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February 13, 2018

GL Garrad Hassan Canada, Inc.  
4100 rue Molson, Suite 100  
Montreal  
QC  
H1Y 3N1  
Canada

Attention: Nancy O'Neill  
Project Manager, Environmental & Permitting

Re: Romney Wind Energy Center  
Wind Turbine/Petroleum Resources Interaction

Dear Nancy,

Jim McIntosh Petroleum Engineering Limited (“JMPEL”) was retained by GL Garrad Hassan Canada, Inc. (“DNV GL”) to investigate possible interactions/interference between any existing or planned petroleum or natural gas wells or facilities and the wind turbine facilities, access roads, or infrastructure planned for the Romney Wind Energy Center (the “Project”, “Project Facilities”, “Project Area”, or “REF”) being developed by Romney Energy Center Limited Partnership (the “Proponent”). The proposed Project is located in the Township of Romney with Collection Lines delivering power via the substation to the Hydro One transmission lines located in the town of Lakeshore (formerly the Townships of Rochester, Maidstone, and Tilbury West), in Essex County, Ontario. The Project is generally bounded by Wheatley Road (Kent Road 1) to the west, Campbell Road to the north-east, Talbot Road (Kings Highway 3) to the south-east, and the town of Wheatley to the south-west.

### **Summary**

There are a number of areas within the Project Area where Project Facilities are within 75 meters of active or abandoned petroleum resources. The areas and required actions are summarized below.

<b>Petroleum Resource Operation</b>	<b>Interacting REF Facility</b>	<b>Potential negative effects to petroleum resource operations</b>	<b>Potential negative effects to REF</b>	<b>Mitigation Measures and/or emergency procedures</b>
Plugged wells in Wheatley Pool	Turbine T13 construction disturbance area	None	Be aware of possible casings during excavating	Do not disturb casings if contacted
Plugged wells in the New Wheatley Pool	Turbines T9 and T10 access roads, collector cables	None	Be aware of possible casings during excavating	Do not disturb casings if contacted
Plugged wells	Turbines T3, T5, T6, T12, and T14 access roads, collector cables	None	Be aware of possible casings during excavating	Do not disturb casings if contacted
Cross-country pipeline serving T008224, T007904	Turbine T5 access road and collector cable	Damage to pipeline	Contacting/damaging pipeline during construction	Locate pipeline, provide extra support/separation
Pipeline along access laneway serving T007261, T009407	Turbine T14 construction disturbance area	Damage to pipeline	Contacting/damaging pipeline during construction	Should be no concern if disturbance area accurate
Cross-country pipeline serving wells along Kings Highway 3	Turbine T14 access road, collector cable, construction disturbance area	Damage to pipeline	Contacting/damaging pipeline during construction	Locate pipeline, provide extra support/separation
Cross-country pipeline serving T007481, T007520, T008663	Turbine T11 construction disturbance area	Damage to pipeline	Contacting/damaging pipeline during construction	Should be no concern if disturbance area accurate
Well T008663	Collector cable on 3 <sup>rd</sup> Concession road allowance	None	None	Well within 75m of road allowance. Not effected by REF
Well T009464	Collector cable on Zion Road road allowance	None	None	Well within 75m of road allowance. Not effected by REF
Pipelines along township road allowances	Above-ground collector cables	Damage to pipeline on road allowances	Contacting/damaging pipeline during construction	Obtain Locates prior to auguring holes for power poles

Most instances where Petroleum Resources are within 75 meters of Project Facilities are as a result of REF collector cables or access roads crossing or parallel to existing pipelines. There will be no effect on these Petroleum Resources from the REF providing that these pipelines are located and protected from disturbance/interference by REF facilities during and after construction by following the recommendations in this report.

## Background

As part of a Renewable Energy Approval (REA) as detailed in Ontario Regulation 359/09, a renewable energy developer must submit an Application for a Renewable Energy Approval for their project. As part of this REA application, the renewable energy developer must discuss effects their project may have on other activities in the area. The Technical Guide to Renewable Energy Approvals<sup>(1)</sup> states that the renewable energy developer must discuss, among other effects, the effects on “Petroleum Setbacks”:

### *7.3.1 Petroleum Setbacks*

*The proponent must ensure that the 75-meter setback from any petroleum wells or facilities is met. If an unplugged petroleum well is located within 75 m of the development, the proponent must apply to MNR for a license to plug the well in accordance with the Oil, Gas, and Salt Resources Act.*

*If the petroleum well or facility is active, and the proponent wishes to construct within the 75 m setback, the proponent is required to have a Professional Engineer prepare a report demonstrating that the petroleum wells or facilities identified within the setback will not have a negative effect on the renewable energy generation facility and vice versa.*

(1) Technical Guide to Renewable Energy Approvals <https://www.ontario.ca/document/technical-guide-renewable-energy-approvals/chapter-1-overview-renewable-energy-approval-real-application-process-and-requirements-submitting#section-0>

The Ministry of Natural Resources has further clarified application requirements for renewable energy developers in their document entitled “Approval and Permitting Requirements, Document for Renewable Energy Projects”. Minimum setback requirements from petroleum resource operations are specified in this document<sup>(2)</sup>:

### *7.8 Petroleum resources operation setback*

*Development is not permitted within 75 meters of a petroleum resources operation, unless the applicant submits an engineer’s report demonstrating that there are no effects to the development. Well location information can be obtained from the Ontario Oil, Gas, and Salt Resources Library.*

(2) Approval and Permitting Requirements, Document for Renewable Energy Projects, pg 39

The balance of this report discusses existing and potential oil and natural gas production activities in the Project Area, specifically as it relates to planned wind turbine sites, access roads, and power corridor locations.

## Potential Oil and Gas Zones and Exploration Methodology

Figure 1 is a rock stratigraphic succession chart for south-western Ontario. This chart outlines the sedimentary rock geological formations encountered in various general areas in south-western Ontario and indicates which of those geological formations have produced oil or gas in those areas. The stratigraphic succession in the Romney Wind Energy Center area is represented under the “Windsor – Sarnia – Goderich – Western Lake Erie” column in this chart.

The geological sediments above the Dundee formation in this chart are not present in the Project Area. Based on this chart, oil or natural gas production could be expected from the Silurian-aged Guelph, A-1 Unit, or A-2 Unit, from the Ordovician-aged Trenton/Black River interval, or from the Cambrian-aged Eau Claire section in the area.

Hydrocarbon accumulations and geological traps in all three potential formations (Silurian, Ordovician, and Cambrian) are controlled by reactivation of Precambrian faults. These faults often occur at boundaries between differing Precambrian rock types close to the Precambrian/Sedimentary interface, with movement along the faults transmitting up into the sedimentary rock section. Movement of sedimentary rock formations up or down or laterally along the fault interface causes traps associated with oil and gas accumulations in the Silurian and Cambrian zones, while the fault plane itself creates a zone of weakness that can allow fluids to move vertically between geological formations, with this fluid movement modifying the host formation rock to create porosity and traps in Ordovician zones. Schematics are appended that show how critical the fault location is for Cambrian, Ordovician, and Silurian exploration programs. Figure 2 depicts a typical Cambrian reservoir, Figure 3 depicts dolomite reservoir development in a typical Ordovician Trenton/Black River play, while Figure 4 depicts Silurian play development relative to faulting.

Because faults and the movement across or along faults are critical to an oil and gas exploration program, modern-day oil and gas companies will spend a great deal of time and effort identifying the location, orientation, and throw across these faults prior to exploratory or development drilling. Exploration companies will use regional magnetics and gravity surveys to identify areas of likely faulting, then 2D (along a straight line) or 3D seismic will be collected to look for the movement across and orientation of these faults. Six maps are appended which show the seismic that has been shot to date in the Project Area to assist exploration companies plan drilling locations. Figure 5 shows the seismic coverage in the Mersea area near turbine T17, Figure 6 shows the seismic coverage in the north part of Romney near turbines A1 and T1, Figure 7 shows seismic coverage in the west-central part of Romney near turbines T2, T3, T4, T5, T6, T7, T8, and T11, Figure 8 shows seismic coverage in the west south part of Romney near turbines T9, T10, T13, and T14, Figure 9 shows seismic coverage in the south part of Romney near turbines T12 and T13, while Figure 10 shows seismic coverage in the east part of the Project Area near turbines T15 and T16. Only 2D seismic lines have been shot in the area, with seismic shot

on most road allowances, followed up with cross-country seismic to more accurately define geological features.

Each section below will review the exploration activities, any oil or gas shows, and any oil or gas production from each of the three main geological targets in the Project Area and any possible interference/impact that planned Project Facilities may have. To date, 83 wells have been drilled within lots where Project Facilities are planned, with 62 wells targeting one of these three geological zones. Table 1 is a listing of all 83 wells. In addition to wells targeting these geological zones, 21 of these wells were classed as Stratigraphic Tests, with those wells generally only drilled through the overburden sands and gravels and into the top of the bedrock formation and are not planned as potential natural gas or oil test holes. The well maps appended to this discussion (Figures 5 through 10) list the license numbers beside each of these wells (example: T007155 is Consumers et al 34281: Romney 6-13-III).

### **Silurian-Aged Guelph, A-1 Unit, A-2 Unit Zones**

The Silurian-aged Guelph, A-1 Unit, and A-2 Unit zones in the Project Area occur at depths of between 400 and 440 meters. Of the 83 wells drilled in the Project Area, 12 wells were only drilled deep enough to test Silurian formations. All of the deeper wells also drilled through the Silurian section, but the drilling company may not have been looking to evaluate Silurian formations. There are 13 wells with no information on drilled depth. These 13 wells were likely targeting Silurian-aged formations as well.

Two Silurian-aged pools have been discovered in the Project Area, the Wheatley Pool which is located in lot 11, Concessions I and II and the New Wheatley Pool which is located in lot 10 and 11, Concession III.

The Wheatley Pool was reported cumulative production of 1,447m<sup>3</sup> (9.1 MBbl) of oil and no gas production. All wells in this pool are now plugged and abandoned. Turbines T12 and T13 directly offsets this pool. Two of the wells within this pool (F000453, F000454, possibly F000455) are within the construction disturbance area for turbine T13 (see Figure 11) and one well (N000995) is just offsetting the construction disturbance area for turbine T12 (see Figure 12). The Proponent needs to be aware that potential abandoned wells may exist within the construction disturbance areas and needs to avoid disturbing the abandoned casings from these wells if exposed during any excavating.

The New Wheatley Pool consisted of one gas well, two gas show wells, and three stratigraphic test wells, with reported cumulative production of 588 10<sup>3</sup>m<sup>3</sup> (20.8 MMcf) of gas. The gas well (F000506) is now plugged and abandoned. The access road and power collection line for turbines T9 and T10 are close to this abandoned gas well (F000506), one of the gas show wells (F000493) and one of the stratigraphic test wells (N000994) (see Figure 13). The Proponent needs to be aware that potential abandoned wells may exist very close to the planned access road/collector line corridor for these turbines and needs to avoid disturbing the abandoned casings from these wells if exposed during any excavating.

In addition to plugged and abandoned wells within these two pools, there are other wells either drilled as stratigraphic tests or drilled to test Silurian targets that are plugged and abandoned that are within 75 meters of Project Facilities. The construction disturbance area and access road/collection cables associated with Turbine T3 are close to stratigraphic test N001014 (see Figure 14). The access road/collection cables serving Turbine T5 are within 75 meters of abandoned well T000154 (see Figure 15). The access road/collection cables serving Turbine T6 are close to abandoned stratigraphic test well N001011 (see Figure 16). The access road/collection cables serving Turbine T14 are close to abandoned stratigraphic test well N001009 (see Figure 17). In all these cases, the Proponent needs to be aware that potential abandoned wells may exist within the construction disturbance area and needs to avoid disturbing the abandoned casings from these wells if exposed during any excavating.

No Silurian-aged oil or gas shows were noted in the drilling records for any of the deeper wells drilled in the main Romney Trenton/Black River area (see description below). Most of these wells were drilled with a rotary rig using drilling mud as the drilling fluid, so any gas or oil shows are unlikely.

### **Ordovician-Aged Trenton/Black River Zones**

All of the existing oil and natural gas producing wells and infrastructure are present as a result of Trenton/Black River (TBR) oil production within or adjacent to the Project Area. As depicted in the Ordovician cartoon in Figure 3, the TBR porosity and oil potential is created by fluid movement through nearly vertical faults. The fault trends are linear, so the initial oil pool development usually occurs with vertical wells drilled along the fault trend as identified by seismic. With the advent of horizontal drilling, many of the older vertical wells have been reentered, with a horizontal drainhole drilled from the original vertical wellbore to more effectively access the vertical porosity development. TBR oil and natural gas have been discovered in the Project Area at depths ranging from 800 to 900 meters.

A number of TBR fault trends and associated oil and gas accumulations have been discovered in the Project Area. Most of the initial drilling was performed by Consumers Gas, which later became Telesis Oil and Gas, then Pembina Resources, Talisman Energy, and finally Dundee Oil and Gas, who is the operator of most of the TBR wells in the area. As well as Dundee-operated wells, there are also oil wells operated by Farmers Oil and Gas and Clearbeach Resources (who operate the Forbes and Judo wells).

There are two main TBR producing trends in the Romney area, the Goldsmith-Lakeshore Field which is just north of Wheatley, and the Renwick-Fargo Field. Both fields are east-west trending TBR fields with numerous vertical and horizontal producing wells. Dundee, who operates most of the wells in both fields, has pipeline systems installed which transport oil, water, and gas from the individual producing wells to central processing facilities called oil batteries. The Goldsmith-Lakeshore Field central battery is located at Mersea 6-23-VII, in Mersea Township just north-west from Wheatley town limits. The Renwick-Fargo Field central battery is located at Romney 6-13-III. Solution gas from the Goldsmith-Lakeshore battery is pipelined to the Renwick-Fargo battery where a gas processing facility is located. Once the solution gas is treated the sales gas is pipelined along the Zion Road to Talbot

Trail (Highway 3) to the sales meter site into the Union Gas pipeline system. Oil and produced water (called “brine”) are separated at the two central batteries, with the produced water pipelined to oilfield brine disposal wells for injection into underground aquifers. There are no sales oil pipelines since the oil from each battery is trucked to sales. Figures 6, 7, 8, 9, and 10 depict the boundaries of these two oil fields (in green) and the wells located within each field.

Whenever possible, the pipeline systems appear to be located on township road allowances. There are, however, numerous locations where pipelines are installed cross-country, with pipeline markers as the only public indications of the location of these pipelines. All of these pipeline would have been installed as per CSA Z662: *Oil and Gas Pipeline Systems*. Based on this code, pipelines not installed on road allowance, railway allowances, or under creeks or other bodies of water only need to be installed with 0.6 meters (2 feet) of cover. Prior to active Project Facility construction, the Proponent will need to meet with Dundee to discuss the location of their pipeline systems in areas where Project Facilities and Dundee pipelines may be close to each other. The Proponent will then need to locate the pipeline systems and determine depth of cover in any areas deemed critical. Once the power collection lines reach public road allowances, the Project Facility power lines will be located above ground. Prior to installing the power poles associated with these above ground Project Facilities, the Proponent will need to have Dundee locate their pipelines through the Ontario One-Call locate system along with locating any other buried public utility systems (telephone, Union Gas, water lines, possibly telecommunication cables).

Based on the proposed wind turbine locations, access roads, and underground electrical collector line locations, there are four locations where Project Facilities off township road allowances are within 75 meters of the Dundee wells, pipelines and related facilities and a number of areas where Project Facilities along township road allowances are within 75 meters of active oil wells or related petroleum facilities.

- 1) The access road and collector line servicing the T5 turbine and the meteorological mast cross a cross-country pipeline system in Romney Lot 11, Concession IV. There is a pipeline crossing of Wheatley Road just west of this location. The pipeline heads due east to brine disposal well T007950, then heads south-east to the T007477 abandoned oil well. This pipeline collects oil, gas, and brine from wells T007904, T008224, and T007477 (now plugged) before reaching the 4<sup>th</sup> Concession road allowance. Additional protection will be required when the access road and collector cables cross this pipeline right-of-way (ROW) to ensure no additional stress is placed on the pipeline(s) due to heavier loads during turbine construction. See Figure 15.
- 2) Turbine T14 and the related underground collector line and access laneway are close to the pipeline collecting oil, gas, and brine from the T007390 (now plugged), T009464, T007261, and T009407 oil wells. The pipeline appears to be installed along the east side of the access laneway to the T007261 wellsite. The access laneway and collector line does not cross the pipeline and it appears from the turbine location that the offset distance is much greater than the 75

meter minimum offset. The construction disturbance area for the turbine extends to within 75 meters of the pipeline. As long as the construction disturbance area does not extend beyond the currently planned area, there will be no interaction/interference with this pipeline. See Figure 17.

- 3) There is at least one, possibly more pipelines installed along the lot line between Lots 13 and 14, Concession II that bring oil, brine, and solution gas production from oil wells along Kings Highway 3 to the Renwick battery. Turbine T14 and the related underground collector cable, access laneway, and construction disturbance area are planned to be installed very close to or along this lot line as well. To avoid damage to this pipeline system, the Project Developer may either need to cross the lot line with the access road and collector line and approach Turbine T14 from the south-east rather than from the lot line as is currently planned, or will need to provide additional protection and isolation from this pipeline system if the access road and collector lines are installed along the lot line. While excavating for the base for the turbine, the Proponent will need to ensure that ground near the lot line remains stable to ensure shifting ground as a result of the excavation does not disturb the pipeline(s). I believe that this pipeline is constructed from fiberglass so electrical interference from the collector cable will be minimal. Tracer wire grounding will be required to ensure the tracer wire does not pick up current from the collector cable. See Figure 17.
- 4) A cross-country pipeline is installed to collect oil, gas, and brine from the T007481 (now plugged), T007520 (now plugged), and T008663 oil wells. The construction disturbance area for T11 turbine extends to this pipeline ROW. Care needs to be taken to ensure no construction activities infringe on this pipeline ROW. See Figure 18.
- 5) In addition to cross-country pipelines within 75 meters of planned Project Facilities, there are a number of instances where Project Facilities located on township road allowances are within 75 meters of oil wells or related petroleum facilities. Oil well T008663 is within 75 meters of the above-ground road allowance collector cable serving Turbine T16. Oil well T009464 is within 75 meters of the above-ground road allowance collector cable along the Zion Road. The custody transfer station where Dundee delivers gas into the Union Gas transmission line at the intersection of the Zion Road and Kings Highway 3 is within 75 meters of above-ground road allowance collector cable along Highway 3. In all these cases, there is no interference between the oil wells or related facilities and the Project Facilities. As discussed earlier, while installing above-ground Project Collector Cables along township road allowances, the Proponent will need to access the Ontario One-Call system to have the petroleum facility pipelines within the road allowance located along with other utilities prior to auguring holes for power poles.

With the extensive cross-country seismic and lack of exploratory drilling to the north of the Renwick-Fargo Field or between the Renwick-Fargo and Goldsmith-Lakeshore fields,



it is unlikely that more exploration for TBR targets will occur in this area, so all Project Facilities associated with turbines A1, T1, T2, T3, T4, T6, T7, T8, or T17 will not be close to any TBR potential.

No other Ordovician Trenton/Black River production is impacted by the Project Facilities.

### **Cambrian-aged Zones**

Of the 83 wells drilled in the vicinity of the Project Area, only 9 wells were drilled into the Cambrian-aged sandstone and dolomite, which is located at depths below 1060 meters. None of these wells encountered oil or natural gas in the Cambrian section, in fact most of the wells either reported no shows of any type, or reported salt water shortly after entering the Cambrian. Based on the current production in this area, the main zone targeted by all deeper drilling has been the Ordovician Trenton/Black River. There is very little chance of finding an economical Cambrian zone in this area.

In summary, there are four areas where the existing Dundee-operated pipelines are in close proximity to planned Project Facilities with only two areas within the 75 meter minimum offset distance. In addition, there is one access road and collector line close to an old abandoned gas well.

Please call to discuss any issues with this report.

Yours truly,



Jim McIntosh, P. Eng.



#### **Attachments:**

- Table 1: Listing of wells drilled in the Project Area
- Figure 1: Stratigraphic succession chart for SW Ontario
- Figure 2: Cambrian play concept drawing
- Figure 3: Ordovician Trenton/Black River play concept drawing
- Figure 4: Silurian play concept drawing
- Figure 5: Seismic coverage: Mersea area
- Figure 6: Seismic coverage: north Romney area
- Figure 7: Seismic coverage: north-central Romney area
- Figure 8: Seismic coverage: south-central Romney area
- Figure 9: Seismic coverage: south Romney area
- Figure 10: Seismic coverage: east Romney area
- Figure 11: Turbine T13 interaction map
- Figure 12: Turbine T12 interaction map
- Figure 13: Turbines T9 and T10 interaction map
- Figure 14: Turbine T3 interaction map
- Figure 15: Turbine T5 interaction map
- Figure 16: Turbine T6 interaction map
- Figure 17: Turbine T14 interaction map
- Figure 18: Turbine T11 interaction map

TABLE 1: WELL LIST in ROMNEY WIND ENERGY CENTER PROJECT

MNRFLicense Number	FULL WELL NAME	Current Status (see Note 1)	OPERATOR	Geol Zone Targeter	WELL TYPE	WELL MODE (see Note 2)	WELL TOTAL DEPTH (m)	WELL			NS Boundary (m)	EW Boundary (m)	
								TOWNSHIP	Tr Lot	Conc			
F000441	Ed. Lounsbury No. 1, Romney 8 - 11 - II	GP - NWF	Unknown	SAL	Natural Gas Well	No Well Found		Romney	8	11	II	274.3 N	243.8 W
F000452	Rich Wright No. 1, Romney 8 - 12 - II	DH - UNK	Unknown	SAL	Dry Hole	Unknown		Romney	8	12	II	15 N	274.3 W
F000453	Ed. Lounsbury No. 4, Romney - 11 - II	GP - NWF	Unknown	SAL	Natural Gas Well	No Well Found		Romney		11	II	533.4 N	182.9 W
F000454	Ed Lounsbury No. 2, Romney 5 - 11 - II	GP - NWF	Unknown	SAL	Natural Gas Well	No Well Found		Romney	5	11	II	533.4 N	152.4 W
F000455	Ed. Lounsbury No. 3, Romney - 11 - II	GP - NWF	Unknown	SAL	Natural Gas Well	No Well Found		Romney		11	II	647.7 N	259.1 W
F000458	Dom. Nat. Gas Co. Records, Romney - 11 - II	DH - UNK	Unknown	SAL	Dry Hole	Unknown		Romney		11	II	548.6 S	182.9 E
F000463	Dom. Natu. Gas Co. Limited, Romney - 11 - II	OSGS - UNK	Unknown	SAL	Oil and Gas Show	Unknown		Romney		11	II	502.9 S	259.1 E
F000465	Imperial Oil No. 185, Romney - 9 - III	OSGS - ABD	Imperial Oil Ltd	SAL	Oil and Gas Show	Abandoned Well	416.66	Romney		9	III	579.1 N	228.6 W
F000467	Dominion Natural Gas Co., Romney 2 - 11 - II	DH - UNK	Unknown	SAL	Dry Hole	Unknown		Romney	2	11	II	228.6 S	228.6 E
F000470	Rich Wright No. 2, Romney 8 - 12 - II	DH - UNK	Unknown	SAL	Dry Hole	Unknown	419.1	Romney	8	12	II	320 N	38 W
F000493	Imperial No.171 (Wheatley No. 2), Romney 3 - 11 - III	OSGS - ABD	Imperial Oil Ltd	SAL	Oil and Gas Show	Abandoned Well	426.72	Romney	3	11	III	582.2 S	22 E
F000502	Peter Heatherington, Romney - 15 - II	DH - UNK	Unknown	SAL	Dry Hole	Unknown		Romney		15	II	76.2 N	320 E
F000506	Imperial No.160 - H.T. Hodgson No.1, Romney - 10 - III	GP - ABD	Imperial Oil Ltd	SAL	Natural Gas Well	Abandoned Well	404.47	Romney		10	III	22 S	22 W
F000520	Dom. Nat. Gas Company Records, Romney 4 - 15 - II	DH - UNK	Unknown	SAL	Dry Hole	Unknown	414.53	Romney	4	15	II	396.2 S	320 E
F000533	Dominion Natural Gas Company No. 222 Romney - G. &	GS - ABD	Dominion Natural Gas Co., Ltd	SAL	Gas Show	Abandoned Well	437.08	Romney	5	202	TRW	396.2 N	137.2 W
F000542	Dom. Nat. Gas Records, Romney 2 - 14 - III	DH - UNK	Unknown	DEV	Dry Hole	Unknown	121.92	Romney	2	14	III	91.44 S	198.1 E
F000660	Imperial No.150 - O. Getty No.1 (Romney No.1), Romney	OSGS - ABD	Imperial Oil Ltd	SAL	Oil and Gas Show	Abandoned Well	438.91	Romney	1	17	IV	251.5 S	21 W
F000669	Oscar Getty, Romney 1 - 17 - IV	DH - UNK	Unknown	SAL	Dry Hole	Unknown	403.86	Romney	1	17	IV	121.9 S	15 W
F000888	Dominion Nat. Gas Co. Records, Romney 8 - 17 - VII	DH - UNK	Unknown	SAL	Dry Hole	Unknown	609.6	Romney	8	17	VII	228.6 N	243.8 W
N000979	J.F.C. Mem 240, Romney - 15 - II	LOC - UNK	Unknown		Location	Unknown		Romney		15	II	X	X
N000993	Alias Getty, Romney - 9 - II	STR - UNK	Unknown	DEV	Stratigraphic Test	Unknown	40.23	Romney		9	II	X	X
N000994	W. Wharram, Romney - 9 - III	STR - UNK	Unknown	DEV	Stratigraphic Test	Unknown	41.15	Romney		9	III	X	X
N000995	Crozier, Romney - 10 - II	STR - UNK	Unknown	DEV	Stratigraphic Test	Unknown	35.05	Romney		10	II	X	X
N000996	J.W. Hodgson, Romney - 10 - II	STR - UNK	Unknown	DEV	Stratigraphic Test	Unknown	42.67	Romney		10	II	X	X
N000997	Whittal, Romney - 10 - II	STR - UNK	Unknown	DEV	Stratigraphic Test	Unknown	40.54	Romney		10	II	X	X
N000998	H.T. Hodgson, Romney - 10 - III	STR - UNK	Unknown	DEV	Stratigraphic Test	Unknown	43.28	Romney		10	III	X	X
N000999	J.W. Hodgson, Romney - 10 - III	STR - UNK	Unknown	DEV	Stratigraphic Test	Unknown	41.45	Romney		10	III	X	X
N001000	Harry Quick, Romney - 10 - IV	STR - UNK	Unknown	DEV	Stratigraphic Test	Unknown	43.59	Romney		10	IV	X	X
N001002	McCracken, Romney - 11 - II	STR - NWF	Unknown	DEV	Stratigraphic Test	No Well Found	50.29	Romney		11	II	X	X
N001003	C.B. Simpson No. 2, Romney - 11 - II	GP - UNK	Unknown	SAL	Natural Gas Well	Unknown		Romney		11	II	624.8 N	167.6 E
N001004	Wm. Lounsbury, Romney - 12 - II	STR - UNK	Unknown	DEV	Stratigraphic Test	Unknown	43.28	Romney		12	II	472.44 N	97.54 W
N001005	Calvin Hyatt, Romney - 12 - III	STR - UNK	Unknown	DEV	Stratigraphic Test	Unknown	48.77	Romney		12	III	X	X
N001006	Oliver Hyatt No. 1, Romney - 12 - IV	STR - UNK	Unknown	DEV	Stratigraphic Test	Unknown	48.77	Romney		12	IV	X	X
N001007	Oliver Hyatt No. 2, Romney - 12 - IV	STR - UNK	Unknown	DEV	Stratigraphic Test	Unknown	48.77	Romney		12	IV	X	X
N001009	Wright, Romney - 13 - II	STR - UNK	Unknown	DEV	Stratigraphic Test	Unknown	48.77	Romney		13	II	X	X
N001010	Charles Hodgson, Romney - 13 - III	STR - UNK	Unknown	DEV	Stratigraphic Test	Unknown	47.55	Romney		13	III	X	X

TABLE 1: WELL LIST in ROMNEY WIND ENERGY CENTER PROJECT

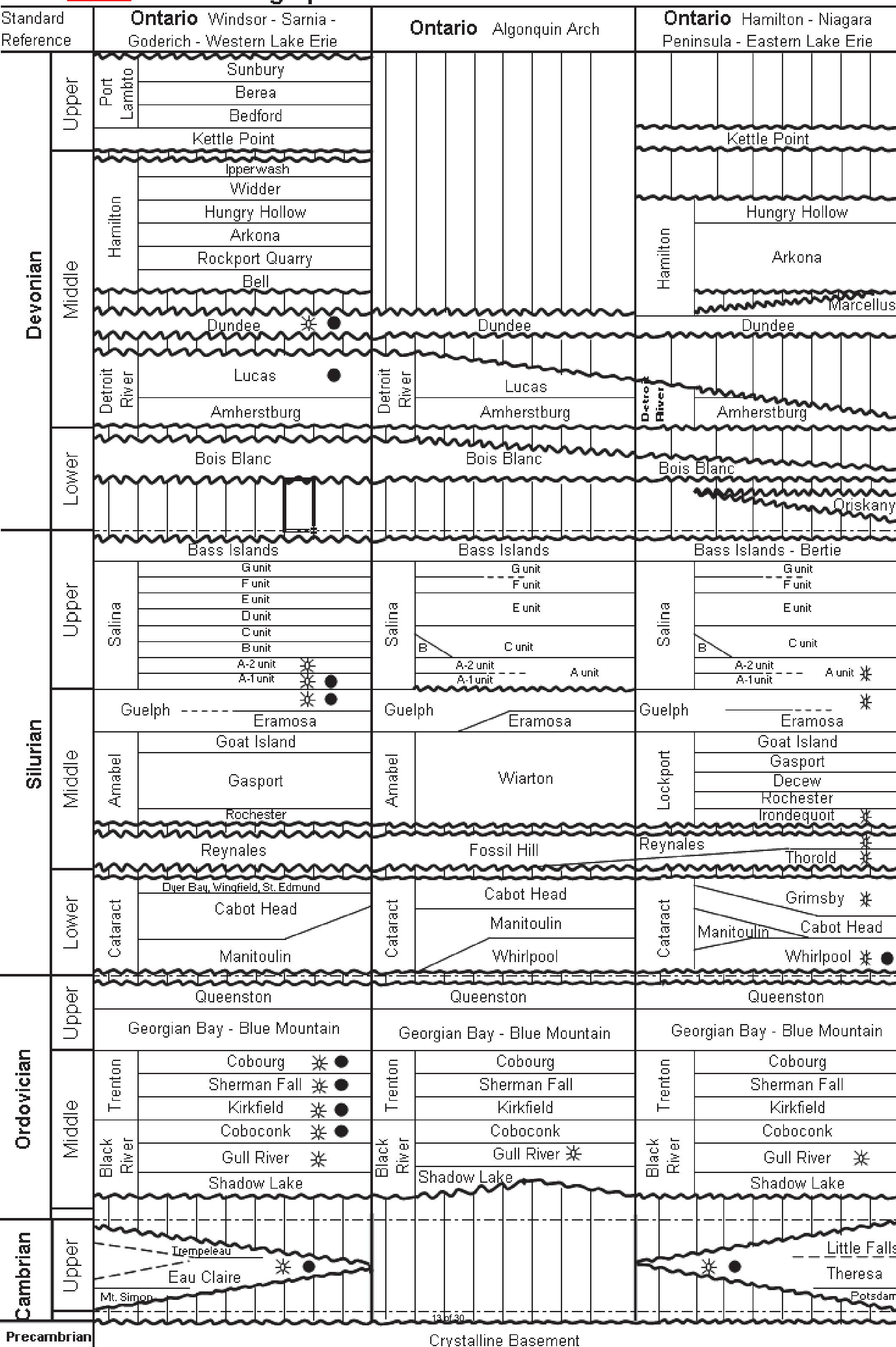
MNRF License Number	FULL WELL NAME	Current Status (see Note 1)	OPERATOR	Geol Zone Targeter	WELL MODE (see Note 2)	WELL TOTAL DEPTH (m)	TOWNSHIP	Tr	Lot	Conc	NS Boundary (see Note 3) (m)	EW Boundary (m)
N001011	Jacob, Romney - 14 - IV	STR - UNK	Unknown	DEV	Stratigraphic Test	Unknown	47.55	Romney	14	IV	X	X
N001012	J.F. Caley, Romney - 14 - V	LOC - UNK	Unknown	DEV	Location	Unknown		Romney	14	V	X	X
N001013	Alvin Hyatt, Romney - 15 - IV	STR - UNK	Unknown	DEV	Stratigraphic Test	Unknown	48.77	Romney	15	IV	X	X
N001014	E. Walker, Romney - 15 - V	STR - UNK	Unknown	DEV	Stratigraphic Test	Unknown	56.39	Romney	15	V	X	X
N001015	John Hyatt, Romney - 15 - VI	STR - UNK	Unknown	DEV	Stratigraphic Test	Unknown	49.68	Romney	15	VI	X	X
N001016	Alvin Thomson, Romney - 16 - III	STR - UNK	Unknown	DEV	Stratigraphic Test	Unknown	42.67	Romney	16	III	X	X
N001018	Getty, Romney - 17 - IV	STR - UNK	Unknown	DEV	Stratigraphic Test	Unknown	38.4	Romney	17	IV	X	X
T000154	Imperial No.696, Romney 3 - 12 - IV	GS - ABD	Imperial Oil Ltd	SAL	Gas Show	Abandoned Well	406.3	Romney	3	12 IV	365.8 S	61 E
T000176	Zenmac - M. Wright No. 1, Romney - 9 - II	DH - ABD	Zenmac Metal Mines Ltd.	SAL	Dry Hole	Abandoned Well	401.12	Romney	9	II	457.2 N	152.4 E
T006583	Cons et al 33849, Romney 1 - 15 - IV	DH - ABD	Talisman Energy Inc.	SAL	Dry Hole	Abandoned Well	487	Romney	1	15 IV	106.7 S	195.1 W
T007155	Cons et al 34281, Romney 6 - 13 - III	OP - SUS	Dundee Oil and Gas Limited	ORD	Oil Well	Suspended Well	1105	Romney	6	13 III	563 N	195 E
T007203	Cons et al 34340, Romney 7 - 10 - II	OP - ACT	Dundee Oil and Gas Limited	ORD	Oil Well	Active Well	1106	Romney	7	10 II	107 N	120 E
T007261	Cons et al 34344, Romney 3 - 14 - II	OP - ACT	Dundee Oil and Gas Limited	ORD	Oil Well	Active Well	1071	Romney	3	14 II	655 S	180 E
T007274	Cons et al 34345, Romney 8 - 13 - III	OP - ACT	Dundee Oil and Gas Limited	ORD	Oil Well	Active Well	938	Romney	8	13 III	134.9 N	169.5 W
T007315	Cons et al 34347, Romney 6 - 13 - IV	OP - ABD	Talisman Energy Inc.	ORD	Oil Well	Abandoned Well	851	Romney	6	13 IV	350.5 N	107 E
T007322	Cons et al 34346, Romney 1 - 12 - III	OP - ABD	Dundee Oil and Gas Limited	ORD	Oil Well	Abandoned Well	1101	Romney	1	12 III	177 S	299 W
T007371	Farmers No. 1, Romney 7 - 9 - II	OPGS - SUS	Farmer's Oil & Gas Inc.	ORD	Oil Well Gas Show	Suspended Well	843.7	Romney	7	9 II	311.5 N	132.2 E
T007390	Cons et al 34350, Romney 1 - 13 - II	OP - SUS	Dundee Oil and Gas Limited	ORD	Oil Well	Suspended Well	940	Romney	1	13 II	228.6 S	3.2 W
T007398	Cons et al 34348, Romney 5 - 14 - II	OSGS - ABD	Talisman Energy Inc.	ORD	Oil and Gas Show	Abandoned Well	1016	Romney	5	14 II	450 N	108 W
T007399	Cons et al 34349, Romney 3 - 13 - III	OP - ABD	Talisman Energy Inc.	ORD	Oil Well	Abandoned Well	938	Romney	3	13 III	448.5 S	49.2 E
T007410	Cons et al 34351, Romney 8 - 13 - IV	OP - ABD	Talisman Energy Inc.	ORD	Oil Well	Abandoned Well	1110	Romney	8	13 IV	107 N	176.7 W
T007421	Cons et al 34352, Romney 2 - 15 - III	BD - ACT	Dundee Oil and Gas Limited	ORD	Disposal Well	Active Well	1111	Romney	2	15 III	218 S	107 E
T007453	Telesis et al 34353, Romney 5 - 12 - IV	OP - ACT	Dundee Oil and Gas Limited	ORD	Oil Well	Active Well	1093.8	Romney	5	12 IV	614 N	190.1 W
T007477	Telesis et al 34513, Romney 7 - 12 - IV	OP - ABD	Dundee Oil and Gas Limited	ORD	Oil Well	Abandoned Well	1106	Romney	7	12 IV	283 N	163.4 E
T007478	Farmers No. 8, Romney 1 - 14 - III	OPGS - SUS	Farmer's Oil & Gas Inc.	ORD	Oil Well Gas Show	Suspended Well	847.5	Romney	1	14 III	156.1 S	110.7 W
T007481	Telesis et al 34336, Romney 4 - 15 - III	OP - ABD	Talisman Energy Inc.	ORD	Oil Well	Abandoned Well	967	Romney	4	15 III	600.5 S	112.6 W
T007493	Telesis et al 34354, Romney 2 - 14 - III	OP - ABD	Talisman Energy Inc.	ORD	Oil Well	Abandoned Well	942	Romney	2	14 III	228 S	132.6 E
T007520	Telesis et al 34337, Romney 6 - 16 - III	OP - ABD	Talisman Energy Inc.	ORD	Oil Well	Abandoned Well	901	Romney	6	16 III	460.8 N	165 E
T007524	Farmers No. 2, Romney 8 - 9 - II	OPGS - SUS	Farmer's Oil & Gas Inc.	ORD	Oil Well Gas Show	Suspended Well	824.8	Romney	8	9 II	118.1 N	126.8 W
T007632	Telesis et al 34517, Romney 3 - 12 - IV	OSGS - ABD	Talisman Energy Inc.	ORD	Oil and Gas Show	Abandoned Well	936	Romney	3	12 IV	663.9 S	110.4 E
T007950	Telesis et al 34516, Romney 3 - 12 - IV	BD - ACT	Dundee Oil and Gas Limited	ORD	Disposal Well	Active Well	1043	Romney	3	12 IV	461.2 S	108.7 E
T008224	Pembina et al (Horiz.#1), Romney 3 - 11 - IV	OP - ACT	Dundee Oil and Gas Limited	ORD	Oil Well	Active Well	858	Romney	3	11 IV	355.4 S	148 E
T008321	Pembina et al (Horiz. #1), Romney 5 - 11 - IV	OP - ABD	Talisman Energy Inc.	ORD	Oil Well	Abandoned Well	1344	Romney	5	11 IV	479.8 N	178.3 W
T008450	Pembina et al, Romney 2 - 13 - III	OP - ABW	Talisman Energy Inc.	ORD	Oil Well	Plugged back and v	836	Romney	2	13 III	140.4 S	151.4 E
T008486	Farmers No. 7, Romney 4 - 9 - II	OPGS - SUS	Farmer's Oil & Gas Inc.	ORD	Oil Well Gas Show	Suspended Well	848	Romney	4	9 II	717.65 N	110.1 W
T008579	Pembina et al(Horiz.#1), Romney 2 - 13 - III	OP - ABDch	Talisman Energy Inc.	ORD	Oil Well	Abandoned Well	1100	Romney	2	13 III	140.4 S	151.4 E

TABLE 1: WELL LIST in ROMNEY WIND ENERGY CENTER PROJECT

MNRF License Number	FULL WELL NAME	Current Status (see Note 1)	OPERATOR	Geol Zone Targeter	WELL_ZONE	WELL_TYPE	WELL MODE (see Note 2)	WELL TOTAL DEPTH (m)	TOWNSHIP Tr Lot Conc	NS Boundary (see Note 3) (m)	EW Boundary (m)
T008663	Talisman (Horiz.#1), Romney 8 - 16 - III	OP - ACT	Dundee Oil and Gas Limited	ORD	Oil Well	Active Well	1266	Romney 8 16 III	49.85 N	111.4 W	
T009407	Talisman (Horiz.#1), Romney 6 - 15 - II	OP - ACT	Dundee Oil and Gas Limited	ORD	Oil Well	Active Well	1962.4	Romney 6 15 II	630.2 N	130.3 E	
T009464	Talisman (Horiz.#1), Romney 2 - 13 - II	OP - ACT	Dundee Oil and Gas Limited	ORD	Oil Well	Active Well	1855.5	Romney 2 13 II	237.2 S	50 E	
T009533	Talisman (Horiz.#1), Romney 5 - 203 - TRW	OP - ABW	Dundee Oil and Gas Limited	ORD	Oil Well	Plugged back and v	3133	Romney 5 203 TRW	1103.3 S	77.13 E	
T009874	Talisman No.2 (Horiz.#1), Romney 5 - 203 - TRW	OP - ACT	Dundee Oil and Gas Limited	ORD	Oil Well	Active Well	3298	Romney 5 203 TRW	1203.3 S	77.13 E	
T009934	Talisman (Horiz.#1, Lat.#1), Romney 5 - 203 - TRW	OP - ACTch	Dundee Oil and Gas Limited	ORD	Oil Well	Active Well	3903	Romney 5 203 TRW	1103.3 S	77.13 E	
T009935	Talisman No. 2(Horiz.#1, Lat.#1), Romney 5 - 203 - TRW	OP - ACTch	Dundee Oil and Gas Limited	ORD	Oil Well	Active Well	3445	Romney 5 203 TRW	1203.3 S	77.13 E	
T010033	Talisman No. 1 (Horiz.#1), Romney 7 - 16 - II	OP - ACT	Dundee Oil and Gas Limited	ORD	Oil Well	Active Well	2108	Romney 7 16 II	53.75 N	55 E	
T010403	Talisman (Horiz.#1, Lat.#1,Lat.#1), Romney 5 - 203 - TRW	OP - ACTch	Dundee Oil and Gas Limited	ORD	Oil Well	Active Well	4082	Romney 5 203 TRW	1103.3 S	77.13 E	
T010491	TLM No.1(Horiz.#1), Romney 1 - 14 - II	OP - ACT	Dundee Oil and Gas Limited	ORD	Oil Well	Active Well	2422	Romney 1 14 II	225 S	160.7 W	
T010526	TLM No. 2 (Horiz.#1), Romney 7 - 16 - II	OP - ACT	Dundee Oil and Gas Limited	ORD	Oil Well	Active Well	2441	Romney 7 16 II	61.2 N	125.3 E	
T012076	C.B. Simpson No. 1, Romney 5 - 11 - II	GP - ABD	Taves, Ernie	SAL	Natural Gas Well	Abandoned Well		Romney 5 11 II	378 N	167.4 W	

- Note 1: OP: Oil Producer, GP: Gas Producer, OPGP: Oil and Gas Producer, INJ: Injection Well, BD: Brine Disposal, STR: Stratigraphic Test Well, DH: Dry Hole, OS: Oil Show, GS: Gas Show, OSGS: Oil and Gas Show
- Note 2: ACT: Active Well, SUS: Suspended Well, ABD: Abandoned Well, ABW: Abandoned and Whipstocked Well, CAP: Capped Well, POT: Potential Well, LOS: Abandoned and Junked Well, NDR: Not Drilled  
UNK: Well Status Unknown, NWF: No Well Found
- Note 3: List of the distance in meters from the nearest lot/concession boundary. For example, a well listed as 140.4m S, 151.4mE is 140.4m south of the NW corner of the lot, then 140.4m east

**Figure 1: Rock - Stratigraphic Succession Toronto - Windsor Area**



x

**Figure 2: Cambrian Traps and Play Concept**

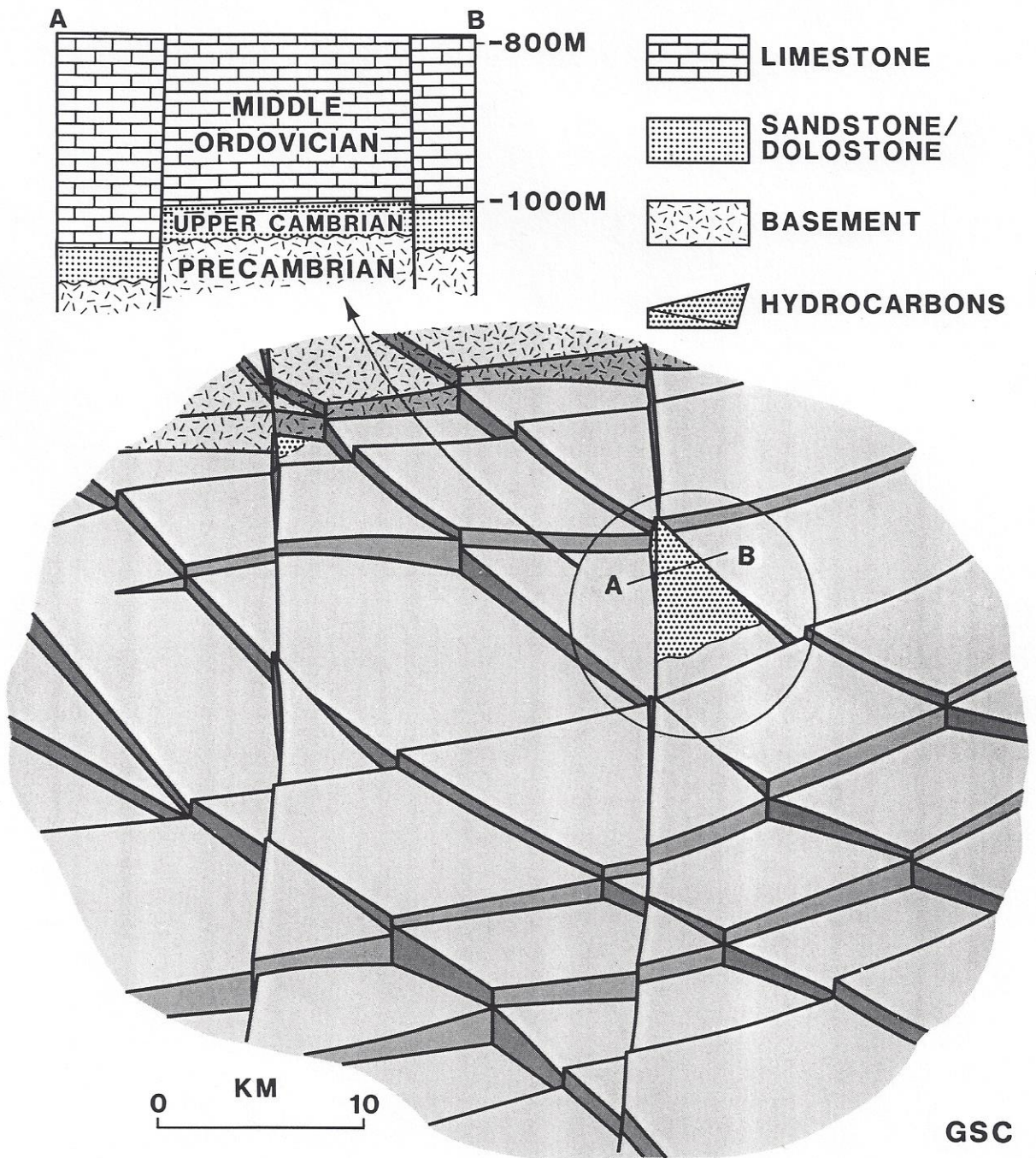


Figure 3: Ordovician Trenton/Black River Play Concept

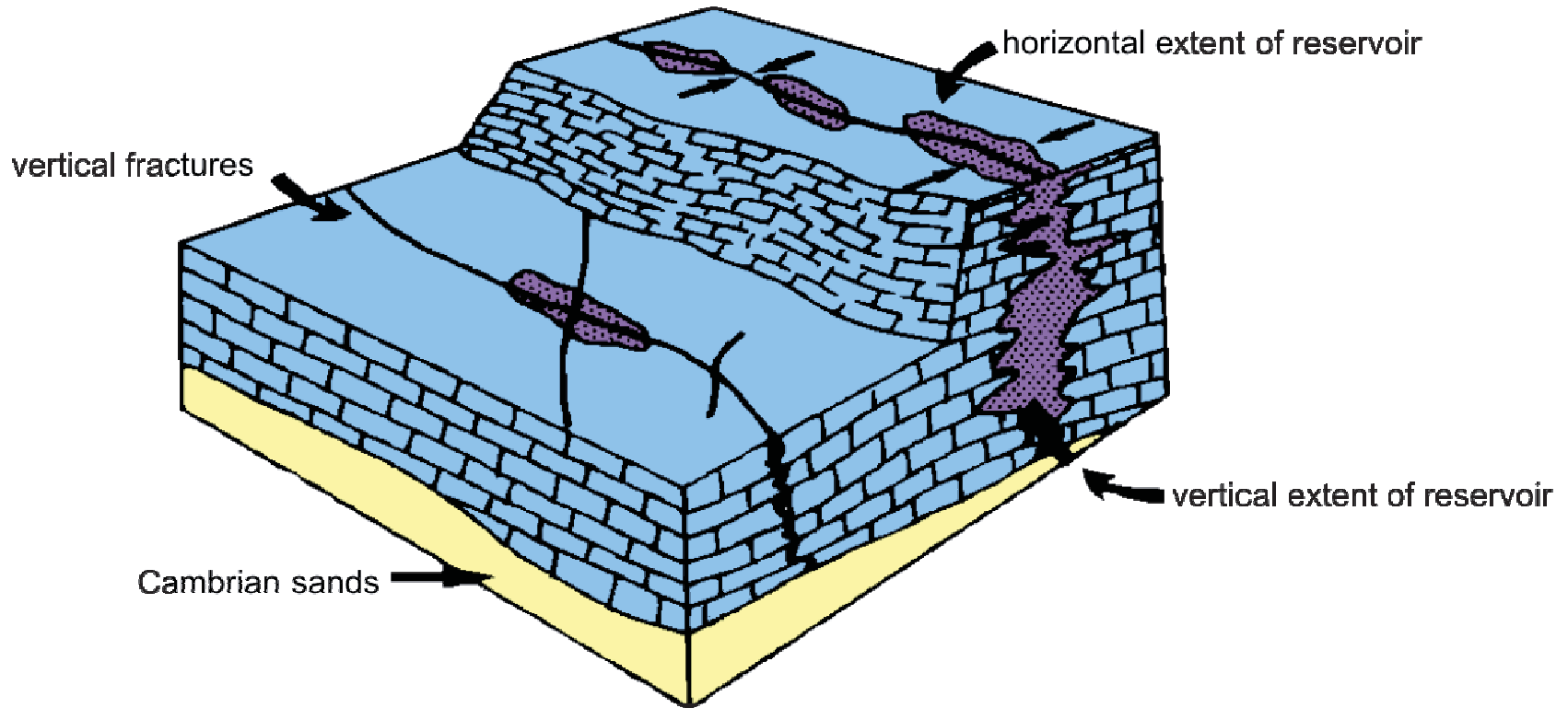


Figure 9. Conceptual 3-D block diagram showing spatial distribution of Trenton-Black River dolomitized reservoir (modified from Ludvigson et al, 1983).

Figure 4: Silurian Guelph, A-1 Unit and A-2 Unit Play Concept

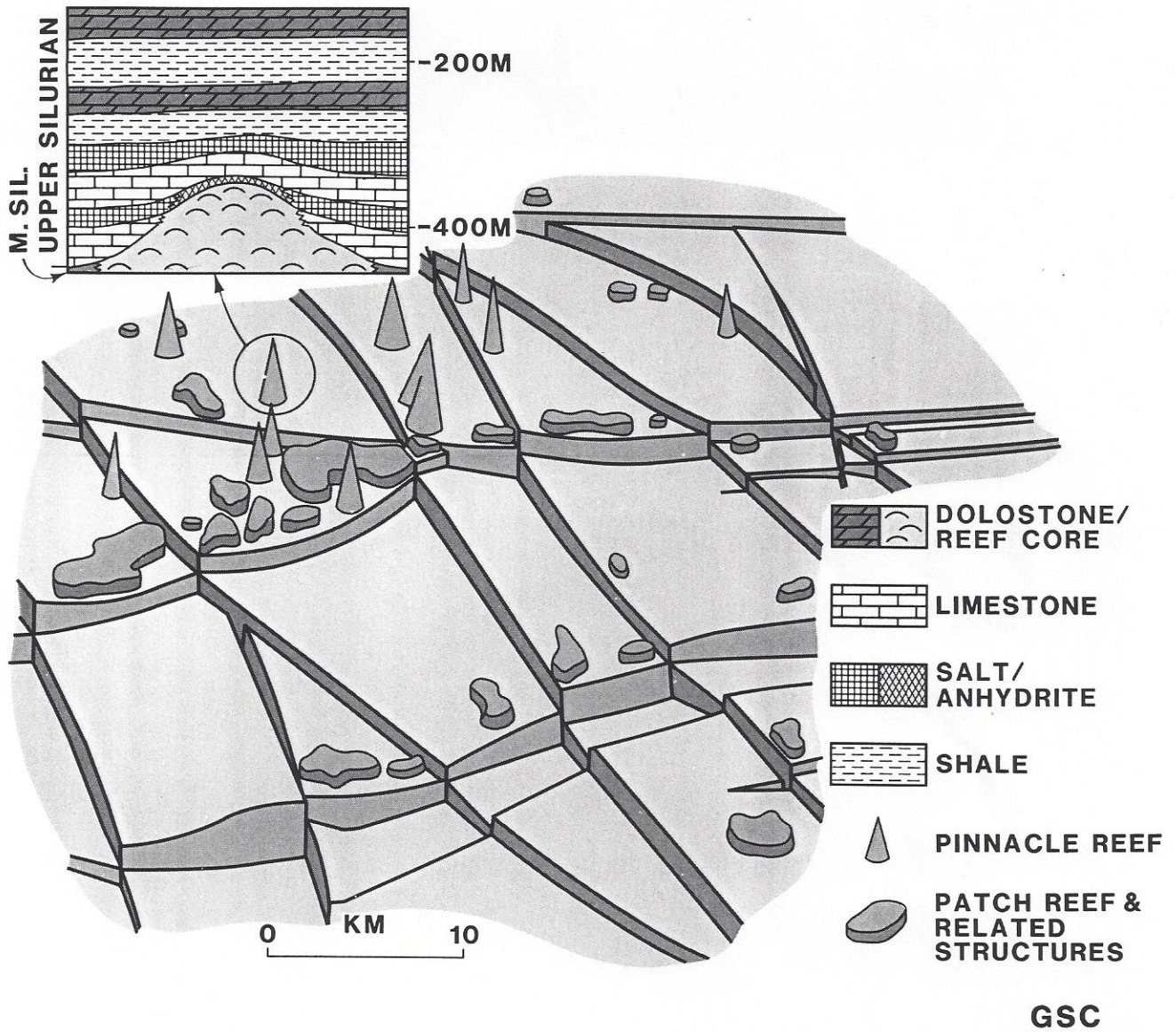




Figure 5: Seismic Coverage in Mersea Area

## Oil, Gas & Salt Resources Library

Petroleum Well, Petroleum Pool, Seismic and Fault Map of Ontario - [Well Location Map](#)

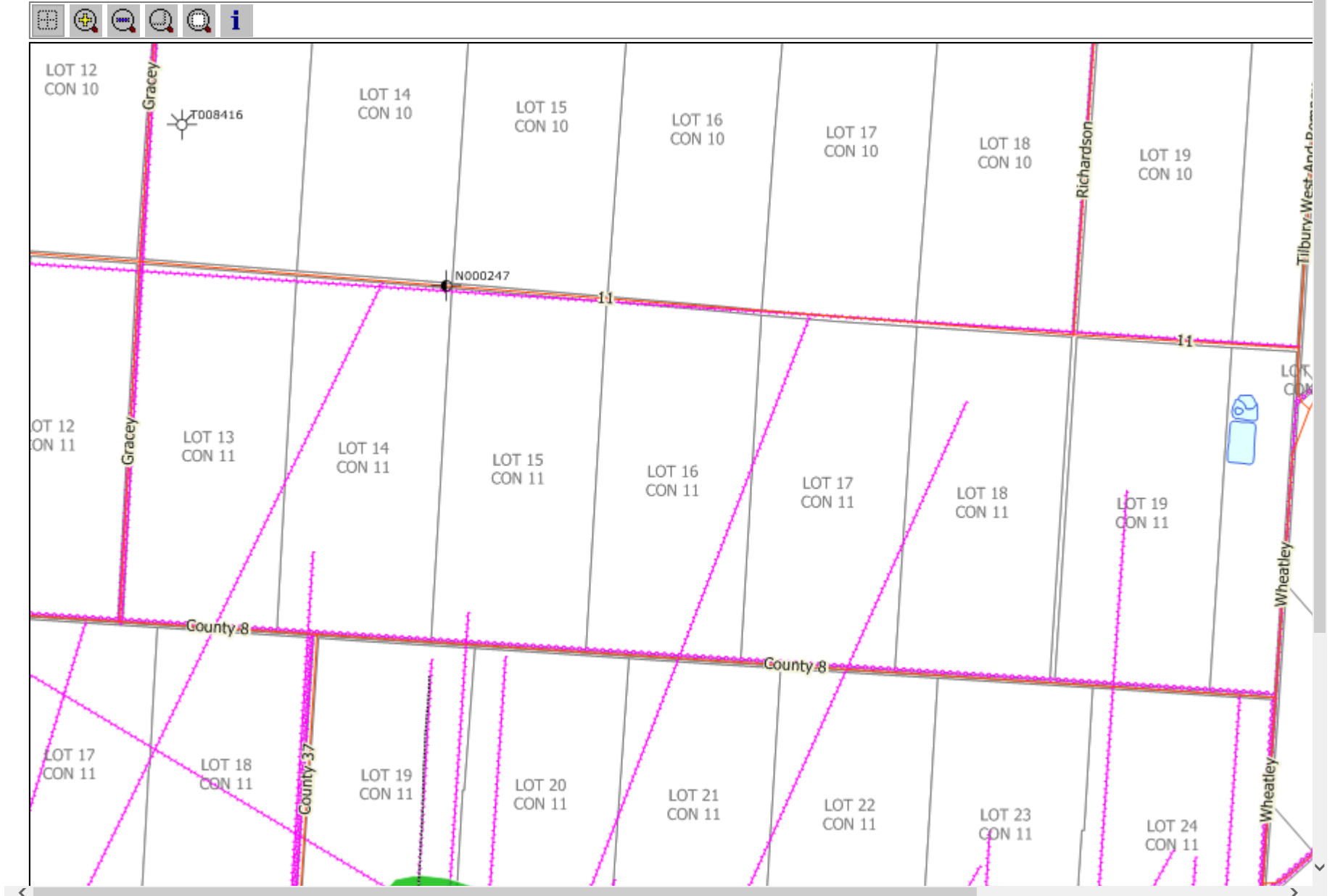


Figure 6: Seismic Coverage in North Romney Area

## Oil, Gas & Salt Resources Library

Petroleum Well, Petroleum Pool, Seismic and Fault Map of Ontario - [Well Location Map](#)

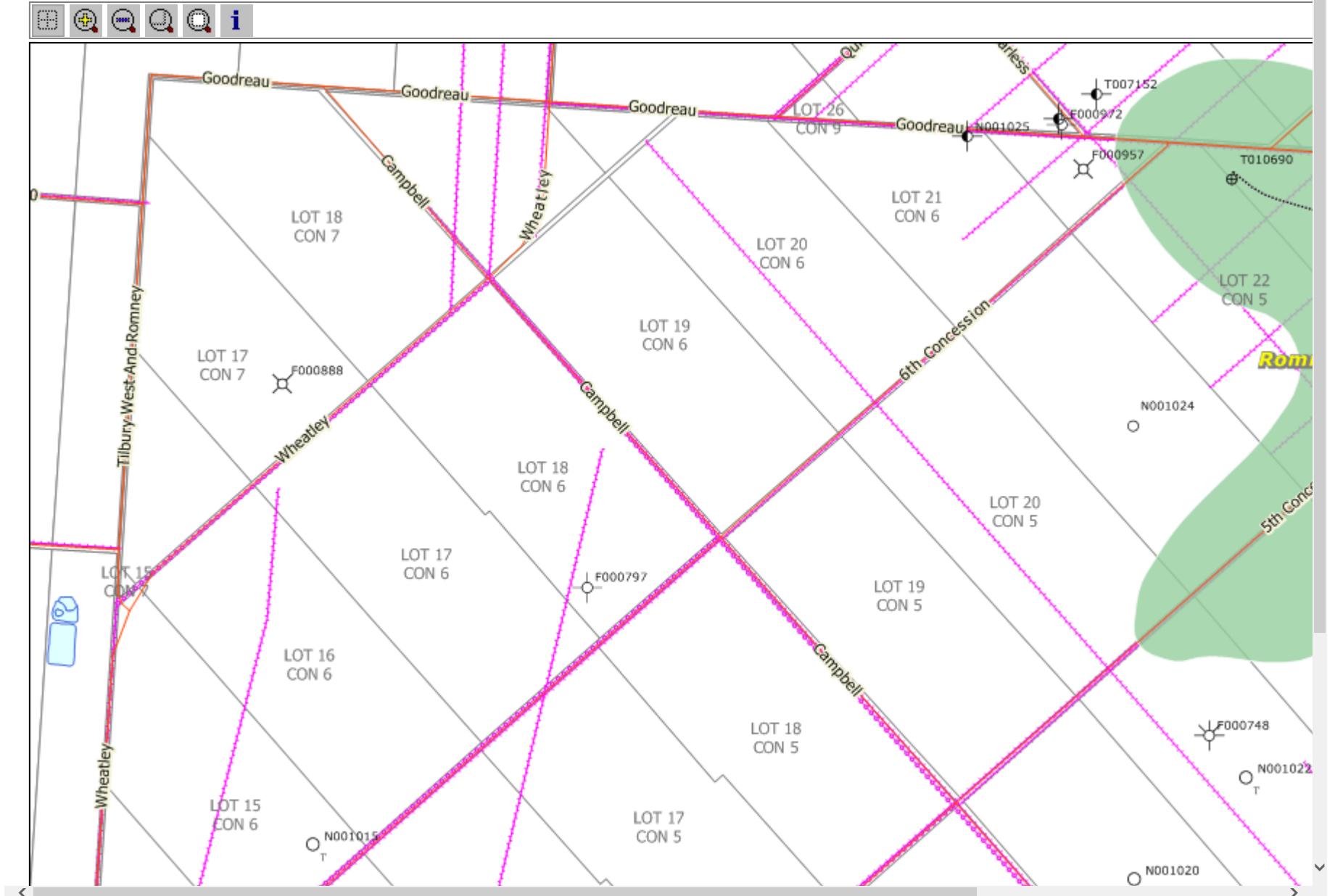


Figure 7: Seismic Coverage and Field Boundaries in North-Central Romney Area

## Oil, Gas & Salt Resources Library

Petroleum Well, Petroleum Pool, Seismic and Fault Map of Ontario - [Well Location Map](#)

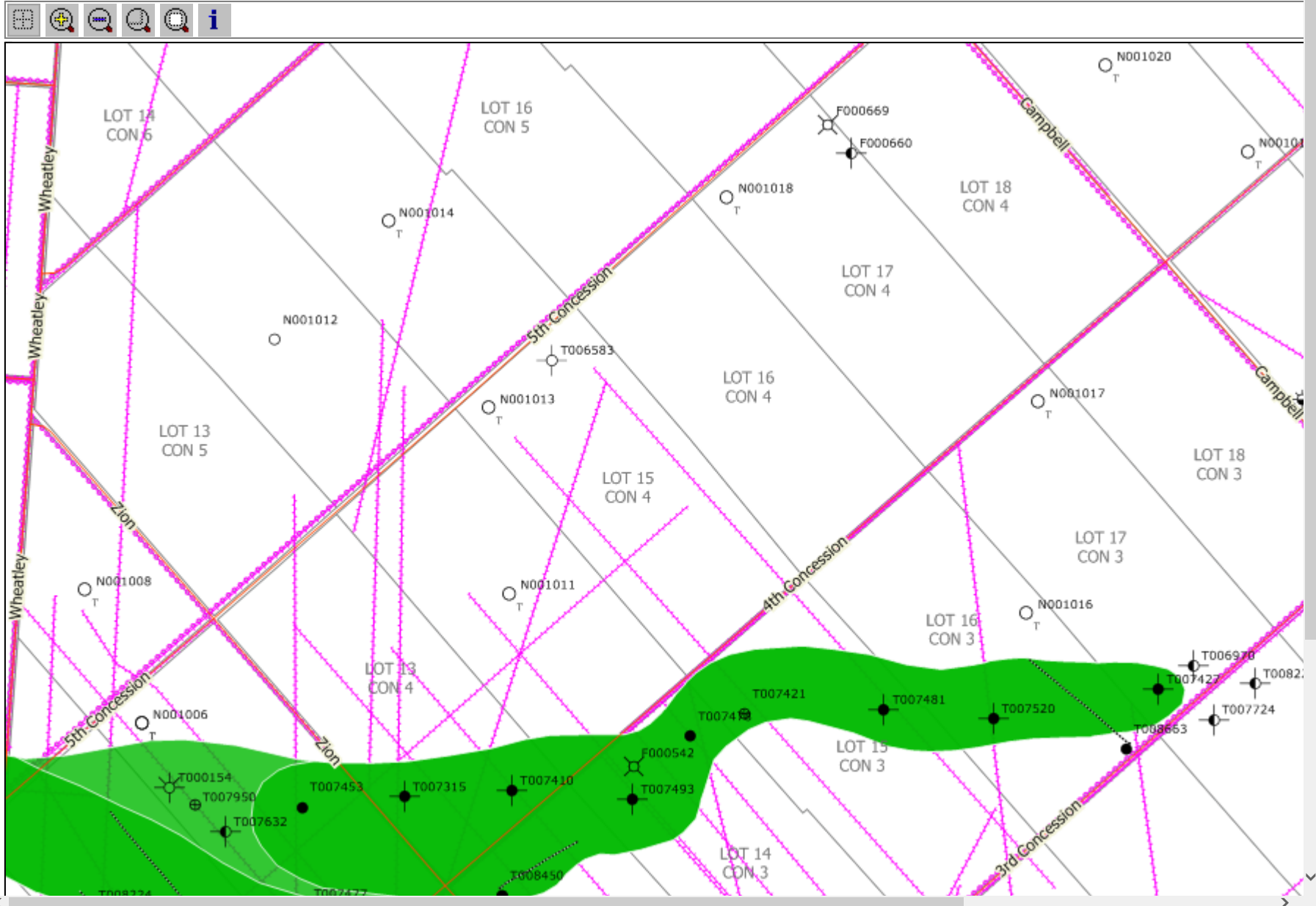


Figure 8: Seismic Coverage and Field Boundaries in South-Central Romney Area

# Oil, Gas & Salt Resources Library

Petroleum Well, Petroleum Pool, Seismic and Fault Map of Ontario - [Well Location Map](#)

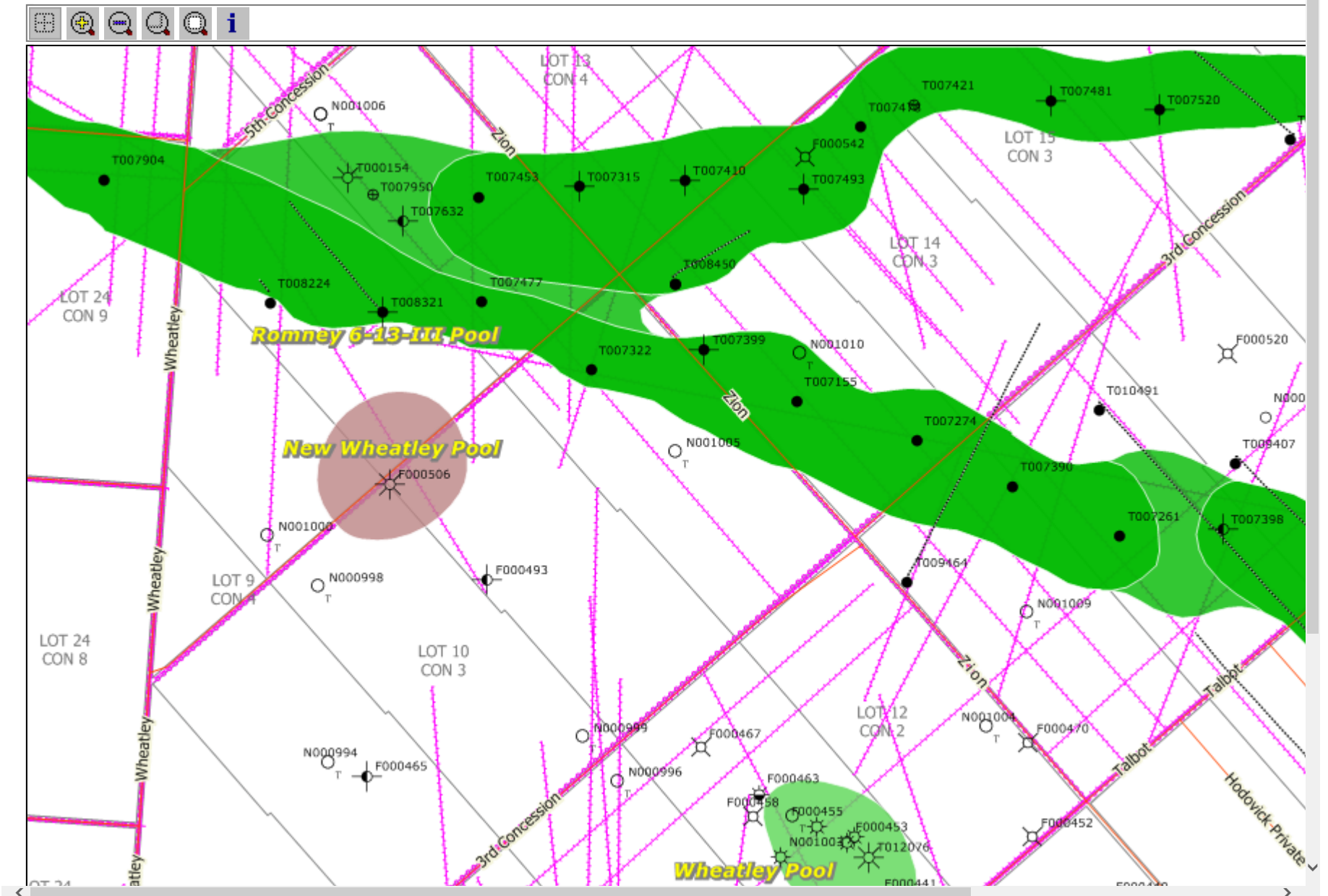


Figure 9: Seismic Coverage and Field Boundaries in South Romney Area

### Oil, Gas & Salt Resources Library

Petroleum Well, Petroleum Pool, Seismic and Fault Map of Ontario - [Well Location Map](#)

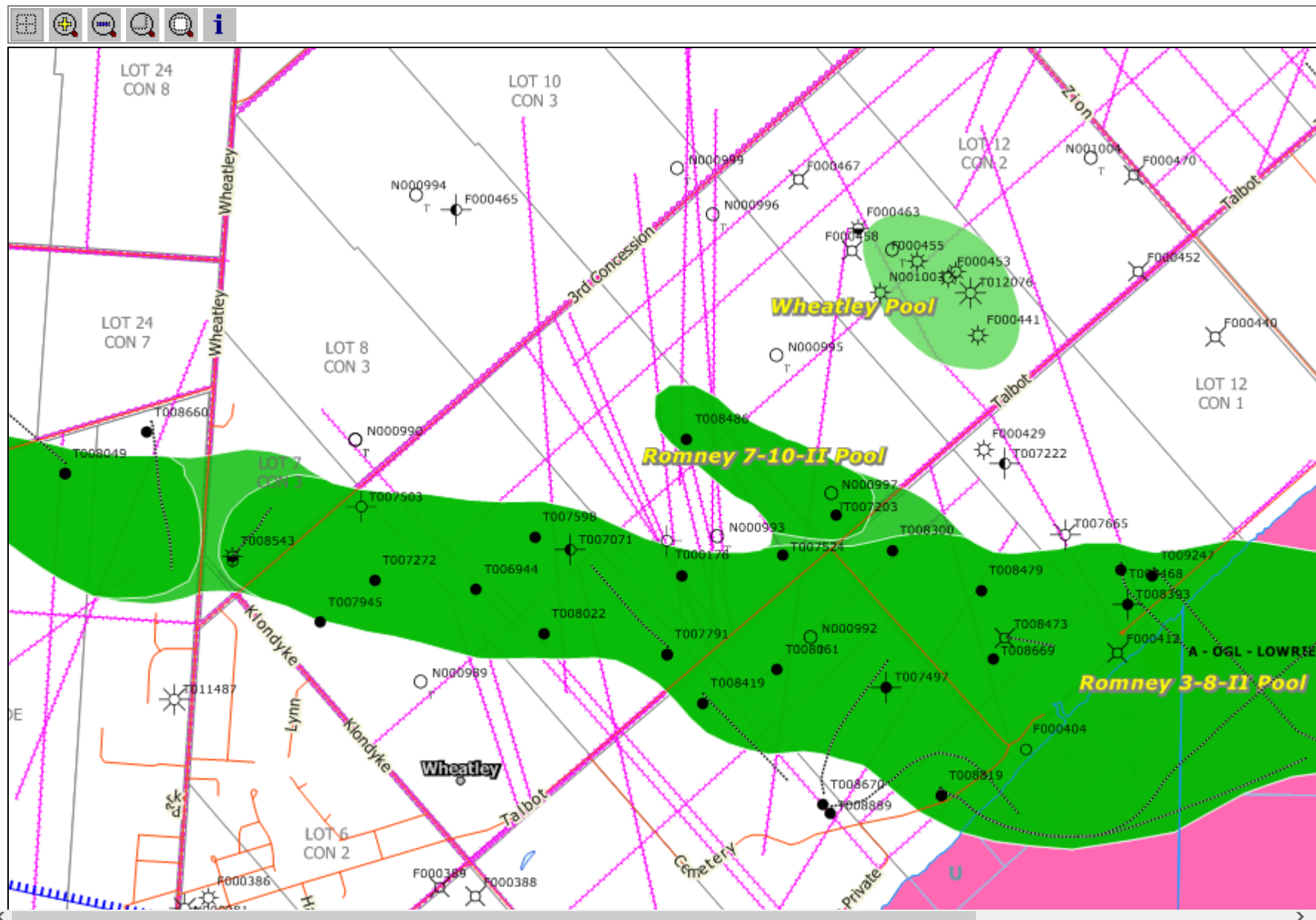


Figure 10: Seismic Coverage and Field Boundaries in East Romney Area

### Oil, Gas & Salt Resources Library

Petroleum Well, Petroleum Pool, Seismic and Fault Map of Ontario - [Well Location Map](#)

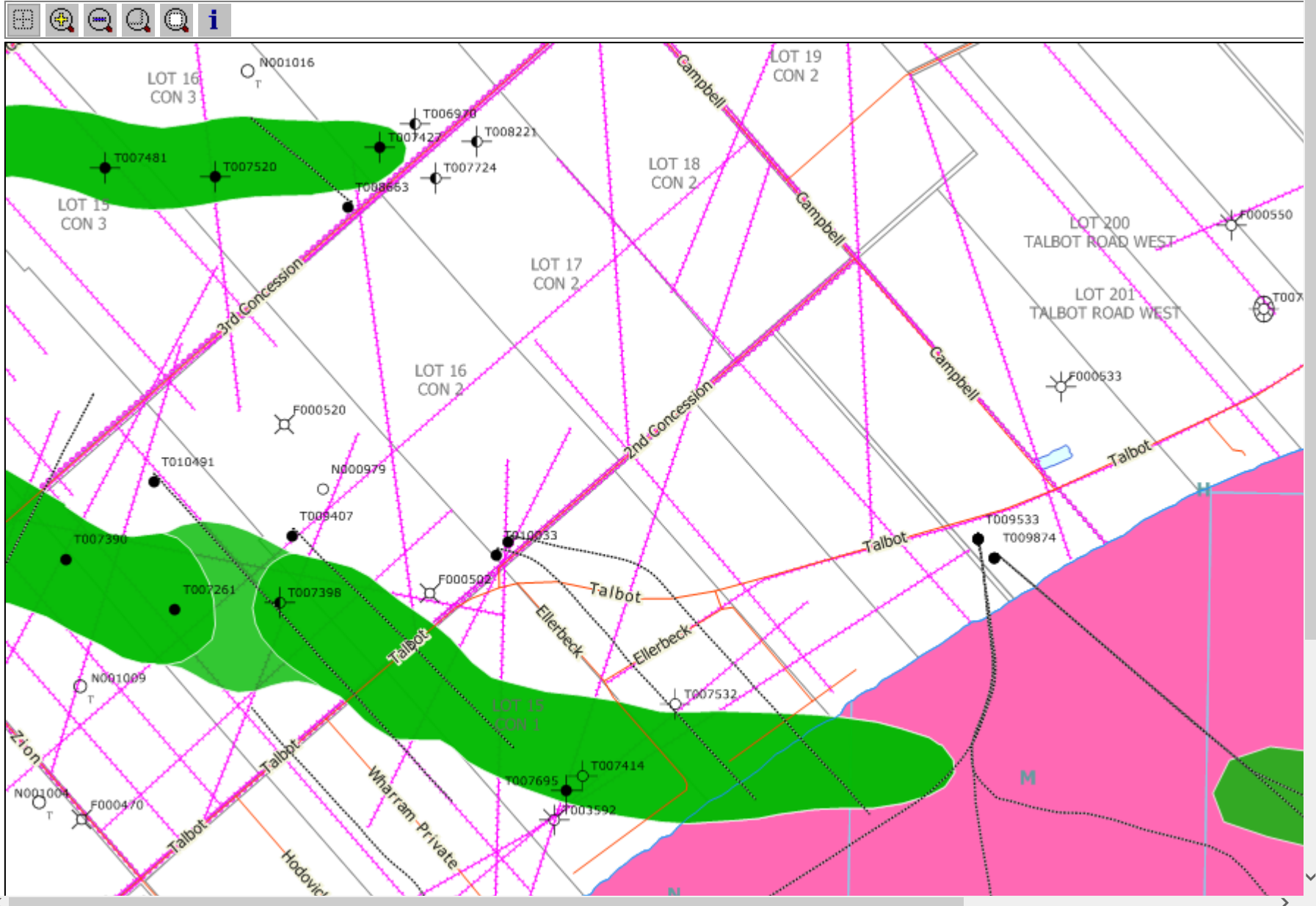
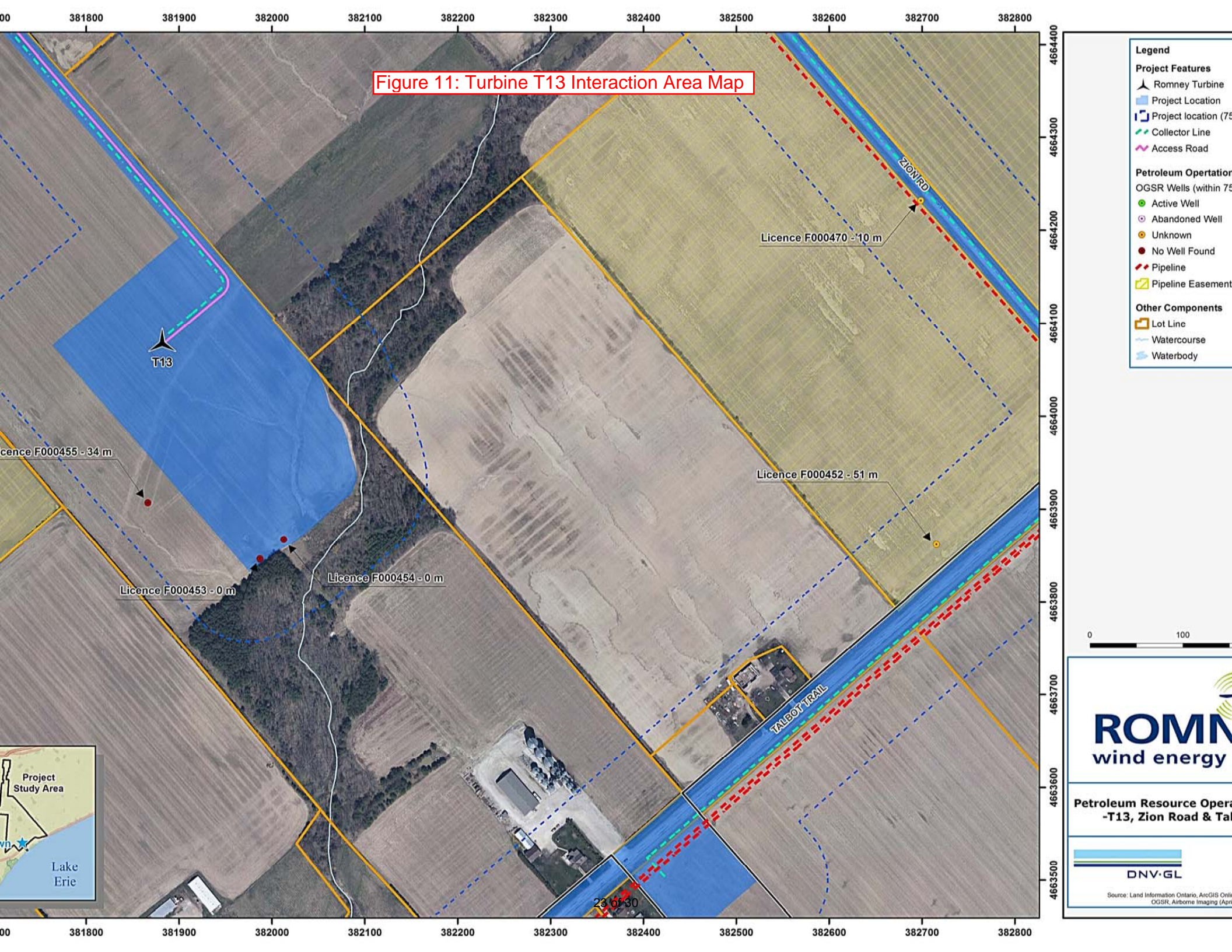


Figure 11: Turbine T13 Interaction Area Map



- Legend**
- Project Features**
- Romney Turbine
  - Project Location
  - Project location (75
  - Collector Line
  - Access Road
- Petroleum Operations**
- OGSR Wells (within 75
- Active Well
  - Abandoned Well
  - Unknown
  - No Well Found
  - Pipeline
  - Pipeline Easement
- Other Components**
- Lot Line
  - Watercourse
  - Waterbody

0 100

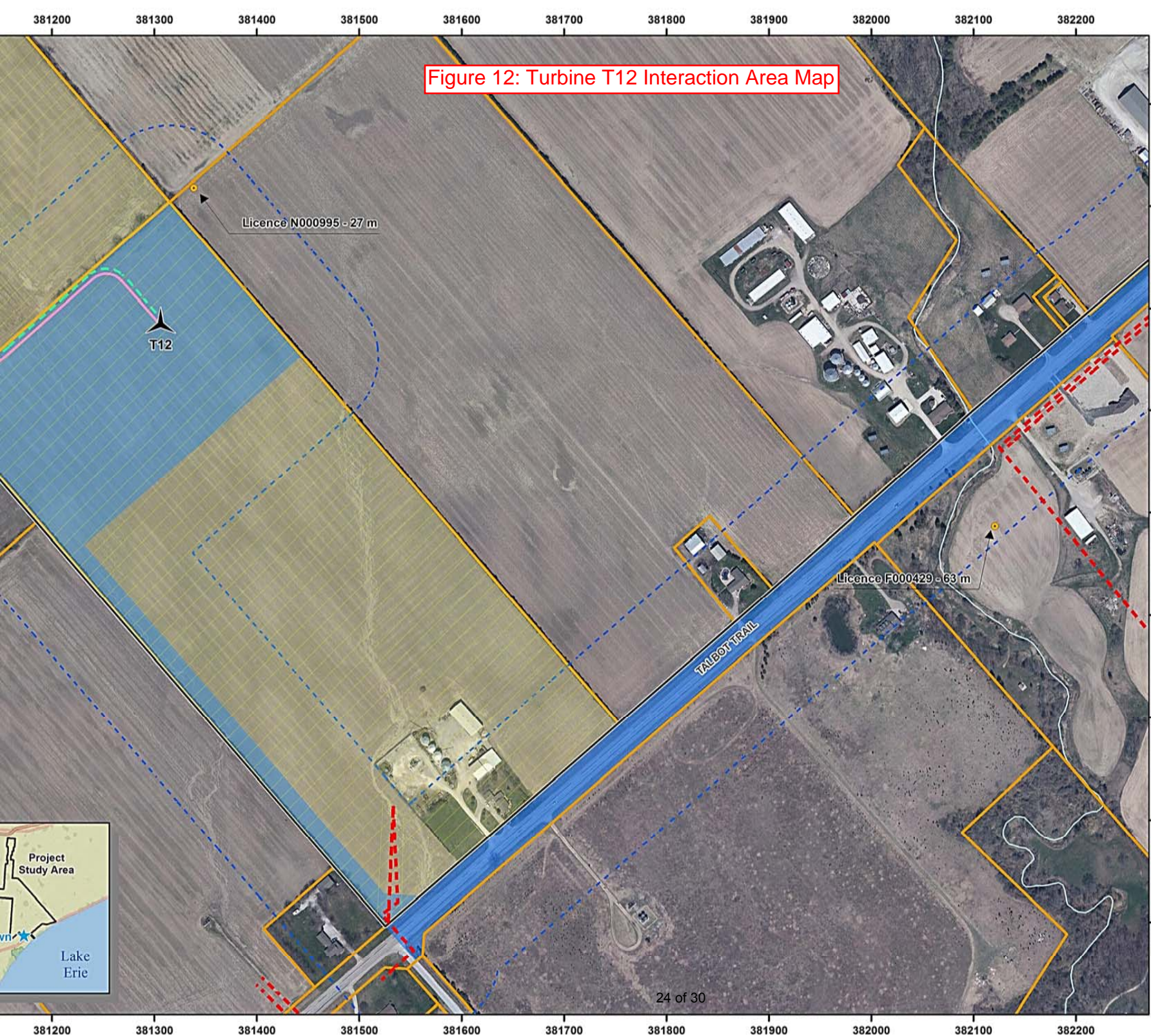


Petroleum Resource Oper  
-T13, Zion Road & Tal

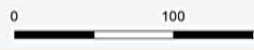


Source: Land Information Ontario, ArcGIS Online, OGSR, Airborne Imaging (Apr

Figure 12: Turbine T12 Interaction Area Map



- Legend**
- Project Features**
- ▲ Romney Turbine
  - ▲ Meteorological Mast
  - Project Location
  - Project location (75m)
  - Collector Line
  - Access Road
- Petroleum Operations**
- OGSR Wells (within 75m)
- Active Well
  - Abandoned Well
  - Unknown
  - No Well Found
  - ◆ Pipeline
  - ▭ Pipeline Easement
- Other Components**
- ▭ Lot Line
  - Watercourse
  - Waterbody



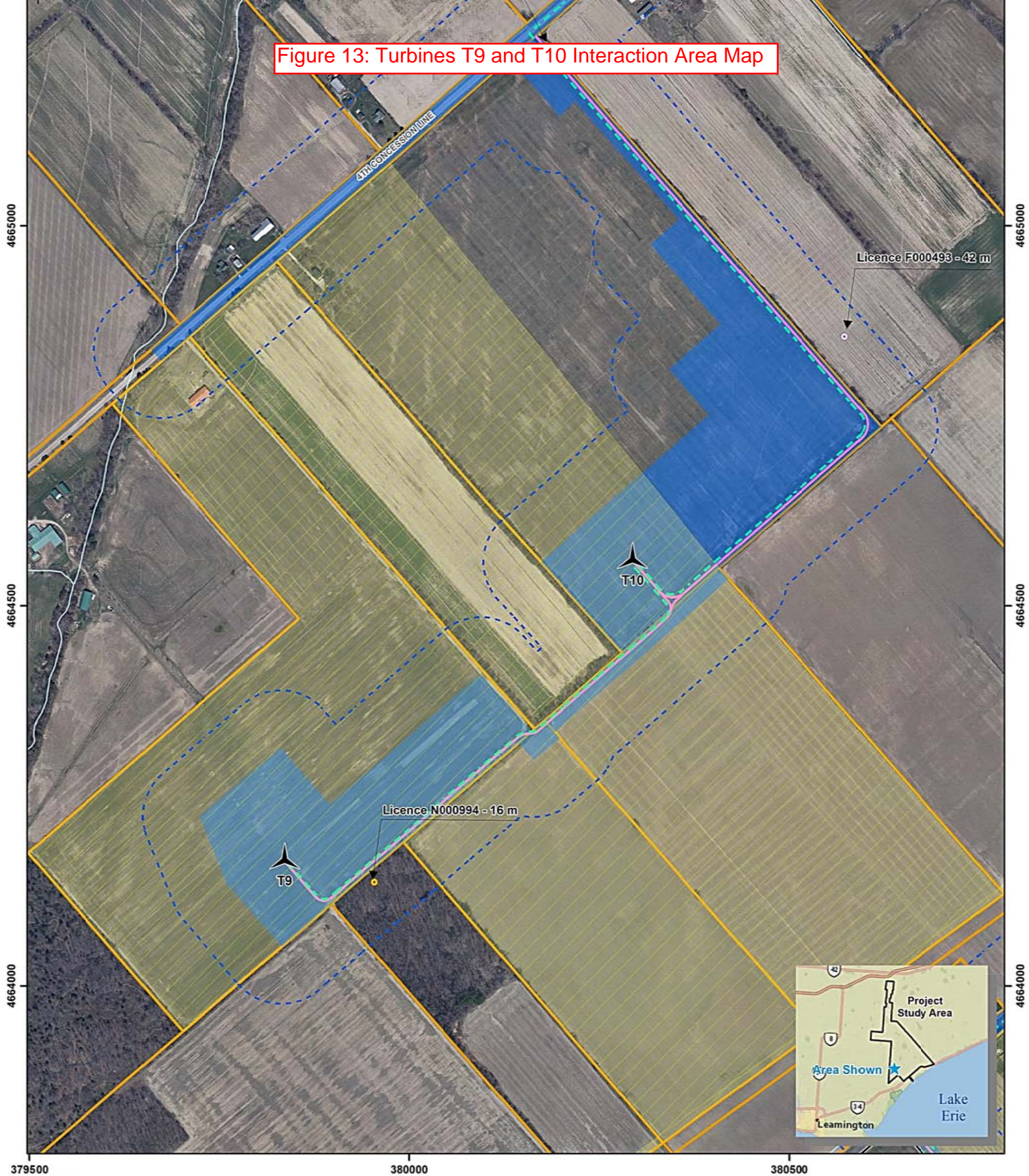
Petroleum Resource Operations  
-T12 & Talbot Trail



Source: Land Information Ontario, ArcGIS Online, OGS, Airborne Imaging (April 2018)



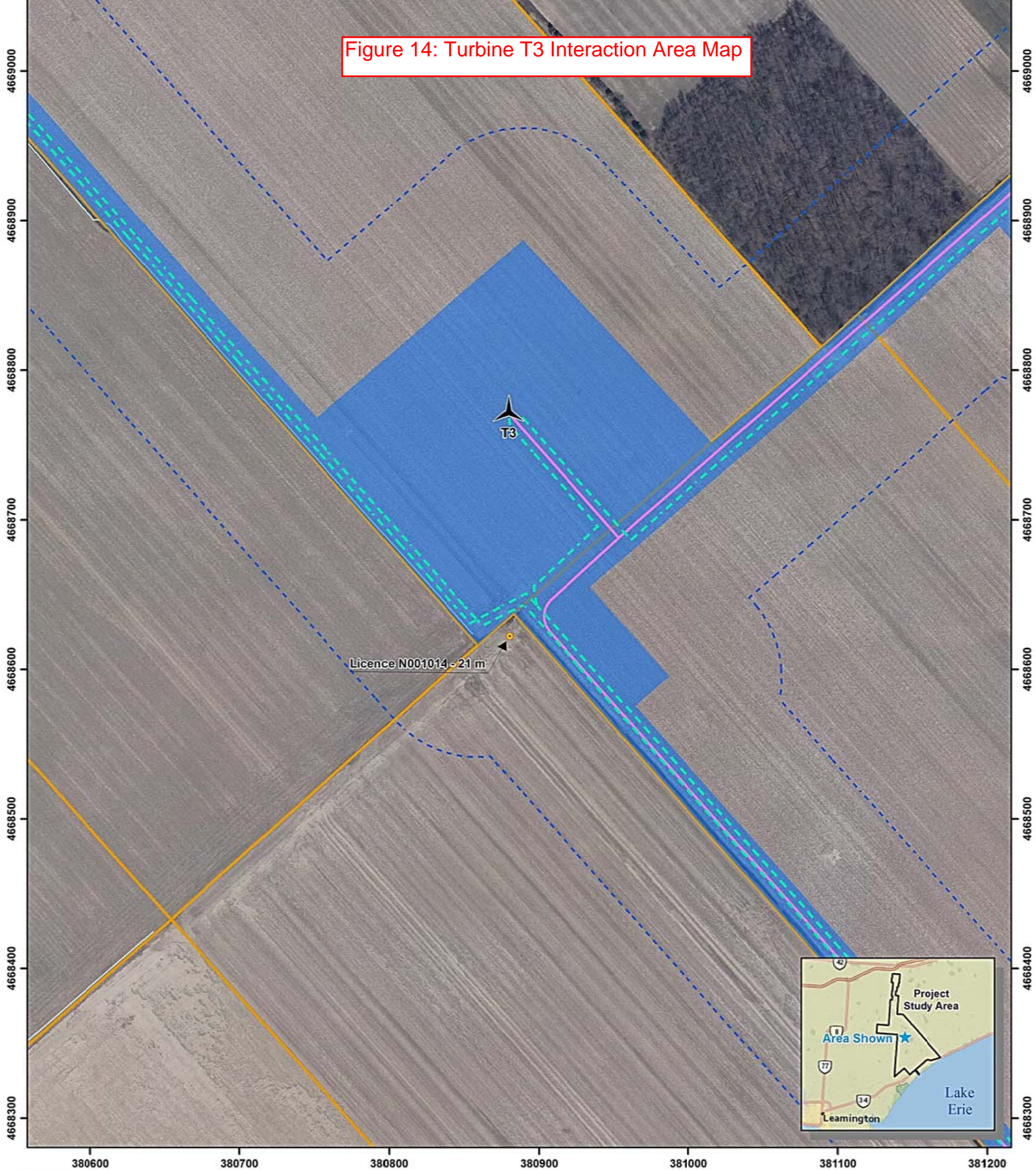
Figure 13: Turbines T9 and T10 Interaction Area Map



Project Features	Petroleum Operations	Other Components
Romney Turbine	OGSR Wells (within 75 m)	Lot Line
Project Location	Active Well	Watercourse
Project location (75m)	Abandoned Well	Waterbody
Collector Line	Unknown	
Access Road	No Well Found	
	Pipeline	
	Pipeline Easement	

**Petroleum Resource Operations Setback**

Figure 14: Turbine T3 Interaction Area Map

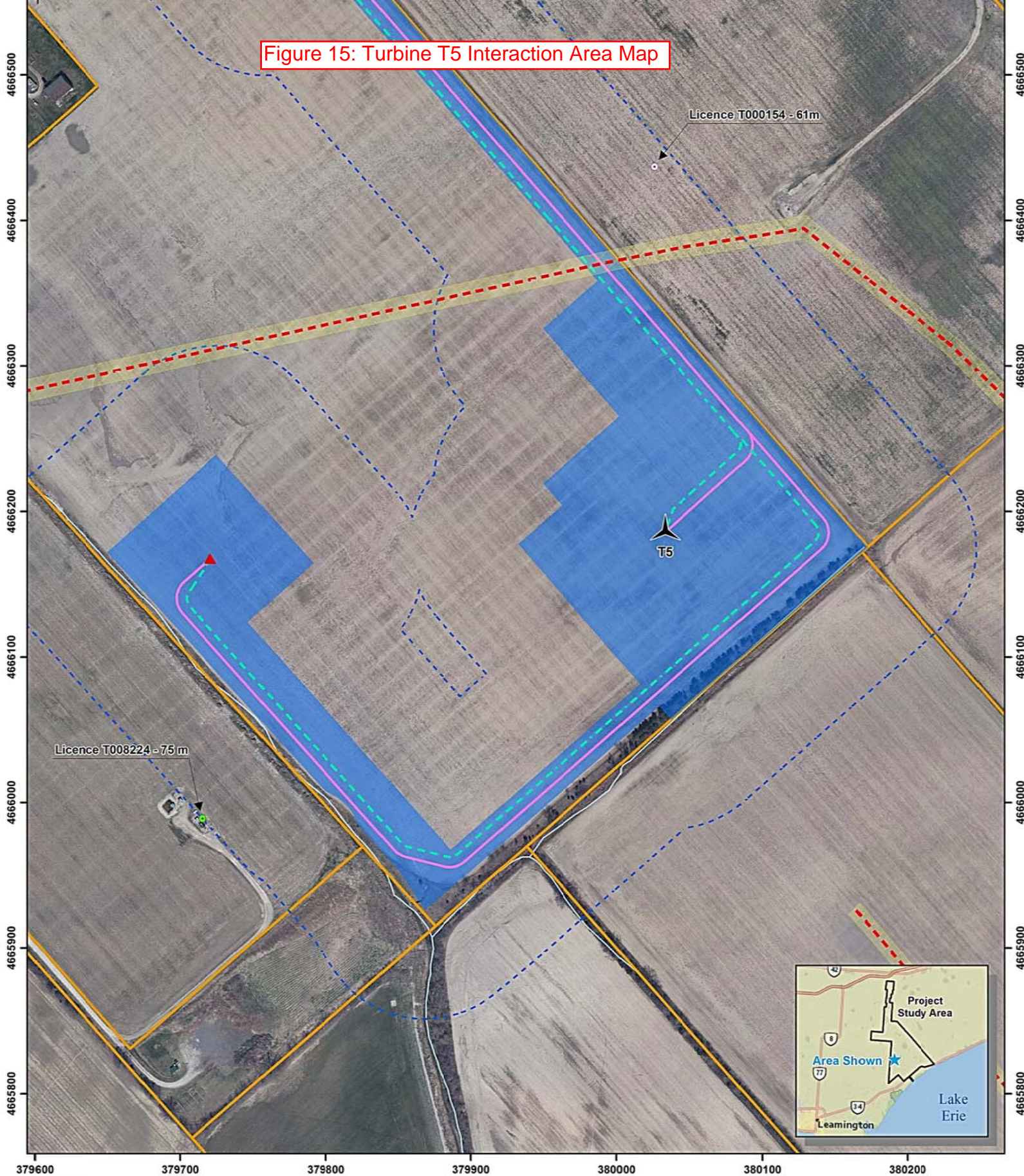


Legend		
Project Features	Petroleum Operations	Other Components
Romney Turbine	OGSR Wells (within 75 m)	Lot Line
Project Location	Active Well	Watercourse
Project location (75m)	Abandoned Well	Waterbody
Collector Line	Unknown	
Access Road	No Well Found	
	Pipeline	
	Pipeline Easement	

**ROMNEY**  
wind energy centre

Petroleum Resource Operations Setback

Figure 15: Turbine T5 Interaction Area Map

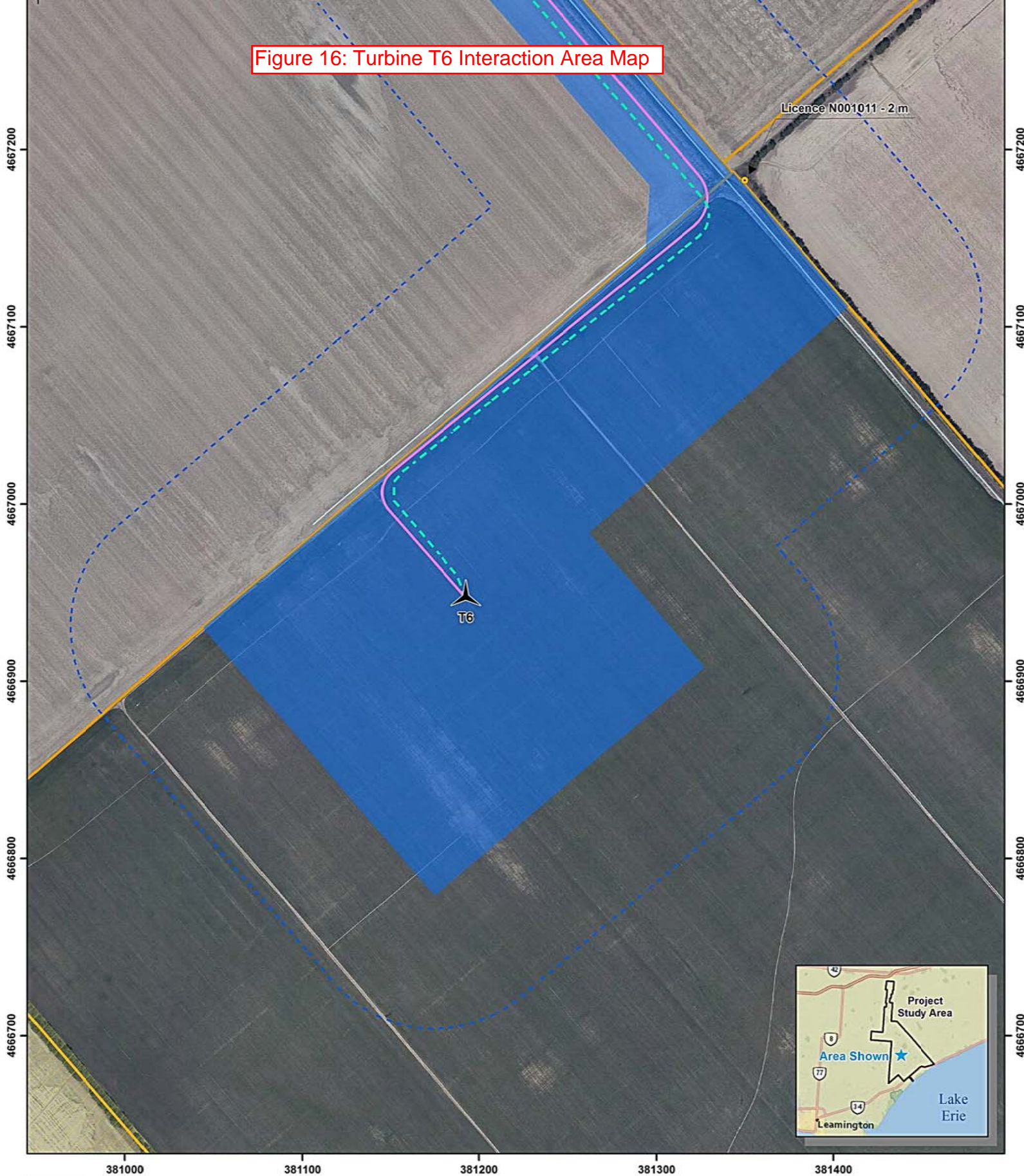


Legend		
Project Features	Petroleum Operations	Other Components
Romney Turbine	OGSR Wells (within 75 m)	Lot Line
Meteorological Mast	Active Well	Watercourse
Project Location	Abandoned Well	Waterbody
Project location (75m)	Unknown	
Collector Line	No Well Found	
Access Road	Pipeline	
	Pipeline Easement	

**ROMNEY**  
wind energy centre

Petroleum Resource Operations Setback

Figure 16: Turbine T6 Interaction Area Map

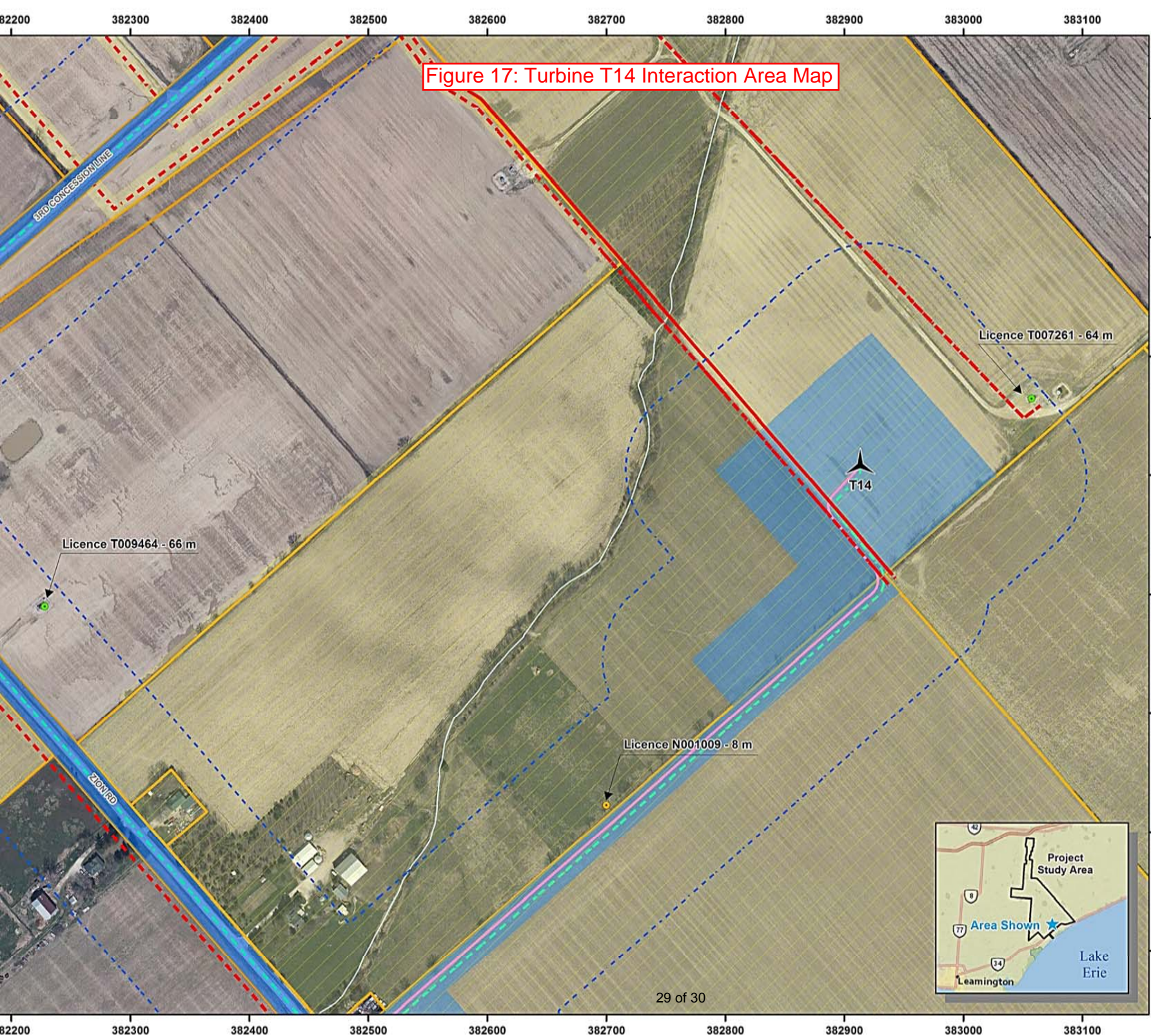


Project Features	Petroleum Operations	Other Components
Romney Turbine	OGSR Wells (within 75 m)	Lot Line
Project Location	Active Well	Watercourse
Project location (75m)	Abandoned Well	Waterbody
Collector Line	Unknown	
Access Road	No Well Found	
	Pipeline	
	Pipeline Easement	

**ROMNEY**  
wind energy centre

Petroleum Resource Operations Setback

Figure 17: Turbine T14 Interaction Area Map



- Legend**
- Project Features**
- Romney Turbine
  - Project Location
  - Project location (75m)
  - Collector Line
  - Access Road
- Petroleum Operations**
- OGSR Wells (within 75 m)
- Active Well
  - Abandoned Well
  - Unknown
  - No Well Found
  - Pipeline
  - Pipeline Easement
- Other Components**
- Lot Line
  - Watercourse
  - Waterbody

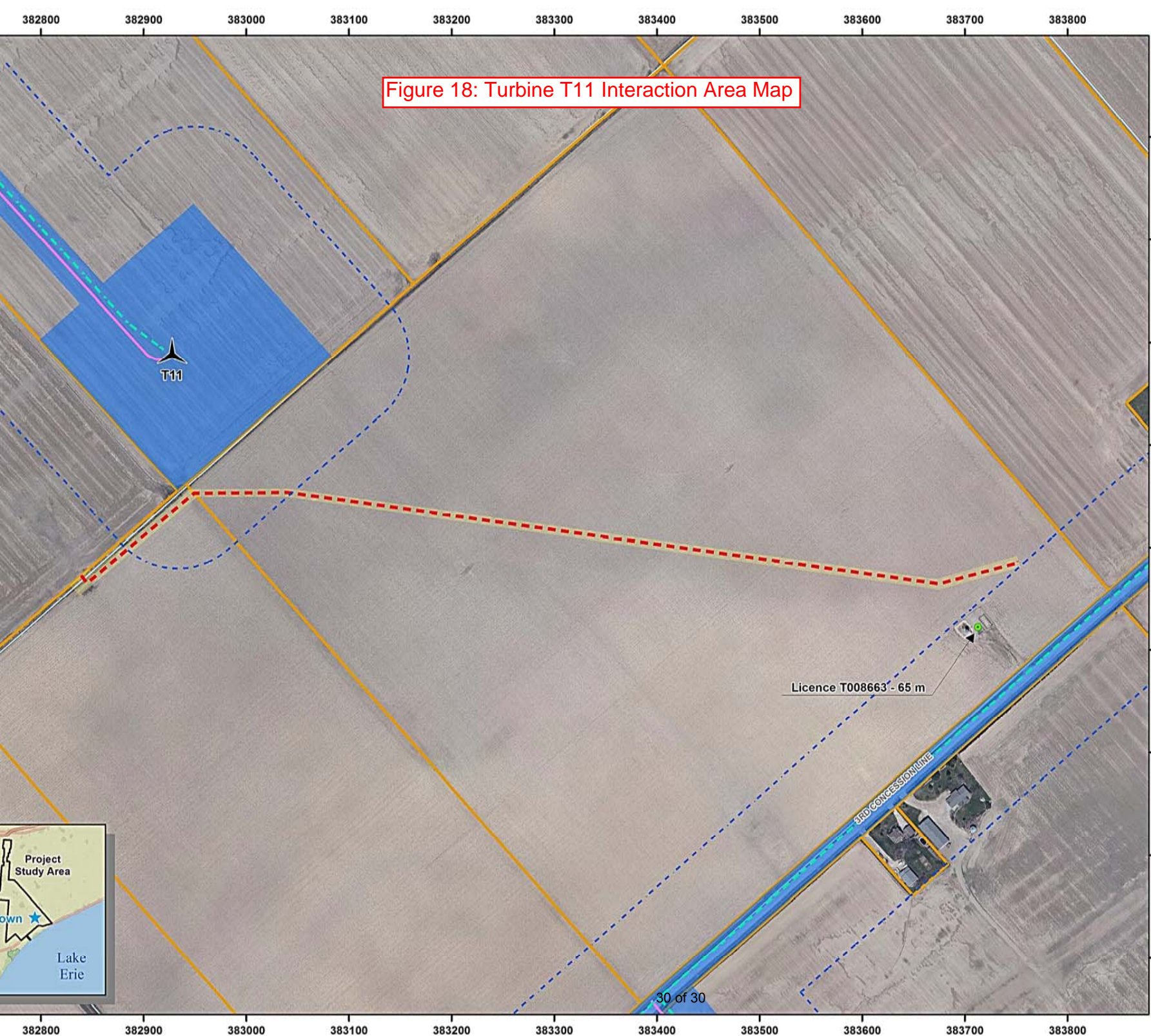


Petroleum Resource Operations  
-T14-



Source: Land Information Ontario, ArcGIS Online, OGSR, Airborne Imaging (April 2014)

Figure 18: Turbine T11 Interaction Area Map



- Legend**
- Project Features**
  - Romney Turbine
  - Project Location
  - Project location (75m)
  - Collector Line
  - Access Road
- Petroleum Operations**
  - OGSR Wells (within 75m)
    - Active Well
    - Abandoned Well
    - Unknown
    - No Well Found
  - Pipeline
  - Pipeline Easement
- Other Components**
  - Lot Line
  - Watercourse
  - Waterbody



Petroleum Resource Operations  
-T11 & 3rd Concession



Source: Land Information Ontario, ArcGIS Online, OGSR, Airborne Imaging (April 2014)