

Appendix A

Agency Coordination

Appendix A-1
MNDNR Correspondence



7699 Anagram Drive
Eden Prairie, MN 55344

PHONE 952-937-5150
FAX 952-937-5822
TOLL FREE 888-937-5150

www.westwoodps.com

MEMORANDUM

Date: December 15, 2014

Re: **North Star Solar Project-Rare Features Review**
Westwood File 0004493.01

To: Lisa Joyal, Endangered Species Review Coordinator
Division of Ecological and Water Resources
MN Department of Natural Resources

From: Kelly Kunst

On behalf of North Star Solar PV, LLC, Westwood Professional Services (Westwood) is providing a summary of the results of the Natural Heritage Information System (NHIS) database search for your review and concurrence that the results are accurate.

The North Star Solar Project consists of the installation of a photovoltaic (PV) system utilizing single axis trackers and associated infrastructure on approximately 800 acres of agricultural land. The proposed array will utilize a tracker and module layout designed for maximized energy production. Attached **Exhibit 1** depicts the location of the North Star Solar Project. **Table 1** summarizes the Sections, Townships, and Ranges included in the Project Area.

Table 1. Location Summary	
Township and Range	Sections
T35, R21	25 and 36
T35, R20	30 and 31
T34, R21	1 and 2

Westwood reviewed the NHIS database for the site which is in a location covered under Westwood’s license agreement (LA668, received April 2014).

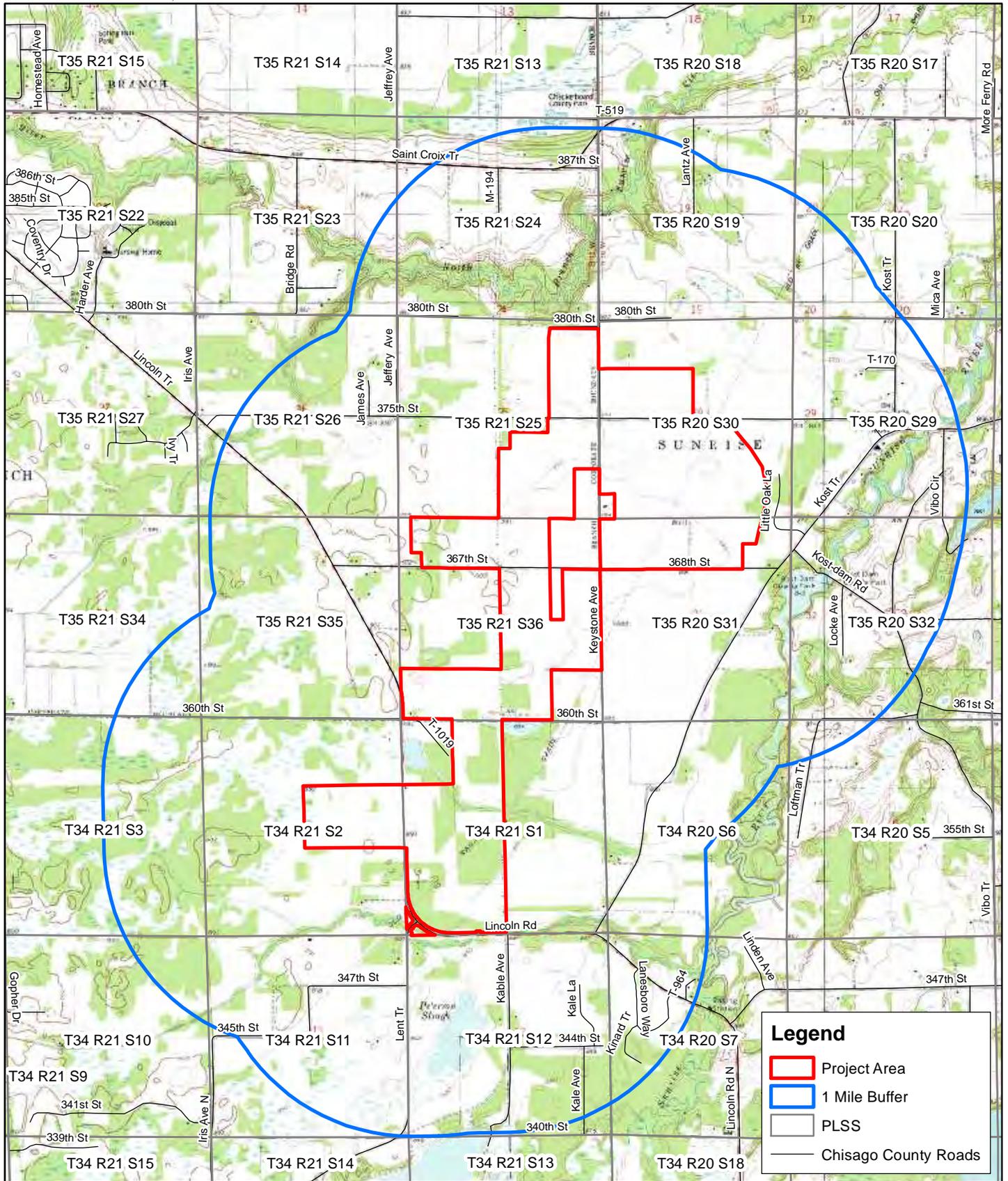
Results of our review found there are two records for Blanding’s Turtle and one historic record for Tooth-cup (last observed in 1892) located within the Project Area.

The database was also reviewed for rare features records located within 1 mile of the Project Area. Results of this review are summarized in **Table 2**.



Table 2. Summary of Rare Features Records Within 1 Mile of Project Area			
EO_ID*	COM_NAME	S_PROTSTAT	LAST_OBS
5474	Tooth-cup	THR	1892-08-01
9892	Black Sandshell	SPC	1996-09
7305	Blanding's Turtle	THR	1987-05-30
9894	Elktoe	THR	1996-09
9890	Fluted-shell	THR	1996-09
9891	Mucket	THR	1996-09
9896	Spike	THR	1996-09
10000	Dry Barrens Prairie (Southern)		1989-09-11
14825	Blanding's Turtle	THR	1992-06-15
21106	Blanding's Turtle	THR	1995-05-10
6803	Blanding's Turtle	THR	1988-06-13
3920	Spike	THR	1996-09
3921	Creek Heelsplitter	SPC	1996-09
3922	Round Pigtoe	SPC	1996-09
3923	Mucket	THR	1996-09
9893	Creek Heelsplitter	SPC	1996-09
27953	Fluted-shell	THR	1996-10
28118	Black Sandshell	SPC	1996-10
29051	Blanding's Turtle	THR	2001-05-02
9899	Round Pigtoe	SPC	1996-09
7304	Blanding's Turtle	THR	2007-07-14
*Records in gray are within the Project Area			

Please review the enclosed information and provide concurrence that the results of this search are accurate and provide any comment you may have regarding these rare features and potential impacts from the proposed project.



Legend

- Project Area
- 1 Mile Buffer
- PLSS
- Chisago County Roads

Data Source(s): USDA-NRCS (2002), MNDNR (1995), MnDOT BaseMap Roads (2010), Westwood (2014).

North Star Solar Project

Chisago County, Minnesota

Site Location

EXHIBIT 1



Westwood Professional Services, Inc.
 7699 Anagram Drive
 Eden Prairie, MN 55344

PHONE 952-937-5150
 FAX 952-937-5822
 TOLL FREE 1-888-937-5150

www.westwoodps.com





2012	For Agency Use Only:	#Sec _____ Contact Rqsted? _____
	Received _____ Due _____ Inv _____	#EOs _____ Survey Rqsted? _____
	Search Radius _____mi. L / I / D EM Map'd _____	#Com _____
	NoR / NoF / NoE / Std / Sub Let _____ Log out _____	Related ERDB# _____

NATURAL HERITAGE INFORMATION SYSTEM (NHIS) DATA REQUEST FORM

Please read the instructions on page 3 before filling out the form. Thank you!

WHO IS REQUESTING THE INFORMATION?

Mr. Name and Title Kristine Maurer
 Ms. Agency/Company Westwood Professional Services

Mailing Address 7699 Anagram Drive, Eden Prairie, MN 55344
(Street) (City) (State) (Zip Code)

Phone 952-697-5729 e-mail kristine.maurer@westwoodps.com Responses will be sent via email.
 If you prefer US Mail check here:

THIS INFORMATION IS BEING REQUESTED FOR A:

- Federal EA State EAW PUC Site or Route Application Watershed Plan BER
 Federal EIS State EIS Local Government Permit Research Project
 NEPA Checklist Other (describe) _____
 Check here if this project is funded through any of the following grant programs: Lessard-Sams Outdoor Heritage Council (L-SOHC), Conservation Partners Legacy (CPL), or Legislative-Citizen Commission on Minnesota Resources (LCCMR).

INFORMATION WE NEED FROM YOU:

- 1) **Enclose a map** of the project boundary/area of interest (topographic maps or aerial photos are preferred).
- 2) Please **provide a GIS shapefile*** (NAD 83, UTM Zone 15N) of the project boundary/area of interest.
- 3) List the following locational information* (attach additional sheets if necessary):

For Agency Use: Region / MCBS Status	<u>County</u>	<u>Township #</u>	<u>Range #</u>	<u>Section(s) (please list all sections)</u>	For Agency Use: TRS Confirmed <input type="checkbox"/>
	<u>Chisago</u>	<u>34</u>	<u>21</u>	<u>1 and 2</u>	
	<u>Chisago</u>	<u>35</u>	<u>20</u>	<u>30 and 31</u>	
	<u>Chisago</u>	<u>35</u>	<u>21</u>	<u>25 and 36</u>	

- 4) Please provide the following information (attach additional sheets if necessary):

Project Name: North Star Solar

Project Proposer: Community Energy Solar, LLC

Description of Project (including types of disturbance anticipated from the project):

The North Star Solar Project consists of the installation of a 100 MW-AC photovoltaic (PV) system utilizing single axis trackers and associated infrastructure on approximately 800 acres of agricultural land. The proposed arrays will utilize a tracker and module layout designed for maximized energy production.

Describe the existing land use of the project site. What types of land cover / habitat will be impacted by the proposed project?

Existing land use is predominately row crop agriculture

List any waterbodies (e.g., rivers, intermittent streams, lakes, wetlands) that may be affected by the proposed project, and discuss how they may be impacted (e.g., dewatering, discharge, riverbed disturbance).

See exhibit 2

Does the project have the potential to affect any groundwater resources (e.g., groundwater appropriation, change in recharge, or contamination)?

No

To your knowledge, has the project undergone a previous Natural Heritage review? If so, please list the correspondence #: ERDB # _____. How does this request differ from the previous request (e.g., change in scope, change in boundary, project being revived, project expansion, different phase)?

No

To your knowledge, have any native plant community or rare species surveys been conducted within the site? If so, please list:

No

List any DNR Permits or Licenses that you will be applying for or have already applied for as part of this project:

N/A

INFORMATION WE PROVIDE TO YOU:

1) The response will include a Natural Heritage letter. If applicable, the letter will discuss potential effects to rare features.

- Check here if you are interested in a list of rare features in the vicinity of the area of interest but you do **not** need a review of potential effects to rare features. Please list the reason a review is not needed:

2) Depending on the results of the query or review, the response may include an Index Report of known aggregation sites and known occurrences of federally and state-listed plants and animals* within an approximate one-mile radius of the project boundary/area of interest. The Index Report and Natural Heritage letter can be included in any public environmental review document.

3) A Detailed Report that contains more information on each occurrence may also be requested. Please note that the Detailed Report may contain specific location information that is protected under *Minnesota Statutes*, section 84.0872, subd. 2, and, as such, the Detailed Report may not be included in any public document (e.g., an EAW).

- Check here if you would like to request a Detailed Report. Please note that if the results of the review are 'No Effects' or a standard comment, a Detailed Report may not be available.

FEES / TURNAROUND TIME

There is a fee* for this service. Requests generally take 3-4 weeks from date of receipt to process, and are processed in the order received.

I have read the entire form and instructions, and the information supplied above is complete and accurate. I understand that material supplied to me from the Natural Heritage Information System is copyrighted and that I am not permitted to reproduce or publish any of this copyrighted material without prior written permission from the DNR. Further, if permission to publish is given, I understand that I must credit the Minnesota Division of Ecological and Water Resources, Minnesota Department of Natural Resources, as the source of the material.

Signature
(required)



Note: Digital signatures representing the name of a person shall be sufficient to show that such person has signed this document.

Mail or email completed form to:

Lisa Joyal, Endangered Species Review Coordinator
Division of Ecological and Water Resources
Minnesota Department of Natural Resources
500 Lafayette Road, Box 25
St. Paul, Minnesota 55155
Review.NHIS@state.mn.us

Form is available at

http://files.dnr.state.mn.us/eco/nhnrp/nhis_data_request.pdf

Revised March 2, 2012



2012	For Agency Use Only:	#Sec _____ Contact Rqsted? _____
	Received _____ Due _____ Inv _____	#EOs _____ Survey Rqsted? _____
	Search Radius _____mi. L / I / D EM Map'd _____	#Com _____
	NoR / NoF / NoE / Std / Sub Let _____ Log out _____	Related ERDB# _____

NATURAL HERITAGE INFORMATION SYSTEM (NHIS) DATA REQUEST FORM

Please read the instructions on page 3 before filling out the form. Thank you!

WHO IS REQUESTING THE INFORMATION?

Mr. Name and Title Kristine Maurer
 Ms. Agency/Company Westwood Professional Services

Mailing Address 7699 Anagram Drive, Eden Prairie, MN 55344
(Street) (City) (State) (Zip Code)

Phone 952-697-5729 e-mail kristine.maurer@westwoodps.com Responses will be sent via email.
 If you prefer US Mail check here:

THIS INFORMATION IS BEING REQUESTED FOR A:

- Federal EA State EAW PUC Site or Route Application Watershed Plan BER
 Federal EIS State EIS Local Government Permit Research Project
 NEPA Checklist Other (describe) _____
- Check here if this project is funded through any of the following grant programs: Lessard-Sams Outdoor Heritage Council (L-SOHC), Conservation Partners Legacy (CPL), or Legislative-Citizen Commission on Minnesota Resources (LCCMR).

INFORMATION WE NEED FROM YOU:

- 1) **Enclose a map** of the project boundary/area of interest (topographic maps or aerial photos are preferred).
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	<u>Chisago</u>	<u>34</u>	<u>21</u>	<u>1</u>	
	<u>Chisago</u>	<u>35</u>	<u>21</u>	<u>36</u>	
	_____	_____	_____	_____	

- 4) Please provide the following information (attach additional sheets if necessary):

Project Name: North Star 115kv High Voltage Transmission Line

Project Proposer: Community Energy Solar, LLC

Description of Project (including types of disturbance anticipated from the project):

The Project consists of a 115kV overhead high voltage transmission line that will connect the North star substation to the Chisago substation. This is part of the North Star Solar Project.

Describe the existing land use of the project site. What types of land cover / habitat will be impacted by the proposed project?

Existing land use is predominately row crop agriculture

List any waterbodies (e.g., rivers, intermittent streams, lakes, wetlands) that may be affected by the proposed project, and discuss how they may be impacted (e.g., dewatering, discharge, riverbed disturbance).

See exhibit 2

Does the project have the potential to affect any groundwater resources (e.g., groundwater appropriation, change in recharge, or contamination)?

No

To your knowledge, has the project undergone a previous Natural Heritage review? If so, please list the correspondence #: ERDB # _____. How does this request differ from the previous request (e.g., change in scope, change in boundary, project being revived, project expansion, different phase)?

No

To your knowledge, have any native plant community or rare species surveys been conducted within the site? If so, please list:

No

List any DNR Permits or Licenses that you will be applying for or have already applied for as part of this project:

N/A

INFORMATION WE PROVIDE TO YOU:

1) The response will include a Natural Heritage letter. If applicable, the letter will discuss potential effects to rare features.

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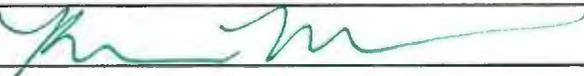
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Signature
(required)



Note: Digital signatures representing the name of a person shall be sufficient to show that such person has signed this document.

Mail or email completed form to:

Lisa Joyal, Endangered Species Review Coordinator
Division of Ecological and Water Resources
Minnesota Department of Natural Resources
500 Lafayette Road, Box 25
St. Paul, Minnesota 55155
Review.NHIS@state.mn.us

Form is available at

http://files.dnr.state.mn.us/eco/nhnrp/nhis_data_request.pdf

Revised March 2, 2012

January 30, 2015

Brooke Haworth
MnDNR Division of Ecological and Water Resources
1200 Warner Road
St. Paul, MN 55106

Re: North Star Solar Project and Proposed 115 kV Transmission Line

File 0004493.01

Cc: Chase Whitney, North Star Solar PV LLC

Dear Ms. Haworth:

Westwood Professional Services (Westwood) was retained by North Star Solar PV LLC to provide environmental services for the 100 MW-AC North Star Solar Project and associated 115 kV high voltage transmission line (HVTL). The Solar Project consists of the installation of a photovoltaic (PV) system utilizing single axis trackers and associated infrastructure on approximately 800 acres of agricultural land and the construction of approximately 1 mile of a new overhead 115kV HVTL. The proposed HVTL is to serve as a connection between the proposed North Star Solar Project and the Xcel Energy Chisago substation. Attached **Exhibit 1** depicts the location of the North Star Solar Project and the proposed HVTL route corridor. Table 1 summarizes the Sections, Townships, and Ranges included in the Project Area.

Table 1. Location Summary	
Township and Range	Sections
T35, R21	25 and 36
T35, R20	30 and 31
T34, R21	1 and 2

On behalf of North Star Solar PV LLC, we request your analysis of the Project for potential environmental impacts and would appreciate any comments and recommendations you may have regarding potential impacts to state resources. If you have questions, please contact me at 952-906-7421 or kelly.kunst@westwoodps.com.

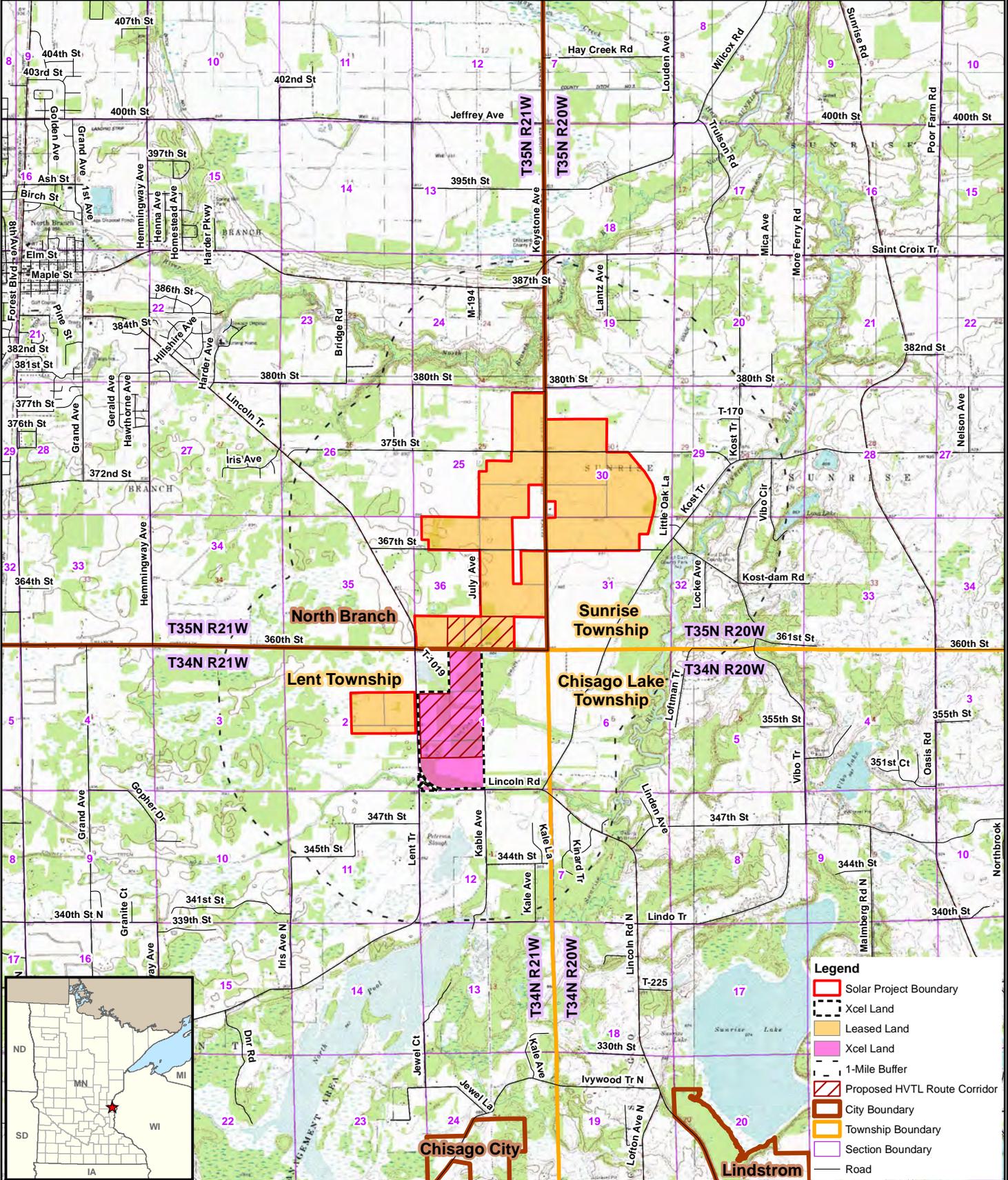
January 28, 2015
Page 2

Sincerely,

A handwritten signature in black ink, appearing to read "Kelly Kunst". The signature is written in a cursive style with a large, stylized initial "K".

WESTWOOD PROFESSIONAL SERVICES

Kelly Kunst
Senior Environmental Scientist



Legend

- Solar Project Boundary
- Xcel Land
- Leased Land
- Xcel Land
- 1-Mile Buffer
- Proposed HVTL Route Corridor
- City Boundary
- Township Boundary
- Section Boundary
- Road

Data Source(s): Data and map are approximate. Westwood (2014); MNDOT Basemap (2014); Chisago County GIS (2014); ESRI (2008); USDA/NRCS - National Cartography & Geospatial Center, Chisago County DRG (various dates); North Star Solar PV LLC (2014).



Westwood Professional Services, Inc.
 7699 Anagram Drive
 Eden Prairie, MN 55344

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 FAX 952-937-5822
 TOLL FREE 1-888-937-5150

www.westwoodps.com



North Star Solar Project

North Branch, Sunrise Township, and Lent Township;
 Chisago County, Minnesota

Project Location and
 USGS Topography

Figure 1

Appendix A-2
USFWS Correspondence

January 21, 2015

Andrew Horton
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
Twin Cities ES Field Office
4101 American Blvd. East
Bloomington, MN 55425-1665

**Re: North Star Solar Project-Chisago County, Minnesota
Endangered Species Review
File 0004493.00**

Cc: Sam Sours and Chase Whitney, Community Energy Solar, LLC

Dear Mr. Horton:

Westwood Professional Services (Westwood) was retained by Community Energy Solar, LLC (CES) to provide environmental services for the proposed North Star Solar Project, located on approximately 800 acres of agricultural land in Chisago County, Minnesota. The North Star Solar Project consists of a 100 MW-AC photovoltaic (PV) system installation utilizing single axis trackers and associated infrastructure. Attached is a map of the project location and preliminary site plan.

Westwood is currently engaged in initial studies and permitting for the North Star Solar Project. At this point no permits have been issued and the Project has not yet been opened up for public commentary.

On behalf of CES, we request your analysis of the Project for potential environmental impacts and would appreciate any comments and recommendations you may have regarding potential impacts to threatened or endangered species.

If you have questions, please contact me at 952-906-7421 or at kelly.kunst@westwoodps.com.

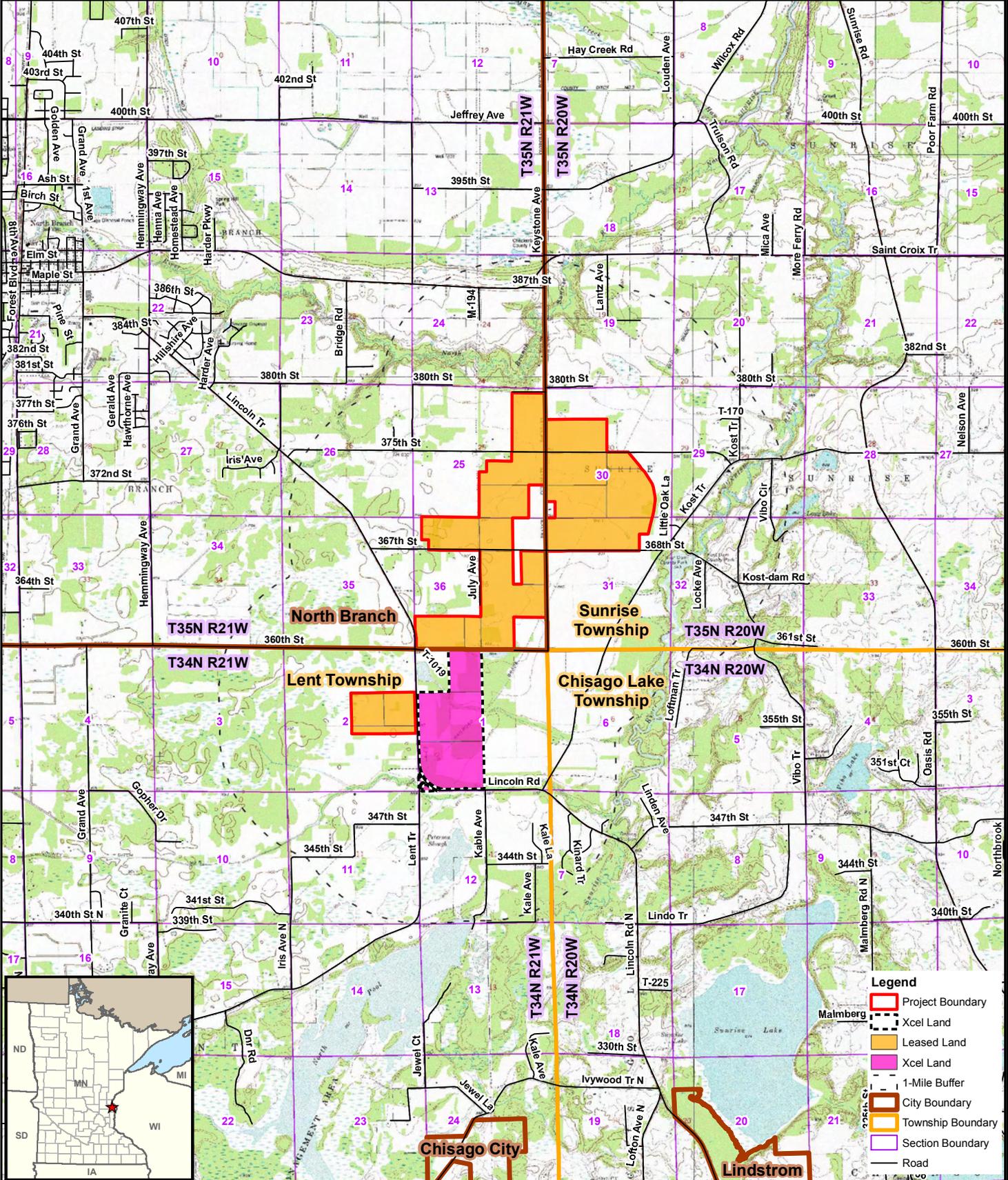
Please contact me if you have any questions.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Kelly Kunst
Senior Environmental Scientist



Data Source(s): Data and map are approximate. Westwood (2014); MNDOT Basemap (2014); Chisago County GIS (2014); ESRI (2008); USDA/NRCS - National Cartography & Geospatial Center, Chisago County DRG (various dates); North Star Solar PV LLC (2014).



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 Eden Prairie, MN 55344

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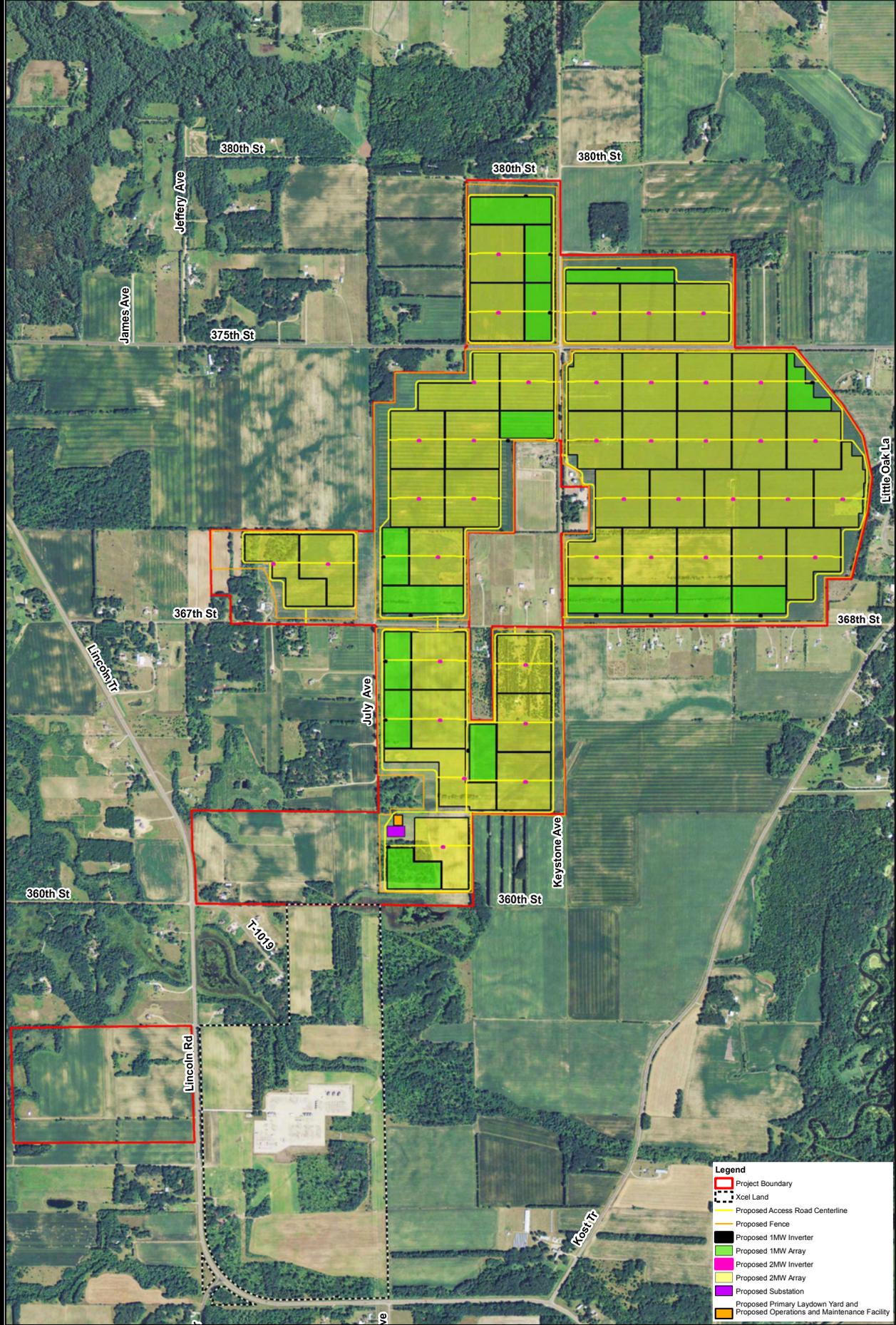
North Star Solar Project

North Branch, Sunrise Township, and Lent Township;
 Chisago County, Minnesota

Project Location and
 USGS Topography

Figure 1

Map Document: P:\0004493.00\GIS\Permit\INS_Project\LocationAndUSGS\Topo01B_1501116.mxd 1/16/2015 9:50:11 AM



Legend

- Project Boundary
- Xcel Land
- Proposed Access Road Centerline
- Proposed Fence
- Proposed 1MW Inverter
- Proposed 1MW Array
- Proposed 2MW Inverter
- Proposed 2MW Array
- Proposed Substation
- Proposed Primary Laydown Yard and Proposed Operations and Maintenance Facility

Map Document: P:\004493.DWG\Permit\NS_AreaAndCapacity\Facility\01E_180120.mxd 1/20/2015 1:56:43 PM

Data Source(s): Data and map are approximate. Westwood (2014), MNDOT Basemap (2014), NAD83 (2013), Chicago County GIS (2014), ESR (2008), North Star Solar PV, LLC (2014).



Westwood Professional Services, Inc.
 1099 Ansgar Drive
 Eden Prairie, MN 55344

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 FAX 952-937-5822
 TOLL FREE 1-888-937-6150

www.westwoodps.com



North Star Solar Project

North Branch, Sunrise Township, and Lent Township;
Chisago County, Minnesota

Preliminary Facility Design

Figure 2

January 30, 2015

Andrew Horton
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
Twin Cities ES Field Office
4101 American Blvd. East
Bloomington, MN 55425-1665

Re: Proposed North Star 115kV High Voltage Transmission Line (HVTL)
File 0004492.01
Cc: Chase Whitney, Community Energy Solar, LLC

Dear Mr. Horton:

Westwood Professional Services (Westwood) was retained by North Star PV LLC to provide environmental services for a 115 kV transmission line for the proposed North Star Solar Project. The proposed transmission line will be located Chisago County, Minnesota and will consist of the construction of approximately 1 mile of new overhead 115kV transmission line to serve as a connection between the proposed Solar Project and the Xcel Energy substation.

The proposed transmission line will be located in Section 1, Township 34 and Section 36, Township 35, Range 21 West in Chisago County (**Exhibit 1**).

On behalf of North Star PV LLC, we request your analysis of the Project for potential environmental impacts and would appreciate any comments and recommendations you may have regarding potential impacts to wildlife and threatened or endangered species.

If you have questions, please contact me at 952-906-7421 or kelly.kunst@westwoodps.com.

Sincerely,

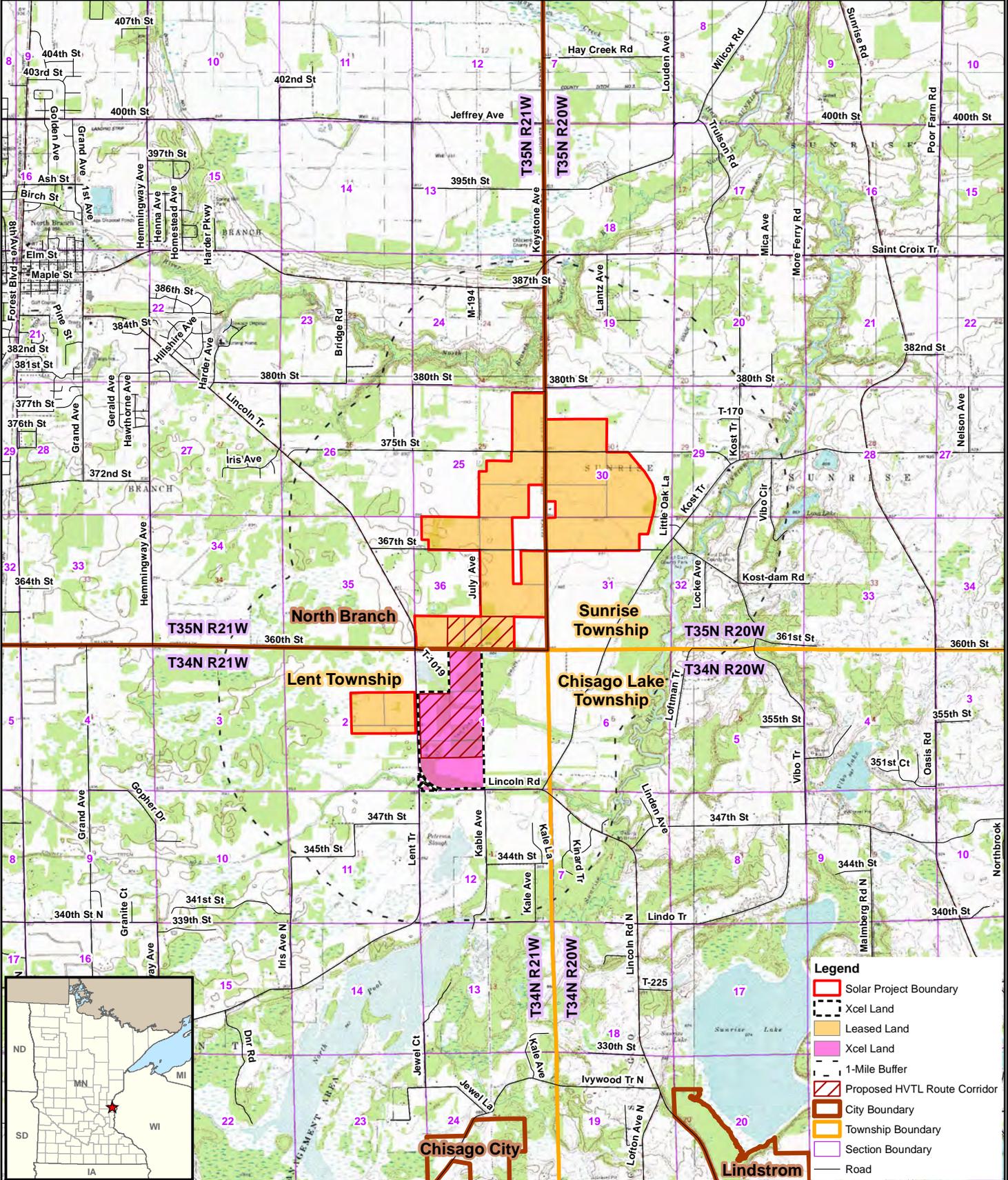
WESTWOOD PROFESSIONAL SERVICES



Kelly Kunst

January 28, 2015
Page 2

Senior Environmental Scientist



Legend

- Solar Project Boundary
- Xcel Land
- Leased Land
- Xcel Land
- 1-Mile Buffer
- Proposed HVTL Route Corridor
- City Boundary
- Township Boundary
- Section Boundary
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Data Source(s): Data and map are approximate. Westwood (2014); MNDOT Basemap (2014); Chisago County GIS (2014); ESRI (2008); USDA/NRCS - National Cartography & Geospatial Center, Chisago County DRG (various dates); North Star Solar PV LLC (2014).



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North Star Solar Project

North Branch, Sunrise Township, and Lent Township;
 Chisago County, Minnesota

Project Location and
 USGS Topography

Figure 1

Appendix A-3
FAA Part 77 Notice Tool Results



« OE/AAA

Notice Criteria Tool

[Notice Criteria Tool - Desk Reference Guide V_2014.2.0](#)

The requirements for filing with the Federal Aviation Administration for proposed structures vary based on a number of factors: height, proximity to an airport, location, and frequencies emitted from the structure, etc. For more details, please reference [CFR Title 14 Part 77.9](#).

You must file with the FAA at least 45 days prior to construction if:

- your structure will exceed 200ft above ground level
- your structure will be in proximity to an airport and will exceed the slope ratio
- your structure involves construction of a traverseway (i.e. highway, railroad, waterway etc...) and once adjusted upward with the appropriate vertical distance would exceed a standard of 77.9(a) or (b)
- your structure will emit frequencies, and does not meet the conditions of the [FAA Co-location Policy](#)
- your structure will be in an instrument approach area and might exceed part 77 Subpart C
- your proposed structure will be in proximity to a navigation facility and may impact the assurance of navigation signal reception
- your structure will be on an airport or heliport
- filing has been requested by the FAA

If you require additional information regarding the filing requirements for your structure, please identify and contact the appropriate FAA representative using the [Air Traffic Areas of Responsibility map](#) for Off Airport construction, or contact the [FAA Airports Region / District Office](#) for On Airport construction.

The tool below will assist in applying Part 77 Notice Criteria.

Latitude:	<input type="text" value="45"/>	Deg	<input type="text" value="28"/>	M	<input type="text" value="32.78"/>	S	<input type="text" value="N"/>	<input type="button" value="v"/>
Longitude:	<input type="text" value="92"/>	Deg	<input type="text" value="54"/>	M	<input type="text" value="28.67"/>	S	<input type="text" value="W"/>	<input type="button" value="v"/>
Horizontal Datum:	<input type="text" value="NAD83"/> <input type="button" value="v"/>							
Site Elevation (SE):	<input type="text" value="900"/> (nearest foot)							
Structure Height (AGL):	<input type="text" value="100"/> (nearest foot)							
Traverseway:	<input type="text" value="No Traverseway"/> <input type="button" value="v"/>							
<small>(Additional height is added to certain structures under 77.9(c))</small>								
Is structure on airport:	<input checked="" type="radio"/> No <input type="radio"/> Yes							

Results

You do not exceed Notice Criteria.

Appendix A-4
Sandia National Laboratories' Solar Glare Hazard
Analysis

Solar Glare Hazard Analysis Report

Generated Dec. 12, 2014, 2:16 p.m.

No glare found

 Print

 Google Map

Inputs

Analysis name	NS
PV array axis tracking	dual
Rated power (kW)	500.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	-6.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017

Time interval (min)	1
Slope error (mrad)	10.0

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	45.4827151489	-92.8824571607	885.23	20.0	905.23
1	45.4844332041	-92.9008910194	894.32	20.0	914.32
2	45.4891201298	-92.8826949134	886.03	20.0	906.03
2	45.4880436577	-92.9010343552	890.25	20.0	910.25
3	45.4891869198	-92.8840776446	887.29	20.0	907.29
3	45.4879768664	-92.8958845139	889.92	20.0	909.92
4	45.4902904465	-92.8841257095	887.54	20.0	907.54
4	45.4846672888	-92.8961703315	892.33	20.0	912.33
5	45.4903903284	-92.8858423233	887.54	20.0	907.54
5	45.4844999996	-92.8983641637	892.88	20.0	912.88
6	45.4914938315	-92.886128141	886.34	20.0	906.34
6	45.4806889192	-92.8982208253	894.0	20.0	914.0
7	45.4808760792	-92.8837446211	887.37	20.0	907.37
8	45.4952843267	-92.8890275015	882.71	20.0	902.71
8	45.482447356	-92.8838398945	887.79	20.0	907.79
10	45.4983785051	-92.8985126491	882.19	20.0	902.19
11	45.4983123278	-92.9035663605	880.58	20.0	900.58
12	45.4906580832	-92.9034972674	891.9	20.0	911.9

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
13	45.4906749308	-92.9075265884	890.67	20.0	910.67
15	45.4914601371	-92.8889416708	890.0	20.0	910.0
15	45.4894378325	-92.9087187766	891.88	20.0	911.88
16	45.4706379371	-92.9090741156	890.25	20.0	910.25
17	45.4706379371	-92.9033037188	890.25	20.0	910.25
17	45.4953174171	-92.8983255388	884.84	20.0	904.84
18	45.4736474012	-92.9033037188	890.26	20.0	910.26
19	45.4735805928	-92.8980113982	888.96	20.0	908.96
20	45.4751683235	-92.8982028003	888.89	20.0	908.89
21	45.4770659576	-92.8981551629	890.58	20.0	910.58
22	45.477158039	-92.9033517838	894.06	20.0	914.06
22	45.489488075	-92.9075742244	892.56	20.0	912.56
23	45.4844448259	-92.9032059791	894.71	20.0	914.71
24	45.4845100044	-92.9008663422	894.2	20.0	914.2
25	45.4875142901	-92.9007652745	890.71	20.0	910.71
26	45.4875212476	-92.8981621387	890.39	20.0	910.39
27	45.4876286939	-92.8961323487	889.97	20.0	909.97
28	45.4771917419	-92.8980113982	890.58	20.0	910.58
28	45.4865979626	-92.8961521999	890.87	20.0	910.87
29	45.4853147595	-92.8964251955	891.38	20.0	911.38
30	45.4845138401	-92.9033895495	894.59	20.0	914.59
30	45.4843388687	-92.8964183549	892.91	20.0	912.91
31	45.4842650117	-92.8980809222	892.95	20.0	912.95

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
32	45.482672799	-92.8981691126	894.78	20.0	914.78
33	45.4808575368	-92.8979505647	893.81	20.0	913.81
34	45.4807802433	-92.8954437731	892.98	20.0	912.98
35	45.4808730712	-92.8823181181	883.8	20.0	903.8

Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)
Airport 1	45.4530672859	-92.9749019645	904.55	0.0

No glare found.

©1997-2014 Sandia Corporation

Solar Glare Hazard Analysis Report

Generated Dec. 12, 2014, 2:17 p.m.

Glare found

 Print

 Google Map

Inputs

Analysis name	NS
PV array axis tracking	dual
Rated power (kW)	500.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	-6.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017

Time interval (min)	1
Slope error (mrad)	10.0

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	45.4827151489	-92.8824571607	885.23	20.0	905.23
1	45.4844332041	-92.9008910194	894.32	20.0	914.32
2	45.4891201298	-92.8826949134	886.03	20.0	906.03
2	45.4880436577	-92.9010343552	890.25	20.0	910.25
3	45.4891869198	-92.8840776446	887.29	20.0	907.29
3	45.4879768664	-92.8958845139	889.92	20.0	909.92
4	45.4902904465	-92.8841257095	887.54	20.0	907.54
4	45.4846672888	-92.8961703315	892.33	20.0	912.33
5	45.4903903284	-92.8858423233	887.54	20.0	907.54
5	45.4844999996	-92.8983641637	892.88	20.0	912.88
6	45.4914938315	-92.886128141	886.34	20.0	906.34
6	45.4806889192	-92.8982208253	894.0	20.0	914.0
7	45.4808760792	-92.8837446211	887.37	20.0	907.37
8	45.4952843267	-92.8890275015	882.71	20.0	902.71
8	45.482447356	-92.8838398945	887.79	20.0	907.79
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20	45.4751683235	-92.8982028003	888.89	20.0	908.89
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24	45.4845100044	-92.9008663422	894.2	20.0	914.2
25	45.4875142901	-92.9007652745	890.71	20.0	910.71
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27	45.4876286939	-92.8961323487	889.97	20.0	909.97
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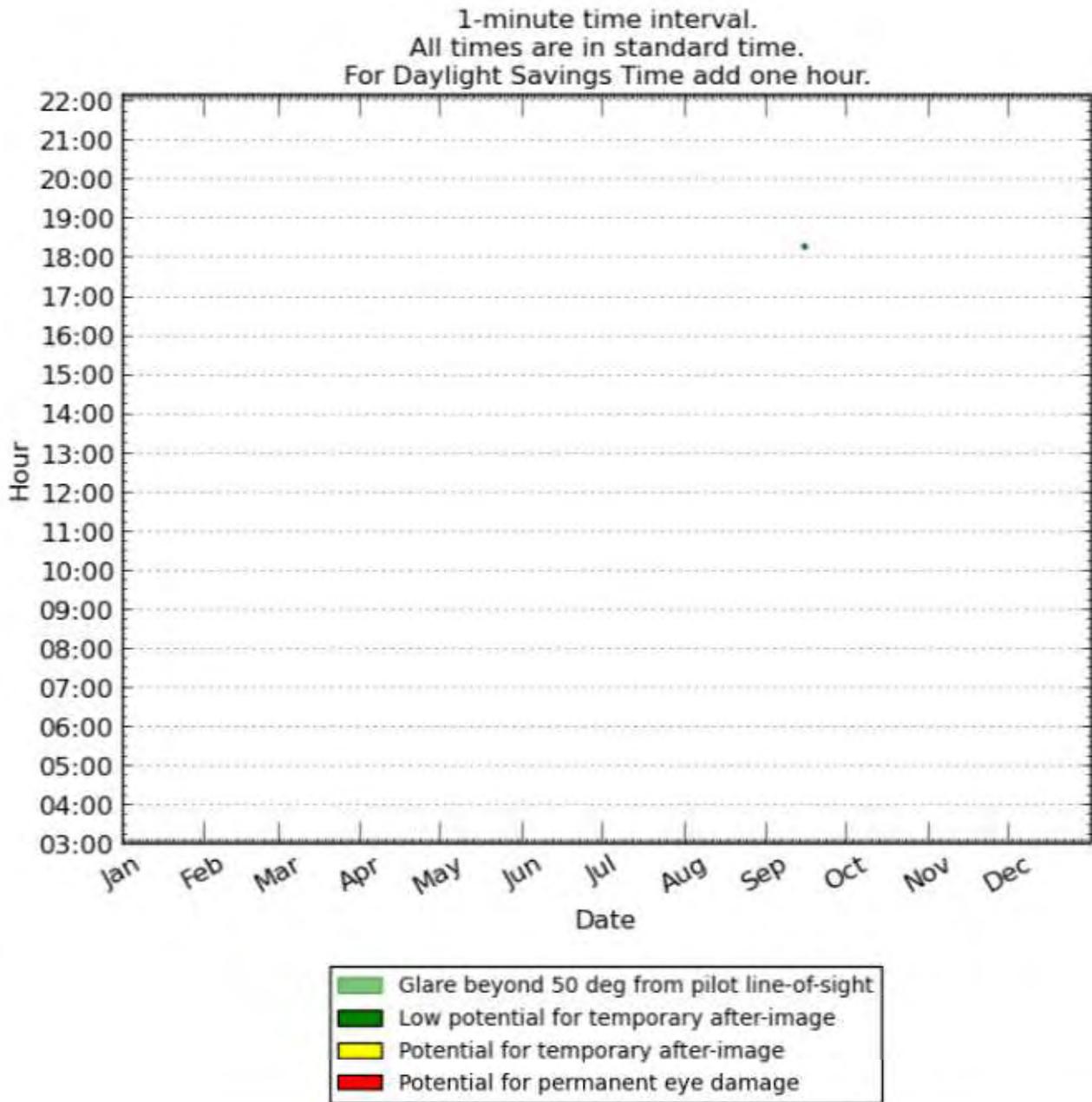
id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
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34	45.4807802433	-92.8954437731	892.98	20.0	912.98
35	45.4808730712	-92.8823181181	883.8	20.0	903.8

Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)
Airport 2	45.4815597189	-92.9889198305	910.29	0.0

Glare Occurrence Plot

All times are in standard time. For Daylight Savings Time add one hour.



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Appendix A-5
Local Government Unit Correspondence

January 30, 2015

Kurt Schneider
Director
Chisago County Environmental Services Department
313 N. Main St.
Center City, MN 55012

Re: North Star Solar Project and Proposed 115 kV Transmission Line
File 0004493.01

Cc: Chase Whitney, Community Energy Solar, LLC

Dear Mr. Schneider:

Westwood Professional Services (Westwood) was retained by North Star Solar PV LLC to provide environmental services for the 100 MW-AC North Star Solar Project and associated 115 kV high voltage transmission line (HVTL). The Solar Project consists of the installation of a photovoltaic (PV) system utilizing single axis trackers and associated infrastructure on approximately 800 acres of agricultural land and the construction of approximately 1 mile of a new overhead 115kV HVTL. The proposed HVTL is to serve as a connection between the proposed North Star Solar Project and the Xcel Energy Chisago substation. Attached **Figure 1** depicts the location of the North Star Solar Project and the proposed HVTL route corridor. Table 1 summarizes the Sections, Townships, and Ranges included in the Project Area.

Table 1. Location Summary	
Township and Range	Sections
T35, R21	25 and 36
T35, R20	30 and 31
T34, R21	1 and 2

On behalf of North Star Solar PV LLC, we request your analysis of the Project for potential environmental impacts and would appreciate any comments and recommendations you may have regarding potential impacts to county resources. If you have questions, please contact me at 952-906-7421 or kelly.kunst@westwoodps.com.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES

January 28, 2015
Page 2

A handwritten signature in black ink, appearing to read "Kelly Kunst". The signature is written in a cursive, flowing style with some loops and flourishes.

Kelly Kunst
Senior Environmental Scientist

January 30, 2015

Ken Roberts
City Planner
6408 Elm Street, PO Box 910
North Branch City Hall, North Branch, MN 55056

Re: North Star Solar Project and Proposed 115 kV Transmission Line

File 0004493.01

Cc: Chase Whitney, North Star Solar PV LLC

Dear Mr. Roberts:

Westwood Professional Services (Westwood) was retained by North Star Solar PV LLC to provide environmental services for the 100 MW-AC North Star Solar Project and associated 115 kV high voltage transmission line (HVTL). The Solar Project consists of the installation of a photovoltaic (PV) system utilizing single axis trackers and associated infrastructure on approximately 800 acres of agricultural land and the construction of approximately 1 mile of a new overhead 115kV HVTL. The proposed HVTL is to serve as a connection between the proposed North Star Solar Project and the Xcel Energy Chisago substation. Attached **Exhibit 1** depicts the location of the North Star Solar Project and the proposed HVTL route corridor. Table 1 summarizes the Sections, Townships, and Ranges included in the Project Area.

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Sincerely,

WESTWOOD PROFESSIONAL SERVICES

January 28, 2015
Page 2

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Kelly Kunst
Senior Environmental Scientist

January 30, 2015

Don Bilunas
Chairman
Lent Township
33155 Hemingway Ave
Stacy, MN 55079

Re: North Star Solar Project and Proposed 115 kV Transmission Line

File 0004493.01

Cc: Chase Whitney, Community Energy Solar, LLC

Dear Mr. Bilunas:

Westwood Professional Services (Westwood) was retained by North Star Solar PV LLC to provide environmental services for the 100 MW-AC North Star Solar Project and associated 115 kV high voltage transmission line (HVTL). The Solar Project consists of the installation of a photovoltaic (PV) system utilizing single axis trackers and associated infrastructure on approximately 800 acres of agricultural land and the construction of approximately 1 mile of a new overhead 115kV HVTL. The proposed HVTL is to serve as a connection between the proposed North Star Solar Project and the Xcel Energy Chisago substation. Attached **Figure 1** depicts the location of the North Star Solar Project and the proposed HVTL route corridor. Table 1 summarizes the Sections, Townships, and Ranges included in the Project Area.

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Sincerely,

January 28, 2015
Page 2

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WESTWOOD PROFESSIONAL SERVICES

Kelly Kunst
Senior Environmental Scientist

January 30, 2015

Delano Olson
Planning Commission
Lent Township
PO Box 933
North Branch, MN 55056

Re: North Star Solar Project and Proposed 115 kV Transmission Line

File 0004493.01

Cc: Sam Sours and Chase Whitney, Community Energy Solar, LLC

Dear Mr. Olson:

Westwood Professional Services (Westwood) was retained by North Star Solar PV LLC to provide environmental services for the 100 MW-AC North Star Solar Project and associated 115 kV high voltage transmission line (HVTL). The Solar Project consists of the installation of a photovoltaic (PV) system utilizing single axis trackers and associated infrastructure on approximately 800 acres of agricultural land and the construction of approximately 1 mile of a new overhead 115kV HVTL. The proposed HVTL is to serve as a connection between the proposed North Star Solar Project and the Xcel Energy Chisago substation. Attached **Exhibit 1** depicts the location of the North Star Solar Project and the proposed HVTL route corridor. Table 1 summarizes the Sections, Townships, and Ranges included in the Project Area.

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Sincerely,

January 28, 2015
Page 2

WESTWOOD PROFESSIONAL SERVICES

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Kelly Kunst
Senior Environmental Scientist

February 10, 2015

Delano Olson
Planning Commission
Sunrise Township
10867 Olson Road
Harris, MN 55032

Re: North Star Solar Project and Proposed 115 kV Transmission Line

File 0004493.01

Cc: Sam Sours and Chase Whitney, Community Energy Solar, LLC

Dear Mr. Olson:

Westwood Professional Services (Westwood) was retained by North Star Solar PV LLC to provide environmental services for the 100 MW-AC North Star Solar Project and associated 115 kV high voltage transmission line (HVTL). The Solar Project consists of the installation of a photovoltaic (PV) system utilizing single axis trackers and associated infrastructure on approximately 800 acres of agricultural land and the construction of approximately 1 mile of a new overhead 115kV HVTL. The proposed HVTL is to serve as a connection between the proposed North Star Solar Project and the Xcel Energy Chisago substation. Attached **Exhibit 1** depicts the location of the North Star Solar Project and the proposed HVTL route corridor. Table 1 summarizes the Sections, Townships, and Ranges included in the Project Area.

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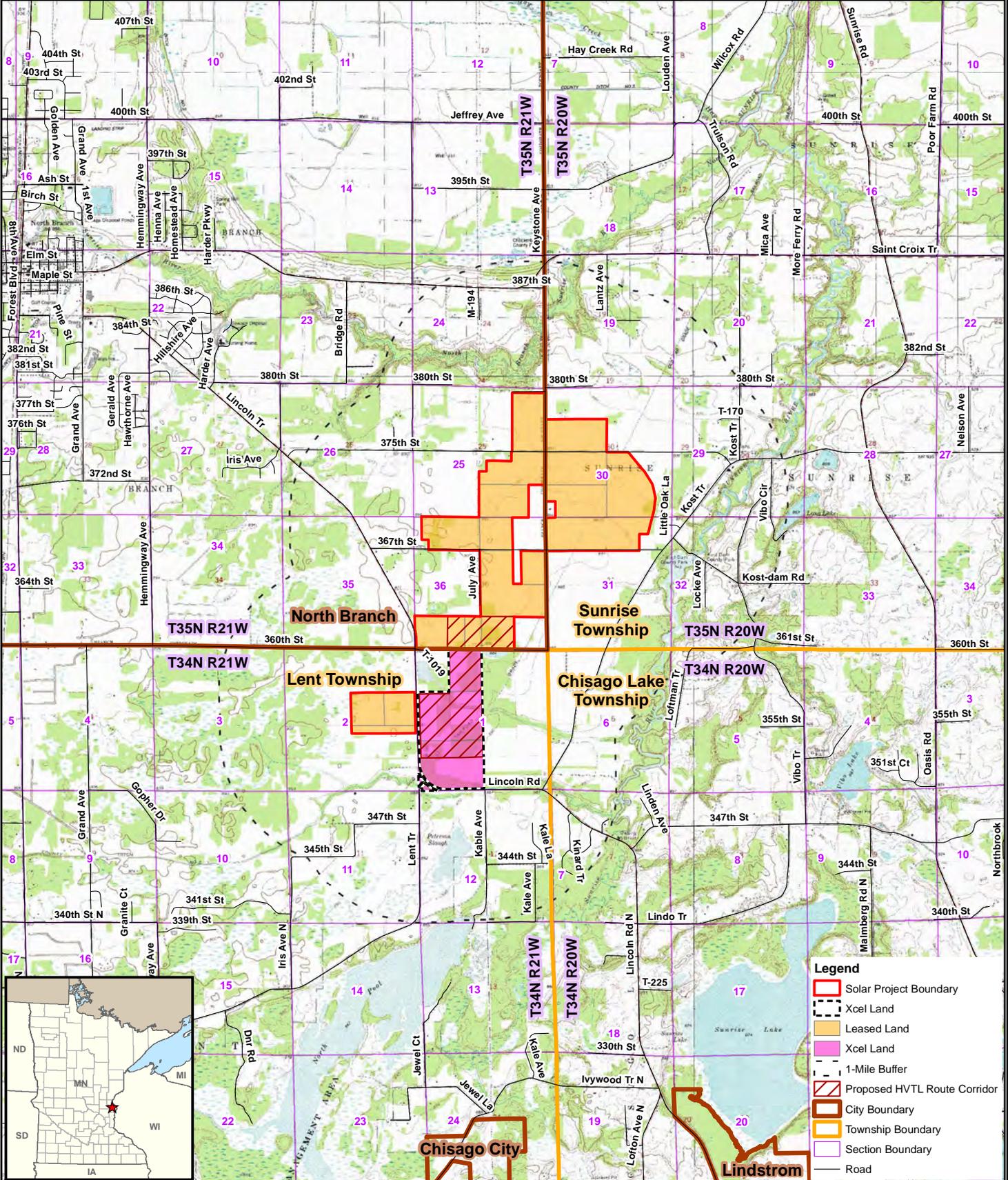
Sincerely,

January 28, 2015
Page 2

WESTWOOD PROFESSIONAL SERVICES

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Kelly Kunst
Senior Environmental Scientist



Legend

- Solar Project Boundary
- Xcel Land
- Leased Land
- Xcel Land
- 1-Mile Buffer
- Proposed HVTL Route Corridor
- City Boundary
- Township Boundary
- Section Boundary
- Road

Data Source(s): Data and map are approximate. Westwood (2014); MNDOT Basemap (2014); Chisago County GIS (2014); ESRI (2008); USDA/NRCS - National Cartography & Geospatial Center, Chisago County DRG (various dates); North Star Solar PV LLC (2014).

North Star Solar Project

North Branch, Sunrise Township, and Lent Township;
Chisago County, Minnesota

Project Location and
USGS Topography

Figure 1



Westwood Professional Services, Inc.
7699 Anagram Drive
Eden Prairie, MN 55344

PHONE 952-937-5150
FAX 952-937-5822
TOLL FREE 1-888-937-5150

www.westwoodps.com



Map Document: P:\0004483.00\GIS\Permit\NS_Project\LocationAndUSGSTopo01B_150130.mxd 1/30/2015 3:53:01 PM

Local Government Unit Response



**Chisago County Department of
Environmental Services and Zoning**

313 No. Main St. #243
Center City, MN 55012
651-213-8374 ~ kmschne@co.chisago.mn.us

RECEIVED

FEB 09 2015

WESTWOOD
PROFESSIONAL SERVICES

February 6, 2015

Westwood Professional Services
Kelly Kunst
7699 Anagram Drive
Eden Prairie, MN 55344

RE: North Star Solar 100 MW – AC Project Westwood File 0004493.01

Dear Ms. Kunst,

Thank you for January 30, 2015, letter of request for analysis of the 100 MW North Star Solar project for potential environmental impacts and impacts to county resources.

The size and scale of the North Star Solar project will cause it to fall under the jurisdiction of the MN Public Utilities Commission (PUC) site permitting and review process. It is anticipated that a thorough environmental review and site permitting process will be carried out and controlled by the PUC. Chisago County will provide further comment as that process and plan development allows. We appreciate the opportunity to issue preliminary comments and offer the following for your consideration:

1. Chisago County has adopted a “Solar Farm” ordinance (attached). We ask that you review and abide by the criteria outlined within the ordinance and that you design and construct the 800+/- acre development in the most environmentally responsible and community friendly manner possible.
2. Chisago County has Essential Service and Transmission Services provisions contained within Section 4.05 of the Zoning Ordinance (attached). We ask that you review and abide by the criteria outlined within this Section and that you design, locate, and construct the associated 115kV transmission line in the most environmentally responsible and community friendly manner possible.
3. The project location map outlines a leased land site area that completely surrounds a non-leased “island” of homes and land owners. The impacts of the development to this island should be carefully considered and mitigated to the maximum extent possible. Please make every effort to design and implement the entire development of the site in a sustainable best practices manner.
4. Corridor preservation and landscaping provisions are noted in Section F. of the Solar Farm ordinance. We ask that you specifically take these provisions into consideration as you prepare PUC site plans and submittals. Native grasses with heavy pollinator (high forbs & wild flower mix) and habitat value should be incorporated into the ground cover plan for the entire site. Rotational ground cover maintenance techniques should be utilized to encourage and create valued solar panel “understory” habitat. The project appearance as viewed from adjoining properties and public rights of way should be carefully considered.

5. The construction of such a large site may introduce unique traffic and construction traffic, noise, dust, and other impacts to the area. Please identify plans to mitigate such activities and impacts to the surrounding area. Road access and construction traffic and activities should be coordinated with the local city and township road authorities. County road access points must be coordinated with Chisago County Public Works.
6. I have circulated your 1/30/15 letter and project location map with the local jurisdictions of Sunrise Township, Lent Township, the City of North Branch, and the Chisago County Soil and Water Conservation District. Please incorporate their feedback as may be offered into your planning and site development activities.

We appreciate this opportunity to provide feedback. I expect a substantial amount of detail will be made available soon as the PUC site review process is fully initiated. Your continued efforts to keep us informed of the development plans, PUC submittals, and site activities will be appreciated.

Sincerely,



Kurt Schneider
Chisago County Environmental Services Director

Cc: Lent Township
Sunrise Township
City of North Branch
Chisago County SWCD

Appendix A-6
Minnesota Pollution Control Agency

January 30, 2015

Karen Kromar
Minnesota Pollution Control Agency
Environment & Energy Section
Resource Management & Assistance Division
520 Lafayette Road North
St. Paul, Minnesota 55155-4194

Karen.Kromar@state.mn.us

Re: North Star Solar Project and Proposed 115 kV Transmission Line

File 0004493.01

Cc: Sam Sours and Chase Whitney, Community Energy Solar, LLC

Dear Ms. Kromar

Westwood Professional Services (Westwood) was retained by North Star Solar PV LLC to provide environmental services for the 100 MW-AC North Star Solar Project and associated 115 kV high voltage transmission line (HVTL). The Solar Project consists of the installation of a photovoltaic (PV) system utilizing single axis trackers and associated infrastructure on approximately 800 acres of agricultural land and the construction of approximately 1 mile of a new overhead 115kV HVTL. The proposed HVTL is to serve as a connection between the proposed North Star Solar Project and the Xcel Energy Chisago substation. Attached **Exhibit 1** depicts the location of the North Star Solar Project and the proposed HVTL route corridor. Table 1 summarizes the Sections, Townships, and Ranges included in the Project Area.

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On behalf of North Star Solar PV LLC, we request your analysis of the Project for potential environmental impacts and would appreciate any comments and recommendations you may have regarding potential impacts to state resources. If you have questions, please contact me at 952-906-7421 or kelly.kunst@westwoodps.com.

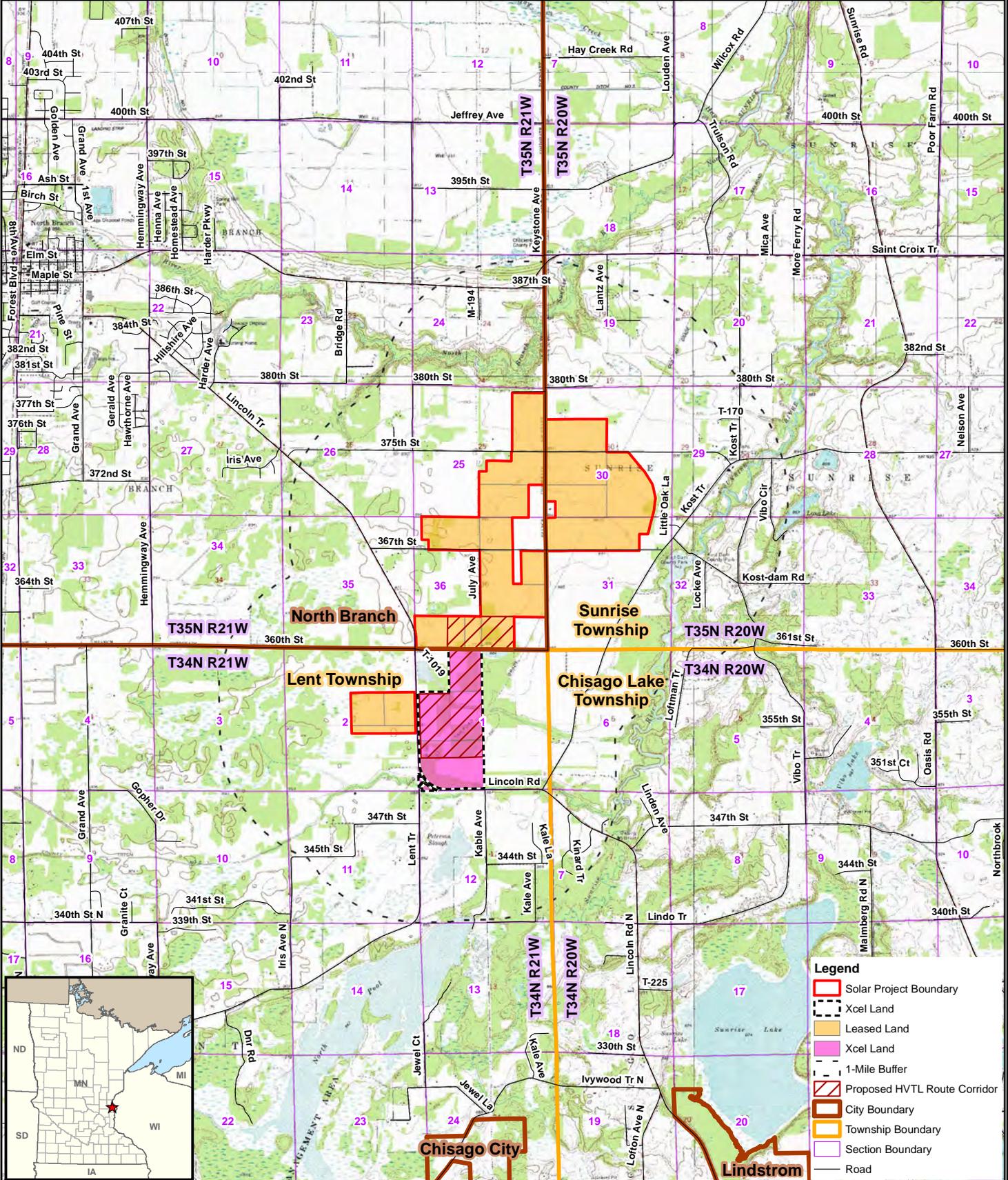
Sincerely,

WESTWOOD PROFESSIONAL SERVICES



January 28, 2015
Page 2

Kelly Kunst
Senior Environmental Scientist



Legend

- Solar Project Boundary
- Xcel Land
- Leased Land
- Xcel Land
- 1-Mile Buffer
- Proposed HVTL Route Corridor
- City Boundary
- Township Boundary
- Section Boundary
- Road

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North Star Solar Project

North Branch, Sunrise Township, and Lent Township;
Chisago County, Minnesota

Project Location and
USGS Topography

Figure 1



Westwood Professional Services, Inc.
7699 Anagram Drive
Eden Prairie, MN 55344

PHONE 952-937-5150
FAX 952-937-5822
TOLL FREE 1-888-937-5150

www.westwoodps.com



Appendix A-7
U.S. Army Corps of Engineers

January 30, 2015

Thomas J. Hingsberger
Regulatory Branch
St. Paul District Corps of Engineers
180 Fifth Street East, Suite 700
Saint Paul, MN 55101-1678
thomas.j.hingsberger@usace.army.mil

Re: North Star Solar Project and Proposed 115 kV Transmission Line

File 0004493.01

Cc: Sam Sours and Chase Whitney, Community Energy Solar, LLC

Dear Mr. Hingsberger:

Westwood Professional Services (Westwood) was retained by North Star Solar PV LLC to provide environmental services for the 100 MW-AC North Star Solar Project and associated 115 kV high voltage transmission line (HVTL). The Solar Project consists of the installation of a photovoltaic (PV) system utilizing single axis trackers and associated infrastructure on approximately 800 acres of agricultural land and the construction of approximately 1 mile of a new overhead 115kV HVTL. The proposed HVTL is to serve as a connection between the proposed North Star Solar Project and the Xcel Energy Chisago substation. Attached **Exhibit 1** depicts the location of the North Star Solar Project and the proposed HVTL route corridor. Table 1 summarizes the Sections, Townships, and Ranges included in the Project Area.

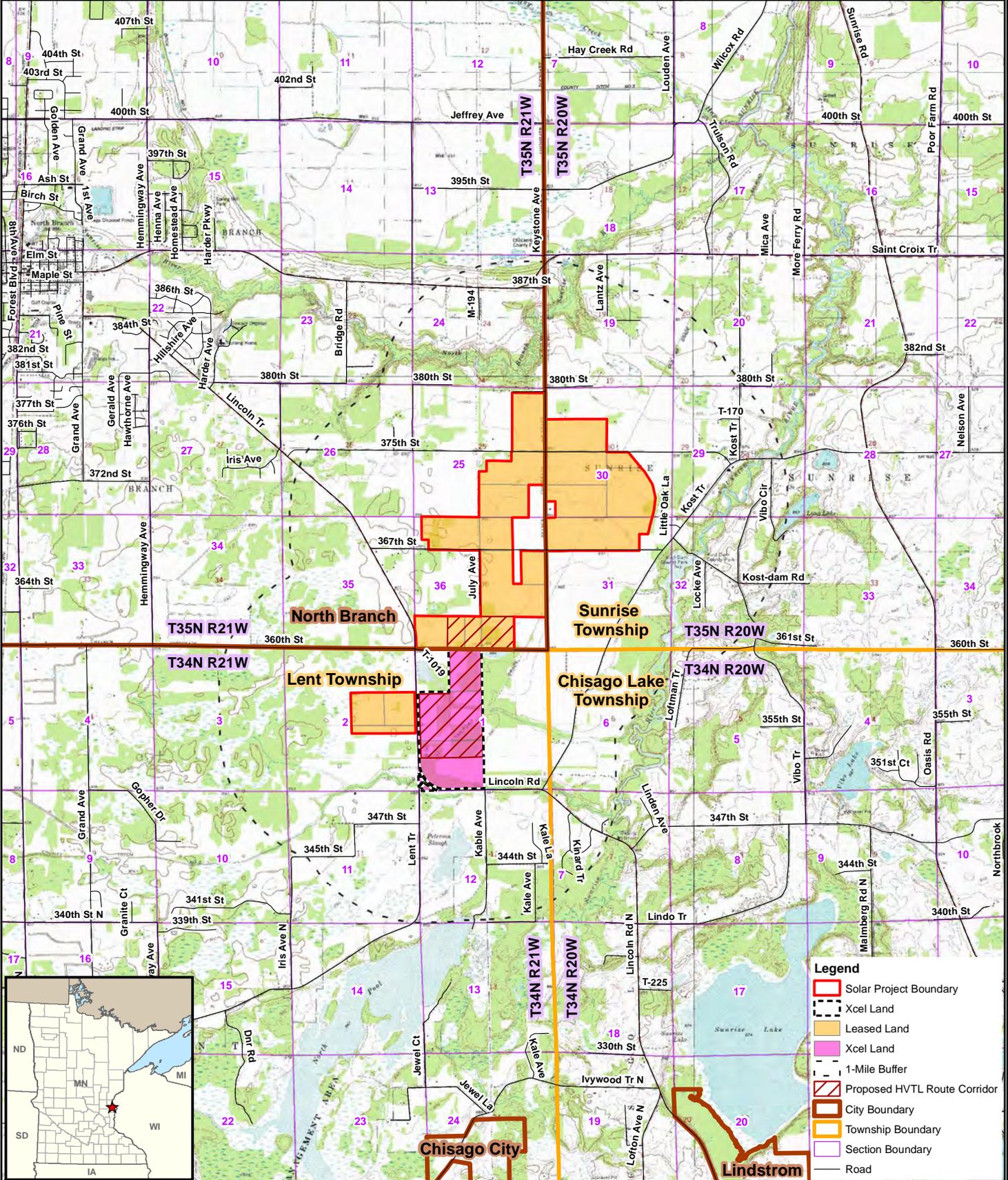
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T35, R20	30 and 31
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WESTWOOD PROFESSIONAL SERVICES

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Kelly Kunst
Senior Environmental Scientist



Legend

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- Xcel Land
- Leased Land
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- 1-Mile Buffer
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 Eden Prairie, MN 55344

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 FAX 952-937-5822
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North Star Solar Project

North Branch, Sunrise Township, and Lent Township;
 Chisago County, Minnesota

Project Location and
 USGS Topography

Figure 1

Map Document: P:\0004483.00\GIS\Permit\NS_Project\LocationAndUSGSTopo01B_150130.mxd 1/30/2015 3:53:01 PM

Appendix A-8
State Historic Preservation Society

January 30, 2015

State Historic Preservation Office
Minnesota Historical Society
345 Kellogg Boulevard West
St. Paul, Minnesota 55102

Re: North Star Solar Project and Proposed 115 kV Transmission Line

File 0004493.01

Cc: Chase Whitney, Community Energy Solar, LLC

Dear Sir or Madam:

Westwood Professional Services (Westwood) was retained by North Star Solar PV LLC to provide environmental services for the 100 MW-AC North Star Solar Project and associated 115 kV high voltage transmission line (HVTL). The Solar Project consists of the installation of a photovoltaic (PV) system utilizing single axis trackers and associated infrastructure on approximately 800 acres of agricultural land and the construction of approximately 1 mile of a new overhead 115kV HVTL. The proposed HVTL is to serve as a connection between the proposed North Star Solar Project and the Xcel Energy Chisago substation. Attached **Exhibit 1** depicts the location of the North Star Solar Project and the proposed HVTL route corridor. Table 1 summarizes the Sections, Townships, and Ranges included in the Project Area.

Table 1. Location Summary	
Township and Range	Sections
T35, R21	25 and 36
T35, R20	30 and 31
T34, R21	1 and 2

Out of due diligence and in anticipation of an archaeological survey recommendation, North Star Solar PV LLC requested a Phase I Archaeological Survey in the fall of 2014. The report detailing the methodology and results of that survey is included with this letter. Please note that we understand that should development include the area of NS-HIS5 (21-CH-135), additional field work will be required.

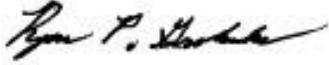
On behalf of North Star Solar PV LLC, we request your analysis of the Project for potential impacts to cultural and historic resources. Additionally, we request your review and comments on the enclosed report – Phase I Archaeological Investigations for the North Star Solar Project by Grohne and Gronhovd. We would

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appreciate any comments and recommendations you may have regarding potential impacts to cultural resources. If you have questions, please contact me at 952-906-7403 or ryan.grohnke@westwoodps.com.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES

A handwritten signature in black ink, appearing to read "Ryan P. Grohnke". The signature is written in a cursive style with a prominent initial "R".

Ryan P. Grohnke
Cultural Resources Field Director/Project Manager