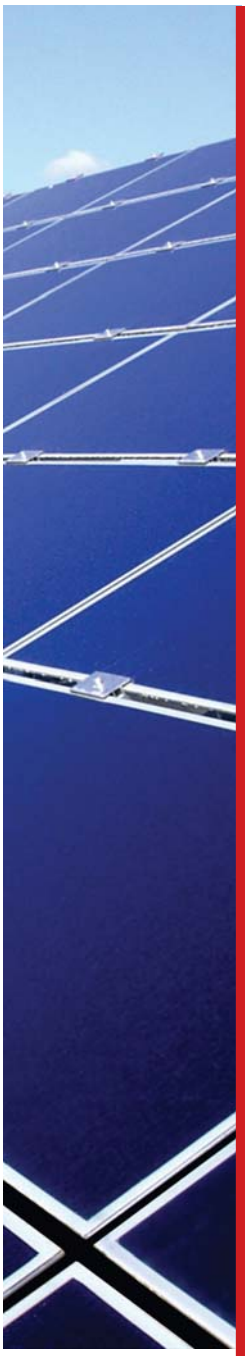

ACCESS & TRAFFIC OPERATION EFFECTS ASSESSMENT
St. Clair Moore Solar Farm

Prepared by: Golder Associates

Date: May 2010

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TECHNICAL MEMORANDUM

DATE May 6, 2010 **PROJECT No.** 10-1118-0006

TO Eric Hyatt
First Solar, Inc.

CC Aurelia Lebegin

FROM Darcy Cowan **EMAIL** dcowan@golder.com

FIRST SOLAR ACCESS & TRAFFIC OPERATION EFFECTS ASSESSMENT – ST. CLAIR MOORE SOLAR FARM

Introduction

Golder Associates Ltd. (Golder) was retained by First Solar, Inc. (First Solar), formerly Opti-Solar Farms Canada Inc., to provide an assessment regarding access feasibility to the First Solar sites located in St Clair, Ontario. Construction of the alternative energy generating facility is scheduled for 2010 and will consist of arrays of solar panels for electricity generation. Construction and maintenance activities will result in additional traffic in the area as discussed below. This memorandum presents findings of the St. Clair Moore Solar Farm facility's traffic operational effects both during construction and operation, as well as the feasibility to provide adequate access to the site, and the design criteria appropriate for traffic access to the site. A similar assessment for the St. Clair Sombra Solar Farm site, located approximately 20 km further south, is provided under a separate cover. This preliminary assessment is based on limited information concerning the site, including construction and operating parameters. The data presented below was collected from First Solar and relevant municipal representatives, and do not include interpretation or modelling.

1.0 SITE LOCATION AND CONTEXT

A site visit was conducted by Golder staff on Monday, December 1, 2008 to collect background information and examine existing road conditions in the vicinity. A photo log of the roadways in the area of the site is contained in **Appendix A**. Golder staff met with representatives from the Township of St. Clair Municipality on Tuesday, December 9, 2008 to discuss concerns that could arise from the development proposal. Relevant and recent Average Annual Daily Traffic (AADT) volumes were not available at the time of study for the municipal roadways.

The site is located approximately 150 km northeast (by road) of the Ambassador Bridge International Border Crossing (Windsor, ON / Detroit, MI) and 25 km south of the Blue Water Bridge International Border Crossing (Sarnia, ON / Port Huron, MI). In addition, the site is approximately 250 km south-west of the Greater Toronto Area (GTA). As illustrated in **Figure 1**, the regularly shaped, 300-acre site of St. Clair Moore Solar Farm is located just east of the Michigan River, and south-east of the town of Corunna.

As illustrated in **Figure 2**, St. Clair Moore Solar Farm is bounded by Highway 40 to the east, which runs in a north-south direction, Rokeby Line to the south, which runs in an east-west direction, and railway tracks to the north, which run in an east-west direction. The closest roadways are Hill St. (County Road 4) to the north, which runs in an east-west direction, and the St. Clair Parkway to the west, which runs in a north-south direction.

The site is located in Lambton County. All roads fall under the jurisdiction of the Township of St. Clair Municipality (see **Figure 1**) except Highway 40 which falls under the jurisdiction of the Ministry of Transportation of Ontario (MTO). Posted speed limits and other related roadway data can be found in **Table 1**. The topography of the site and its environs is generally flat. All roads except Highway 40 have a rural cross section, with two traffic lanes and gravel shoulders.

Highway 40 is a four-lane provincial highway with gravel shoulders, narrowing to 2 lanes 600 m south of Rokeby Line, and is located to the east of the site. There are designated southbound and northbound lanes turning west onto Rokeby Line. This route could be used as the main route to the site. Highway 40 currently has an average annual daily traffic (AADT) volume of approximately 10,700 vehicles per day (veh/day), and a posted speed limit of 80 km/hr.

Rokeby Line, west of Highway 40, is a two-lane, municipal roadway with gravel shoulders. This upgrade was requested by the municipality of Lambton from Suncor who operate an ethanol plant immediately south of St. Clair Moore Solar Farm. There are no posted speed limits in the vicinity of the intersection with Highway 40. There are stop signs on Rokeby Line east and west of Highway 40.

St. Clair Moore Solar Farm is located in a designated industrial area bounded by agricultural areas to the east and west. The agricultural area to the west of St. Clair Moore Solar Farm serves as a buffer zone between the residential area of the Town of Corunna and the industrial area.

2.0 SITE DEVELOPMENT PROPOSAL

First Solar plans to initiate construction in 2010 after approvals are obtained and finish construction in 2011. Ultimately, the site will consist of a total generating capacity of 20 MW. It is anticipated that major deliveries will occur over a seven-month period, from April 15 to November 15, using 16.15 m (53 ft.) transports for solar modules and 13.7 m (45 ft.) flatbeds for pre-cast concrete mounting pads. Additional trucks associated with deliveries of construction materials and support are anticipated. A maximum workforce of approximately 80 full-time construction staff will be utilized during times of peak activity. For the purpose of this analysis, it is assumed that the material delivery trucks will be carrying panels, inverters and construction materials (cement, gravel and sand). **Table 2** presents a summary of the projected truck and other vehicular traffic anticipated during the peak July to October period of construction activity. There are no specific weight requirements and the trucks will be subject to normal load restrictions. Employee traffic (light vehicles) of up to 160 two-way vehicle trips per day during heightened construction activity is anticipated. Post-construction, employee traffic will be significantly reduced, consisting primarily of maintenance traffic.

3.0 SITE ACCESS

As indicated on **Figure 2**, the proposed construction entrance for St. Clair Moore Solar Farm is located on Rokeby Line, approximately 400 m west of Highway 40 and 3.2 km east of St. Clair parkway. There is a “No Trucks” sign posted immediately west of the proposed construction entrance.

This entrance is intended to be the only site access and would be used for all commercial traffic, material delivery, employees and visitors. **Table 1** presents a summary of the advantages and disadvantages of the entrance location.

4.0 ANALYSIS

There are three major directions of approach to the site: one from Windsor, another from Port Huron and a third from the Greater Toronto Area (GTA). Commercial traffic coming from Windsor is assumed to travel eastbound on Highway 401, then north-eastbound along King’s Highway 2 (County 2), and then north-westbound along Highway 40. Commercial traffic travelling from Port Huron is assumed to travel eastbound along Highway 402 and then southbound along Highway 40. Commercial traffic travelling from the GTA is assumed to travel south-westbound along Highway 401, then westbound along Highway 402 and then southbound along Highway 40.

The intersection of these highways has been designed to accommodate heavy truck movement and can accommodate the movement of trucks generated by the site during the peak construction period. Highway 40 is interrupted at Churchill Line and resumes southbound 5.5 km further west on Churchill Line. There is a height restriction at the Highway 402 overpass at Christina Street (County Road 7). All commercial traffic will be following the Highway Traffic Act. No restrictions are anticipated at this point. In the rare case where a detour is required due to height restrictions, trucks can use County Road 29 via County Roads 16 and 33 to continue on Highway 402. Due to the close proximity between the Port Huron border crossing and the St. Clair sites, it would be preferable to have all truck deliveries from Port Huron rather than from Windsor or the GTA. Township of St. Clair municipal representatives indicated that conflicts between transport trucks and other traffic are only anticipated in the event that the St. Clair Parkway (west of the site) is used.

During the data collection process, Township of St. Clair municipal representatives indicated that the proposed site entrance to the St. Clair Moore Solar Farm site on Rokeby Line could accommodate employee / visitor use and commercial traffic access for construction support, as the roadway was upgraded to accommodate commercial traffic travelling to the Suncor Energy ethanol plant. Access at this location has good visibility for both approaching and departing vehicles. Additionally, the intersection at Rokeby Line and Highway 40 has designated turning lanes to accommodate large commercial vehicles.

Projected traffic volumes are expected to be relatively light and will consist of normal sized truckloads by WB-17 or lesser design vehicles. The provincial highway is a designated truck route and is designed accordingly. The structural adequacy to accommodate additional truckloads on the municipal roadways should be confirmed. Township of St. Clair municipal representatives indicated that the condition of the existing roads would require inspection prior to and after construction with the developers and municipal staff. Also, preferred haul routes will need to be confirmed with municipal staff during the approvals stage. The overall objective would be to, at minimum, restore the roadways to their conditions prior construction.

5.0 ACCESS DESIGN REQUIREMENTS

The access should be designed to provide two five-metre wide traffic lanes (one lane inbound and one lane outbound). Corner radii should be designed to accommodate the movements of WB-17 design vehicles (with at least 15 m radii). Daylighting should be provided in accordance with County and/or Ministry of Transportation requirements. All driveways should adhere to Municipal standards for commercial access. Due to low opposing traffic volume on the boundary roads, tapers or auxiliary turning lanes will not be warranted.

Table 1: Summary of Access Locations

Site	Access Location	Jurisdiction	Posted Speed (km/h)	Advantages	Disadvantages
St. Clair Moore Solar Farm	Rokeby Line (north)	Lambton County, Township of St. Clair	None	• Designated turning lanes onto and off Rokeby Line from Hwy 40 • Road is in good condition • Good visibility	

Table 2: Site Traffic Generation (20MW)

Anticipated MW to be Constructed		**20**
Construction Period April 15 - November 15 (months)		7
Construction Period (working days)		153
Total Inbound Commercial Traffic during Construction Period [1]		5,210
Peak Inbound Commercial Traffic Volume Per Day [2]		58
Peak Two-Way Total Commercial Traffic Volume Per Day		**116**
Construction Employees		80
Employee Vehicle Trips Per Day		160
Visitor Trips Per Day (5% of Employee Trips Per Day)		8
Peak Two-Way Total Auto Volume Per Day		**168**
Peak Two-Way Total Vehicle Volume Per Day		**284**
Peak Hourly Traffic Generation During Peak Construction (July – October)		
Auto	Inbound	80
	Outbound (5% of Peak Inbound)	4
Commercial Traffic [3]	Inbound	8
	Outbound	8
Total	Inbound	88
	Outbound	12
Total Peak Hourly Traffic Generation (veh/hr)		100

Notes:

1. Total inbound commercial traffic volume over a 7-month construction period for 20 MW includes 1618 trucks for module delivery, 1796 trucks for rack delivery and 1796 trucks for BOS (inverters, transformers, cable).

2. Peak commercial traffic generation as per **Table 3**.

3. Hourly commercial traffic volumes are based on an 8-hour working day.

Table 3: Estimated Commercial Traffic Generation

Start	End	Week Days	Modules/ day	Racks/ day	BOS/ day	Trucks/ day	Total	Cumulative Total
15-Apr	15-May	23	6	6	6	18	414	414
16-May	15-Jun	21	8	8	8	24	504	918
16-Jun	15-Jul	22	10	16	16	42	924	1842
16-Jul	15-Aug	22	18	20	20	58	1276	3118
16-Aug	15-Sep	22	14	16	16	46	1012	4130
16-Sep	15-Oct	22	10	10	10	30	660	4790
16-Oct	15-Nov	21	8	6	6	20	420	5210

Closure

This report is provided for the information and use of First Solar only and is specific to the St. Clair Moore Solar Farm site. Third party reliance on the information is at the sole risk of the third party. This report replaces all other draft or versions provided by Golder Associates Ltd.

We trust that you find this analysis satisfactory. Please contact the undersigned at 905-567-4444 should further comment or clarification be required.

Limit of Use

This document is a private communication designated solely to and for the use of the recipient First Solar Inc. and is not intended for any use of or reliance upon by any third party. Therefore, in no event Golder Associates Ltd., be liable for any loss or damage of any kind incurred to any third party or by any third party due to use of or reliance upon the information contained in this document.

Darcy Cowan,
Associate

Irwin Wislesky, P. Eng.,
Principal

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Attachments:
Figure 1: Regional Map
Figure 2: St. Clair Moore Solar Farm Location
Appendix A: Site Reconnaissance Photos – St. Clair Moore Solar Farm

APPENDIX A

Site Reconnaissance Photos - St. Clair Moore Solar Farm

	
Rokeby & train tracks: facing East	Rokeby & train tracks: facing East, North side ditchline
	
Rokeby & train tracks: facing East, South side ditchline	Rokeby & train tracks: facing West, North side ditchline and drain
	
Construction Entrance: facing North	Construction Entrance: facing East

	
Construction Entrance: facing West	Construction Entrance: facing North-West, drain 10m East of entrance
	
Construction Entrance: facing West, sign West of entrance	Construction Entrance: facing North, sign East of entrance
	
Construction Entrance: facing North, sign East of entrance	Hwy 40 & Rokeby: facing North, SBL

	
Hwy 40 & Rokeby: facing West, WBL	Hwy 40 & Rokeby: facing North, West side ditchline
	
Hwy 40 & Rokeby: facing West, North side ditchline	Hwy 40 & Rokeby: facing North-West, in the curve
	
Hwy 40 & railway: facing East	Hwy 40 & railway: facing West

Hwy 40 & railway: facing North, SBL and West side ditchline

Hwy 40 & railway: facing South. West side ditchline

Hwy 40 & railway: facing South, SBL and West side ditchline

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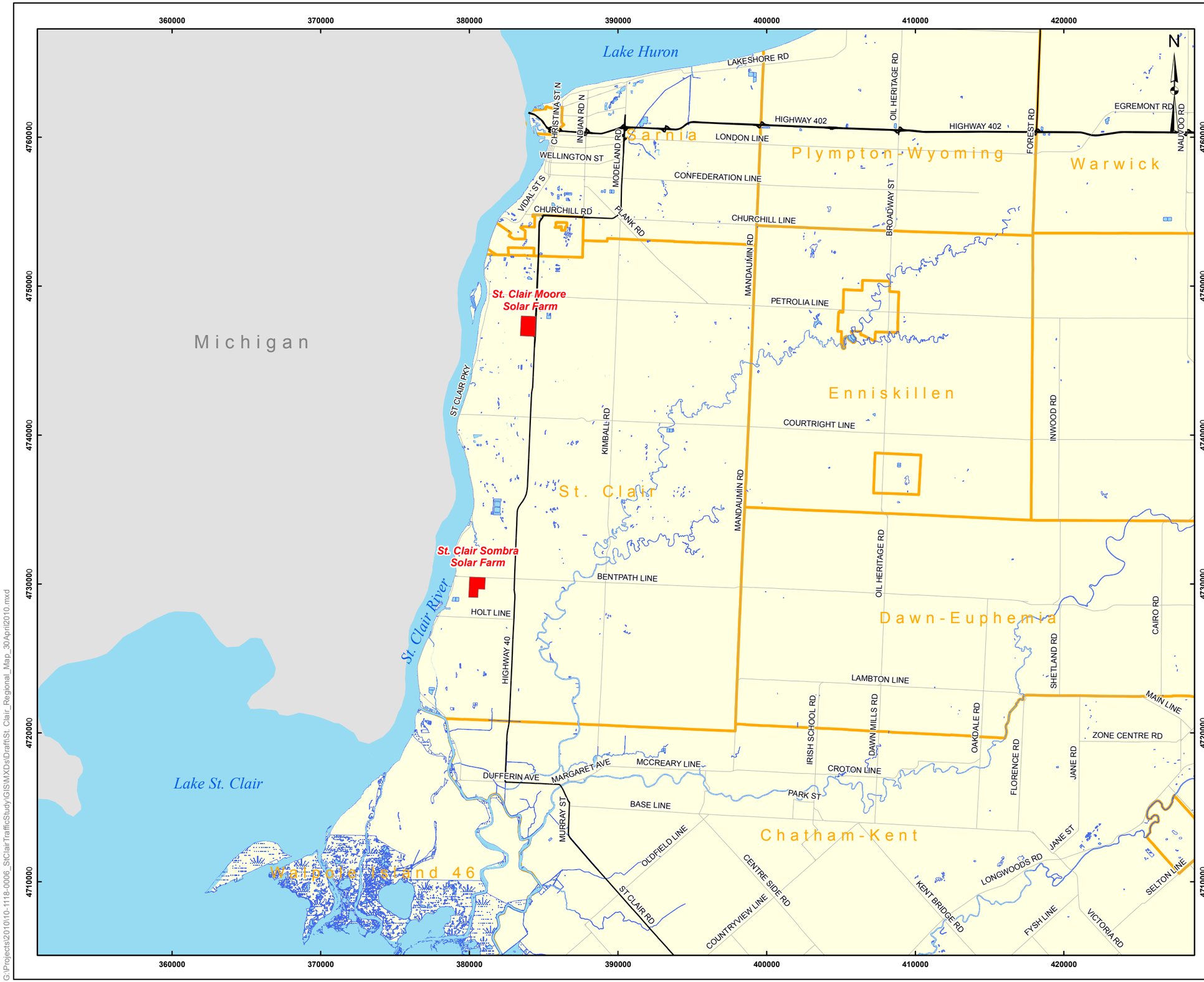
FIGURES



LEGEND

- Site Location
- Highway
- Local Road
- Waterbody
- Wetland
- Municipal Boundary

REFERENCE

Base Data - MNR NRVIS, obtained 2004, CANMAP v2006.4
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2008
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

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PROJECT
FIRST SOLAR TRAFFIC STUDIES

TITLE
REGIONAL MAP

Golder Associates
Mississauga, Ontario

PROJECT No. 10-1118-0006			SCALE: 1:250,000	REV. 0.0
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GIS	CGE	05 May 2010		
CHECK	AL	05 May 2010		
REVIEW	DC	05 May 2010		

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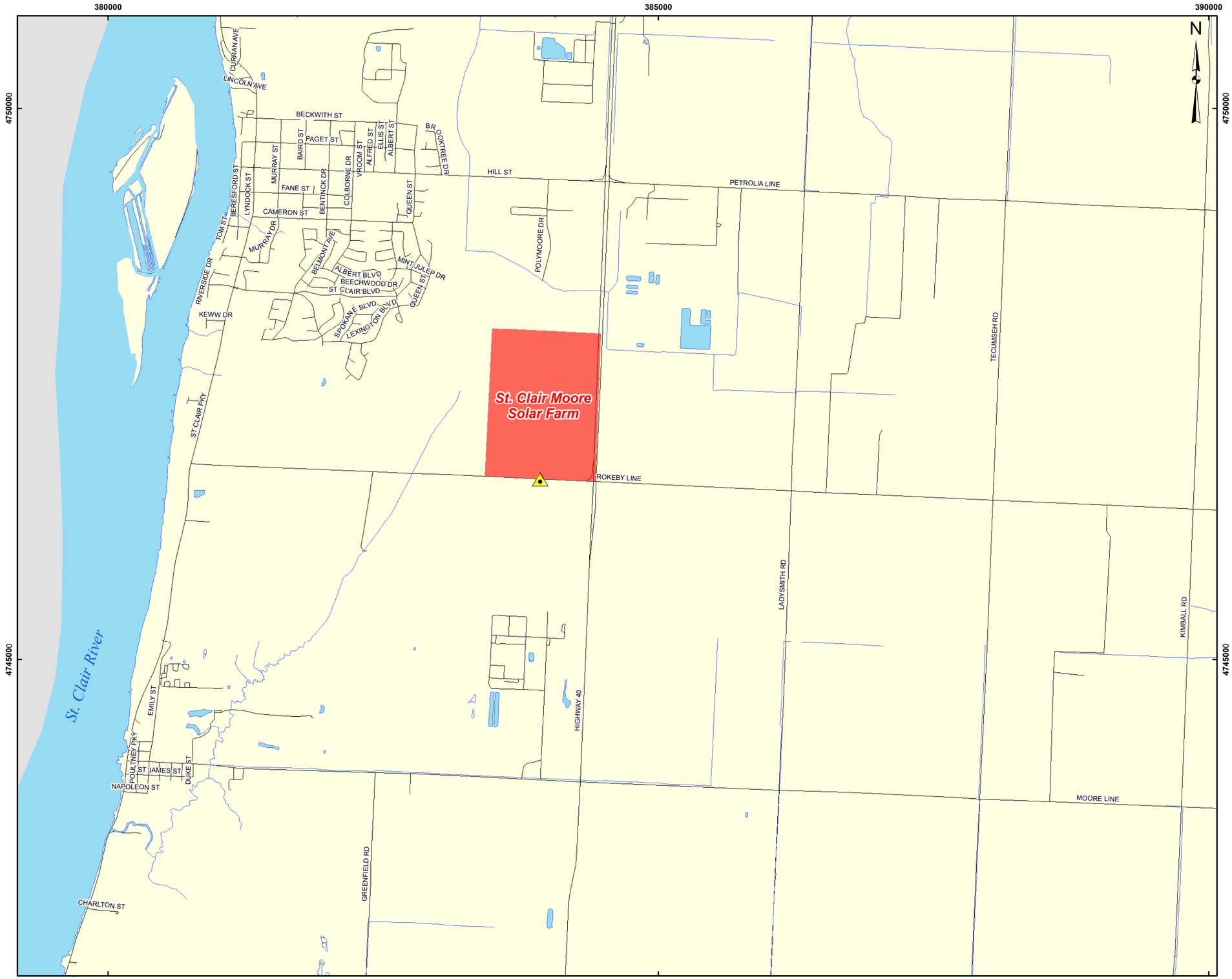

LEGEND

- Proposed Primary Construction Access
- Site Location
- Roads
- Watercourse
- Waterbody
- Wetland

REFERENCE

Base Data - MNR NRVIS, obtained 2004, CANMAP v2006.4
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2008
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

0 250 500 1,000 1,500 2,000
Metres

PROJECT
FIRST SOLAR TRAFFIC STUDIES

TITLE
ST. CLAIR MOORE SOLAR FARM

Golder Associates
Mississauga, Ontario

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