Great Lakes Power
Transmission

East-West Tie – Document Production from GLPT

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Overview

Document Purpose

The Ontario Energy Board ("OEB") has initiated a proceeding to designate an electricity transmitter to undertake development work for a new electricity transmission line between Northeast and Northwest Ontario: the East-West Tie line. The OEB has assigned File Number EB-2011-0140 to the designation proceeding.

As part of that proceeding, on June 14, 2012, the OEB ordered that Great Lakes Power Transmission LP ("GLPT") produce information and documentation relevant to the development of the East-West Tie. This information will be disclosed to all potential designation applicants to provide the foundation for a fair designation process. "Phase 1 Partial Decision and Order June 14, 2012" (the "Order") provides detailed instructions regarding the documentation and information that is required, the format of the required production, and confidentiality procedures.

This document provides an overview of the documents and other information produced by GLPT in response to that Order. It includes explanatory notes that should be helpful to parties to the proceeding.

"APPENDIX C - Affidavit of Completeness" on page 37 confirms that the information referred to in this document represents full disclosure of all information in GLPT's possession related to the East-West Tie, as required by the section "Confirmation of Completeness of Lists" in the Order.

Approach

GLPT has provided all of the information requested in Appendix B from the Order.

The Order also specifies that GLPT disclose all information related to the East-West Tie. Upon inspection of the information required from HONI, and subsequent inspection of GLPT information systems, it was decided that some additional items might be relevant to the designation applicants for the East-West Tie. Therefore, in the interest of full disclosure, additional information has been included that was not specified in Appendix B.

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Confidentiality and Access

In the "Practical Considerations" section of the Order, it states as follows:

> Where providing a copy of the information to all parties is not practical, HONI and GLPT must make arrangements to allow parties to have access to the information… subject to the confidentiality constraints discussed above. Options include viewing the information at the utility's offices, and/or arranging with Board staff for a secure electronic site through which parties can access the information.

The items that are considered confidential are available to the parties subject to the confidentiality procedures described in the Order via the following methods:

1. **LiDAR Data for GLPT Circuits Emanating from Anjigami T.S. and Wawa T.S.** – Due to the nature of this data, it cannot be effectively be provided in document or file formats. A good description of what is available from this data can be found in this document. Further, GLPT will schedule a teleconference with each interested party from whom the Board has accepted a Declaration and Undertaking and provide a skilled operator with the necessary access and shared desktop software so that the interested party can examine this data and ask the operator for different views, cross-sections, measurements, etc., as desired. Screen shots of interest will be provided via secure electronic file sharing.

   Please note that the LiDAR overview image of Wawa TS was redacted from the non-confidential version of this document.

2. **Orthographic View of Circuits Connected to Wawa T.S. and Anjigami T.S.** – This image provides a detailed view of the Wawa T.S. and the Anjigami T.S. It was redacted from the non-confidential version of this document.

3. The following data is available via GLPT's secure website. Each interested party from whom the Board has accepted a Declaration and Undertaking will be provided by GLPT with set up and login information and instructions:

   a) **PLS CADD "Plan and Profile" drawings for W23K Circuit** – A description and sample of what is available is described in this document. There is a set of 20 .tif images available

   b) **GIS Data for W23K Circuit** – A description of what is available, and instructions for use, are described in this document. This data is available in "intelligent pdf" format, in 52 separate files.

   c) **"Flyover" Images of W23K Circuit** – A sample is provided in this document. 1,711 sequential .jpg images are available.

   d) **Northern Reinforcement Information** – The records from a 2003 initiative that was considering options for transmission reinforcement from Manitoba through Wawa to Toronto are available.

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Documents and Other Information Produced by GLPT

1. Outage Statistics for W23K Circuit

The outage statistics for the W23K circuit for 2006 through 2011 are as follows.

230 kV Line Outages
2006 - 2011

230 kV Line	2006			2007			2008			2009			2010			2011		
	Vegetation	Lightning	Other	Vegetation	Lightning	Other	Vegetation	Lightning	Other	Vegetation	Lightning	Other	Vegetation	Lightning	Other	Vegetation	Lightning	Other
W23K			2	1		1											1	

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2. Vegetation Management Program Overview

An overview of the Vegetation Management Program at GLPT follows.

The maintenance of rights of way ("ROWs") is an ongoing challenge that is of particular importance to GLPT because of the unique character of its transmission system. GLPT's transmission system extends through two forest zones in Northern Ontario that have dense vegetation throughout, and which are situated amidst the difficult terrain of the Canadian Shield. Effective ROW maintenance is required to ensure that appropriate clearances between vegetation and electrical equipment are maintained in order to mitigate risks to the reliability of GLPT's system and to the bulk electricity system in Ontario.

Vegetation management in ROWs is an essential component of maintaining the reliability of GLPT's transmission system because contact between vegetation and transmission lines, such as due to weather events or growth, can result in outages. Moreover, properly maintained ROWs allow for access to transmission facilities, which is needed to carry out inspections and maintenance activities. GLPT's vegetation management activities include brush removal along the floors of ROWs through the ground application of herbicides by work crews in accordance with applicable regulatory requirements. Brush removal is generally carried out during the summer growing season.

Vegetation management also includes brush removal, tree trimming and tree removal along the edges of ROWs to prevent the encroachment of vegetation into the ROWs. This work is typically carried out during the winter and is performed by different work crews with different skills and equipment than those who do brush removal along the floors of ROWs. More specifically, the work involves the trimming of branches and the removal of trees which pose a potential risk to adjacent transmission lines. Along certain areas of GLPT's ROWs, known as buffer zones, standard methods of vegetation management are not possible for a variety of reasons. These include the presence or proximity of rivers, creeks, waterways, wetlands and lakes where, pursuant to requirements under the *Pesticides Act*, there may be restrictions on the use of particular herbicides or their manner of application. Other areas where standard methods of vegetation management are not possible include areas such as areas of higher elevation, areas of difficult terrain and areas where property issues restrict GLPT's ability to use standard methods. In all such buffer zones, GLPT must resort to more labour- and time-intensive processes such as hand cutting, spot spraying and the use of alternative herbicides.

GLPT relies on the use of specialized, outside contractors for the performance of the various components of this work. GLPT targets a 6-year cycle for completion of all brush removal, tree trimming and tree removal activities needed on its system's ROWs, including ROW floors and edges, as well as buffer zones. The clearing of ROWs is a highly regulated activity as GLPT is required to comply with the IESO's reliability compliance program, which is generally aligned with NERC Reliability Standard FAC-003-1 (Transmission Vegetation Management Program).

These requirements reflect a generally greater focus on vegetation management across the electricity sector in the wake of the 2003 blackout. Moreover, GLPT must comply with the highly prescriptive licensing and approvals requirements under the *Pesticides Act* and relevant regulations. GLPT's ROW maintenance activities are also subject to requirements and restrictions under the provincial species protection legislation in respect of certain at risk species that inhabit areas within GLPT's network of ROWs.

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3. Transmission Line Condition Assessment Program Overview

An overview of the Transmission Line Condition Assessment Program follows.

For transmission lines, visual inspections are carried out either by GLPT crews or by external consultants. GLPT crews conduct patrol inspections of transmission lines annually to assess condition and to identify structural problems and hazards. Because GLPT's transmission lines are primarily located in rural areas of Northern Ontario, where the terrain is rugged and the vegetation is dense, specialized equipment or expertise is required. Analyses may also be performed by external consultants to provide additional detailed information on structures, conductors and insulators.

Where these inspections identify immediate deficiencies or potential hazards, GLPT undertakes the appropriate corrective maintenance to resolve the identified issue.

The information collected through inspections is compiled in a searchable database where it is used for long term maintenance planning and to identify trends in asset conditions.

GLPT collects real-time data from lines on a continuous basis using its Supervisory Control and Data Acquisition system ("SCADA"). The data collected through SCADA relates to power flow, fault data and power quality, and supplements the information collected through the inspection activities identified above.

GLPT also makes use of recently acquired LiDAR data that provides detailed information on transmission lines, structures and vegetation as well as a GIS system that supports the collection and maintenance of information regarding the transmission circuits. These tools provide vital field information to front line crews to allow for a more efficient / effective program.

The forms used to support a detailed lines condition assessment of W23K circuit can be found in "APPENDIX A - Lines Condition Assessment Forms" on page 22.

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4. LiDAR Data for GLPT Circuits Emanating from Anjigami T.S. and Wawa T.S. - CONFIDENTIAL

In 2009 GLPT had an aerial survey done of most of its circuits, including the W23K circuit, Anjigami T.S. and Wawa T.S. Appendix B of the Order requires disclosure of "LiDAR data for GLPT circuits emanating from Anjigami T.S. and Wawa T.S."

LiDAR data consists of millions of dots located spatially in 3 dimensions. They are colour-coded to differentiate between structures, lines, ground, vegetation, water, etc. In order to view this information, sophisticated viewing software is required. The data volume is large and stored in numerous different .bin files. Locating an area of interest requires significant knowledge of both the data and software. It is therefore not feasible to provide this information in document format, or even in an electronic format that could be readily used by the other parties.

An overview of the kinds of information that can be had via LiDAR files follows. If a party from whom the Board has accepted a Declaration and Undertaking wishes to view particular details regarding the Anjigami T.S., the Wawa T.S., or the circuits emanating from them, GLPT will provide a skilled operator with the necessary access, a scheduled teleconference, and shared desktop software so that the party can ask for different views, cross-sections, measurements, etc.. Screen shots of interest will be provided via secure electronic file sharing.

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A view of the LiDAR data for the Wawa T.S. and Anjigami T.S. looks like this. Vegetation is green, transmission structures are pink, circuit cables are purple or white or orange. This information provides a good 3-dimensional view of the stations and circuits emanating from the stations. (The following image is confidential - redacted.)

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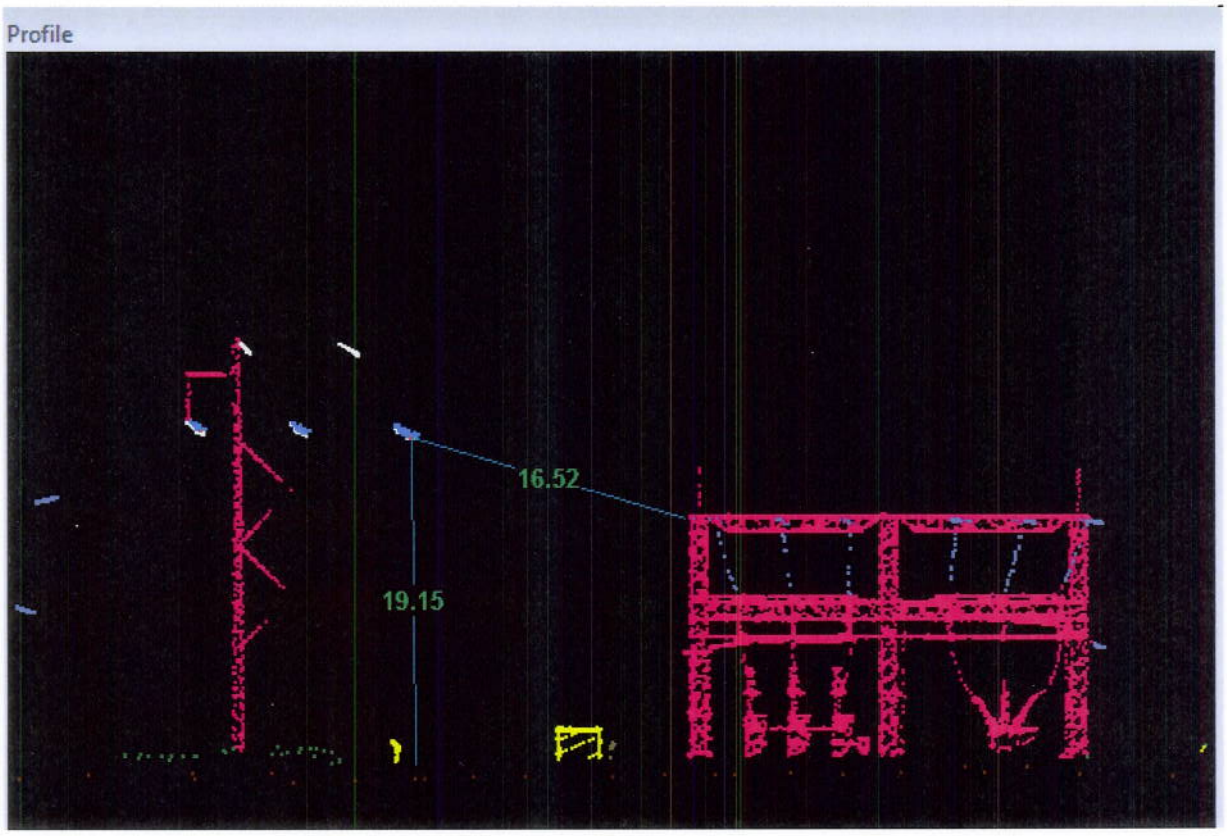
Via software, cross-sections can be taken from the "cloud" of laser points, enabling a view of different features in 3 dimensions, measurements to be taken, etc.



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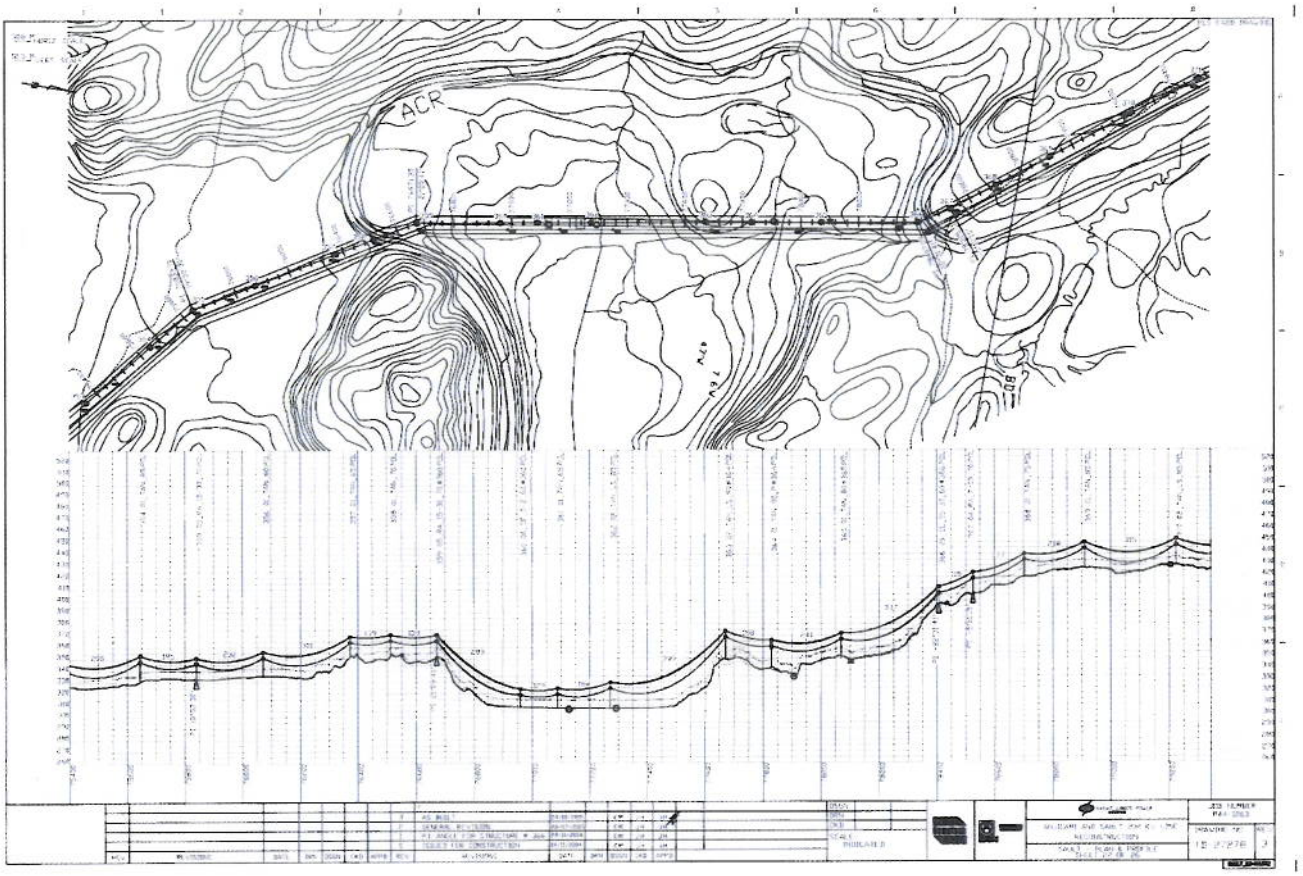
5. PLS CADD "Plan and Profile" drawings for W23K Circuit - CONFIDENTIAL

The "plan and profile" drawings for the W23K circuit are available as .tif images that illustrate the terrain, pole locations, etc. There is a set of 20 of these images for the W23K circuit available electronically in the "Plan and Profile" folder in GLPT's secure website. They are in a geographically linear sequence, starting with TD-27230 R2.TIF at the Wawa T.S./Anjigami T.S. end, and terminating with TD-27249 R3.TIF at Mackay T.S. A sample image is included below.



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6. Orthographic View of Circuits Connected to Wawa T.S. and Anjigami T.S - CONFIDENTIAL

An "Ortho View of GLPT's circuits connected to Wawa T.S. and Anjigami T.S." follows. (The following image is confidential - redacted.)

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7. GIS Data for W23K Circuit - CONFIDENTIAL

GLPT GIS data resides in a Microsoft SQL Server "sde database". To work with this data requires expensive and complex software, and significant expertise.

Therefore, to satisfy the Order, GIS data for the W23K Circuit has been provided as a series of 52 "intelligent pdfs", which provide very detailed information for different segments of the entire W23K circuit. These files can be opened using Adobe Acrobat Reader. This is a widely-available and free viewer, available at this link http://get.adobe.com/reader/?promoid=DINRS. Note that there are different versions of Adobe Acrobat Reader for different operating systems.

The files are relatively simple to use. The various layers can be turned on and off, and the attributes of different features can be viewed, etc.

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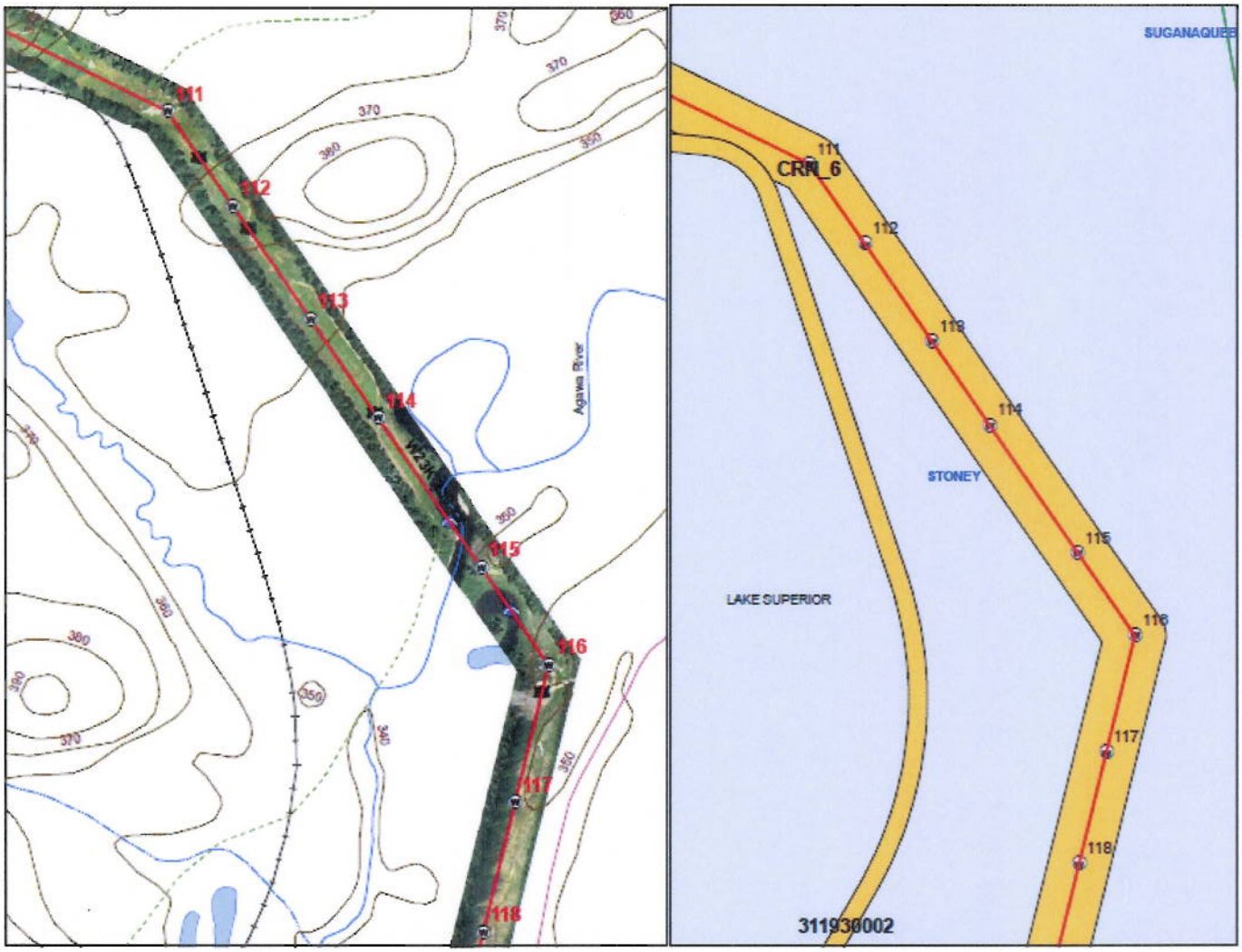
An example follows. The left frame shows the circuit and structures, orthographic image, contours, roads, railways, rivers, lakes and crossings of various types. The right frame provides layers that are typically abstract concepts created by people, such as townships, lots, concessions, provincial parks, and national parks. The layers and labels can be turned on and off, and detailed attributes about different features can also be viewed.



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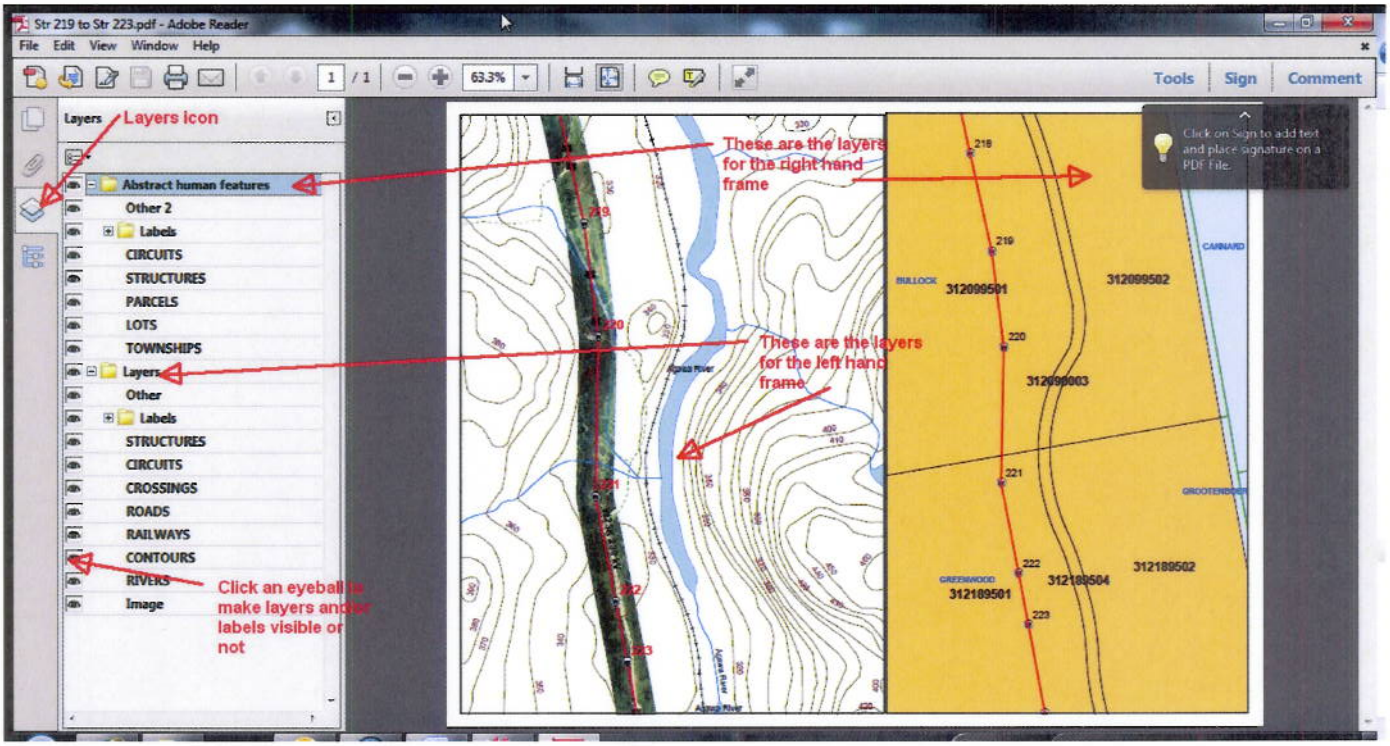
Basic instructions regarding how to work with these files follow, based on using Adobe Reader X, version 10.1.3.

Click on the "Layers" icon on the left side of the screen to see the available layers and labels. This can be used to make layers and/or labels visible or not.



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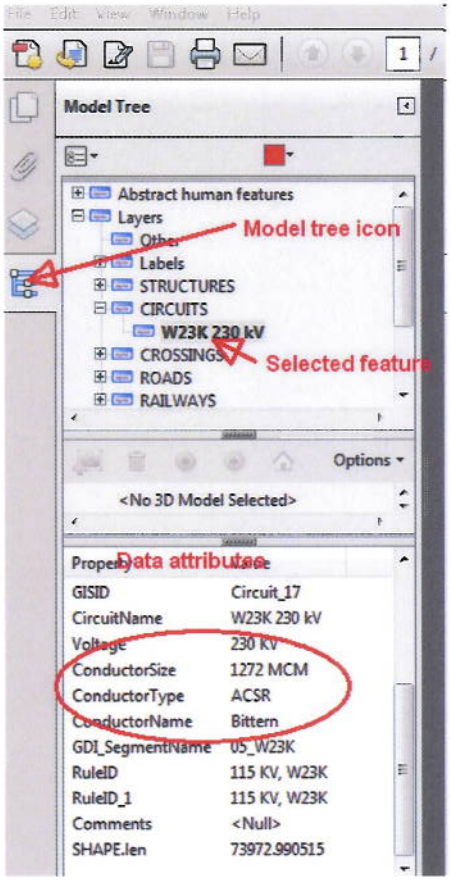
The data attributes associated with different features can be found by clicking on the "model tree" icon on the left, selecting a feature, and scrolling through the feature's properties.



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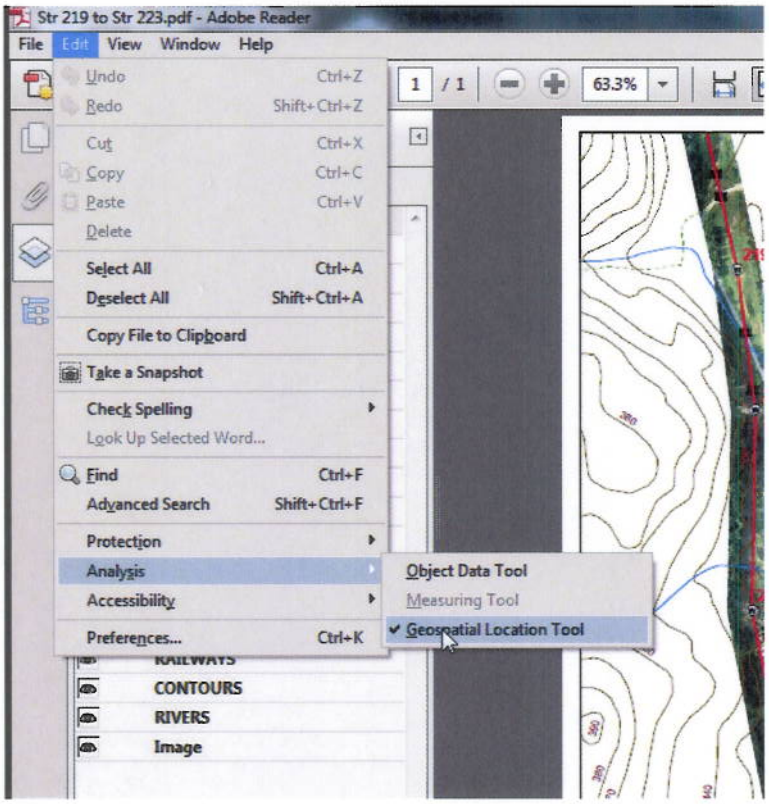
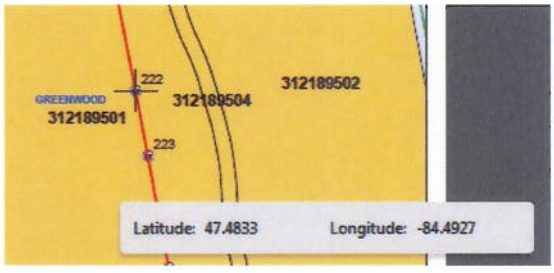
To determine geospatial coordinates, turn on the Geospatial Location Tool by clicking Edit in the menu, Analysis, Geospatial Location Tool.



Then the longitude and latitude of your mouse coordinates will be displayed when you hover over the maps.



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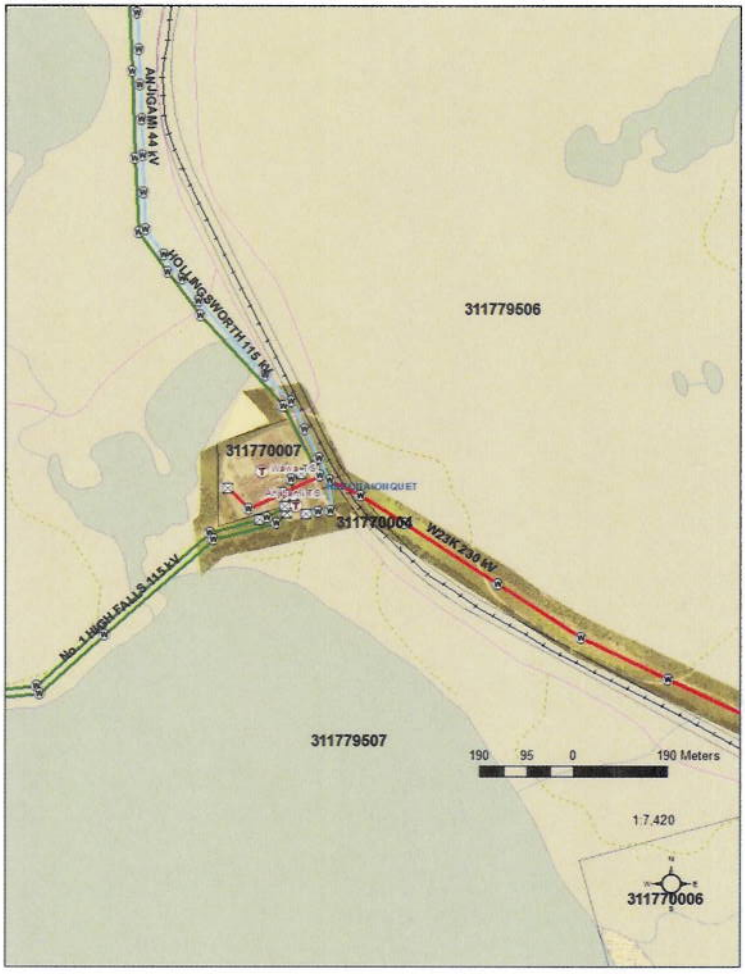
8. Relevant Land Information

Although not specifically requested by the Order, in the interest of full disclosure, some additional land-related information that might be of interest follows.

Property Identification Numbers

The PINs for parcels in and around the Wawa TS and Anjigami TS are indicated below.



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Relevant Land Agreements

GLPT has a few land agreements in the vicinity of the Wawa T.S. and Anjigami T.S. These are described in the following chart.

#	Type	Instrument number	Grantor	Description	Date registered	Registry System
1	Lease	LT26454	The Algoma Central and Hudson Bay Railway Company	Portion of W23K ROW that runs from structure 7 to Anjigami TS, then across heading west along High Falls circuits ROW. A 150' ROW through the lands of the Lessor (Restoule, Nebonaionquet).	7/26/47	Land Titles
2	Lease		The Algoma Central and Hudson Bay Railway Company	Agreement dated Sept 1, 1957 leasing a 100' strip of land through Nebonaionquet and Maness beginning at the ROW directly south of the Anjigami TS, running north through Wawa TS, then along the ROW, and ending at the southerly limit of Parcel 2028 AWS.		
3	Lease		The Algoma Central Railway	Two 25' strips of land abutting each side of the original 150' ROW through Nebonaionquet and Naveau, along the High Falls circuits ROW.		
4	Other	NWP8200-94-6622	Canadian Coast Guard	Navigable Waters Protection Act Work Assessment for Transmission Lines crossing Michipicoten River, associated with PIN 311779507, outside Wawa T.S.	1/09/95	

#	Notes	GLPT Interest
1	Agreement dated Sept 1, 1937. Captured from the 1929 Lang&Ross survey in a general NW direction. Drawing started at S boundary of Restoule to meet with ROW at N boundary of Stoney. No tie in points in this area. Southernmost part of Nebonaionquet rotated and extended by 265' to meet S boundary of LT29914. Western boundary of Nebonaionquet extended by 61' to reach the Naveau border. No rotating of this section.	This portion lease was assigned to 3011650 Nova Scotia Limited in 1995 who now own the lands in question.
2	Drawn in a general SW direction starting at the southern boundary of PIN 311670007 and ending at the Anjigami T.S. There is one segment (measuring ~9380ft). The southern most 2 segments were shifted N until the bottom met up with the Anjigami TS and the top met up with the 9380ft strip. The drawing guide was left in place to show where the shift occurred. Plan was ~3290ft too long.	This lease was assigned to ACR Inc. on Jan 31, 1995 and then further assigned to 3011650 Nova Scotia Limited on Nov 4, 1997.
3	Agreement dated May 1, 1987. Leases an additional 25' ROW to each side of the existing 150' ROW through Nebonaionquet and Naveau Twps. No plans for the extensions. Drawn as parallel 25' strips from and at right angles to the general North and South limits of the original 150' ROW	This portion of the lease was assigned to 3011650 Nova Scotia Limited in 1995, who now own these lands. Assignments in same file
4		

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9. "Flyover" Images of W23K Circuit – CONFIDENTIAL

This was not specifically requested in the Order. However a sequence of images of the W23K circuit might be of interest.

Although GLPT does not have an actual video of the W23K circuit, this series of jpg images can be viewed in sequence to provide a very similar experience by looking at the images in the "Flyover images of W23K circuit" folder, in filename sequence. These images were captured in 2009 as part of the aerial survey. These can be viewed via GLPT secure website to any party from whom the Board has accepted a Declaration and Undertaking.

A sample image follows.

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10. Northern Reinforcement Information – CONFIDENTIAL

Based on research into GLPT's archives, documents were found dated 2003 that contain subject matter related to transmission line development in the north. Different options for additional transmission infrastructure were explored. This material was not specifically requested in the Order, but has been included in this document production.

There are 2 documents available: a project brief and a study provided by Acres International. These can be viewed via GLPT secure website to any party from whom the Board has accepted a Declaration and Undertaking.

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Appendices

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APPENDIX A - Lines Condition Assessment Forms

Lines Condition Assessment Form

This form is used to capture the results of a lines condition assessment.

Str # **Circuit** **Date & Initial**

Task #	Item	Description	Condition Rating per pole, timber, insulator, etc								Comments record item affected (ie hangdown, idler, etc; # WP holes or nests & if 10' from phase, etc)
			A	B	C	D	E	F	G	H	
1.0	**Structures**	**A, B, C, D from left to right when looking towards the next highest number**									
1.1	Wood	Rake and Bends									
		Radial Cracks									
		Shell Rot (Shale)									
		Top Rot, Splits & Feathering									
		Lightning Damage									
		MechanicalDamage									
		WP Holes									
		WP Nests (oval)									
		Ants									
		Fire Damage									
		Ground Line Rot (show: + above, - below)									
		Butt Rot - sounding									
		Unstable Soil Cond.									
2.0	**Supports**	**A, B, C from left to right or top to bottom. On double cct A, B, C left side top down then right side D, E, F**									
		Double arms on 3-pole Str, use A (closest) to B (furthest) on Lt side, C (closest) to D (furthest) on Rt side									
		Spars - A-left spar, B-right spar, C-left brace, D-right brace									
2.1	Wood	Warps/bends (from weight, stress, age)									
		Cracks and Splits									
		Rot and Moss									
2.2	Steel	Bends/twists to arms and/or braces									

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		Galvanizing, Rust									
		Bolts, lock washers (loose, missing)									
3.0	**Insulators**	**A, B, C from left to right or top to bottom. On double cct A, B, C left side top down then right side D, E, F**									
3.1	Porcelain	Broken, Cracks, Chips & Flashover									
3.2	Glass	Broken & Flashover									
3.3	Polymeric	Sheds: punctured, ripped or missing; Corona ring & cutting; Pollution									
		Rods: Exposed; Sheath Cracks; and End Fittings									
4.0	**Conductor**	**Phases A, B, C from left to right or top to bottom. Use F, G for the Shield Wire from left to right**									
	Sky Wire	Vibration Dampers									
		Cond. Clamps, DE, Sleeves, Paddles									
5.0	**Anchors**	**Use A-Head Guy, B-Back Guy, C-Guy Left, D-Guy Right**									
		Rust & Cathodic Damage									
		Bends or Kinks									
		Buried Rods									
6.0	**Guying**	**Use A-Head Guy, B-Back Guy, C-Guy Left, D-Guy Right**									
		Bent Top Fittings									
		3-Bolts, Preforms									
		Slack or Loose									
		Broken Strands, Rust at Ground									
7.0	**Groundin g**	Rods Buried									
		Down Grd, Clamps									
		Bonding/Connectio n									
8.0	**Hardware**										

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		Wear: tower eyes, eye bolts, at DE's and shield wire									
		Bolts bent, lock washers loose, flashover and rust									
9.0	**Public**	Tripping, snagging									
	Safety	Signs & Numbers									
		Yellow Guards (with reflective tape)									
10.0	**Other Info**	**For next span: water crossings, gates, fencing, property owner, vegetation, errosion, counterpoise, etc.**									

Condition Rating: 3 - Good Condition; 2 - Minor Issues; 1 - Deteriorating; 0 - Needs Immediate Attention

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Lines Inspection Criteria

This form accompanies the "Lines Condition Assessment" form to provide detailed instructions regarding how to complete each question.

Task	Item	Description	Rate	Criteria
1.0	**Structures**			**NOTE: 4 - 5 factors listed below in zero = pole replacement**
1.1	**Wood**	Rake and Bends	3	Poles straight and clear of defects; natural twists and bends are ok
			2	Slight bend and or twists, with rake or lean of <5°; includes in-line
			1	> 5° lean (ie. 1m (3') on 65' pole)
			0	Danger of falling over **NOTE: can be tied to unstable soil below**
		Radial Cracks	3	Natural radial cracks < 6 mm (1/4") wide are ok
			2	Cracks from 6 - 12 mm (1/4 - 1/2") wide (length doesn't matter)
			1	Cracks > 12 mm (1/2") are a climbing hazard
			0	Checks and cracks do not reduce pole strength (probably never a 0), but examine for insects and decay
		Shell Rot (Shale), *moss is often associated with it*	3	Clear but some surface greying on cedars < 3 mm (1/8") permissible
			2	< 6 mm (1/4") on older poles is permissible - often visible as pole shrinkage around bolts (ie bolts look loose)
			1	From 6 - 50 mm (1/4 - 2") thick and < 30% of the circumference
			0	> 50 mm (2") thick and covers > 30% of the circumference; **= 1 factor to replace**
		Top Rot, Splits & Feathering	3	No visible signs of top rot, splits and feathering
			2	Top 10 cm (4") show some signs, but no concerns
			1	From 10 - 30 cm (4 - 12") severe damage but split bolt in place
			0	> 30 cm (12") of top has severe damage and no split bolt in place; **= 1 factor to replace**
		Lightning Damage	3	No sign of lightning damage
			2	Some burn marks but no visible damage to pole
			1	< 50 mm (2") thick and < 30% of the circumference missing, or very large splits or cracks but bolts still holding everything

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Task	Item	Description	Rate	Criteria
				together
			0	> 50 mm (2") thick and covers > 30% of the circumference; **= 1 factor to replace**
		Mechanical Damage	3	No real damage, some visible surface checks or marks (ie bears)
			2	< 6 mm (1/4") damage on < 30% of circumference
			1	From 6 - 50 mm (1/4 - 2") thick and < 30% of the circumference
			0	> 50 mm (2") damage and covers > 30% of circumference. Definitely "0" for a single unguyed pole with signs of breaks/cracks across the wood fibres (horizontal break); but if pole is guyed or part of a 2-pole structure; **= 1 factor to replace**
		WP Holes *(record # of holes)*	3	No WP holes
			2	Any amount of small V-shaped holes. They have no effect on integrity of structure. Just record the amount
			1	Amount of look out holes up to 100 mm (4") in diameter and usually 150 - 200 mm (6 - 8") deep. Record amount and if an outage is required to fill (ie below the phases)
			0	V-holes and look out holes rarely affect structural integrity, but examine for insects and decay
		WP Nests - oval *(examine nests)*	3	No WP nests. **NOTE circumference and internal measurements for height, width, depth req'd to determine rating for the nest. Record # of nests and if an outage is req'd to investigate or fill**
			2	> 100 mm (4") of shell thickness along length of nest
			1	From 100 - 50 mm (4 - 2") shell thickness along length of nest
			0	< 50 mm (2") shell thickness then; **= 1 factor to replace**. Definitely "0" for a single unguyed pole.
		Ants	3	no ants visible
			X	
			X	
			0	Ants visible = 1 factor to replace. **NOTE: the presence of ants can deteriorate a pole in 5 years, = 1 factor to replace.** *There are either ants or no ants, therefore rating is either 3 or 0*

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Task	Item	Description	Rate	Criteria
		Fire Damage *(on ground and pole)*	3	No visible damage at base(grass) or leakage on pole near hardware
			2	At base < 6 mm (1/4") damage on < 30% of circumference
			1	At base from 6 - 50 mm (1/4 - 2") thick and < 30% of the circum; and pockets of burning or surface damage near hardware
			0	At base > 50 mm (2") damage and covers > 30% of circum. especially for a single unguyed pole, while guyed poles **= 1 factor to replace**. **NOTE: charcoal acts like a preservative; usually no rot/insects** on the pole, fire damage near hardware and/or stress points that will cause imminent structure failure
		Ground Line Rot *(show: + above grade, -- below grade)*	3	No sign of rot above or below grade **NOTE: dig down 50 cm (1.6' or 19"), scrap off surface rot and compare narrowest circumference to full circumference at normal ground line. Must be > 90%**
			2	< 6 mm (1/4") rot on whole circumference (slight rot visible)
			1	> 90% (< 50 mm (2") of rot on circumference)
			0	< 90% (> 50 mm (2") of rot on circumference) **= 1 factor to replace**
		Butt Rot - sounding *(strike every 30 cm (1') from 1 m (3') to ground level on all 4 quadrants, equals 12 strikes)*	3	Sounds good (ie rings)
			X	
			X	
			0	Sounds dull **= 1 factor to replace**. Notes: Hammer into pole, rate as 0; Striking pole is either good/bad, therefore rating is either 3 or 0
		Unstable Soil Cond - footings *(includes erosion)*	3	solid - no movement visible **NOTE: usually associated with clay or swampy soils. Also visible indirectly by leaning structures or anchors pulling out**
			2	Anchors have pulled somewhat but stable/settled (ie < 30 cm (1')
			1	Soil/surface at poles/anchors eroded/exposed > 50 cm (1.6') or serious erosion approaching the structure within 3 m (10') from creeks, washouts, major storms, etc
			0	Pole/anchor erosion >1 m (3') indicate: fill req'd or str to be relocated

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Task	Item	Description	Rate	Criteria
2.0	**Supports (arms & braces)**			
2.1	**Wood**	Warps/bends (from weight, stress, age)	3	Timbers/spars are straight and clear of defects; natural twists are ok
			2	Slight bend and or twists due to heavy loads
			1	Very visible bends due to heavy loads, especially unsupported timbers (ie no kick arms or guy brace)
			0	Danger of breaking
		Cracks and Splits	3	A few natural radial cracks for both spars/timbers are ok
			2	Spar cracks from 6 - 12 mm (1/4 - 1/2") wide (length doesn't matter); timber cracks should be about half the size of spars
			1	Splits and cracks at end of spars/timbers but split bolt is in place
			0	Splits and cracks at end of spars/timbers with no split bolt and signs of cracks in line with the insulator bolts
		Rot and Moss	3	No visible defects
			2	Shell rot and surface greying is visible on spars/timbers but there are no concerns
			1	Rot and/or moss visible on spar/timber and show signs of insulator bolts pulling through but split bolt is in place.
			0	Rot and/or moss visible on spar/timber and show signs of insulator bolts pulling through with no split bolt in place; or severe rot showing signs of imminent failure
2.2	**Steel**	Bends/twists to arms and/or braces	3	No visible bending, twisting, warping
			2	Slight twisting/bending (possibly due to heavy loads)
			1	Visible bend, twist or kink
			0	Steel member should be replaced, then **= 1 factor to replace**
		Galvanizing, Rust	3	No rust or galvanized discolouration visible
			2	Brownish tinge of rust or galvanized discolouration visible
			1	Heavy rust visible through paint or galvanizing and < 30% of surface
			0	Heavy rust visible through paint or galvanizing and > 30% of surface, then **= 1 factor to replace**
		Bolts, lock washers (loose, missing)	3	No visible defects
			2	Lock washers not fully compressed

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Task	Item	Description	Rate	Criteria
			1	Bolts bent/loose/missing at steel arms, arm braces, and pole braces
			0	Missing bolts that could affect structure integrity
3.0	**Insulators**			
3.1	**Porcelain**	Broken or Cracks *(includes chips and flashover and cement growth)*	3	No damage to insulators visible
			2	< 30% (2 units in a string of 7) have a chip visible or flashover
			1	< 50% of the string is broken or > 30% have chips or flashover
			0	> 50% of the string is broken or cement growth visible
3.2	**Glass**	Broken *(includes flashover)*	3	No damage to insulators visible
			2	< 30% (2 units in a string of 7) have flashover
			1	< 50% of the string is broken or > 30% have flashover
			0	> 50% of the string is broken
3.3	**Polymeric**	Sheds: punctured, ripped or missing; Corona ring & Corona cutting; Pollution (dirty)	3	No visible defects, with corona ring present (built in and/or add on)
			2	< 2 sheds have defects and/or flashover on the corona ring or sheds have "alligator skin" (dry checked surface) a sign of aging
			1	> 2 sheds have defects; or dirty sheds; or corona cutting on live end of sheds; or corona ring missing/loose;
			0	> 50% of sheds have defects
		Rods: Exposed; Sheath Cracks; and End Fittings	3	No visible defects
			X	
			1	Deterioration of end-fitting moisture seals
			0	Sheath cracks or splits visible or rod exposed, indicates FRP rod is expanding due to water ingression; or broken FRP rod (looks like loose strands) of fibre glass; or end fitting has moved (letting go)
4.0	**Conductor and Shield Wire**			
		Vibration Dampers	3	No visible defects
			2	Letting go (rubber shield wire hoses)
			1	Loose (hanging down) or missing
			X	
		Conductor and	3	No visible defects

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Task	Item	Description	Rate	Criteria
		Shield Wire with Clamps, Dead Ends, Paddles, Sleeves	2	Conductor buldging due to mechanical/bullet damage but no broken strands; or banana sleeves; or slight bird caging
			1	≥ 1 broken strands at midspan or near connectors (often due to vibration); or signs of pitting, rusting on conductor and/or shield wire; or serious bird caging near sleeves and connectors;
			0	Loop/conductor loose ready to make contact with a grounded object
5.0	**Anchors - Slug, Rock, PISA**			
		Rust and Cathodic Damage	3	No visible defects
			2	Some surface rust where air and water meet, further down is ok
			1	< 20% of the anchor has deteriorated (20% is approx. down one size) ie 1" to 3/4" or 3/4" to 5/8" etc
			0	> 20% of the anchor has deteriorated
		Bends or Kinks	3	No visible defects
			2	Slight bend due to anchor out of line
			1	Serious kink or bend due to mechanical damage/equipment
			0	Anchor broken or came out of the ground
		Buried Rods	3	No visible defects
			2	Buried just below surface will be uncovered during inspection
			1	Buried 15 -30cm (6 -12") below the surface or could not be inspected
			X	*Buried rods have little affect on anchor failure*
6.0	**Guying**			
		Bent Top Fittings *(outage req'd)*	3	No visible defects
			2	Slight bend in bolt visible
			1	Major bend in fittings or pulling through pole
			X	
		Preforms, 3-bolts	3	No visible defects
			2	Preforms not finished off (finish off at inspection)
			1	Missing one of two 3-bolt clamps, (tighten bolts at inspection)
			X	
		Slack or Loose	3	No visible defects

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Task	Item	Description	Rate	Criteria
			2	Slack guy when there is a back up (ie double, V or 2-1 guys)
			1	Slack guys with no back up; broken guys; or missing guys;
			0	Imminent structure failure due to missing/broken guys
		Broken Strands, Rust at Ground Line	3	No visible defects
			2	Light surface rust on guy or galavanizing wearing off
			1	< 20% of steel has deteriorated/rusted (≤ 1 broken strand)
			0	> 20% of steel has deteriorated/rusted (> 1 broken strand)
7.0	**Grounding**			
		Ground Rods with clamps and above grade	3	No visible defects
			2	Top of rod exposed but close to pole so not to pose a trip hazard
			1	> 15 cm (6") top and/or body of rod exposed and/or clamp loose
			X	*No connection or exposure of rods have little affect on power failure*
		Down Ground with clips and staples	3	No visible defects
			2	Staples too far apart but ground is tight
			1	Down ground is broken or piece is missing (but can't contact phase); Down ground staples/clips are too far apart (large section flopping)
			0	Imminent danger of down ground contacting a phase
		Bonding/Connection	3	No visible defects
			X	*Either connected or not connected not in between*
			1	Shield wire, guys, hardware not bonded to down ground; indicate what and how many in the comments
			X	*No bonding has little affect on a power failure*
8.0	**Hardware**			
		Wear: tower eyes, eye bolts, at DE's and shield wire	3	No visible defects
			2	< 20% wear on metal to metal parts
			1	> 20% wear on metal to metal parts
			0	Worn hardware affecting the integrity of the str/conductor
		Bolts bent, lock washers loose, flashover and rust	3	No visible defects **NOTE: bolts pulling through poles/timbers are covered under poles and timbers above**

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Task	Item	Description	Rate	Criteria
			2	Slight rust visible or discolouration due to flashover
			1	Bolts bent/loose at spars, timbers, braces and DE's; or broken/missing hardware affecting the future integrity of the str;
			0	Broken/missing hardware affecting the immediate integrity of the str
9.0	**Public Safety**			
		Step & Touch	3	No visible defects
			X	
			X	
			0	Grounding hazards (ie step and touch potential) present; ie low conductor, broken ground at ground level, broken counterpoise where public can bridge it)
		Tripping, snagging	3	No visible defects
			X	
			X	
			0	Tripping and snagging hazards present near the base of poles, anchors and guys (ie frayed guy wire tails)
		Signs & Numbers	3	No visible defects
			X	
			X	
			0	Warning signs and numbers missing from pole (focus on high risk public area such as schools, arenas, built up areas, etc)
		Snow machine and OVR hazards	3	No visible defects
			X	
			X	
			0	Guys, X-bracing not well marked if near travelled trails
		Yellow Guards (with reflective tape)	3	No visible defects
			X	
			1	Guards without reflective tape or colour no longer effective
			0	Guards missing specially near summer/winter trails
10.0	**Other Information**			**Record the location/distance to nearest structure (+/- meters)**
		Water Crossings		Status of water crossings, shape of geotech, erosion

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Task	Item	Description	Rate	Criteria
		Gates & Fencing		Fence location and how to get around, gate location and locks present or required
		Property Owner		Name and contact phone number if obtainable
		Vegetation		Record any issues that would be of concern (ie brush growth, danger trees, etc)
		Erosion		Places where erosion is threatening poles, roads and bridges
		Counterpoise		Location, what is needed to repair, ie length, equip, etc
		Sleeves		Record issues with bird caging, rust, pulling out, banana sleeves, etc in mid span
		Clearances		Record clearance violations

Condition Rating: 3 - Good Condition; 2 - Minor Issues; 1 - Deteriorating; 0 - Needs Immediate Attention

Definitions	Colour and Rating		Description
Good Condition	**Blue**	3	Condition acceptable - Document the condition on the assessment form. No further action is required.
Minor Issues	**Yellow**	2	Minor issues, condition seems stable - Document on assessment form and take pictures. (Condition trend will be reviewed (monitored) annually by the Engineering department.)
Deteriorating	**Orange**	1	No imminent threat although condition is deteriorating. - Document on assessment form and take pictures. (Corrective action will be taken through a maintenance program carried out in the following year).
Needs Immediate Attention	**Red**	0	Requires immediate attention. Potential failure imminent. - Contact engineering department at the end of shift. - Document on assessment form and take pictures.

Discussion Items:

When filling out forms, do we fill one out per circuit or one out per structure. There are advanatages of having all info for a circuit (ie insulators, cond, clamps, etc) under the one circuit, for outage purposes. Means filling out an extra sheet for the second circuit at a pole. But would reduce the number of ABCE columns by 2 (still need A-F for

We'll record dirty insulators in the city separately - no need to record this for all circuits when the problem here is near the steel mill and railway

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Task	Item	Description	Rate	Criteria
				Mark X in those spots on Assess Form where there is no chance of filling in climbing inspections would reveal a lot about hardware condition and wear. That is not possible due to climbing restrictions therefore need better scopes and binoculars for suspect locations. consider using scope on 1 in 20 strs ie. random sample indicate scope used at top of sheet??

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Lines Condition Assessment Abbreviations

Guy Abbreviations:

S	single - one point on a pole to one anchor
St	storm - usually one guy to one anchor (sometimes double)
Sp	span - from a pole to a stub
Br	bridge - span guy between poles on same structure
D	double - from same point on the structure to one anchor
V	"V" guy - from two different poles to one anchor
2-1	"2 to 1" - two single guys from different points on one pole to one anchor
HG	head guy
BG	back guy
GL	guy left
GR	guy right

Examples:

SGR	single guy to right
SGL	single guy to left
SHG	single head guy
SBG	single back guy
DGR	double guy to right
DGL	double guy to left
DHG	double head guy
DBG	double back guy
2-1 GR	2 - 1 guy to right
2-1 GL	2 - 1 guy to left
2-1 HG	2 - 1 head guy
2-1 BG	2 - 1 back guy
VGR	"V" guy to right
VGL	"V" guy to left
VHG	"V" head guy
VBG	"V" back guy
St GR	storm guy to right
St GL	storm guy to left
Sp GL	span guy left
Sp GR	span guy right

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APPENDIX B - Glossary and Acronyms

CIP	Critical Infrastructure Protection – This program is coordinates all of NERC's efforts to improve physical and cyber security for the bulk power system of North America.
GIS	Geographic Information System – This is a computer-based information system at GLPT that stores and presents information in a map-like view, with different "layers" or "feature classes" that can be included, excluded and queried upon.
GLPT	Great Lakes Power Transmission LP.
HONI	Hydro One Networks Inc.
IESO	Independent Electricity System Operator - The IESO balances the supply of and demand for electricity in Ontario and then directs its flow across the province's transmission lines.
LiDAR	Light Detection And Ranging - Is an optical remote sensing technology that can measure the distance to, or other properties of a target by illuminating the target with light, often using pulses from a laser. In the context of GLPT, most of the ROW as well as the stations were surveyed aerially in 2009 to gather both LiDAR as well as photographic imagery.
NERC	North American Electric Reliability Corporation – Its mission is to ensure the reliability of the North American bulk power system.
OEB	The Ontario Energy Board.
Order	Phase 1 Partial Decision and Order June 14, 2012 in OEB as file number EB-2011-0140.
PIN	Property Identification Number – A number used for identifying different parcels in the Ontario land parcel database.
ROW	Right-of-way – This refers to the strip of land traversed by GLPT's transmission circuits.
SCADA	Supervisory Control and Data Acquisition system.
SQL	Structured Query Language – It is a language used to obtain information from and update database tables.
T.S.	Transmission Station.

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APPENDIX C - Affidavit of Completeness

EB-2011-0140

IN THE MATTER OF sections 70 and 78 of the Ontario Energy Board Act 1998, S.O. 1998, c. 15 (Schedule B);

AND IN THE MATTER OF a Board-initiated proceeding to designate an electricity transmitter to undertake development work for a new electricity transmission line between Northeast and Northwest Ontario: the East-West Tie Line.

Affidavit of Gary Gazankas

I, Gary Gazankas, BSc.,Electrical Engineering, of the Town of Sault Ste Marie, Ontario **MAKE OATH AND SAY AS FOLLOWS**:

1. I am Director of Operations, Great Lakes Power Transmission LP.
2. Further to the Ontario Energy Board's Phase 1 Partial Decision and Order, Production of Documents, June 14, 2012, I confirm that the information discussed in this document is the only information in the possession of Great Lakes Power Transmission LP which might be related to the East-West Tie line.

SWORN BEFORE ME at the City of Toronto, in the Province of Ontario, on June 26th, 2012.

Commissioner for Taking Affidavits etc.

GARY V GAZANKAS

David Baptista dos Reis
Barrister, Solicitor & Notary Public