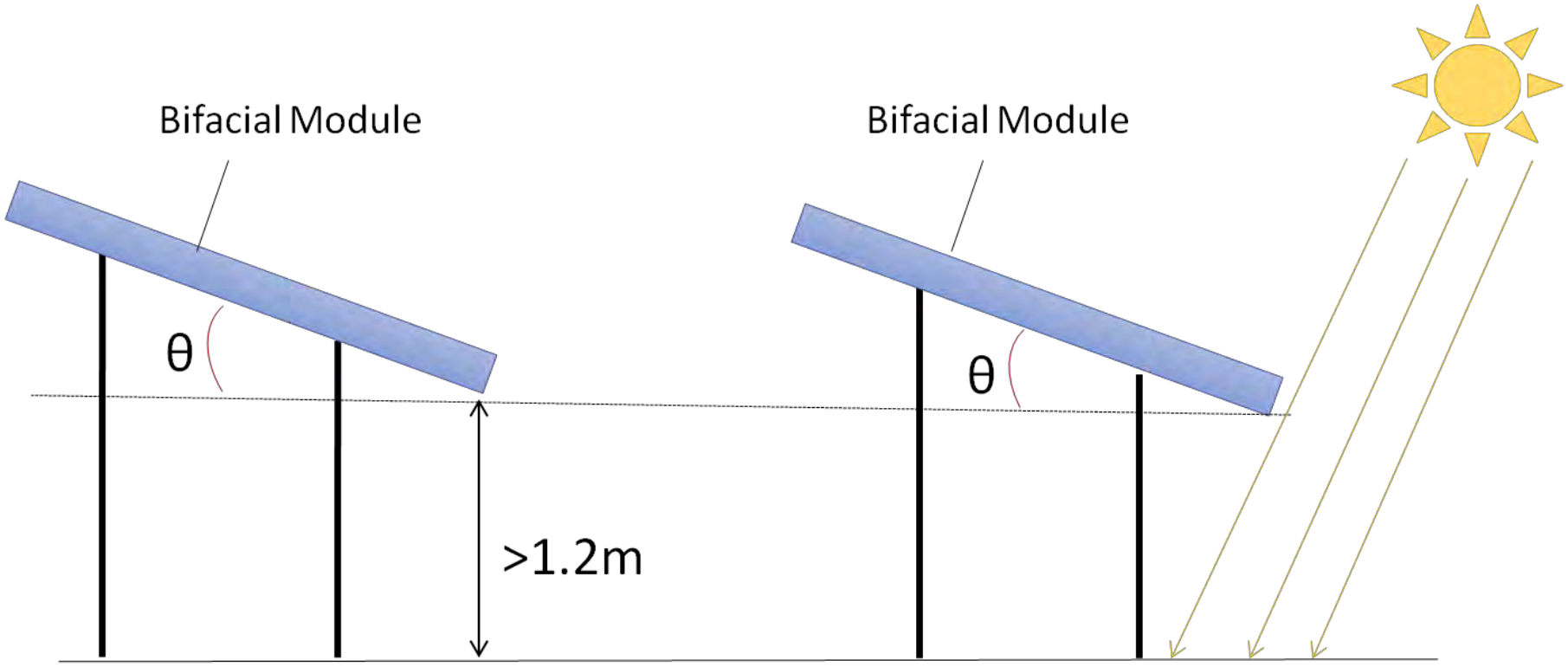
Glass



PVDF Tedlar@ PVF Glass

The stain-resistance of transparent backsheet makes the rear side of bifacial modules easier to clean and maintain than glass.

Installation: Angle & Height



Install tilt Angle:

1. Latitude : 30 °(N)~30°(S)
   Θ=30 °
2. Latitude: >30°(N or S)
   Θ=latitude

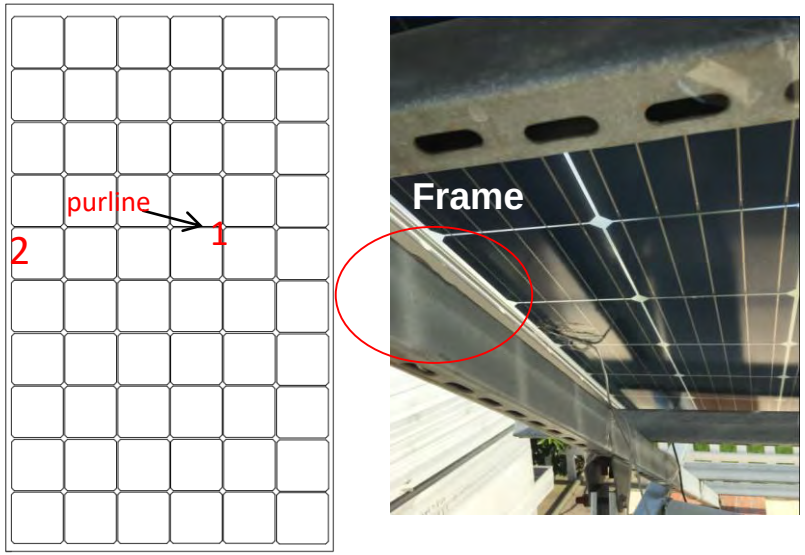
Mounting Height:

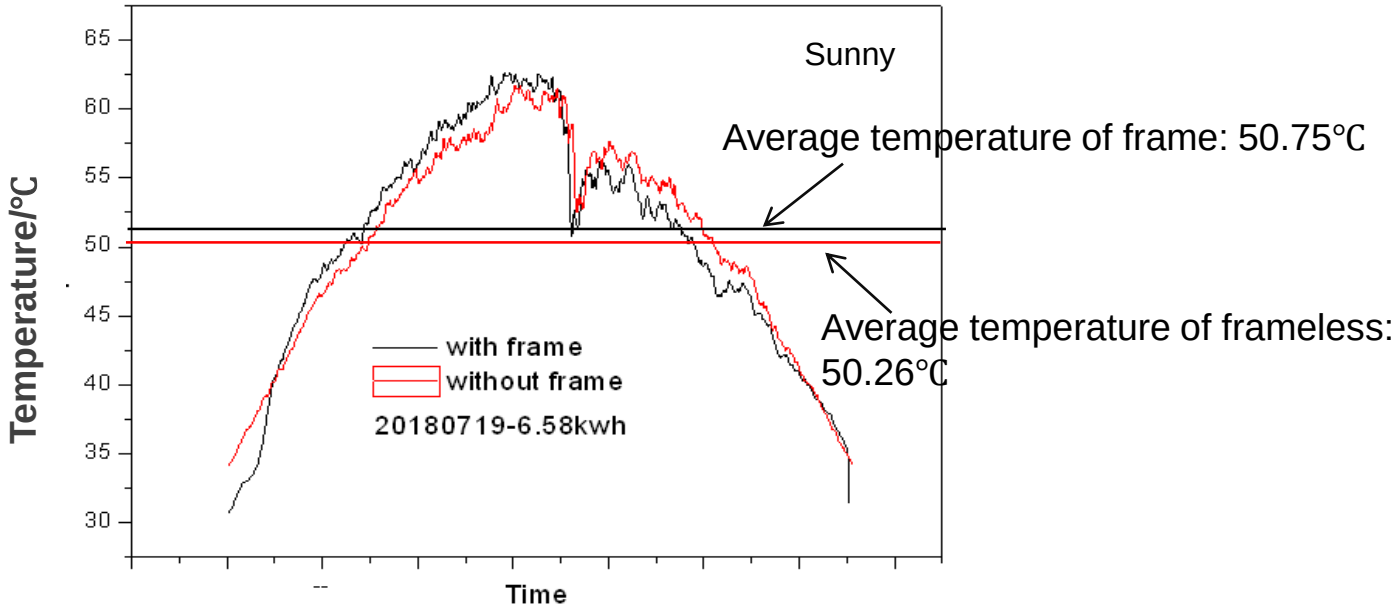
1.2 m is recommended.

<1.2 m → Decreasing rear side energy generation gain

>1.2 m → Increasing mounting construction cost

Installation: Frame Shading Issue





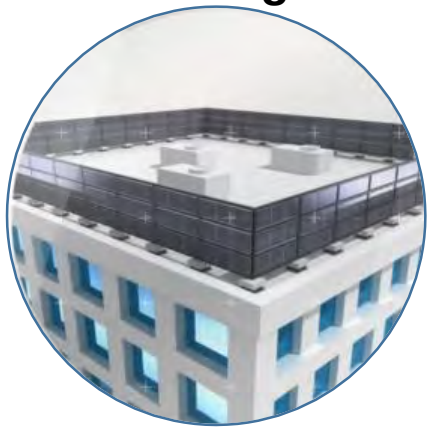
Temperature at the test point 2 varying on time

The temperature of shading area on bifacial module with frame is very close to that of frameless module

→ Influence of frame shading is negligible.

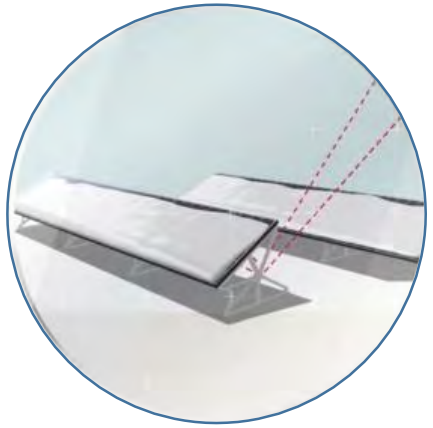
Various Application

Railing



Soundproof

Snow-covered Circumstance



Carport

Sun-Tracking Mount

Case study-California rooftop project

Location
Presidio National Park, Building 1016, San Francisco, CA
Owner
U.S. Department of Interior, National Park Service
Completion Time
May 1996 (23 years service time)

System information
Size: 1.25 kWp
Module type: **bifacial with transparent backsheet**
Projected System Electrical Output: 716.4 kWh/yr/AC

Inspection result in 2018
- ✓ **No signs of degradation of Tedlar in the front or back**
- ✓ **No yellowness**

Source: Dupont

Certification Process

2019.03

- ✓ IEC/TUV（2005）
- ✓ PID
- ✓ CQC 认证
- ✓ Salt, Ammonia
- ✓ Sand

2019.06

- ✓ IEC/TUV（2016）

2019.08

- ✓ UL(New standard)

2019.09

- ✓ PQP

Solar
JinKO
Building Your Trust in Solar
Thank you for your continued support

NEXTracker
a flex company

POWER ON.

NX Horizon Self-Powered Tracker

Our most amazing tracker yet.

In our mission to make solar a mainstream energy source, NEXTracker has engineered the most intelligent and flexible tracking technology yet. Using sustainable design methods with outcomes that benefit people and the planet, we bring you: NX Horizon™.

NX Horizon (formerly referred to as the Self-Powered Tracker or SPT), brings self-contained motor power to each row, eliminating power wiring and trenching. Our advanced horizontal tracker is designed to operate with 80% less power than other trackers and it has the widest rotational range available with the lowest O&M costs. By offering more powerful systems at a greater value, NEXTracker enables greater deployment of renewable energy worldwide.

NX Horizon key features and benefits include:

– Self-powered system with smart performance communications: Self-contained units on each row include a dedicated 30 watt PV panel to provide power to the controller which drives the motor and hosts intelligent control electronics to position each tracker. With smart communications built in, NX Horizon systems can be accessed remotely, providing customers with a granular view to optimize tracker performance, operations and maintenance.

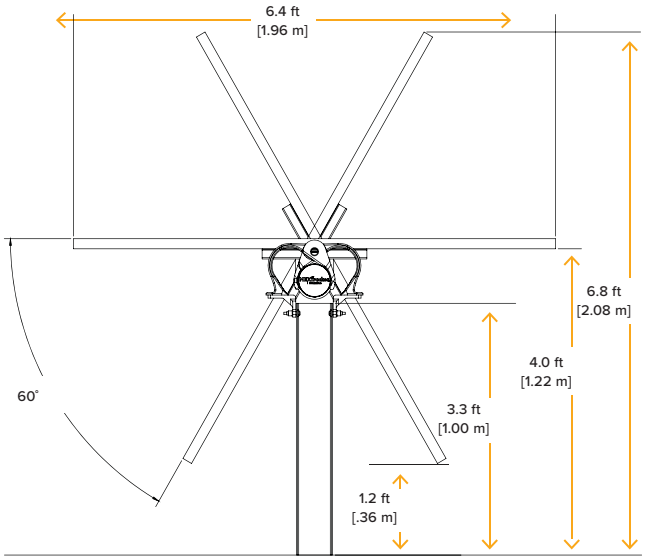
– Independent balanced rows with 120 degree rotational range: Each NX Horizon row has its own controlled motor with rotational range that delivers up to 2% more energy than typically linked row trackers. These agile, independent rows stow in less than 90 seconds to reduce wind forces on the array, carefully protecting the PV modules in rapidly changing environments. NX Horizon solar trackers also have a mechanically balanced row design that align PV panels with the tracker's axis of rotation – which greatly reduces torsional load, using less energy from the motor to track throughout the day.

– Self-grounded system with theft-proof fasteners: NX Horizon is the world's first horizontal tracker with an entirely self-grounded design. This means no separate bonding hardware is required. You save on material and associated costs by eliminating grounding washers, braided straps, bare copper wire, and grounding rods. What's more, we've designed our own fasteners that can only be removed with special tools – deterring PV theft.

NX Horizon Specifications

Tracking Technology	Horizontal single-axis balanced-mass tracker with independently-driven rows
Tracking Range	Up to 120° (± 60°)
Control System	1 Self-Powered Controller (SPC) per tracker; 1 Network Control Unit (NCU) per 100 SPCs
Communications	Wireless ZigBee® mesh network/SCADA; no communication wiring required
Drive System	One slew gear, 24 VDC motor and self-powered controller w/dedicated solar panel per row
DC Capacity	23-35kWp per tracker row, depending on panel type
System Voltage	Flexible, based on system design
Power Consumption	No grid power required
Ground Coverage Ratio	Fully configurable by customer; typical range 33%-50%
Installation Method	Rapid field assembly, no welding required
Foundation Types	Compatible with all major foundation types (driven pier, concrete foundation, ground screw)
Standard Wind Design	100 mph/161 kph, 3 second gust per ASCE7-10; configurable for higher wind speeds
Safety Stowing	Automated wind and snow stowing with self-contained backup power; no external power required
Torsional Limiter	Included at each foundation/bearing for additional wind and snow load protection
Principal Materials	Galvanized and stainless steel
Grounding Method	Self-grounding structure; separate materials and labor not required
Compliance	Grounding/bonding: UL2703; structural design: ASCE7-10
Other Available Options	Snow and flood sensors
Warranty	10 years on structural components; 5 years on drive and control systems
Typical Dimensions	Height 2.1 m/6.8 ft (@ 60°), Width 2.0 m/6.4 ft, Length 85 m/283 ft

Typical 72-cell c-Si configuration: 85 m row with 80 panels mounted in portrait:



NEXTracker
6200 Paseo Padre Parkway
Fremont, CA 94555 USA
+1 510 270 2500
nextracker.com

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NX Gemini

Introducing the NEXTracker Two-in-Portrait Smart Solar Tracker

The NX Gemini™ two-in-portrait (2P) solar tracker optimizes lifetime value and performance, helping project developers and asset owners get the most from their power plant. Ideally suited for sites with challenging soils, high winds, and irregular boundaries, the ruggedized 2P tracker features a patent-pending distributed drive system for maximum stability in extreme weather, eliminating the need for dampers and producing virtually zero energy losses associated with stowing.

Capitalize with Highest Power Density Solar Tracker

NX Gemini's flexible 2P module configuration allows for the maximum number of modules per foundation, requiring only 60 meters and seven foundation posts to provide support for up to 120 modules on four 1500-volt strings. With the lowest number of foundations per megawatts on the solar tracker market today, NX Gemini helps reduce tracker installation costs on difficult sites.

Pair with TrueCapture and Bifacial for Maximum Performance

The 2P tracker can be equipped with either monofacial or bifacial PV modules and integrated with the entire NEXTracker software ecosystem, including the TrueCapture™ advanced smart control and energy yield enhancement platform. Incorporated into the NX Gemini design is the field-proven innovations found in NX Horizon™, such as independent-row architecture, intelligent control systems and wireless communications.

FEATURES AND BENEFITS

- Industry-leading 2P design with 7 foundations points per 120 module row
- Ideal for challenging soils
- Bifacial-optimized for maximum performance
- Patent-pending distributed drive system for maximum stability in high winds
- TrueCapture ready, gain up to 6% more energy
- Special rotation feature for high velocity module installation

> "The NEXTracker team has always collaborated with us during their product development process, resulting in trackers that are faster to build, compatible for more sites and easier to maintain. NX Gemini is a strong tracker option for sites with challenging topography and geotechnical conditions."
>
> **George Hershman, President of Swinerton Renewable Energy**

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GENERAL AND MECHANICAL

Tracking type	Horizontal single-axis, independent row
String voltage	1,500 V_{DC}
Typical row size	112 - 120 modules, depending on module string length
Drive type	NX patent-pending self-locking, distributed drive
Motor type	48 V brushless DC motor
Array height	Rotation axis elevation 1.9 to 2.5 m/ 6'2" to 8'2"
Ground coverage ratio (GCR)	Typical range 28-50%
Modules supported	Mounting options available for most utility-scale crystalline modules
Bifacial features	Available with optimized central torque tube gap

Tracking range of motion	±50°
Operating temperature range	Array powered: -20°C to 55°C (-4°F to 131°F) AC powered: -40°C to 55°C (-40°F to 131°F)
Module configuration	2 in portrait. 4 x 1,500 strings per standard tracker. Partial length trackers available.
Module attachment	Self-grounding, electric tool-actuated fasteners standard. Clamping system optional.
Materials	Galvanized steel
Allowable wind speed	Configurable up to 210 kph (130 mph) 3-second gust
Wind protection	Intelligent wind stowing with self-locking, distributed drive system for maximum array stability in all wind conditions
Foundations	Standard W8 section foundation posts. Typically ~160 piers/MW

ELECTRONICS AND CONTROLS

Solar tracking method	Astronomical algorithm with backtracking. TrueCapture™ upgrades available for terrain adaptive backtracking and diffuse tracking mode
Control electronics	NX tracker controller with inbuilt inclinometer and backup battery
Communications	Zigbee wireless communications to all tracker rows and weather stations via network control units (NCUs)
Nighttime stow	Yes
Power supply	Array powered: NX Integrated DC pre-combiner & power supply AC powered: Customer-provided 240 V_{AC} circuit

INSTALLATION, OPERATIONS AND SERVICE

PE stamped structural calculations and drawings	Included
Onsite training and system commissioning	Included
Installation requirements	Simple assembly using swaged fasteners and bolted connections. No field cutting, drilling or welding
Monitoring	NX Data Hub™ centralized data aggregation and monitoring
Module cleaning compatibility	Compatible with virtually all standard cleaning systems
DC string monitoring	Available with array-powered option
Warranty	10-year structural, 5-year drive and control components
Codes and standards	UL 3703, UL 2703, IEC 62817

Installer-friendly array height with construction rotation feature for faster, easier installation

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HEM

UTILITY SCALE MV CENTRAL STRING INVERTER

The Power Electronics HEM medium voltage inverter is designed for utility scale solar applications, that require the advantages of a central inverter solution but also the modularity of a string architecture. The HEM can reach up to a nominal power of 3.6MVA, and offers a wide MPPT window. It also has the added advantage of having an integrated medium voltage transformer and switchgear.

Its architecture, composed of six field replaceable units (FRU), is designed to provide the highest availability and optimize yield production.

Its use in Utility Scale PV plants provides considerable savings in CAPEX, since having an integrated MV transformer and switchgear reduces the need of additional connections between the LV and MV sides.

Thanks to the Power Electronics iCOOL3 cooling system, the HEM is the first inverter able to provide IP65 degree of protection with an air cooling system, and as a result reducing OPEX costs.

THE INNOVATIVE MEDIUM VOLTAGE CENTRAL STRING INVERTER

IP65 AVAILABLE

TURNKEY SOLUTION

MULTI MPPT

ADJUSTABLE POWER

DAY

NIGHT

OUTDOOR DURABILITY

INGRESS PROTECTION

ACTIVE HEATING

3 LEVEL TOPOLOGY

iCOOL 3

ECON MODE

REAL TURN-KEY SOLUTION

With the HEM, Power Electronics offers a real turn-key solution, including the MV transformer and switchgear fully assembled and tested at the factory. The HEM is a compact turnkey solution that will reduce site design, installation and connections costs.

MV SWITCHGEAR	MV TRANSFORMER	STRING INVERTERS CABINET	DC RECOMBINER

STRING CONCEPT POWER STAGES

The HEM combines the advantages of a central inverter with the modularity of the string inverters. Its power stages are designed to be easily replaceable on the field without the need of advanced technical service personnel, providing a safe, reliable and fast Plug&Play assembly system.

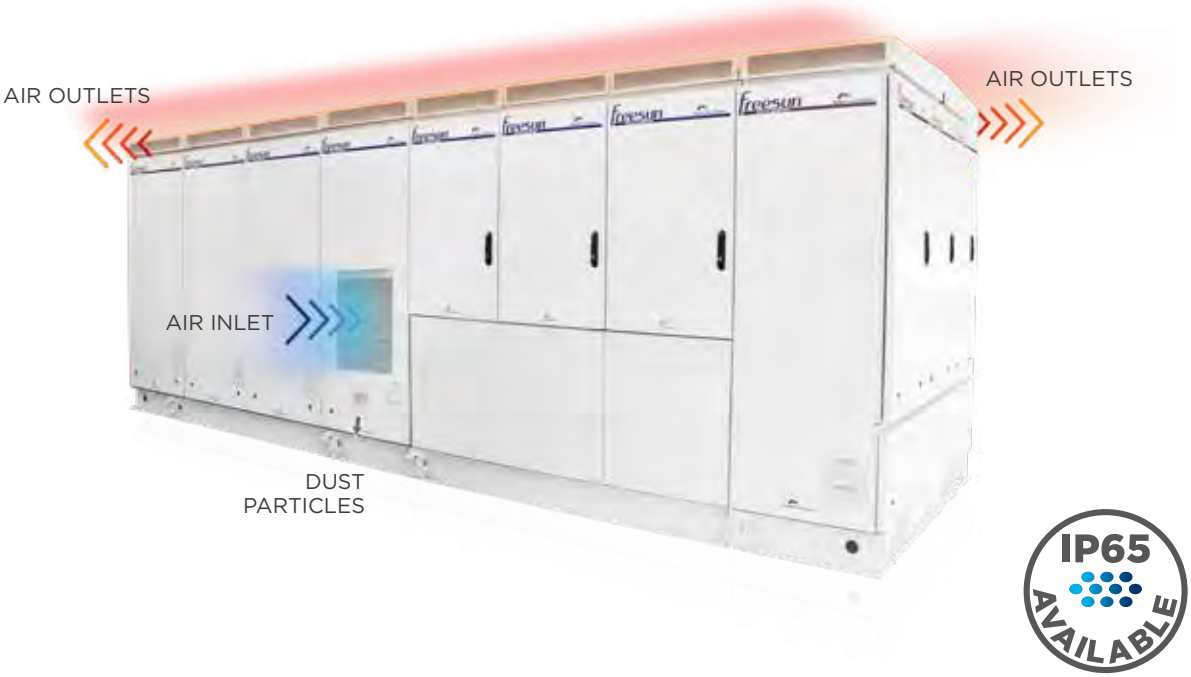
Following the modular philosophy of the Freesun series, the HEM is composed of 6 FRUs (field replaceable units), being able to work with up to 6 different MPPts, providing a perfect solution for irregular locations, where each area of the PV plant has a different production curve.

HEM is also available with a single MPPt, where all the power stages are physically joined in the DC side and therefore, in the event of a fault, the faulty module is taken off-line and its output power is distributed evenly among the remaining functioning FRUs.

INNOVATIVE COOLING SYSTEM

Based on more than 3 years of experience with our MV Variable Speed Drive, the iCOOL3 is the first air-cooling system allowing IP65 degree of protection in an outdoor solar inverter.

iCOOL3 delivers a constant stream of clean air to the FRUs and the MV transformer, being the most effective way of reaching up to IP65 degree of protection, without having to maintain cumbersome dust filters or having to use liquid-cooling systems, avoiding the commonly known inconveniences of it (complex maintenance, risk of leaks, higher number of components...), therefore resulting in an OPEX cost reduction.



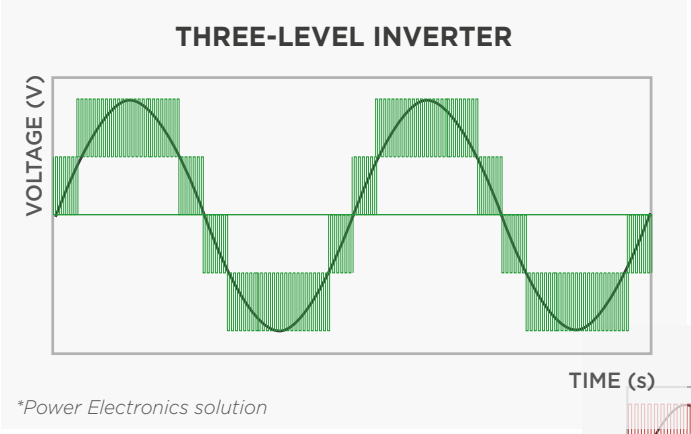
ROBUST DESIGN

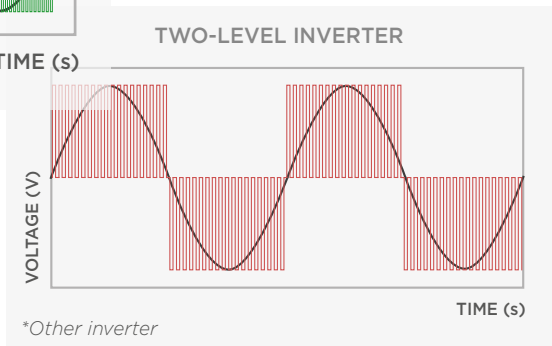
HEM inverter modules have a design life of greater than 30 years of operation in harsh environments and extreme weather conditions. HEM units are tested and ready to withstand conditions from the frozen Siberian tundra to the Californian Death Valley, featuring:

- Totally sealed electronics cabinet protects electronics against dust and moisture.
- Conformal coating on electronic boards shields PCBs from harsh atmospheres.
- Temperature and humidity controlled active heating prevents internal water condensation.
- C4 degree of protection according to ISO 12944. Up to C5-M optional.
- 50mm mineral panel isolates the cabinet from solar heat gains.
- Roof cover designed to dissipate solar radiation, reduce heat build-up and avoid water leakages. The solid HEM structure avoids the need of additional external structures.
- Random units selected to pass a Factory Water Tightness Test ensuring product quality.

MULTILEVEL TOPOLOGY

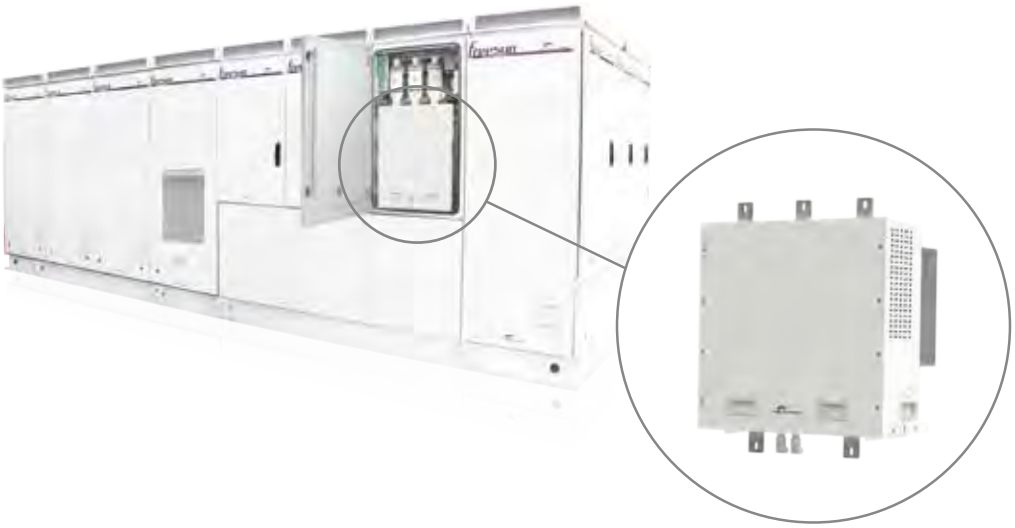
The multilevel IGBT topology is the most efficient approach to manage high DC link voltages and makes the difference in the 1,500 Vdc design. Power Electronics has many years of power design in both inverters and MV drives and the HEM design is the result of our experience with 3 level topologies. The 3 level IGBT topology reduces stage losses, increases inverter efficiency and minimizes total harmonic distortion.





EASY TO SERVICE

By providing full front access the HEM series simplifies the maintenance tasks, reducing the MTTR (and achieving a lower OPEX). The total access allows a fast swap of the FRUs without the need of qualified technical personnel.



EASY TO MONITOR

The Freesun app is an easy way to monitor the status of Power Electronics inverters. All inverters come with built-in wifi, allowing remote connectivity to any smart device for detailed updates and information without the need to open cabinet doors. The app user friendly interface allows quick and easy access to critical information (energy registers, production and events).

ACTIVE HEATING

At night, when the unit is not actively exporting power, the inverter can import a small amount of power to keep the inverter internal ambient temperature above -20°C, without using external resistors. This autonomous heating system is the most efficient and homogeneous way to prevent condensation, increasing the inverters availability and reducing the maintenance. (patented)

VAR AT NIGHT

At night, the HEM inverter can shift to reactive power compensation mode. The inverter can respond to an external dynamic signal, a Power Plant Controller command or pre-set reactive power level (kVAr).

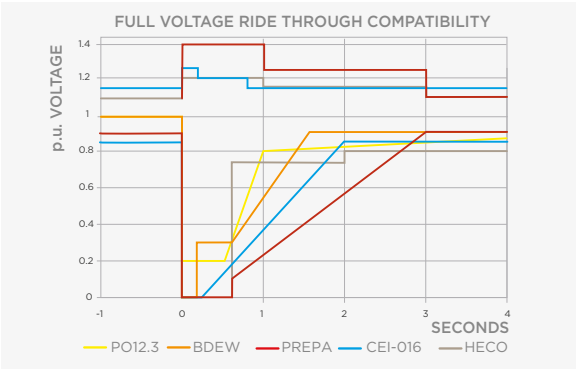
ECON MODE

This innovative control mode allows increasing the efficiency of the MV transformer up to 25%, reducing the power consumption of the plant and therefore providing considerable savings.

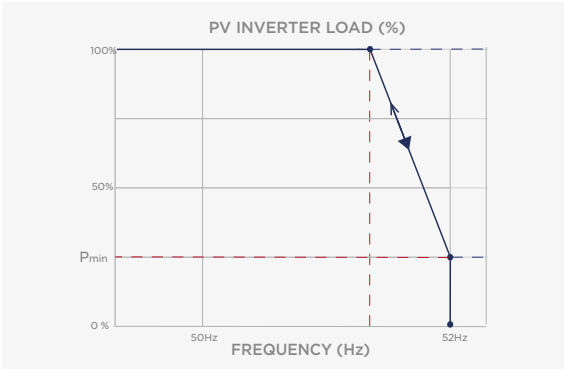
Available as an optional kit, this feature has a pay-back time of less than a few years, therefore resulting in the increase of the plant lifetime overall revenue.

DYNAMIC GRID SUPPORT

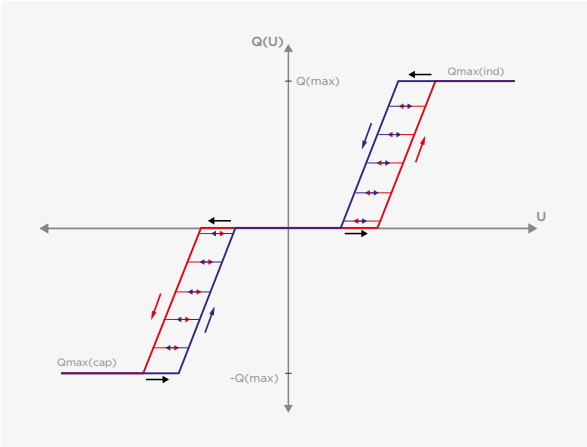
HEM firmware includes the latest utility interactive features (LVRT, OVRT, FRS, FRT, Anti-islanding, active and reactive power curtailment...), and can be configured to meet specific utility requirements.

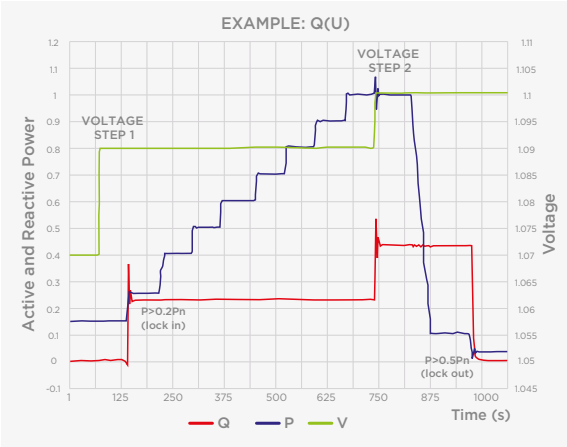


▲ **LVRT or ZVRT (Low Voltage Ride Through).** Inverters can withstand any voltage dip or profile required by the local utility. The inverter can immediately feed the fault with full reactive power, as long as the protection limits are not exceeded.



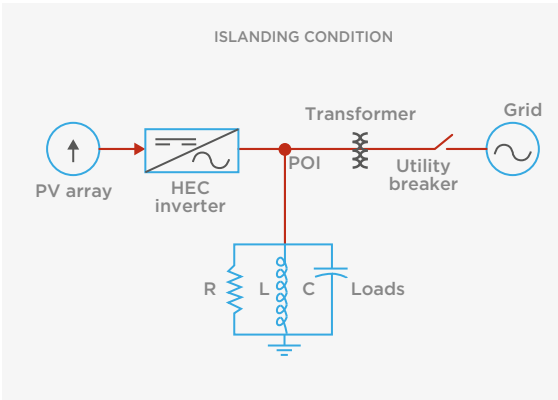
▲ **FRS (Frequency Regulation System).** Frequency droop algorithm curtails the active power along a preset characteristic curve supporting grid stabilization.





▲ **Q(V) curve:** It is a dynamic voltage control function which provides reactive power in order to maintain the voltage as close as possible to its nominal value.

▲ **FRT (Frequency Ride Through):** Freesun solar inverters have flexible frequency protection settings and can be easily adjusted to comply with future requirements.



▲ **Anti-islanding:** This protection combines passive and active methods that eliminates nuisance tripping and reduces grid distortion according to IEC 62116 and IEEE1547.

HEM

TECHNICAL CHARACTERISTICS

REFERENCE		FS3300M
OUTPUT	AC Output Power(kVA/kW) @50°C[1]	3300
	AC Output Power(kVA/kW) @25°C[1]	3630
	Operating Grid Voltage(VAC)[2]	34.5kV ±10%
	Operating Grid Frequency(Hz)	50Hz/60Hz
	Current Harmonic Distortion (THDi)	< 3% per IEEE519
	Power Factor (cosine phi)[3]	0.5 leading ... 0.5 lagging adjustable / Reactive Power injection at night
INPUT	MPPt @full power (VDC)	934V-1310V
	Maximum DC voltage	1500V
	Number of inputs[2]	Up to 36
	Max. DC continuous current (A)	3970
	Max. DC short circuit current (A)	6000
EFFICIENCY & AUXILIARY SUPPLY	Max. Efficiency PAC, nom (η)	98% including MV transformer (preliminary)
	Max. Power Consumption (KVA)	20
CABINET	Dimensions [WxDxH] (ft)	20x6.5x7 (preliminary)
	Type of ventilation	Forced air cooling
ENVIRONMENT	Degree of protection	NEMA3R - IP54 / IP65 available
	Permissible Ambient Temperature	-35°C[4] to +60°C / >50°C Active Power derating
	Relative Humidity	4% to 100% non condensing
	Max. Altitude (above sea level) [5]	1000m
	Noise level [6]	< 79 dBA
CONTROL INTERFACE	Interface	Graphic Display
	Communication protocol	Modbus TCP
	Plant Controller Communication	Optional
	Keyed ON/OFF switch	Standard
PROTECTIONS	Ground Fault Protection	GFDI and Isolation monitoring device
	General AC Protection	MV Switchgear (configurable)
	General DC Protection	Fuses
	Overvoltage Protection	AC, DC Inverter and auxiliary supply type 2
CERTIFICATIONS	Safety	UL1741, CSA 22.2 No.107.1-01, UL62109-1, IEC62109-1, IEC62109-2
	Compliance	NEC 2014 / NEC 2017 (optional)
	Utility interconnect	UL 1741SA-Sept. 2016 / IEEE 1547.1-2005

NOTES

[1] Values at 1.00•Vac nom and cos Φ=1. Consult Power Electronics for derating curves.
[2] Depending on the project configuration.
[3] Consult P-Q charts available: $Q(kVAr)=\sqrt{(S(kVA)^2-P(kW)^2)}$.
[4] Heating resistors kit option below -20°C.
[5] Consult Power Electronics for other altitudes.
[6] Readings taken 1 meter from the back of the unit.

HEM

TECHNICAL CHARACTERISTICS

REFERENCE		FS3225M
OUTPUT	AC Output Power(kVA/kW) @50°C[1]	3225
	AC Output Power(kVA/kW) @25°C[1]	3550
	Operating Grid Voltage(VAC)[2]	34.5kV ±10%
	Operating Grid Frequency(Hz)	50Hz/60Hz
	Current Harmonic Distortion (THDi)	< 3% per IEEE519
	Power Factor (cosine phi)[3]	0.5 leading ... 0.5 lagging adjustable / Reactive Power injection at night
INPUT	MPPt @full power (VDC)	913V-1310V
	Maximum DC voltage	1500V
	Number of inputs[2]	Up to 36
	Max. DC continuous current (A)	3970
	Max. DC short circuit current (A)	6000
EFFICIENCY & AUXILIARY SUPPLY	Max. Efficiency PAC, nom (η)	98% including MV transformer (preliminary)
	Max. Power Consumption (KVA)	20
CABINET	Dimensions [WxDxH] (ft)	20x6.5x7 (preliminary)
	Type of ventilation	Forced air cooling
ENVIRONMENT	Degree of protection	NEMA3R - IP54 / IP65 available
	Permissible Ambient Temperature	-35°C[4] to +60°C / >50°C Active Power derating
	Relative Humidity	4% to 100% non condensing
	Max. Altitude (above sea level) [5]	1000m
	Noise level [6]	< 79 dBA
CONTROL INTERFACE	Interface	Graphic Display
	Communication protocol	Modbus TCP
	Plant Controller Communication	Optional
	Keyed ON/OFF switch	Standard
PROTECTIONS	Ground Fault Protection	GFDI and Isolation monitoring device
	General AC Protection	MV Switchgear (configurable)
	General DC Protection	Fuses
	Overvoltage Protection	AC, DC Inverter and auxiliary supply type 2
CERTIFICATIONS	Safety	UL1741, CSA 22.2 No.107.1-01, UL62109-1, IEC62109-1, IEC62109-2
	Compliance	NEC 2014 / NEC 2017 (optional)
	Utility interconnect	UL 1741SA-Sept. 2016 / IEEE 1547.1-2005

NOTES

[1] Values at 1.00•Vac nom and cos Φ=1. Consult Power Electronics for derating curves.
[2] Depending on the project configuration.
[3] Consult P-Q charts available: $Q(kVAr)=\sqrt{(S(kVA)^2-P(kW)^2)}$.
[4] Heating resistors kit option below -20°C.
[5] Consult Power Electronics for other altitudes.
[6] Readings taken 1 meter from the back of the unit.

HEM

TECHNICAL CHARACTERISTICS

REFERENCE		FS3150M
OUTPUT	AC Output Power(kVA/kW) @50°C[1]	3150
	AC Output Power(kVA/kW) @25°C[1]	3465
	Operating Grid Voltage(VAC)[2]	34.5kV ±10%
	Operating Grid Frequency(Hz)	50Hz/60Hz
	Current Harmonic Distortion (THDi)	< 3% per IEEE519
	Power Factor (cosine phi)[3]	0.5 leading ... 0.5 lagging adjustable / Reactive Power injection at night
INPUT	MPPt @full power (VDC)	891V-1310V
	Maximum DC voltage	1500V
	Number of inputs[2]	Up to 36
	Max. DC continuous current (A)	3970
	Max. DC short circuit current (A)	6000
EFFICIENCY & AUXILIARY SUPPLY	Max. Efficiency PAC, nom (η)	98% including MV transformer (preliminary)
	Max. Power Consumption (KVA)	20
CABINET	Dimensions [WxDxH] (ft)	20x6.5x7 (preliminary)
	Type of ventilation	Forced air cooling
ENVIRONMENT	Degree of protection	NEMA3R - IP54 / IP65 available
	Permissible Ambient Temperature	-35°C[4] to +60°C / >50°C Active Power derating
	Relative Humidity	4% to 100% non condensing
	Max. Altitude (above sea level) [5]	1000m
	Noise level [6]	< 79 dBA
CONTROL INTERFACE	Interface	Graphic Display
	Communication protocol	Modbus TCP
	Plant Controller Communication	Optional
	Keyed ON/OFF switch	Standard
PROTECTIONS	Ground Fault Protection	GFDI and Isolation monitoring device
	General AC Protection	MV Switchgear (configurable)
	General DC Protection	Fuses
	Overvoltage Protection	AC, DC Inverter and auxiliary supply type 2
CERTIFICATIONS	Safety	UL1741, CSA 22.2 No.107.1-01, UL62109-1, IEC62109-1, IEC62109-2
	Compliance	NEC 2014 / NEC 2017 (optional)
	Utility interconnect	UL 1741SA-Sept. 2016 / IEEE 1547.1-2005

NOTES

[1] Values at 1.00•Vac nom and cos Φ=1. Consult Power Electronics for derating curves.
[2] Depending on the project configuration.
[3] Consult P-Q charts available: $Q(kVAr)=\sqrt{(S(kVA)^2-P(kW)^2)}$.
[4] Heating resistors kit option below -20°C.
[5] Consult Power Electronics for other altitudes.
[6] Readings taken 1 meter from the back of the unit.

HEM

TECHNICAL CHARACTERISTICS

REFERENCE		FS3075M
OUTPUT	AC Output Power(kVA/kW) @50°C[1]	3075
	AC Output Power(kVA/kW) @25°C[1]	3380
	Operating Grid Voltage(VAC)[2]	34.5kV ±10%
	Operating Grid Frequency(Hz)	50Hz/60Hz
	Current Harmonic Distortion (THDi)	< 3% per IEEE519
	Power Factor (cosine phi)[3]	0.5 leading ... 0.5 lagging adjustable / Reactive Power injection at night
INPUT	MPPt @full power (VDC)	870V-1310V
	Maximum DC voltage	1500V
	Number of inputs[2]	Up to 36
	Max. DC continuous current (A)	3970
	Max. DC short circuit current (A)	6000
EFFICIENCY & AUXILIARY SUPPLY	Max. Efficiency PAC, nom (η)	98% including MV transformer (preliminary)
	Max. Power Consumption (KVA)	20
CABINET	Dimensions [WxDxH] (ft)	20x6.5x7 (preliminary)
	Type of ventilation	Forced air cooling
ENVIRONMENT	Degree of protection	NEMA3R - IP54 / IP65 available
	Permissible Ambient Temperature	-35°C[4] to +60°C / >50°C Active Power derating
	Relative Humidity	4% to 100% non condensing
	Max. Altitude (above sea level) [5]	1000m
	Noise level [6]	< 79 dBA
CONTROL INTERFACE	Interface	Graphic Display
	Communication protocol	Modbus TCP
	Plant Controller Communication	Optional
	Keyed ON/OFF switch	Standard
PROTECTIONS	Ground Fault Protection	GFDI and Isolation monitoring device
	General AC Protection	MV Switchgear (configurable)
	General DC Protection	Fuses
	Overvoltage Protection	AC, DC Inverter and auxiliary supply type 2
CERTIFICATIONS	Safety	UL1741, CSA 22.2 No.107.1-01, UL62109-1, IEC62109-1, IEC62109-2
	Compliance	NEC 2014 / NEC 2017 (optional)
	Utility interconnect	UL 1741SA-Sept. 2016 / IEEE 1547.1-2005

NOTES

[1] Values at 1.00•Vac nom and cos Φ=1. Consult Power Electronics for derating curves.
[2] Depending on the project configuration.
[3] Consult P-Q charts available: $Q(kVAr)=\sqrt{(S(kVA)^2-P(kW)^2)}$.
[4] Heating resistors kit option below -20°C.
[5] Consult Power Electronics for other altitudes.
[6] Readings taken 1 meter from the back of the unit.

HEM

TECHNICAL CHARACTERISTICS

REFERENCE		FS3000M
OUTPUT	AC Output Power(kVA/kW) @50°C[1]	3000
	AC Output Power(kVA/kW) @25°C[1]	3300
	Operating Grid Voltage(VAC)[2]	34.5kV ±10%
	Operating Grid Frequency(Hz)	50Hz/60Hz
	Current Harmonic Distortion (THDi)	< 3% per IEEE519
	Power Factor (cosine phi)[3]	0.5 leading ... 0.5 lagging adjustable / Reactive Power injection at night
INPUT	MPPt @full power (VDC)	849V-1310V
	Maximum DC voltage	1500V
	Number of inputs[2]	Up to 36
	Max. DC continuous current (A)	3970
	Max. DC short circuit current (A)	6000
EFFICIENCY & AUXILIARY SUPPLY	Max. Efficiency PAC, nom (η)	98% including MV transformer (preliminary)
	Max. Power Consumption (KVA)	20
CABINET	Dimensions [WxDxH] (ft)	20x6.5x7 (preliminary)
	Type of ventilation	Forced air cooling
ENVIRONMENT	Degree of protection	NEMA3R - IP54 / IP65 available
	Permissible Ambient Temperature	-35°C[4] to +60°C / >50°C Active Power derating
	Relative Humidity	4% to 100% non condensing
	Max. Altitude (above sea level) [5]	1000m
	Noise level [6]	< 79 dBA
CONTROL INTERFACE	Interface	Graphic Display
	Communication protocol	Modbus TCP
	Plant Controller Communication	Optional
	Keyed ON/OFF switch	Standard
PROTECTIONS	Ground Fault Protection	GFDI and Isolation monitoring device
	General AC Protection	MV Switchgear (configurable)
	General DC Protection	Fuses
	Overvoltage Protection	AC, DC Inverter and auxiliary supply type 2
CERTIFICATIONS	Safety	UL1741, CSA 22.2 No.107.1-01, UL62109-1, IEC62109-1, IEC62109-2
	Compliance	NEC 2014 / NEC 2017 (optional)
	Utility interconnect	UL 1741SA-Sept. 2016 / IEEE 1547.1-2005

NOTES

[1] Values at 1.00•Vac nom and cos Φ=1. Consult Power Electronics for derating curves.
[2] Depending on the project configuration.
[3] Consult P-Q charts available: $Q(kVAr)=\sqrt{(S(kVA)^2-P(kW)^2)}$.
[4] Heating resistors kit option below -20°C.
[5] Consult Power Electronics for other altitudes.
[6] Readings taken 1 meter from the back of the unit.

EXHIBIT J

DECOMMISSIONING AND FINAL RECLAMATION PLAN

Cheboygan County February 25, 2019

DECOMMISSIONING AND FINAL RECLAMATION PLAN

Background

Commercial-scale solar farms are designed for a minimum expected life of 30 years. Decommissioning will occur because of the following conditions:

1. The solar farm has reached the end of its life span; or
2. The solar farm does not produce power for a period of 18 months; or
3. The solar farm is rendered inoperable and will not be repaired or replaced.

After the useful life of the projects, the solar farm would be disassembled from the steel mounting frames and the site would be restored to pre-project conditions. The solar farm the Applicant or its successor in interest would be responsible for the removal, recycling, and/or disposal of all solar arrays, inverters, transformers and other structures on the site. The Applicant anticipates using the best available recycling measures at the time of decommissioning. Further, the Applicant would be required to maintain the vegetative plan for the site during decommission to preserve the soil quality for continued habitat or agricultural activities after the site has been decommissioned.

Per Section 17.30.3.4(M) of the Cheboygan County zoning ordinance:

i. Removal of all non-utility owned equipment, including conduit buried at less than three (3) feet, structures, fencing, roads and foundations.

   The applicant would be in compliance with the above requirement.

ii. Restoration of the property to its original condition prior to construction of the Level 3 SES-PV System, subject to reasonable wear and tear. The owner of the leased parcel, however, may request the restored ground surface not to be revegetated, and may request that graveled areas, developed access roads, fences, vegetative screening and berms remain.

   The applicant would be in compliance with the above requirement.

iii. A timeframe for completion of decommissioning with specific timeframes specified for: The applicant would expect a timeframe of 12 months for decommissioning but dependent on weather conditions.

   a) All above ground buildings, equipment and structures.
   3 months dependent on weather conditions-some underground work could be done concurrently.

   b) All below ground foundations and electrical cables.

5-6 months dependent on weather conditions. If it is a hard winter and ground is frozen for an extended period of time the timeframe could be longer.

c) Restoration of all ground surfaces not specifically exempt.

3 months dependent on weather conditions.

d) Furnishing a description and copy of any memorandum of lease or any other agreement(s) with the landowner(s) regarding decommissioning.

Under the terms of the lease agreements with the underlying property owners of the proposed solar farms, the Lessee, "shall provide security ("Removal Bond") to cover the estimated removal costs associated with the Solar Facilities then on the Property". Furthermore, it is stated in the leases that the Lessee "may provide a single Removal Bond that benefits Owner and the governmental authority, all in a manger consistent with the requirements of the governmental authority, and the governmental authority shall have access to the Property pursuant to reasonable notice to effect or complete the required removal or decommissioning."

e) Providing a list of names, addresses and telephone numbers of persons or parties responsible for designating the contractor(s) responsible for decommissioning.

Parties responsible are Cheboygan Solar LLC Attn: General Counsel

f) Providing a plan and schedule for updating the decommissioning plan every 5 (five) years.

Applicant agrees to provide an updated decommissioning plan every 5 (five) years.

g) Justification for the requested decommissioning time period requested must be sufficient to allow the Planning Commission to approve or revise the proposed decommissioning timeframe based on the material submitted.

Applicant will be in compliance with the above statement.

Restoration Fund Issuance

Prior to a building or construction permit being issued for the project, a description of the financial security guaranteeing the removal of the system will be provided. The financial security shall be in a form acceptable to the County Board, based on net removal cost, and the County shall be the beneficiary. The estimate shall be prepared by the project engineer and the amount shall be net of salvage value of equipment. The estimate shall be updated every 5 years and shall be subject to approval by the County.

EXHIBIT K

PROPERTY TAX CONTRIBUTION

Orion Renewable Energy Group, LLC 1/23/2020

Property Tax Contribution

91MW Cheboygan Solar Project in Grant Township, Cheboygan County, MI

DRAFT capital cost estimates and projection figures provided for methodology validation.

with Educational Tax Rate Exemption Applied to Personal Industrial Property

	Millage Rate	6	18	2.8075	1.7476	1.9667	1.5349	5.7284	0.500	0.250	1.000	0.500
	%	0.006	0.018	0.0028075	0.0017476	0.0019667	0.0015349	0.0057284	0.0005	0.00025	0.001	0.0005
Year	**Total Tax & Fees:**	State Education (Real & Personal Utility Property Only)	School Operating Non-Resident (Real & Personal Utility Only)	School Operating Resident DEBT	Intermediate School:	Township:	Library	County Alloc.	Sr. Cit.	Ambu	Road	CCE 911
1	**$ 694,393**	$ 12,322	$ 36,966	$ 112,948	$ 70,307	$ 79,122	$ 61,750	$ 230,458	$ 20,115	$ 10,058	$ 40,231	$ 20,115
2	**$ 595,881**	$ 10,959	$ 32,878	$ 96,654	$ 60,165	$ 67,708	$ 52,842	$ 197,213	$ 17,214	$ 8,607	$ 34,427	$ 17,214
3	**$ 527,534**	$ 9,994	$ 29,982	$ 85,364	$ 53,137	$ 59,799	$ 46,670	$ 174,176	$ 15,203	$ 7,601	$ 30,406	$ 15,203
4	**$ 474,271**	$ 9,227	$ 27,682	$ 76,575	$ 47,666	$ 53,642	$ 41,865	$ 156,244	$ 13,638	$ 6,819	$ 27,275	$ 13,638
5	**$ 428,549**	$ 8,560	$ 25,681	$ 69,037	$ 42,974	$ 48,362	$ 37,744	$ 140,863	$ 12,295	$ 6,148	$ 24,590	$ 12,295
6	**$ 390,368**	$ 7,992	$ 23,977	$ 62,750	$ 39,060	$ 43,957	$ 34,306	$ 128,035	$ 11,175	$ 5,588	$ 22,351	$ 11,175
7	**$ 359,729**	$ 7,524	$ 22,572	$ 57,714	$ 35,925	$ 40,429	$ 31,553	$ 117,759	$ 10,278	$ 5,139	$ 20,557	$ 10,278
8	**$ 336,631**	$ 7,155	$ 21,464	$ 53,928	$ 33,569	$ 37,778	$ 29,483	$ 110,035	$ 9,604	$ 4,802	$ 19,209	$ 9,604
9	**$ 305,992**	$ 6,686	$ 20,059	$ 48,892	$ 30,434	$ 34,250	$ 26,730	$ 99,758	$ 8,707	$ 4,354	$ 17,415	$ 8,707
10	**$ 290,435**	$ 6,417	$ 19,250	$ 46,357	$ 28,856	$ 32,474	$ 25,344	$ 94,586	$ 8,256	$ 4,128	$ 16,512	$ 8,256
11	**$ 267,338**	$ 6,047	$ 18,142	$ 42,571	$ 26,500	$ 29,822	$ 23,274	$ 86,862	$ 7,582	$ 3,791	$ 15,163	$ 7,582
12	**$ 251,781**	$ 5,778	$ 17,333	$ 40,037	$ 24,922	$ 28,046	$ 21,889	$ 81,690	$ 7,130	$ 3,565	$ 14,261	$ 7,130
13	**$ 236,225**	$ 5,508	$ 16,524	$ 37,502	$ 23,344	$ 26,271	$ 20,503	$ 76,518	$ 6,679	$ 3,339	$ 13,358	$ 6,679
14	**$ 228,210**	$ 5,338	$ 16,013	$ 36,218	$ 22,545	$ 25,371	$ 19,801	$ 73,899	$ 6,450	$ 3,225	$ 12,900	$ 6,450
15	**$ 190,029**	$ 4,770	$ 14,310	$ 29,931	$ 18,631	$ 20,967	$ 16,364	$ 61,070	$ 5,330	$ 2,665	$ 10,661	$ 5,330
16	**$ 189,555**	$ 4,699	$ 14,097	$ 29,897	$ 18,610	$ 20,944	$ 16,345	$ 61,002	$ 5,325	$ 2,662	$ 10,649	$ 5,325
17	**$ 189,082**	$ 4,628	$ 13,884	$ 29,864	$ 18,590	$ 20,920	$ 16,327	$ 60,935	$ 5,319	$ 2,659	$ 10,637	$ 5,319
18	**$ 188,608**	$ 4,557	$ 13,671	$ 29,831	$ 18,569	$ 20,897	$ 16,309	$ 60,867	$ 5,313	$ 2,656	$ 10,625	$ 5,313
19	**$ 188,135**	$ 4,486	$ 13,458	$ 29,798	$ 18,548	$ 20,874	$ 16,291	$ 60,799	$ 5,307	$ 2,653	$ 10,614	$ 5,307
20	**$ 187,661**	$ 4,415	$ 13,245	$ 29,765	$ 18,528	$ 20,851	$ 16,273	$ 60,731	$ 5,301	$ 2,650	$ 10,602	$ 5,301
21	**$ 187,187**	$ 4,344	$ 13,032	$ 29,731	$ 18,507	$ 20,827	$ 16,255	$ 60,664	$ 5,295	$ 2,647	$ 10,590	$ 5,295
22	**$ 186,714**	$ 4,273	$ 12,819	$ 29,698	$ 18,486	$ 20,804	$ 16,236	$ 60,596	$ 5,289	$ 2,645	$ 10,578	$ 5,289
23	**$ 186,240**	$ 4,202	$ 12,606	$ 29,665	$ 18,466	$ 20,781	$ 16,218	$ 60,528	$ 5,283	$ 2,642	$ 10,566	$ 5,283
24	**$ 185,766**	$ 4,131	$ 12,393	$ 29,632	$ 18,445	$ 20,758	$ 16,200	$ 60,460	$ 5,277	$ 2,639	$ 10,554	$ 5,277
25	**$ 185,293**	$ 4,060	$ 12,180	$ 29,599	$ 18,424	$ 20,734	$ 16,182	$ 60,393	$ 5,271	$ 2,636	$ 10,543	$ 5,271
	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Yrs 1-5	**$ 2,720,628**	$ 51,063	$ 153,189	$ 440,579	$ 274,249	$ 308,633	$ 240,871	$ 898,953	$ 78,465	$ 39,232	$ 156,929	$ 78,465
Yrs 6-10	**$ 1,683,155**	$ 35,774	$ 107,322	$ 269,641	$ 167,845	$ 188,888	$ 147,416	$ 550,173	$ 48,022	$ 24,011	$ 96,043	$ 48,022
Yrs 11-15	**$ 1,173,582**	$ 27,441	$ 82,323	$ 186,258	$ 115,941	$ 130,477	$ 101,830	$ 380,040	$ 33,172	$ 16,586	$ 66,343	$ 33,172
Yrs 16-20	**$ 943,041**	$ 22,785	$ 68,354	$ 149,155	$ 92,845	$ 104,486	$ 81,545	$ 304,335	$ 26,564	$ 13,282	$ 53,127	$ 26,564
Yrs 21-25	**$ 931,200**	$ 21,010	$ 63,030	$ 148,325	$ 92,328	$ 103,904	$ 81,091	$ 302,641	$ 26,416	$ 13,208	$ 52,832	$ 26,416
Total	**$ 7,451,606**	$ 158,072	$ 474,217	$ 1,193,958	$ 743,209	$ 836,387	$ 652,754	$ 2,436,141	$ 212,637	$ 106,319	$ 425,274	$ 212,637

Deborah Tomlinson

From: Brent Shank <mgr@chcrc.com>
Sent: Monday, March 09, 2020 9:14 AM
To: Deborah Tomlinson
Subject: Re: Orion Renewable Energy LLC Special Use Permit Application
Attachments: mgr.vcf

Follow Up Flag: Follow up
Flag Status: Completed

Good Morning,

I have reviewed the proposed project and any potential issues for County Roads. The only items of concern for the Road Commission:

1. Driveway permits for all access locations.
2. In areas of proposed plantings, we do not allow trees to be planted in the road right of way (per CCRC policy). These areas of proposed plantings along the roads would need to be reviewed with more detail prior to work starting.

Thank you,

Brent Shank, P.E.
Engineer/Manager
Cheboygan County Road Commission
mgr@chcrc.com
(231) 238-7775

On 3/3/2020 10:52 AM, Deborah Tomlinson wrote:

> The following is a link to the Orion Renewable Entergy LLC special use permit application that will be reviewed by the Planning Commission at the 03/18/20 meeting: http://is0.gaslightmedia.com/cheboygancounty/_ORIGINAL_/fs15-1583249756-27609.pdf (This is a large file and may take a little while to load). The following is a link to the 03/18/20 Planning Commission notice: http://is0.gaslightmedia.com/cheboygancounty/_ORIGINAL_/fs15-1583249756-27609.pdf.
>
> Please review these documents and email me prior to 03/11/20 if you have any comments that you would like to submit to the Planning Commission. Thank you!
>
> Debbie
>
> Debbie Tomlinson
> ***Assistant to Director of Planning & Zoning***
> ***Cheboygan County Planning & Zoning Department***
> PO Box 70, 870 South Main Street
> Cheboygan, MI 49721
> (231)627-8489 phone
> (231)627-3646 fax
> *debbiet@cheboygancounty.net*
> *www.cheboygancounty.net/planning*

Exhibit 3

151-004-100-002-00
HART, FREDERICK & KATHLEEN H/W &
8272 PAGE RD
CHEBOYGAN, MI 49721

151-004-100-003-00
ORTIZ, KELLY & PATSY H/W
5523 CRONAN RD
CHEBOYGAN, MI 49721

151-004-200-002-00
HART, KATHLEEN L/EWPTS
5606 CRONAN RD
CHEBOYGAN, MI 49721

151-004-200-003-00
HART, KATHLEEN L/EWPTS
5606 CRONAN RD
CHEBOYGAN, MI 49721

151-004-300-001-01
ARCHAMBO, EVAN & SARAH ARCHAMBO,
10674 BUTLER RD
CHEBOYGAN, MI 49721

151-004-300-001-02
NORDMAN, ERIC
2748 MAPLEWOOD AVE
ANN ARBOR, MI 48104

151-004-300-002-01
GAINOR, RUTH L/EWPTS
8311 TWIN LAKES RD
CHEBOYGAN, MI 49721

151-004-300-002-03
GAINOR, RUTH L/E; KRISTINE
5404 CRONAN RD
CHEBOYGAN, MI 49721

151-004-300-003-00
BERDEN, ROBERT L/EWPTS, THEN TO:
5235 CRONAN RD
CHEBOYGAN, MI 49721

151-004-316-160-00
KWIATKOWSKI, KEITH & KRISTINE
5045 CRONAN RD
CHEBOYGAN, MI 49721

151-004-400-001-00
MOUSSEAU, MOLLY ANN
5240 CRONAN RD
CHEBOYGAN, MI 49721

151-004-400-002-00
PUTSEY, NANCY; PHILIP PUTSEY &
33630 JOHN HAUK
GARDEN CITY, MI 48135

151-004-400-003-00
CHAMBERLAIN, WAYNE & CHRISTINA H/W
10408 WING RD
CHEBOYGAN, MI 49721

151-004-400-004-00
CHAMBERLAIN, HENRY H, TRUSTEE
24752 CAMPBELL AVE
WARREN, MI 48089-3812

151-004-401-001-00
TROMBLE BAY FARMS II, LLC
5299 TROMBLE DR
CHEBOYGAN, MI 49721

151-005-100-001-00
TROMBLE BAY FARMS II, LLC
5299 TROMBLE TRL
CHEBOYGAN, MI 49721

151-005-100-002-00
DOWLING, TIMOTHY & DESIREE H/W
5518 N BLACK RIVER RD
CHEBOYGAN, MI 49721

151-005-100-003-01
WISNIEWSKI, WILLIAM
7410 PAGE RD
CHEBOYGAN, MI 49721

151-005-100-003-02
PTASNIK, ALEX
11200 BUTLER RD
CHEBOYGAN, MI 49721

151-005-100-004-00
SCHOOLCRAFT, MARY & FRANK
7280 PAGE RD
CHEBOYGAN, MI 49721

151-005-200-001-00
HART, KERRY ANN
7420 PAGE RD
CHEBOYGAN, MI 49721

151-005-300-001-00
CLEARY, SUSAN
5356 N BLACK RIVER RD
CHEBOYGAN, MI 49721

151-005-300-001-01
CLEARY, SUSAN
5356 N BLACK RIVER RD
CHEBOYGAN, MI 49721

151-005-300-002-00
CLEARY, SUSAN
5356 N BLACK RIVER RD
CHEBOYGAN, MI 49721

151-005-300-003-00
CLEARY, SUSAN
5356 N BLACK RIVER RD
CHEBOYGAN, MI 49721

151-005-300-004-00
TROMBLE BAY FARMS II, LLC
5299 TROMBLE TRL
CHEBOYGAN, MI 49721

151-005-300-00S-00
SCOTT, GERALDINE & DEBRA RILES JTRS
34410 MORAVIAN DR
STERLING HEIGHTS, MI 48312

151-005-300-006-00
JOHNSON, WARREN
7045 TWIN LAKES RD
CHEBOYGAN, MI 49721

151-005-300-007-00
HEYTHALER PROPERTIES, CORP
7015 TWIN LAKES RD
CHEBOYGAN, MI 49721

151-005-300-008-00
HERRON, LISA A
337 ROTH BLVD
CLAWSON, MI 48017

151-005-400-001-00
PTASNIK, ALEXANDER
11200 BUTLER RD
CHEBOYGAN, MI 49721

151-006-100-002-02
AMUNDSON, JAMES & CHRISTINE H/W,
5962 TRUDEAU RD
CHEBOYGAN, MI 49721

151-006-100-002-09
GARMS, BOBBY
5750 TRUDEAU RD
CHEBOYGAN, MI 49721

151-006-100-003-00
LAFRINERE, DENNIS & MAUREEN H/W
7179 PAGE RD
CHEBOYGAN, MI 49721

151-006-100-004-00
TROMBLE BAY FARMS II, LLC
5299 TROMBLE DR
CHEBOYGAN, MI 49721

151-006-100-004-01
UNKNOWN

151-006-100-005-00
TROMBLE BAY FARM5 II, LLC
5299 TROMBLE DR
CHEBOYGAN, MI 49721

151-006-107-063-00
MERCHANT, TONY
2915 INDIAN TRL
CHEBOYGAN, MI 49721

151-006-200-001-01
LAFRINERE, DENNI5 & MAUREEN H/W
7179 PAGE RD
CHEBOYGAN, MI 49721

151-006-200-001-01
LAFRINERE, DENNIS & MAUREEN H/W
7179 PAGE RD
CHEBOYGAN, MI 49721

151-006-200-001-02
YORK, DUANE & ELIZABETH H/W
5669 N BLACK RIVER RD
CHEBOYGAN, MI 49721

151-006-200-002-00
TROMBLE BAY FARMS II, LLC
5299 TROMBLE DR
CHEBOYGAN, MI 49721

151-006-200-003-00
TROMBLE BAY FARMS II, LLC
5299 TROMBLE DR
CHEBOYGAN, MI 49721

151-006-200-004-00
LAFRINERE, DENNIS N & MAUREEN H/W
7179 PAGE RD
CHEBOYGAN, MI 49721

151-006-200-005-00
TROMBLE BAY FARMS II, LLC
5299 TROMBLE DR
CHEBOYGAN, MI 49721

1S1-006-300-001-01
EUSTICE, ERYN & AMANDA H/W
5252 TRUDEAU RD
CHEBOYGAN, MI 49721

151-006-300-001-02
TROMBLE BAY FARMS II, LLC
5299 TROMBLE DR
CHEBOYGAN, MI 49721

1S1-006-300-002-01
EUSTICE, ERYN & AMANDA H/W
120 SOUTH E ST
CHEBOYGAN, MI 49721

151-006-300-003-05
DUPUIE, LAWRENCE & ROBIN H/W
5100 TRUDEAU RD
CHEBOYGAN, MI 49721

151-006-300-004-00
HART, HELEN L/EWPTS;
6393 TWIN LAKES RD
CHEBOYGAN, MI 49721-9536

151-006-400-001-04
STEVENS, DAVID & DEBORAH H/W
6545 TWIN LAKES RD
CHEBOYGAN, MI 49721

151-006-400-001-04
STEVENS, DAVID & DEBORAH H/W
6545 TWIN LAKES RD
CHEBOYGAN, MI 49721

1S1-006-400-001-05
TROMBLE BAY FARMS II, LLC
5299 TROMBLE DR
CHEBOYGAN, MI 49721

151-006-400-001-06
STEAD, ANGIE
S2S1 N BLACK RIVER RD
CHEBOYGAN, MI 49721

151-007-200-001-01
DANIELS, LYNNE, TRUSTEE
2973 CANTON RD
CHEBOYGAN, MI 49721

151-007-200-002-00
DANIELS, LYNNE, TRU5TEE
2973 CANTON RD
CHEBOYGAN, MI 49721

151-008-100-001-00
TWIN LAKES STORAGE, LLC
23995 FREEWAY PARK DR
FARMINGTON HILLS, MI 48335

151-008-100-002-00
TWIN LAKES STORAGE, LLC
23995 FREEWAY PARK DR
FARMINGTON HILLS, MI 48335

151-008-100-003-00
STEAD, ROBIN W & TAMARA L H/W
4402 N BLACK RIVER RD
CHEBOYGAN, MI 49721

1S1-008-100-004-00
BEETHEM PROPERTIES
12688 HILL RD
CHEBOYGAN, MI 49721

151-008-200-001-01
BARTLETT, STUART & MARIE H/W
4845 OWENS RD
CHEBOYGAN, MI 49721

151-008-200-001-02
BEETHEM PROPERTIES
12688 HILL RD
CHEBOYGAN, MI 49721

151-008-200-001-03
MCCARTHY, JOSEPH & ARLENE, TRUSTEES
7400 TWIN LAKES RD
CHEBOYGAN, MI 49721

151-008-200-002-00
REGISTER, SHELLY & BRIAN WAYNE
4969 OWENS RD
CHEBOYGAN, MI 49721

151-008-300-001-00
BEETHEM PROPERTIES
12688 HILL RD
CHEBOYGAN, MI 49721

151-008-300-004-03
LAYMAN, PHILLIP & CARON LAYMAN
4812 EAGLE
WHITE LAKE, MI 48383

151-008-300-006-00
BEETHEM PROPERTIES
12688 HILL RD
CHEBOYGAN, MI 49721

151-008-300-007-00
TROMBLE BAY FARMS III, LLC
5299 TROMBLE TRL
CHEBOYGAN, MI 49721

151-008-300-008-00
LAYMAN, CHARLES & CINDY H/W
2875 GROVELAND RD
ORTONVILLE, MI 48462

151-008-400-001-00
TROMBLE BAY FARMS III, LLC
S299 TROMBLE TRL
CHEBOYGAN, MI 49721

151-008-400-001-01
BROWN, MICHAEL & DIANA H/W
15757 HEBRON MAIL RTE RD
CHEBOYGAN, MI 49721

151-008-400-002-00
MEYER, DONALD & FLAVIA H/W
4431 OWENS RD
CHEBOYGAN, MI 49721

151-008-400-003-00
TROMBLE BAY FARMS III, LLC
5299 TROMBLE TRL
CHEBOYGAN, MI 49721

151-008-400-004-00
TROMBLE BAY FARMS III, LLC
5299 TROMBLE TRAIL
CHEBOYGAN, MI 49721

1S1-009-100-001-00
WOLF, DAVID G & MICHELE N H/W
8152 TWIN LAKES RD
CHEBOYGAN, MI 49721

151-009-100-002-00
WOLF, DAVID G & MICHELE N H/W
8152 TWIN LAKES RD
CHEBOYGAN, MI 49721

151-009-100-003-00
WOLF, DAVID & MICHELE H/W
8152 TWIN LAKES RD
CHEBOYGAN, MI 49721

151-009-100-004-01
STUMP, DIANNA
8360 TWIN LAKES RD
CHEBOYGAN, MI 49721

151-009-100-004-03
TROMBLE BAY FARMS II, LLC
5299 TROMBLE DR
CHEBOYGAN, MI 49721

151-009-100-004-04
STUMP, DIANNA
8360 TWIN LAKES RD
CHEBOYGAN, MI 49721

151-009-200-001-02
SCHMITT, ARLENE M
4883 CHAMBERLAIN RD
CHEBOYGAN, MI 49721

151-009-200-001-03
GRANT TOWNSHIP
8908 TWIN LAKES RD
CHEBOYGAN, MI 49721

151-009-200-001-04
JORDON, DAVID A
PO BOX 128
CONCORD, MI 49237

151-009-200-001-05
TROMBLE BAY FARMS II, LLC
5299 TROMBLE DR
CHEBOYGAN, MI 49721

151-009-200-001-06
ROSS, BRENDA K
6813 BLACK MOUNTAIN RD
ONAWAY, MI 49765

151-009-200-001-07
TROMBLE BAY FARMS II, LLC
5299 TROMBLE DR
CHEBOYGAN, MI 49721

151-009-200-002-00
TROMBLE BAY FARMS II, LLC
5299 TROMBLE DR
CHEBOYGAN, MI 49721

151-009-200-003-00
TROMBLE BAY FARMS II, LLC
5299 TROMBLE DR
CHEBOYGAN, MI 49721

151-009-300-001-00
TROMBLE BAY FARMS III, LLC
5299 TROMBLE TRAIL
CHEBOYGAN, MI 49721

151-009-300-001-01
HART, LARRY
8038 HANSON RD
CHEBOYGAN, MI 49721

151-009-300-001-02
JOHNSON, ROBERT & BETTY H/W
8234 HANSON RD
CHEBOYGAN, MI 49721

151-009-300-002-00
JOHNSON, ROBERT & BETTY H/W
8234 HANSON RD
CHEBOYGAN, MI 49721

151-009-300-003-00
TROMBLE BAY FARMS II, LLC
5299 TROMBLE DR
CHEBOYGAN, MI 49721

151-009-300-004-00
TROMBLE BAY FARMS III, LLC
5299 TROMBLE TRAIL
CHEBOYGAN, MI 49721

151-009-400-001-00
TROMBLE BAY FARMS II, LLC
5299 TROMBLE DR
CHEBOYGAN, MI 49721

151-009-400-002-00
TROMBLE BAY FARMS II, LLC
5299 TROMBLE DR
CHEBOYGAN, MI 49721

151-009-400-003-00
TROMBLE BAY FARMS III, LLC
5299 TROMBLE TRAIL
CHEBOYGAN, MI 49721

151-009-400-004-00
TROMBLE BAY FARMS III, LLC
5299 TROMBLE TRAIL
CHEBOYGAN, MI 49721

151-010-100-006-00
HERR, TY
4782 CHAMBERLIN RD
CHEBOYGAN, MI 49721

151-010-100-007-00
HERR, TY L
4782 CHAMBERLIN RD
CHEBOYGAN, MI 49721

151-010-100-010-03
HERR, TY L
4782 CHAMBERLIN RD
CHEBOYGAN, MI 49721

151-010-100-018-00
KRAMARZ, JEROME
2940 LINCOLN
DEARBORN, MI 48124

151-010-300-001-00
EVANS, MICHAEL & MARY H/W
N1577 MAPLE TREE RD
ADELL, WI 53001-1400

151-010-300-002-00
EVANS, MICHAEL & MARY H/W
N1577 MAPLE TREE RD
ADELL, WI 53001-1400

151-015-100-001-00
CRAMBLETT, MICHAEL & MICHELLE
2856 ELK DR
BETTENDORF, IA 52722

151-016-100-001-00
ROGERS, DAVID SR & PATRICIA H/W
3886 OWENS RD
CHEBOYGAN, MI 49721

151-016-100-003-00
BOYD, ERIC A
8200 ROSS RD
CHEBOYGAN, MI 49721

151-016-100-004-00
BOYD, ERIC A & CARMELA H/W
8200 ROS5 RD
CHEBOYGAN, MI 49721

151-016-100-005-00
LAUGHHUNN, DARWIN L
6850 STILES RD
BROWN CITY, MI 48416

151-016-100-006-00
BOYD, MYLES C & STACIE M H/W
5385 CHURCH RD
CASCO, MI 48064

151-016-100-007-00
BOYD, THOMAS M
9279 SAINT CLAIR HWY
CASCO, MI 48064

151-016-100-008-00
BOYD, THOMAS M
9279 SAINT CLAIR HWY
CASCO, MI 48064-1224

151-016-200-001-00
CAMPAGNA, PATRICIA A
3139 BLOOMCREST
SHELBY TOWNSHIP, MI 48316

151-016-200-002-00
LAUGHHUNN, JOSEPH & MARGARET H/W
8849 34 MILE RD
ROMEO, MI 48065-3152

151-016-200-003-01
DURFEY, MARY L L/EWPTS
8644 ROSS RD
CHEBOYGAN, MI 49721

151-016-200-004-00
PANYARD, GERARD J & PAULINE E,
33218 TALL OAKS CT
FARMINGTON, MI 48336

151-016-200-005-00
WAY, HOWARD & LORI H/W
3912 PALO DURO DR
PLANO, TX 75074

151-016-200-006-00
ZALEWSKI, ANTHONY J &
8842 ROSS RD
CHEBOYGAN, MI 49721

151-016-200-007-00
ZALEWSKI, ANTHONY &
8842 ROSS RD
CHEBOYGAN, MI 49721

151-016-200-008-00
ZALEWSKI, ANTHONY &
8842 ROSS RD
CHEBOYGAN, MI 49721

151-017-200-001-00
ANDERSEN, JOHN & CAROLYN H/W
538 N FLAG5HIP DR
SALEM, SC 29676

151-017-200-002-02
BOYD, THOMA5 M
3901 OWENS RD
CHEBOYGAN, MI 49721

152-031-400-003-00
I5ON, GARY & SHERYL H/W
6622 ORCHARD BEACH RD
CHEBOYGAN, MI 49721

152-031-400-005-00
BROWN, CHARLES & TONI H/W
7300 TRUDEAU RD
CHEBOYGAN, MI 49721

152-031-400-006-00
LAFRINERE, DENNI5 & MAUREEN H/W
7179 PAGE RD
CHEBOYGAN, MI 49721

152-032-100-005-00
PAVWOSKI, ALLEN & ANGELINE,
1315 BERTEN
LANSING, MI 48910

152-032-300-001-00
LAFRINERE, DENNIS & MAUREEN H/W
7179 PAGE RD
CHEBOYGAN, MI 49721

152-032-301-001-00
LAFRINERE, DENNIS & MAUREEN H/W
7179 PAGE RD
CHEBOYGAN, MI 49721

153-001-200-002-05
MORROW, BRETT
5525 TRUDEAU RD
CHEBOYGAN, MI 49721

153-001-200-002-08
SPEED, SCOTT WILLIAM
5609 TRUDEAU RD
CHEBOYGAN, MI 49721

153-001-200-002-10
CLARMONT, DALE & DAWN
5741 TRUDEAU RD
CHEBOYGAN, MI 49721

153-001-400-003-01
MOULDER, ROBERT & CONSTANCE H/W,
5353 TRUDEAU RD
CHEBOYGAN, MI 49721

153-001-400-003-08
MOULDER, ROBERT & CONSTANCE H/W,
5353 TRUDEAU RD
CHEBOYGAN, MI 49721

153-001-408-071-00
MOULDER, ROBERT & CON5TANCE H/W,
5353 TRUDEAU RD
CHEBOYGAN, MI 49721

151-004-100-002-00
OCCUPANT
8272 PAGE RD
CHEBOYGAN, MI 49721

151-004-100-003-00
OCCUPANT
5523 CRONAN RD
CHEBOYGAN, MI 49721

151-004-200-002-00
OCCUPANT
5606 CRONAN RD
CHEBOYGAN, MI 49721

151-004-200-003-00
OCCUPANT
5540 CRONAN RD
CHEBOYGAN, MI 49721

151-004-300-001-01
OCCUPANT
5237 CRONAN RD
CHEBOYGAN, MI 49721

151-004-300-001-02
OCCUPANT
5326 OWENS RD
CHEBOYGAN, MI 49721

151-004-300-002-01
OCCUPANT
8311 TWIN LAKES RD
CHEBOYGAN, MI 49721

151-004-300-003-00
OCCUPANT
5235 CRONAN RD
CHEBOYGAN, MI 49721

151-004-316-160-00
OCCUPANT
5045 CRONAN RD
CHEBOYGAN, MI 49721

151-004-400-001-00
OCCUPANT
5240 CRONAN RD
CHEBOYGAN, MI 49721

151-004-400-002-00
OCCUPANT
5420 CHAMBERLIN RD
CHEBOYGAN, MI 49721

151-004-400-004-00
OCCUPANT
8811 TWIN LAKES RD
CHEBOYGAN, MI 49721

151-005-100-002-00
OCCUPANT
5518 N BLACK RIVER RD
CHEBOYGAN, MI 49721

151-005-100-003-01
OCCUPANT
7410 PAGE RD
CHEBOYGAN, MI 49721

151-005-100-004-00
OCCUPANT
7280 PAGE RD
CHEBOYGAN, MI 49721

151-005-200-001-00
OCCUPANT
7420 PAGE RD
CHEBOYGAN, MI 49721

151-005-300-001-00
OCCUPANT
5428 N BLACK RIVER RD
CHEBOYGAN, MI 49721

151-005-300-001-01
OCCUPANT
5470 N BLACK RIVER RD
CHEBOYGAN, MI 49721

151-005-300-002-00
OCCUPANT
5372 N BLACK RIVER RD
CHEBOYGAN, MI 49721

151-005-300-003-00
OCCUPANT
5356 N BLACK RIVER RD
CHEBOYGAN, MI 49721

151-005-300-005-00
OCCUPANT
5046 N BLACK RIVER RD
CHEBOYGAN, MI 49721

151-005-300-006-00
OCCUPANT
7045 TWIN LAKES RD
CHEBOYGAN, MI 49721

151-005-300-007-00
OCCUPANT
7015 TWIN LAKES RD
CHEBOYGAN, MI 49721

151-005-300-008-00
OCCUPANT
7393 TWIN LAKES RD
CHEBOYGAN, MI 49721

151-005-400-001-00
OCCUPANT
7757 TWIN LAKES RD
CHEBOYGAN, MI 49721

151-006-100-002-02
OCCUPANT
5962 TRUDEAU RD
CHEBOYGAN, MI 49721

151-006-100-002-09
OCCUPANT
5750 TRUDEAU RD
CHEBOYGAN, MI 49721

151-006-200-001-02
OCCUPANT
5669 N BLACK RIVER RD
CHEBOYGAN, MI 49721

151-006-200-002-00
OCCUPANT
N BLACK RIVER RD
CHEBOYGAN, MI 49721

151-006-300-001-01
OCCUPANT
5252 TRUDEAU RD
CHEBOYGAN, MI 49721

151-006-300-003-05
OCCUPANT
5100 TRUDEAU RD
CHEBOYGAN, MI 49721

151-006-300-004-00
OCCUPANT
6393 TWIN LAKES RD
CHEBOYGAN, MI 49721

151-006-400-001-04
OCCUPANT
6545 TWIN LAKES RD
CHEBOYGAN, MI 49721

151-006-400-001-04
OCCUPANT
6545 TWIN LAKES RD
CHEBOYGAN, MI 49721

151-006-400-001-06
OCCUPANT
5251 N BLACK RIVER RD
CHEBOYGAN, MI 49721

151-007-200-002-00
OCCUPANT
4839 N BLACK RIVER RD
CHEBOYGAN, MI 49721

151-008-100-001-00
OCCUPANT
7022 TWIN LAKES RD
CHEBOYGAN, MI 49721

151-008-100-003-00
OCCUPANT
4530 N BLACK RIVER RD
CHEBOYGAN, MI 49721

151-008-200-001-01
OCCUPANT
4845 OWENS RD
CHEBOYGAN, MI 49721

151-008-200-001-03
OCCUPANT
7400 TWIN LAKES RD
CHEBOYGAN, MI 49721

151-008-200-002-00
OCCUPANT
4969 OWENS RD
CHEBOYGAN, MI 49721

151-008-300-001-00
OCCUPANT
4372 N BLACK RIVER RD
CHEBOYGAN, MI 49721

151-008-300-004-03
OCCUPANT
7210 ARTESIAN TRL
CHEBOYGAN, MI 49721

151-008-300-008-00
OCCUPANT
7250 ARTESIAN TRL
CHEBOYGAN, MI 49721

151-008-400-001-00
OCCUPANT
4395 OWENS RD
CHEBOYGAN, MI 49721

151-008-400-001-01
OCCUPANT
4485 OWENS RD
CHEBOYGAN, MI 49721

151-008-400-002-00
OCCUPANT
4431 OWENS RD
CHEBOYGAN, MI 49721

151-009-100-001-00
OCCUPANT
8098 TWIN LAKES RD
CHEBOYGAN, MI 49721

151-009-100-003-00
OCCUPANT
8152 TWIN LAKES RD
CHEBOYGAN, MI 49721

151-009-100-004-01
OCCUPANT
8360 TWIN LAKES RD
CHEBOYGAN, MI 49721

151-009-200-001-02
OCCUPANT
4883 CHAMBERLAIN RD
CHEBOYGAN, MI 49721

151-009-200-001-03
OCCUPANT
8876 TWIN LAKES RD
CHEBOYGAN, MI 49721

151-009-200-001-06
OCCUPANT
8606 TWIN LAKES RD
CHEBOYGAN, MI 49721

151-009-300-001-01
OCCUPANT
8038 HANSON RD
CHEBOYGAN, MI 49721

151-009-300-001-02
OCCUPANT
8190 HANSON RD
CHEBOYGAN, MI 49721

151-009-300-002-00
OCCUPANT
8234 HANSON RD
CHEBOYGAN, MI 49721

151-009-400-002-00
OCCUPANT
8546 HANSON RD
CHEBOYGAN, MI 49721

151-010-100-006-00
OCCUPANT
4804 CHAMBERLIN RD
CHEBOYGAN, MI 49721

151-010-100-007-00
OCCUPANT
4782 CHAMBERLIN RD
CHEBOYGAN, MI 49721

151-010-100-010-03
OCCUPANT
4766 CHAMBERLIN RD
CHEBOYGAN, MI 49721

151-010-300-002-00
OCCUPANT
9165 ROSS RD
CHEBOYGAN, MI 49721

151-016-100-001-00
OCCUPANT
3886 OWENS RD
CHEBOYGAN, MI 49721

151-016-100-003-00
OCCUPANT
8134 ROSS RD
CHEBOYGAN, MI 49721

151-016-100-004-00
OCCUPANT
8200 ROSS RD
CHEBOYGAN, MI 49721

151-016-100-005-00
OCCUPANT
8268 ROSS RD
CHEBOYGAN, MI 49721

151-016-100-006-00
OCCUPANT
8334 ROSS RD
CHEBOYGAN, MI 49721

151-016-100-007-00
OCCUPANT
8400 ROSS RD
CHEBOYGAN, MI 49721

151-016-100-008-00
OCCUPANT
8466 ROSS RD
CHEBOYGAN, MI 49721

151-016-200-001-00
OCCUPANT
8530 ROSS RD
CHEBOYGAN, MI 49721

151-016-200-002-00
OCCUPANT
8596 ROSS RD
CHEBOYGAN, MI 49721

151-016-200-003-01
OCCUPANT
8644 ROSS RD
CHEBOYGAN, MI 49721

151-016-200-004-00
OCCUPANT
8714 ROSS RD
CHEBOYGAN, MI 49721

151-016-200-005-00
OCCUPANT
8778 ROSS RD
CHEBOYGAN, MI 49721

151-016-200-006-00
OCCUPANT
8842 ROSS RD
CHEBOYGAN, MI 49721

151-016-200-007-00
OCCUPANT
8906 ROSS RD
CHEBOYGAN, MI 49721

151-016-200-008-00
OCCUPANT
8968 ROSS RD
CHEBOYGAN, MI 49721

151-017-200-002-02
OCCUPANT
3901 OWENS RD
CHEBOYGAN, MI 49721

152-031-400-003-00
OCCUPANT
5714 N BLACK RIVER RD
CHEBOYGAN, MI 49721

152-032-300-001-00
OCCUPANT
7179 PAGE RD
CHEBOYGAN, MI 49721

153-001-200-002-05
OCCUPANT
5525 TRUDEAU RD
CHEBOYGAN, MI 49721

153-001-200-002-08
OCCUPANT
5609 TRUDEAU RD
CHEBOYGAN, MI 49721

153-001-200-002-10
OCCUPANT
5741 TRUDEAU RD
CHEBOYGAN, MI 49721

153-001-408-071-00
OCCUPANT
5353 TRUDEAU RD
CHEBOYGAN, MI 49721

151-006-100-002-09
OCCUPANT
5752 TRUDEAU RD
CHEBOYGAN, MI 49721

CHEBOYGAN COUNTY
PLANNING AND ZONING DEPARTMENT

CHEBOYGAN COUNTY BUILDING ▪ 870 S. MAIN ST., PO BOX 70 ▪ CHEBOYGAN, MI 49721
PHONE: (231) 627-8489 ▪ FAX: (231) 627-3646; www.cheboygancounty.net/planning/

STAFF REPORT

Item/Requested Action: A request for a Special Use Permit for a Level 3 Solar Energy System - Photovoltaic (SES-PV) per Sections 9.3.27 and 10.3.16 of the Zoning Ordinance	**Prepared by:** Michael Turisk
Date: March 12~~7~~, 2020	**Expected Meeting Date:** March 18, 2020

GENERAL INFORMATION

Property Owners (per Exhibit A-1; *List of Parcels*):
Tromble Bay Farms II, LLC
Tromble Bay Farms III, LLC
Rick and Michele Tromble
Beethem Properties
David and Michele Wolf
Lisa A. Herron

Applicant:
Orion Renewable Energy Group, LLC

Contact and Phone:
Amanda Hoffman; 503.476.4883

Property Location:
The subject properties are located in Grant Township and generally located 13 miles southeast of the City of Cheboygan along N. Black River Road, south of Twin Lakes Road and bounded by Ross Road to the south and Page Road to the north, Chamberlin Road to the east and Trudeau Road to the west.

BACKGROUND INFORMATION

The applicant requests a Special Use Permit to construct and operate a Level 3 Solar Energy System – Photovoltaic (SES-PV), per Sections 9.3.27 and 10.3.16 of the Zoning Ordinance. The project site for the "Cheboygan Solar Project" ("Project") is generally located 13 miles southeast of the City of Cheboygan in Grant Township. Broad characteristics of the Project (*see Exhibit A; Cover Sheet C-001*):

- Would encompass approximately 1,572 acres on 31 leased and private parcels zoned Agriculture and Forestry Management (M-AF) and Lake and Stream Protection (P-LS). (*see Exhibit A; Sheet C-203*)

- Photovoltaic (PV) solar modules and supporting equipment and infrastructure would be located within a fenced, approximately 862-acre Project area of which approximately 227 acres would be covered by PV. (PV modules arrange individual PV cells and are grouped into an *array*.)

- The Project's arrays would be mounted on single-axis tracking systems (*see Exhibit A; Sheet C-203*) that facilitate maximum solar absorption efficiency and productivity by allowing arrays to track the sun's path throughout the day (unlike stationary or static arrays). PV panels would reset to the east in the evening or early morning to receive sunlight at sunrise. The typical maximum height of PV arrays would be less than 10 feet and would not exceed the maximum 20 foot standard.

- The dimensions of PV arrays would vary. They would be oriented north-south given the use of single-axis tracking devices.

- PV generates direct current (DC) electricity; therefore, electricity generated by the Project would be fed underground to approximately 40, 3,550 kW (kilowatt) inverters that convert DC output to alternating current (AC). (*see Exhibit A; Sheet C-202*)

- Transformer-generated power would be routed to a Project point-of-interconnect (POI) substation or switchyard that would be accessed via Owens Road. The Project substation would include a larger transformer that "steps up" medium voltage to the 138 kilovolts (kV) of the adjacent transmission line to facilitate distribution to the grid (*see Exhibit A; Sheets C-206 and C-207*).

- An operations and maintenance (O & M) building would be constructed between Twin Lakes Road and Hanson Road, at the west side of Owens Road and near to the overhead electric right-of-way (*see Exhibit A; Sheet C-204*). Typical operations and maintenance activities that would occur include, but would not limited to, liaison and remote monitoring; inverter operation; security and management; and repair and maintenance.

- The Project is designed to produce up to 91 megawatts (MW) of electricity at the point of interconnection to the grid and for distribution to a regional power provider. (The average number of homes powered per MW of PV varies from state to state due to several factors, including average sunshine [*insolation*] and average household electricity consumption. However, since 2012 the national average has ranged from 150 - 210 homes per MW).

- The primary component of the Project is expected to be constructed in approximately nine to 14 months, weather dependent. The Project may be built in phases if full capacity is not achieved in the first phase.

- Landscape Details, per *Exhibit A; Sheet L-101*, include four Plant Modules with Modules 1 and 2 to be installed and maintained to serve residential screening purposes and Modules 3 and 4 intended for public and private road rights-of-way screening.

- An emergency response plan would be prepared in coordination with local emergency service providers that would ensure 24/7 access and provide contact information for operations personnel. The emergency response plan would include lockboxes for access gates, with keys to be provided to emergency services personnel.

- Chain link and woven wire fencing would be installed as a security measure. (*See Exhibit A; Sheet C-205*).

- The Project would create approximately 200 construction jobs, and two to four full-time maintenance and operations jobs according to the applicant.

- Exhibit A; Sheet C-201 (*General Notes and Details*) provides plan notes regarding code compliance, electrical interconnection, height restrictions, landscaping, required and applicant-imposed setbacks and temporary staging/unloading areas. Details are provided for pole-mounted lighting fixtures, access road and gravel access road section.

- A Special Use application/site plan waiver is requested from the requirement that site plans be drawn at 1 inch = 100 feet or less.

- Once commissioned and operational, the anticipated useful Project life is 30 years at a minimum.

Surrounding Zoning and Land Uses:
The zoning of the subject properties and immediate area is Agriculture and Forestry Management (M-AF) and Lake and Stream Protection (P-LS). Land uses are predominately agricultural with scattered "rural-residential" home sites.

Environmentally Sensitive Areas (steep slopes, wetlands, woodlands, stream corridor, floodplain):
No identified environmentally sensitive areas of significance, such as Critical Habitat, occur within or near to the nearly 1,600 acre project site. Although the leased area encompasses almost 1,600 acres, solar modules (groups of photovoltaic cells), and supporting infrastructure would be within a fenced area of approximately 862 acres. The application indicates that effort would be made to minimize or avoid impacting wetlands and vegetation during clearing, grubbing, grading and construction within Lake and Stream Protection zoning. The applicant indicates that all requisite Federal and State permits would be obtained in order to comply with applicable environmental regulations. Although not required by the Zoning Ordinance, the Project proposes native lawn and plant seed mixes and various "pollinator friendly" plantings that would enhance wildlife habitat and attract various pollinators. (See Exhibit H; *Vegetative Management Plan*)

Historic Buildings/Features:
There are no known historic buildings or features on the subject properties.

Traffic Implications:
There will be a temporary, but likely noticeable influx of traffic movements during site preparation and construction. However, due to minimal maintenance requirements, this project is expected to generate negligible traffic impacts at the commissioning and operation phase.

Access and street design: (secondary access, pedestrian access, sidewalks, residential buffer, ROW width, access to adjacent properties):
Construction, operations and maintenance personnel would primarily use Twin Lakes Road, Hanson Road and Owens Road (collectors) to arrive and depart via the Project's proposed 21 access points (*see Overall Map C-002*):

- One access point along Page Road;
- Two access points along the east side of Trudeau Road;
- Two access points along Hanson Road;
- Two access points along Ross Road;
- Four access points along North Black River Road;
- Five access points along Twin Lakes Road; and
- Five access points along Owen Road.

Sheet C-201 provides detail regarding the proposed design and dimensional characteristics of access driveways and unimproved internal roads. The Project would be required to comply with all applicable minimum design standards for non-residential driveways and approaches.

Signs:
The Project will position construction-related signs so as not to interfere with driver visibility and vehicle safety, including positioning signs at least 25 feet from road intersections.

Setbacks:
Per Section 17.30.6.C., the minimum setbacks for Level 3 Solar Energy Systems – SES PV are as follows:

All Level 3 SES-PV Systems along with their supporting structures, inverters and supporting buildings and equipment (excluding fencing, vegetative screening, berms, roads, underground cables and generator system step-up transformer facilities) shall comply with:

a) **100 feet from any dwelling. This setback may be waived or reduced if requested by the owner of the dwelling to be screened.**

The Project would by compliant with this setback standard as depicted by 100 feet radii surrounding existing residences in proximity to the Project.

b) **50 feet from any Level 3 SES-PV Facility perimeter not abutting a private or public road unless requested to be waived by the property owner of the parcel to be screened.**

The Project would comply with this setback standard as depicted by the 50 foot setback line as depicted by the single dash line surrounding existing residences in proximity to the Project and shown In Exhibit A; (*Sheets C-002; C-101 and C-102*).

c) **50 feet from any public or private road right of way.**

The Project would comply with this setback standard by the 50 foot setback line as depicted by the two dash line shown along the 66 foot road rights-of-way in Exhibit A (*Sheets C-002, C-101 and C-102*).

d) **500 feet from any major body of water as listed in section 10.1.2.**

Not applicable

e) **40 feet from any perennial stream, other than those listed in Section 10.1.2, shown as part of the P-LS zoning district. However, underground cables may be allowed if permitted by the Michigan Department of Environmental Quality (MDEQ) and the Army Corps of Engineers.**

The Project would comply with this setback standard as depicted by the delineated wetlands and streams/50-feet buffer shown in Exhibit A (*Sheets C-002, C-101 and C-102*).

ii. The generator system step-up transformer facility and any electrical storage facility shall meet the following setbacks:

a) **500 feet from any dwelling.**

The Project would comply with this setback standard as depicted by the *Proposed Substation Footprint* shown in Exhibit A (*Sheets C-002, C-101 and C-102*).

b) **250 feet from any public or private road abutting the Level 3 SES-PV Facility perimeter of or bisecting the project.**

The Project would comply with this setback standard as shown in Exhibit A (*Sheets C-002, C-101 and C-102*).

c) **500 feet from the ordinary high water mark of any body of water listed in Section 10.1.2.**

Not applicable

iii. All tree plantings utilized for screening shall have setbacks of seven (7) feet from any property line, public or private road right(s)-of-way, utility or driveway easement(s) or the Level 3 SES-PV

Facility perimeter. The seven (7) foot setback shall be measured at the time of planting from the center of the trunks of the trees used for screening.

The Project would comply with this setback standard as shown in Exhibit A (*Sheets C-002, C-101 and C-102*).

iv. Fencing shall be no closer than one (1) foot from any property line, public road right(s)-of-way, utility or driveway easement(s) or the established Level 3 SES-PV Facility perimeter. Fencing is considered a security measure and cannot be considered as adequate screening for a Level 3 SES-PV System.

Note that *Exhibit A; Sheet C-201* indicates two distinct applicant-imposed setbacks, including 50 feet from any delineated wetland or stream, and 250 feet from existing dwellings (100 feet is the minimum standard).

Noise:
Photovoltaic (PV) arrays do not generate sound alone; however, supporting hardware, such as tracking motors, integrated inverters (via cooling fans, for example), and medium- and high-voltage transformers, do so. (Given PV arrays alone do not generate electricity in the absence of sunlight, minimal noise impacts would be experienced during nighttime hours and overcast conditions).

Sound propagation modeling was performed (see Exhibit D; *Sound Simulations*) to determine Project compliance with the maximum allowable 60 dBA (A-weighted decibels) standard, per Section 17.30.6.C. Results indicate that maximum sound from a given property line would be 49 dBA, near to the proposed Project substation at the west side of Owens Road (south of its intersection with Twin Lakes road). The nearest residence would be approximately 260 feet from any tracking motor, with 45 dBA documented as the maximum. The nearest residence would be approximately 670 feet from any inverter and approximately 850 feet from the high-voltage transformer. (See Exhibit D [*Sound Simulations*]; Figure 4: *A Scale of Sound Pressure Levels for Typical Sound Sources).* This is a useful reference in that it offers examples of common sounds and their respective decibels.

Fence/Hedge/Buffer/Screening:
Landscaping and screening are required project elements for Level 3 Solar Energy Systems - Photovoltaic (SES-PV), per Section 17.30.6.C. As noted in Exhibit A (Sheet L-101; *Landscape Details*), the applicant proposes four distinct Plant Modules that would be sited according to current conditions and anticipated build-out conditions to serve as screening the Project from public rights-of-way and residential uses, in particular, as well as to maintain and enhance landscape aesthetics and wildlife habitat. Existing vegetation would be maintained and integrated where appropriate with landscaping/Plant Modules.

Photo simulations have been provided to depict the appearance of the Project from eight locations or simulation points around the Project site, and at different stages of woody vegetation growth. Photo simulations include required setbacks and three simulations include landscaping at the time of planting and at the 10-year mark. (*See Exhibit E*):

ViewPoint 1 - Twin Lakes Road just east of North Black River Road looking southeast
ViewPoint 2 - Hanson Road just west of Chamberlain Road looking south
ViewPoint 3 - Intersection of Hanson Road and Owens Road looking northeast
ViewPoint 4 - Ross Road just east of Owens Road looking north
ViewPoint 5 - Twin Lakes Road just west of Chamberlain looking northwest
ViewPoint 6 - Twin Lakes Road between North Black River Road and Owens Road looking southeast
ViewPoint 7 - Twin Lakes Road just east of North Black River Road looking northeast
ViewPoint 8 - North Black River Road, north of Twin Lakes Road looking northwest

Parking:
Three temporary staging areas to allow for unloading equipment, materials and provide construction-related and employee vehicle parking would be located just west of North Black River Road, at the north side of Twin Lakes Road (east of its intersection with Trudeau Road), and at the east side of Trudeau Road (near to the western terminus of the Project Area). These staging areas would be restored after construction is completed.

There are no parking requirements for this use. However, the Zoning Ordinance requires one space per two employees. Two to four full-time operational maintenance and security personnel are expected at the time of commission and operation; therefore, a minimum of two parking spaces would be required.

Lighting:
The Applicant has indicated that the Project would be in full compliance with the applicable standards as set forth in Sections 3.7 and 20.10 of the Zoning Ordinance. Exhibit A shows the locations of all lighting within the proposed facility and Sheet C-201 (General Notes and Details) indicated that pole-mounted fixtures would be 18 feet in height from grade. During operations, lighting would not be needed under typical nighttime periods. It would be only during occasional unscheduled maintenance situations will motion- and/or manually-activated illumination be needed. Since maintenance activities are not typically carried out during the evening hours, lights will only be turned on as needed. Localized security lighting may also be employed during construction and operations. Perimeter and safety lights will be installed and used only on an as-needed basis for emergencies or security. Manually or motion activated lighting would be provided at points of site ingress and egress, any operations and maintenance, and the Project substation.
The on-site Project substation will include lighting to allow for safety inspections or maintenance that may be required during nighttime hours. Lighting would also be provided adjacent to the operations and maintenance building and mounted at the site entrance gates to allow for safe entry and exit. All lighting will be shielded and downward-directional to minimize light trespass.

Stormwater management:
Relatively flat sites are ideal for Level 3 Solar Energy Systems/utility-scale solar energy development. The topography within the Project site is generally consistent, ranging from approximately 185 feet to 200 feet above mean sea level.

The highest elevations occur at the northwestern to the southeast corners of the Project area. Lower elevations occur at the southwestern Project area where the land slopes gently downward toward the Black River.

The *Preliminary Vegetative Management Plan* (*Exhibit H*) presents an overview of methods or best management practices for stormwater management, through minimizing erosion and sedimentation loads into nearby waterways and improving soil conditions. The primary objectives of the Vegetative Management Plan are to preserve and enhance aesthetic value of the project site and preserve and restore natural habitats that would be resistant to invasive species, particularly herbaceous plants. The Plan also articulates the site enhancements that intend to create habitats to attract various pollinators (e.g., bees; butterflies) and how vegetative corridors would be maintained along on-site streams to the greatest extent practicable. Ultimately, a final, detailed vegetation management plan would be developed based on the preliminary plan to help to guide the implementation of vegetation management efforts during construction, operations and maintenance. The Vegetative Management Plan would also acknowledge the requirement to comply with the Department of Environment, Great Lakes and Energy (EGLE) Soil Erosion and Sedimentation Control Program, Part 91.

Long-term maintenance protocols to manage cover would include mowing to preclude woody plant and noxious weed encroachment, with controls using mechanical and herbicidal methods. The project site would be evaluated annually for replanting/reseeding in order to maintain adequate and viable ground cover throughout the Project's life cycle.

Future Land Use Map/Master Plan:
The project site/ subject properties are within designated Forest/Agriculture on the Cheboygan County Future Land Use Map. A land use goal identified in the County's Master Plan ("Plan") is to "provide opportunities for safe and efficient use and transport of energy sources." Relevant strategies identified in the Plan for meeting said goal include *"allow for appropriate use and transport of all forms of energy"* and *"ensure opportunities for development of renewable energy that maximizes sustainable use of natural resources and retains energy dollars in the local economy."*

Public Comment:
Prior to application submittal, the applicant hosted an open house at the Cheboygan Public Library on February 10, 2020. In response to feedback received. The site plans presented at the open house were amended to show the removal of a row of PV at the south side of the Project along Ross Road in order to provide additional buffer for nearby residents.

The Planning and Zoning Department mailed Notices of Hearing on March 3, 2020 to surrounding property owners within 300 feet of the subject properties; however, no public comments have been received as of the date of this report (March 12).

Review or permits from other government agencies:
The applications, site plans and supporting documents were provided to the Grant Township Supervisor, County Road Commission, District Health Department No. 4, Michigan Department of Transportation (MDOT), Alverno Fire Department, the County Administrator, the County Building Official and legal counsel. As of this report, staff has received comments from the County Road Commission (attached) regarding the need for driveway permits for all access points and review of the vegetative screening/Vegetative Management Plan prior to commencing work.

Recommendations (proposed conditions of approval):

1. The applicant shall comply with requirements for Level 3 Solar Energy Systems – SES-PV, per Section 17.20 of the Zoning Ordinance, as applicable.

2. Prior to issuance of any County Department of Building Safety building permits, the Project shall be in compliance with the Department of Environment, Great Lakes and Energy's (EGLE) Soil Erosion and Sedimentation Control Program, Part 91, as applicable.

3. Prior to construction or commencing with construction preparation activities including, but not limited to, land clearing, grubbing and/or grading, the applicant shall obtain County Department of Building Safety permits, as applicable.

4. Prior to construction, the applicant shall obtain all County Road Commission permits, as applicable, and submit written confirmation of compliance with County Road Commission requirements with regard to fencing and screening installations.

5. The Project shall comply with District Health Department No. 4 requirements, as applicable.

6. Herbaceous and woody vegetation installed and utilized as ground cover and screening purposes shall be maintained for the duration of the useful life of the Project. In addition, dead, dying and diseased herbaceous and woody vegetation shall be replaced as needed for the duration of the useful life of the Project.

7. Prior to beginning construction or commencing with site preparation activities, including, but not limited to, land clearing, grubbing and/or grading, a performance guarantee shall be furnished to the County by the owner of the Level 3 Solar Energy System – SES-PV in the form of a cash deposit, certified check, irrevocable letter of credit or surety bond acceptable to the County in an amount equal to the estimated costs associated with removal of the Level 3 Solar Energy System – SES-PV, including all solar panels, supporting structures, inverters, transformers and all associated equipment in accordance with the decommissioning and restoration plan in Section 17.30.3.3.M. The performance guarantee shall be approved by the County prior to beginning construction or commencing with site preparation activities, including, but not limited to, land clearing, grubbing and/or grading.

8. The applicant shall provide the Planning and Zoning Department the Acceptance of Conditions form to be attached to the special land use approval letter within thirty (30) calendar days from the date of the approval letter. This form shall be signed by the owner(s) of the Level 3 Solar Energy System - Photovoltaic (SES-PV). The applicable building permit application(s) shall include a site plan in conformance with this special land use that meets all applicable site development standards (such as minimum required setbacks from property boundaries) and appropriate building permit fees, as applicable. Permits must be issued within twelve (12) months from the date of the special land use approval letter (unless a special use extension request is approved by the Planning Commission, pursuant to Section 18.12.a., as amended), otherwise the special land use may be deemed void upon thirty (30) days written notification to the applicant.

9. Any changes to the approved special use shall be subject to review by the Planning and Zoning Department and may require an application for special use amendment and approval by the Planning Commission.

10. It is the applicant's responsibility to obtain any additional permits or meet additional conditions, if any, that may be applicable to the proposed land use pursuant to other federal, state, or local laws or regulations.

CHEBOYGAN COUNTY PLANNING COMMISSION

SPECIAL USE PERMIT REQUEST

Wednesday, March 18, 2020; 7:00 PM

Applicant

Orion Renewable Energy Group, LLC
155 Grand Avenue; Suite 706
Oakland, CA 94612

Owners

Tromble Bay Farms II, LLC
Tromble Bay Farms III, LLC
Rick and Michele Tromble
Beethem Properties
David and Michele Wolf
Lisa A. Herron

Parcel(s)

Grant Township
Sections 4, 5, 6, 8 and 9

1. 151-009-200-001-05
2. 151-006-100-004-00
3. 151-006-300-001-02
4. 151-006-100-005-00
5. 151-006-200-003-00
6. 151-006-200-005-00
7. 151-006-400-001-05
8. 151-008-400-003-00
9. 151-008-400-004-00
10. 151-008-100-004-00
11. 151-008-300-006-00
12. 151-008-300-007-00
13. 151-008-400-001-00
14. 151-008-200-001-02
15. 151-009-300-001-00
16. 151-009-100-003-00
17. 151-009-300-004-00
18. 151-009-400-004-00
19. 151-009-400-003-00
20. 151-009-200-001-07
21. 151-009-300-003-00
22. 151-009-100-004-03
23. 151-009-400-002-00
24. 151-009-200-002-00
25. 151-009-400-001-00
26. 151-009-200-003-00
27. 151-004-401-001-00
28. 151-005-100-001-00
29. 151-005-300-004-00
30. 151-005-300-008-00
31. 151-006-200-002-00

GENERAL FINDINGS

1. The applicant requests a Special Use Permit for a Level 3 Solar Energy System – Photovoltaic (SES-PV) on leased, private land in Grant Township.

2. The subject properties for the proposed Level 3 Solar Energy System – Photovoltaic (SES-PV) are zoned Agriculture and Forestry Management (M-AF) and Lake and Stream Protection (P-LS) and encompass approximately 1,572 acres on 31 parcels.

3. Photovoltaic (PV) solar modules and supporting equipment and infrastructure would be located within a fenced, approximately 862-acre Project area of which approximately 227 acres would be covered by PV.

4. Level 3 Solar Energy Systems– Photovoltaic (SES-PV) are permitted by special use in the Agriculture and Forestry Management (M-AF) and Lake and Stream Protection (P-LS) zoning districts pursuant to Sections 9.3.27 and 10.3.16, respectively, of the Zoning Ordinance.

5. Level 3 Solar Energy Systems– Photovoltaic (SES-PV) require a special use permit in accordance with Section 18.7., and a site plan review in accordance with Section 20.10 of the Zoning Ordinance.

6. A Project substation and operations and maintenance (O & M) building would be constructed between Twin Lakes Road and Hanson Road, at the west side of Owens Road and near to the overhead electric right-of-way.

7. Upon completion, the Level 3 Solar Energy Systems– Photovoltaic (SES-PV) would generate up to 91 megawatts (MW) of electricity for distribution to a regional power provider.

8. The applicant has requested a waiver from the requirement that site plans be drawn at 1 inch = 100 feet or less.

Findings of Fact Under Section 17.30.6.C of the Zoning Ordinance

A. Setbacks:

i. All Level 3 SES-PV Systems along with their supporting structures, inverters and supporting buildings and equipment (excluding fencing, vegetative screening, berms, roads, underground cables and generator system step-up transformer facilities) shall comply with the following setbacks:

a) 100 feet from any dwelling. This setback may be waived or reduced if requested by the owner of the dwelling to be screened.

b) 50 feet from any Level 3 SES-PV Facility perimeter not abutting a private or public road unless requested to be waived by the property owner of the parcel to be screened.

c) 50 feet from any public or private road right of way.

d) 500 feet from any major body of water as listed in section 10.1.2.

e) 40 feet from any perennial stream, other than those listed in Section 10.1.2, shown as part of the P-LS zoning district. However, underground cables may be allowed if permitted by the Michigan Department of Environmental Quality (MDEQ) and the Army Corps of Engineers.

ii. The generator system step-up transformer facility and any electrical storage facility shall meet the following setbacks:

a) 500 feet from any dwelling.

b) 250 feet from any public or private road abutting the Level 3 SES-PV Facility perimeter of or bisecting the project.

c) 500 feet from the ordinary high water mark of any body of water listed in Section 10.1.2.

iii. All tree plantings utilized for screening shall have setbacks of seven (7) feet from any property line, public or private road right(s)-of-way, utility or driveway easement(s) or the Level 3 SES-PV Facility perimeter. The seven (7) foot setback shall be measured at the time of planting from the center of the trunks of the trees used for screening.

iv. Fencing shall be no closer than one (1) foot from any property line, public road right(s)-of-way, utility or driveway easement(s) or the established Level 3 SES-PV Facility perimeter. Fencing is considered a security measure and cannot be considered as adequate screening for a Level 3 SES-PV System.

1. The Project would comply with the applicable minimum setback requirements, above. (*see Project Narrative and Exhibit A*)
2.
3. Standard has been met.

OR

1.
2. Standard has not been met.

B. Vegetative Screening and Landscaping:
i. Level 3 SES-PV facilities abutting a public or private road or property line of an adjacent parcel shall comply with the following requirements:

a) Screening shall be required along any public or private road right(s)-of-way and opposite any dwelling on the same or adjacent parcels unless the owner of the dwelling to be screened requests in writing otherwise.

b) Evergreen coniferous trees or a combination of trees and berms shall be the minimum acceptable methods of screening wherever screening is required.

c) Minimum height at time of planting requirements for trees utilized for screening are as follows:

1. Trees planted opposite a dwelling shall be a minimum of eight (8) feet tall at the time of planting. The tree height may be reduced by one (1) foot for each one (1) foot in the height of the berm on which it is planted, i.e., the total of the berm and tree height must be a minimum of eight (8) feet in height. If the road bed is elevated above the surrounding land surface at the location requiring screening, tree tops shall be at least eight (8) feet above the road surface.

2. Tree height at the time of planting shall not be allowed to be reduced below four (4) feet in height regardless of berm height (see Figure 2).

3. Trees planted for screening along road rights-of-way not opposite a dwelling shall require a minimum height at the time of planting of five (5) feet.

ii. Buried electrical cables within easements used to connect noncontiguous parcels with the Level 3 SES-PV facility, although an integral part of the facility, shall not require screening regardless of proximity to any dwelling.

iii. All tree plantings or combination of trees and berms utilized for screening opposite a dwelling shall extend 100 feet in either direction from a point on the Level 3 SES-PV facility perimeter directly opposite the midpoint of the opposing dwelling.

iv. In the event a property line lies within the road right(s)-of-way, setbacks shall be measured from the edge of the road right(s)-of-way. v. At road or driveway intersections, vegetative screening or combination of trees and berms or fences shall be established or maintained in a manner that does not obstruct the view of vehicular traffic in any direction. All right-of-way intersections shall be provided and maintained with a clear unobstructed vision corner extending not less than 20 feet from all right-of-way line intersections along said right-of-way line in the form of a triangle.

vi. Natural vegetative screening is encouraged to be incorporated and maintained into the evergreen coniferous tree screening requirements per Section 17.30.6.C.B. However, natural vegetative screening shall be considered an addition to, and not a replacement for, the evergreen coniferous tree screening requirements. vii. All trees planted for screening shall be maintained in good condition for the life of the project. All dead, dying or diseased trees shall be replaced within one (1) year with trees in compliance with the standards set forth in this Section.

1. The Project would comply with the minimum vegetative screening and landscaping requirements, above. (*see Exhibit A; Sheet L-101*)

2.

3. Standard has been met.

OR

1.

2. Standard has not been met.

C. Noise:
No Level 3 SES-PV facility shall generate noise that, when measured at the Level 3 SES-PV Facility's perimeter, shall exceed 60 decibels (dBA). This standard does not apply during construction, routine equipment maintenance, repair or replacement, or at the time of decommissioning and reclamation.

1. The Project would comply with the maximum dBA standard, as sound simulations performed at various locations in the Project site demonstrate compliance. (see Exhibit D; Sound Simulations)

2.

3. Standard has been met.

OR

1.

2. Standard has not been met.

D. Electrical Interconnection:
All electrical interconnections or distribution lines shall comply with all applicable codes and standards. Only existing above-ground transmission lines as well as above-ground transmission lines from the project generation station step-up transformer facility to the point of interconnection with transmission lines are permitted above ground. All other electrical interconnections shall be buried unless other requirements are determined at the time of building permit review.

1. The Project would comply with the aforementioned requirements. *(see Exhibit A; Sheets C-206 and C-207)*

2.

3. Standard has been met.

OR

1.

2. Standard has not been met.

E. Height Restriction:
Level 3 SES-PV solar collection panels with their support structures shall not exceed 20 feet in height when oriented at maximum tilt. All other structures except those within the generation station step-up transformer facility and associated transmission towers shall be limited to thirty-five (35) feet. Equipment within the generation station step-up transformer facility shall be exempt from height restrictions.

1. As shown in the Site Plan (Exhibit A), the typical maximum height of PV panels is less than 10 feet, but would not exceed 20 feet.

2.

3. Standard has been met.

OR

1.

2. Standard has not been met.

F. Performance Guarantee:
In conjunction with the approval of a Level 3 SES-PV System the Planning Commission shall require the owner of the Level 3 SES-PV System to furnish the County with a performance guarantee in the form of a cash deposit, certified check, irrevocable letter of credit or surety bond acceptable to the County in an amount equal to the estimated costs associated with removal of the Level 3 SES-PV facility, including all solar panels, supporting structures, inverters, transformers and all associated equipment in accordance with the decommissioning and restoration plan in Section 17.30.3.3.M. This performance guarantee shall be furnished prior to the construction of the Level 3 SES-PV System and may be combined with any performance guarantee required to be given to the owner of the site.

1. A Performance Guarantee would be furnished after entitlement and prior to construction. Applicant understands this requirement for a performance guarantee and will comply with it.

2.

3. Standard has been met.

OR

1.

2. Standard has not been met.

G. Final Reclamation:
Any Level 3 SES-PV System not operated for a continuous period of twelve (12) months shall be considered abandoned. The owner of any Level 3 SES-PV System that is abandoned as provided herein shall be removed from the property upon receipt of notice from the Zoning Administrator of such abandonment, or the end of operation under the terms and conditions of this subsection. The timeframe for final reclamation shall be determined and approved by the Planning Commission and made a condition of approval of the special use permit. Except as provided herein, the Level 3 SES-PV System shall be removed from the property by the owner of the Level 3 SES-PV System, including all structures, equipment, components, and subsystems, except underground cables buried at a depth greater than three (3) feet. Berms and trees, service roads and fencing, however, if requested by the owner of the property on which the Level 3 SES-PV System is located, shall be permitted to remain. Furthermore, the property owner may request that the property on which the Level 3 SES-PV System functioned remain unvegetated.

1. The Applicant has communicated understanding of the final reclamation requirements and will comply with them as needed. (*see Exhibit J*)

2.

3. Standard has been met.

OR

1.

2. Standard has not been met.

Findings of Fact Under Section 18.7 of the Zoning Ordinance

The Planning Commission makes the following findings of fact as required by Section 18.7 of the Zoning Ordinance for each of the following standards listed in that section:

a. The property subject to the application is located in a zoning district in which the proposed special land use is allowed.

   1. The applicant requests a special use permit for a Level 3 Solar Energy System – Photovoltaic (SES-PV) on leased, private land in Grant Township. (*see Project Narrative; Exhibit A*)

   2. The subject properties are zoned Agriculture and Forestry Management (M-AF) and Lake and Stream Protection (P-LS). (*see Project Narrative; Exhibits A and C*)

   3. Level 3 Solar Energy Systems – Photovoltaic (SES-PV) is a land use that requires a special use permit in the Agriculture and Forestry Management (M-AF) and Lake and Stream Protection (P-LS) zoning districts, pursuant to Sections 9.3.27 and 10.3.16, respectively, of the Zoning Ordinance.

   4.

   5. Standard has been met.

      OR

   1.

   2. Standard has not been met.

b. The proposed special land use will not involve uses, activities, processes, materials, or equipment that will create a substantially negative impact on the natural resources of the County or the natural environment as a whole.

   1. The Project is designed and would be constructed to avoid sensitive natural resources, such as wetlands, riparian areas and trees. The Project site is not known to lie within critical habitat for endangered, threatened or sensitive species. (*see Project Narrative; Exhibits A and H*)

   2. Furthermore, the location of the Project avoids any designated conservation areas or preserves.

   3. Native seed mixes and pollinator-friendly vegetation would be planted and maintained that would enhance habitat for pollinating insects, birds and other wildlife. These activities would be helpful to continued agricultural activities in and around the Project site, and support the natural resources in and surrounding the site.

   4.

   5. Standard has been met.

      OR

   1.

   2. Standard has not been met.

c. The proposed special land use will not involve uses, activities, processes, materials, or equipment, or hours of operation that will create a substantially negative impact on other conforming properties in the area by reason of traffic, noise, smoke, fumes, glare, odors, or the accumulation of scrap material that can be seen from any public or private highway or seen from any adjoining land owned by another person.

1. The Project would comply given that anticipated traffic counts post-construction and during operations would be minor, generating approximately 10 vehicle trips per day by 2-4 full-time employees. Maintenance efforts would enlist up to 20 employees that would generate approximately 50 vehicle trips per day.

2. Sound simulations demonstrate that the Project would not generate more than 60 dBA as measured at the property line. (*see Project Narrative; Exhibit D*)

3. In addition:

    - PV does not generate appreciable noise during nighttime, storms and heavy overcast periods;
    - PV does not generate odors, smoke and/or other pollutants during operation and maintenance;
    - PV is designed to be highly absorptive of photons (sunlight) in order to maximize efficiency, thereby minimizing potential disruptive glare; and
    - PV does not generate scrap or other waste materials during operation.

4.

5. Standard has been met.

OR

1.

2. Standard has not been met.

d. The proposed special land use will be designed, constructed, operated, and maintained so as not to diminish the opportunity for surrounding properties to be used and developed as zoned.

1. The design, construction, operation, and maintenance of the proposed Project would not diminish opportunities for surrounding property owners to use and develop their properties as zoned. As noted above, the Project would not generate negative off-site impacts from traffic, noise, smoke, fumes, glare, odors, or waste materials that would negatively impact the ability to use or develop surrounding properties. The Project's design complies with the minimum applicable zoning standards (e.g., setback; screening) to help minimize the potential for negative off-site impacts. (*See Applications; Project Narrative and Exhibits A, D, E and H*)

2.

3. Standard has been met.

OR

1.

2. Standard has not been met.

e. The proposed special land use will not place demands on fire, police, or other public resources in excess of current capacity nor increase hazards from fire or other dangers to the subject property or adjacent properties.

1. The Project would not require public resources greater than current capacity, nor increase hazards from fire or other dangers. (*See Applications; Project Narrative and Exhibits A, B and G*)

2.

3. Standard has been met.

OR

1.

2. Standard has not been met.

f. The proposed special land use shall not increase traffic hazards or cause congestion on the public or private highways and streets of the area in excess of current capacity. Adequate access to the site shall be furnished either by existing roads and highways or proposed roads and highways. Signs, buildings, plantings, or other elements of the proposed project shall not interfere with driver visibility or safe vehicle operation. Entrance drives to the use and to off-street parking areas shall be no less than 25 feet from a street intersection (measured from the road right-of-way) or from the boundary of a different zoning district.

1. The Project would not create traffic congestion or increase traffic-related hazards adjacent to (and in the vicinity of) the Project site, located in an area of the County with an established circulation system with conditions that allow easy access with minimal, if any, changes to existing circulation or traffic patterns anticipated, particularly during operation.

2. Collector roads would serve the Project and offer an adequate level of service capacity. Given negligible trip generation at operation, associated traffic would likely be unnoticeable given 2-4 full-time employees. Points of ingress/egress and off-street parking would be 25 feet at a minimum from intersections.

   The applicant would coordinate with the County Road Commission in order to minimize potential roadway conflict during construction. (*See Applications; Project Narrative and Exhibit A*)

3.

4. Standard has been met.

OR

1.

2. Standard has not been met.

g. The proposed special land use will be adequately served by water and sewer facilities, and refuse collection and disposal services.

1. The operations and maintenance building would be served by well and septic. The Project would not utilize significant volumes of water when operational (groundwater would not be used to clean solar modules), but newly planted herbaceous and woody plants and seeds would require regular watering until established. Trash and other refuse would be hauled offsite to an authorized area landfill. (*See Applications; Project Narrative)*

2.

3. Standard has been met.

OR

1.

2. Standard has not been met.

h. The proposed special land use will comply with all specific standards required under this Ordinance applicable to it.

1. The Project will comply with all specific standards required under the Zoning Ordinance, including the standards for granting site plan approval in Section 20.10 and the standards and the standards applicable to Level 3 SES-PV Systems in Section 17.30.6.C. of the Zoning Ordinance. (*See Project Narrative; Exhibits A, C, D, E. G, H, I and J*)

2.

3. Standard has been met.

OR

1.

2. Standard has not been met.

SPECIFIC FINDINGS OF FACT UNDER SECTION 20.10 OF THE ZONING ORDINANCE

The Planning Commission makes the following findings of fact as required by Section 20.10 of the Zoning Ordinance for each of the following standards listed in that Section:

a. The site plan shall be designed so that there is a limited amount of change in the overall natural contours of the site and shall minimize reshaping in favor of designing the project to respect existing features of the site in relation to topography, the size and type of the lot, the character of adjoining property and the type and size of buildings. The site shall be developed so as not to impede the normal and orderly development or improvement of surrounding property for uses permitted in this Ordinance.

   1. Minimal changes to the natural contours of the site would occur during site preparation and construction given level terrain. (*See Project Narrative; Exhibits A and H*)

   2.

   3. Standard has been met.

      OR

   1.

   2. Standard has not been met.

b. The landscape shall be preserved in its natural state, insofar as practical, by minimizing tree and soil removal, and by topographic modifications which result in smooth natural appearing slopes as opposed to abrupt changes in grade between the project and adjacent areas.

   1. Utility-scale PV or "solar farms" are typically sited on terrain with little slope, as is the case with the Project site, and therefore minimal changes to the natural contours would occur during site preparation and construction. (*See Project Narrative; Exhibit A)*)

   2. Although site grading, as well as tree and vegetation grubbing, would occur as part of site preparation, effort would be made to maintain existing, viable trees and vegetation to maintain landscape aesthetic, enhance proposed vegetative screening and stabilize soils. Trees and various varietals of native plants would be planted post-construction and maintained during operation; doing so would help in remediating pre-construction tree and vegetation removal. (*See Project Narrative; Exhibits A, E and H*)

   3.

   4. Standard has been met.

      OR

   1.

   2. Standard has not been met.

c. Special attention shall be given to proper site drainage so that removal of storm waters will not adversely affect neighboring properties.

   1. Stormwater would be maintained on the Project site. The Vegetative Management Plan is designed to reduce stormwater runoff, improve soils, and create habitat for various pollinators, namely bees and

butterflies. More than 8,000 square feet of impervious surface would not be located on the Project site, due to the fact that solar panels are not considered impervious. (*See Exhibits A and H*)

2.

3. Standard has been met.

OR

1.

2. Standard has not been met.

d. The site plan shall provide reasonable, visual and sound privacy for all dwelling units located therein. Fences, walls, barriers and landscaping shall be used, as appropriate, for the protection and enhancement of property and for the privacy of its occupants.

Not applicable, as no dwelling units are proposed.

e. All buildings or groups of buildings should be so arranged as to permit emergency vehicle access by some practical means.

1. A practical means for access by emergency vehicles is provided via numerous access points via local collector road and internal operations and maintenance roads. (*see Exhibit A*)

2.

3. Standard has been met.

OR

1.

2. Standard has not been met.

f. Every structure or dwelling unit shall have access to a public street, walkway or other area dedicated to common use.

1. The onsite project substation and operations and maintenance building would have access to public roadways, principally Owens Road. (*see Project Narrative; Exhibit A*)

2.

3. Standard has been met.

OR

1.

2. Standard has not been met.

g. For subdivision plats and subdivision condominiums, there shall be a pedestrian circulation system as approved by the Planning Commission.

Not applicable, as no subdivision condominiums or subdivision plats are proposed.

h. Exterior lighting shall be arranged as follows: a. It is deflected away from adjacent properties, b. It does not impede the vision of traffic along adjacent streets and c. It does not unnecessarily illuminate night skies.

1. The Project would comply with the lighting standards as provided in Sections 3.7.1 and 20.10 of the Zoning Ordinance. For example, per the submitted application, all lighting, including for access, maintenance and security purposes, would be shielded and directed downward to minimize light trespass or light pollution. The on-site Project substation or switchyard will include manually- and/or motion-activated lighting to allow for inspections or maintenance as may be required during evening hours. (However, maintenance is not typically performed during nighttime hours). Project perimeter and security lighting would be installed and illuminated only on an as-needed basis for emergencies or security breaches. (*see Exhibits A and G*)

2.

3. Standard has been met.

OR

1.

2. Standard has not been met.

i. The arrangement of public or common ways for vehicular and pedestrian circulation shall respect the pattern of existing or planned streets and pedestrian or bicycle pathways in the area. Streets and drives which are part of an existing or planned street pattern which serves adjacent development shall be of a width appropriate to the traffic volume they will carry and shall have a dedicated right-of-way equal to that specified in the Master Plan.

Not applicable. No public common ways are proposed.

j. Site plans shall conform to all applicable requirements of state and federal statutes and the Cheboygan County Master Plan, and approval may be conditioned on the applicant receiving necessary state and federal permits.

1. The site plan conforms to the applicable requirements of state and federal statutes and the Cheboygan County Master Plan ("Plan"), as the Project would help the County to successfully attain the Plan goal that speaks to providing opportunities for safe and efficient use and transport of energy sources. To this end, strategies identified in the Plan for meeting said goal are to "allow for appropriate use and transport of all forms of energy" and "ensure opportunities for development of renewable energy that maximizes sustainable use of natural resources and retains energy dollars in the local economy."

2.

3. Standard has been met.

OR

1.

2. Standard has not been met.

DECISION

TIME PERIOD FOR JUDICIAL REVIEW

State law provides that a person having an interest affected by the zoning ordinance may appeal a decision of the Planning Commission to the Circuit Court. Pursuant to MCR 7.101 any appeal must be filed within twenty-one (21) days after this Decision and Order is adopted by the Planning Commission.

DATE DECISION AND ORDER ADOPTED

Wednesday, March 18, 2020

_____

Patty Croft, Chairperson

_____

Charles Freese, Secretary