

**Strategic Assessment of Provincial
Electricity Transmission
Infrastructure**

**Presentation to
OAlA, October 22, 2009**

Purpose of Presentation

- Legislative basis of the Strategic EA
- Background on Ontario's Bulk transmission system
- Proposed transmission expansions
- Transmission project level analysis
- Strategic Environmental Assessment analysis
- Conclusions



Big picture

- Significant changes proposed to Ontario's electricity generation supply mix.
- Ability to secure new generation linked to ability to expand transmission.
- New transmission lines would be a major addition to a hundred year old electrical system.
- Ontario's bulk transmission system did not envision having to connect wind resources or other renewables.
- New northern hydropower resources will require transmission reinforcement through new lines.
- Imports of sustainable hydropower from Labrador, Manitoba and Quebec would require new transmission lines.

Big picture

- Competition across the Province for corridors: Metrolinx, ORC, natural gas pipelines, recreational uses.
- Provincial policies such as Places to Grow creates demand for more electricity in urban areas.
- Approving new transmission lines in urban areas is problematic.
- New Oak Ridges Moraine, Niagara Escarpment Plan, Green Belt legislation affecting transmission corridors since last major expansion of transmission system.
- Thus, a Strategic Environmental Assessment is warranted.

Legislative Basis

- Transmission expansion was subject to Integrated Power System Plan (“IPSP”) for the period 2008 to 2027
- Minister’s Supply Mix Directive defined SEA Studies.
- Hearing initiated before Ontario Energy Board in 2007.
- Superseded by *Green Energy Act*.

Supply Mix Directive

- Minister's Supply Mix Directive (June 13, 2006) addressed effective management of electricity supply, transmission, capacity and demand.
- Maximize feasible cost effective contribution
 - from conservation, renewable sources
 - next base load from nuclear
 - replace coal-fired generation
 - add gas-fired generation (“GFG”)
 - GFG if conservation and renewables are not feasible or cost effective.

Overview of IPSP Regulation

Ontario Reg. 424/04

8. “Ensure that for each electricity project recommended in the plan that meets the criteria set out in subsection (2), the plan contains a sound rationale including, (i.) an analysis of the impact on the environment of the electricity project, and (ii.) an analysis of the impact on the environment of a reasonable range of alternatives to the electricity project”.

...for electricity projects that will require an EA under Part II of the Environmental Assessment Act... within five years after the approval of the IPSP.

Ontario's Transmission System

- 500 kV lines are the bulk carriers over long distances
- 230 kV lines provide high voltage between generation and load sources
- 115kV lines provide smaller load
- Street level lines may be 13.2 kV or lower



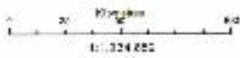
Ontario's Transmission System

- Generating sources vary: wind, nuclear, hydro, coal
- Transformer stations typically transform power to next step voltage
- AC power is the norm with DC power used for long distances





**HYDRO ONE NETWORKS INC.
 TRANSMISSION SYSTEM
 SOUTHERN ONTARIO**



LEGEND

- HV Substation
- Transmission Station
- Transmission Lines**
- 500 kV
- 230 kV
- 110 kV
- 69 kV

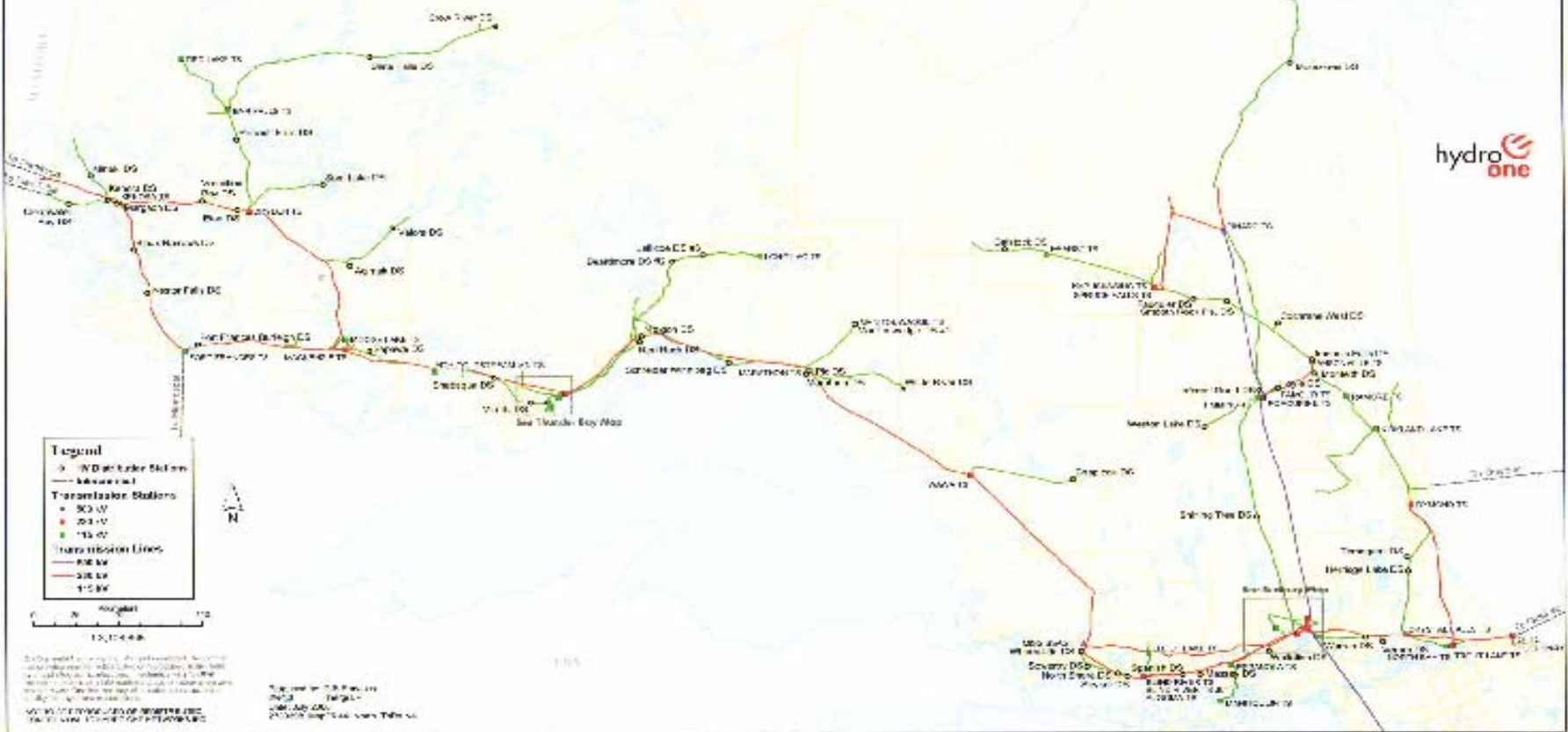
Transmission Lines

- 500 kV
- 230 kV
- 110 kV
- 69 kV

As of the date of this map, the Hydro One Networks Inc. (HON) is the owner of the transmission system shown on this map. HON is not responsible for any errors or omissions on this map. HON is not responsible for any changes to the transmission system shown on this map. HON is not responsible for any changes to the transmission system shown on this map.

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 Exhibit A
 Tab 6
 Schedule 1

**HYDRO ONE NETWORKS INC.
 TRANSMISSION SYSTEM
 NORTHERN ONTARIO**



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Proposed Transmission Expansion

- Manitoba Transmission Interconnection
- Moose River Basin Development
- North South Transmission Reinforcement
- Sudbury West Transmission Reinforcement
- Darlington B Incorporation
- Bruce GTA Transmission Reinforcement
- Lake Superior East Wind Development

Proposed Transmission Expansion (cont.)

- Barrie South Transmission Reinforcement
- Connection projects equal to/ greater than 50 km to connect wind farms:
 - Parry Sound Wind Development
 - Bruce Peninsula Wind Development
 - Manitoulin Island Wind Development
- Little Jackfish River and East Nipigon Wind

HSAL Role

- Complete a Strategic EA
 - Focus on electricity resource management vs. project specific assessment
 - Provide expert evidence at Ontario Energy Board
- Scope:
 - Meet requirements of Section 8 of O. Reg. 424/04
 - High-level in nature
 - Look at policy options
 - Integrate into the plan
- Individual EA's would be required for each transmission project
- Are there red flags or environmental impediments to bringing on new transmission with respect to new generation requirements?

Broad Methodology



- Another firm completed the air, water, resource consumption assessment for the potential new lines.
- OPA completed the system planning and engineering components internally.

Strategic EA

- Strategic EA seen to be appropriate tool for assessing plan, policy and program level effects of new transmission enhancements.
- HSAL completed research and literature review on SEA methods.
- Begin with project-level analysis so as to inform strategic analysis.

Evaluation Criteria Method

Address given criteria re: Supply Mix Directive:

- Reliability, Feasibility, Flexibility
- Cost
- Environmental Performance and
- Societal Acceptance

Address and apply MOE Criteria:

Screening Criteria contained in Appendix C of the March 2001 MOE “Guide to Environmental Assessments for Transmission Projects”.

Apply sustainability criteria as part of overall SEA review.

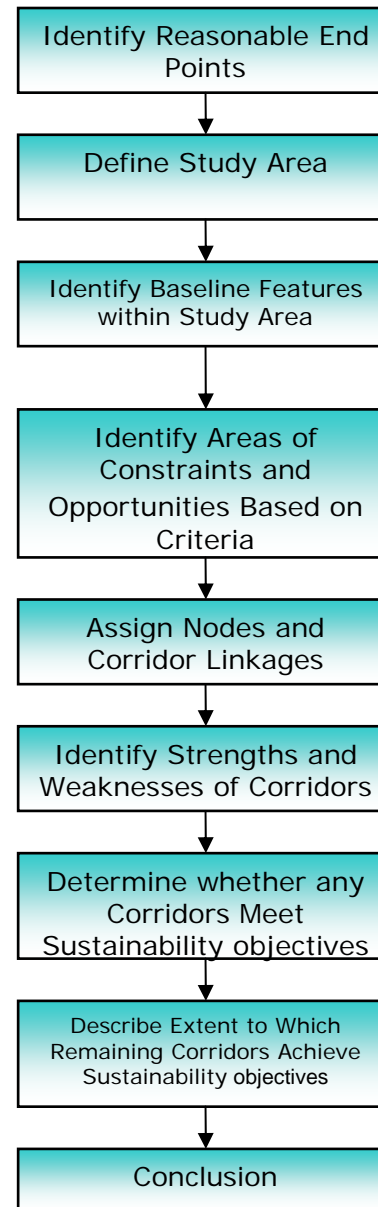
Consultation

- Stakeholder consultation
- First Nations and Metis engagement
- Discussion papers
- Review of intervener comments
- Teleconferences

Project-level Analysis

- Define study area
- Desk top/ secondary data.
- Supported by GIS data.
- Used existing EA studies where available.
- HSAL Team has on the ground experience with most of the projects.
- Identify corridors
- Are there a reasonable number of corridor alternatives that could proceed to Individual EA?
- Are there any show stoppers that would inhibit a line from being approved and in turn, would inhibit connection of new renewable and other energy generation?

Project Level Analysis



Example: Owen Sound to Lion's Head

Rationale for Project

- Commitment of 700 MW of wind generation in the Bruce Peninsula, major additional potential.

Project Description

- A new greenfield 230 kV transmission line from Owen Sound north to Lion's Head to connect future wind farms.
- Southern connect point: Owen Sound TS or from a point on the existing Bruce TS to Owen Sound TS 230 kV transmission corridor.

Evaluation Factors

Factors

- Socio-economic
- Agricultural
- Aquatic
- Terrestrial
- Forestry

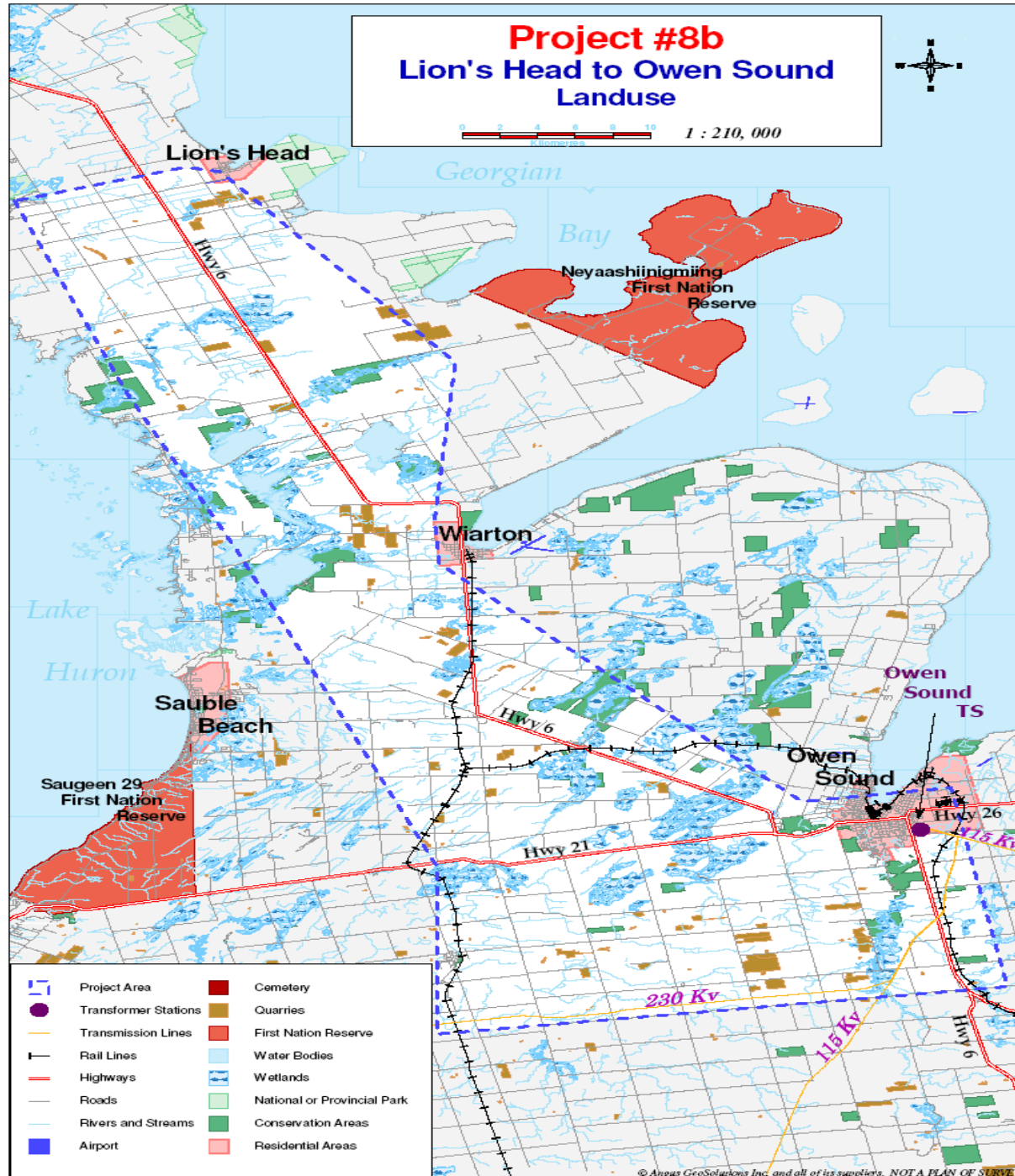
Indicators

- Features
- Soils
- Wetlands
- Habitat
- Timber Growth

Project #8b Lion's Head to Owen Sound Landuse



0 1 2 3 4 5 6 7 8 9 10
Kilometers
1 : 210,000



	Project Area		Cemetery
	Transformer Stations		Quarries
	Transmission Lines		First Nation Reserve
	Rail Lines		Water Bodies
	Highways		Wetlands
	Roads		National or Provincial Park
	Rivers and Streams		Conservation Areas
	Airport		Residential Areas

Baseline Socioeconomic Conditions

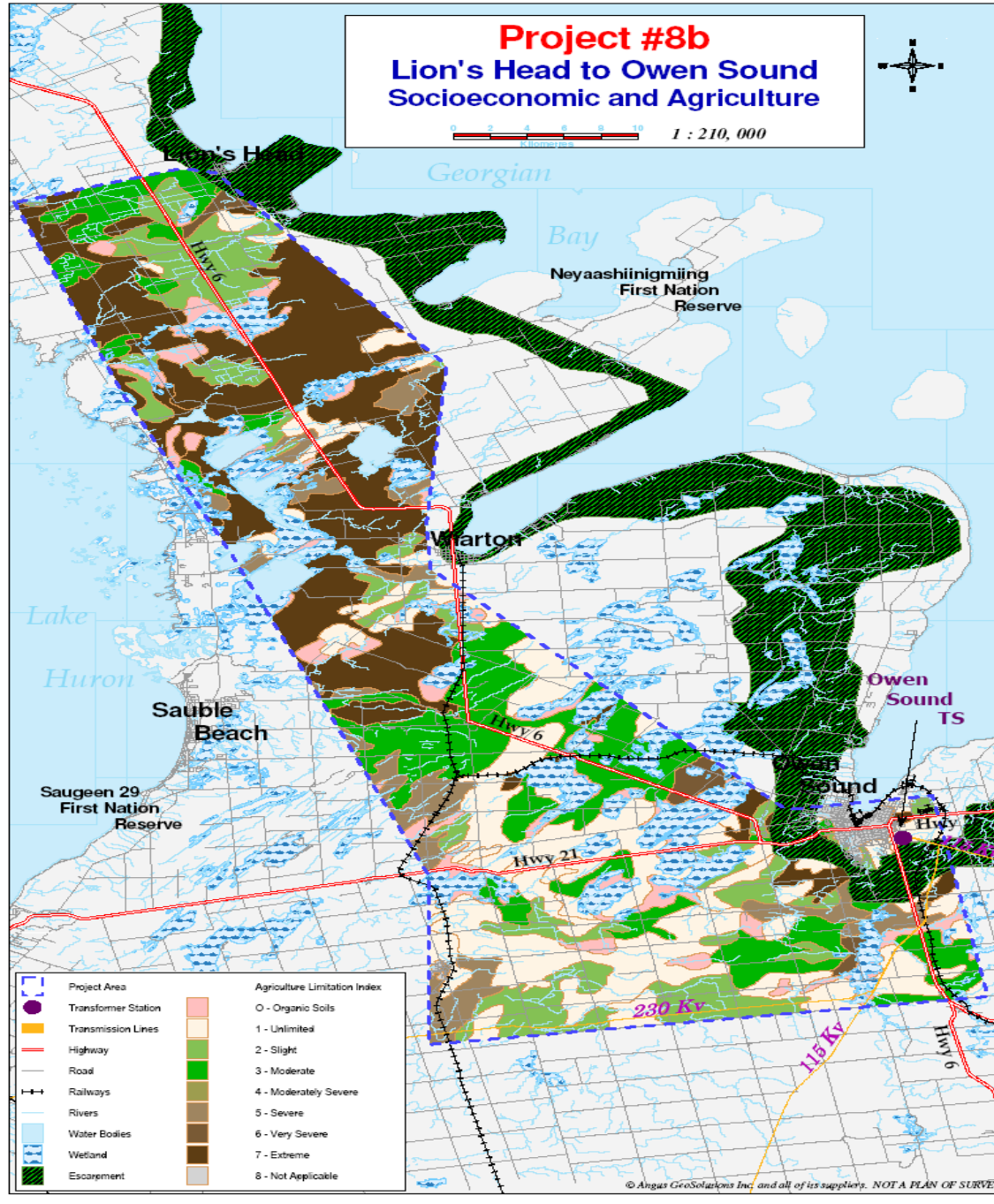
- Encompasses Bruce Peninsula but avoids most of the Niagara Escarpment area
- Some agricultural lands
- Two FN reserves:
 - Neyaashiinigmiing First Nation Reserve located outside of the study area in Cape Croker
 - Saugeen 29 First Nation Reserve outside of the study area in Sauble Beach South.
- One nature reserve, north of Highway 21, west of Owen Sound.

Project #8b

Lion's Head to Owen Sound Socioeconomic and Agriculture



0 2 4 6 8 10
Kilometers
1 : 210, 000



	Project Area		Agriculture Limitation Index
	Transformer Station		0 - Organic Soils
	Transmission Lines		1 - Unlimited
	Highway		2 - Slight
	Road		3 - Moderate
	Railways		4 - Moderately Severe
	Rivers		5 - Severe
	Water Bodies		6 - Very Severe
	Wetland		7 - Extreme
	Escarpment		8 - Not Applicable

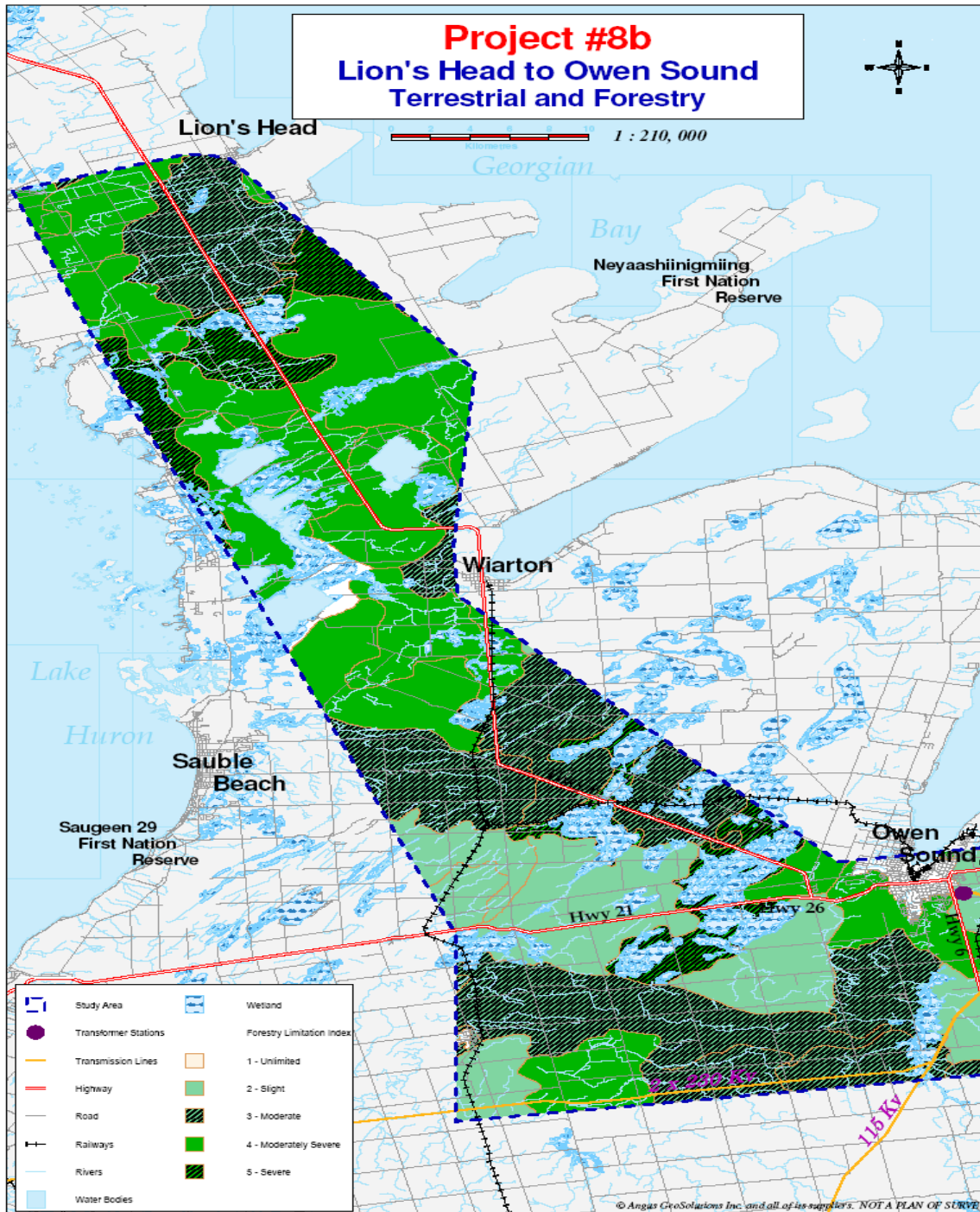
Baseline Natural Environmental Conditions

- Large lake complex north and west of Wiarton.
- Flora and fauna typical of Bruce Peninsula
- Numerous wetlands and watercourses associated with the lake complex.
- Limited mineral and forestry resources

Project #8b Lion's Head to Owen Sound Terrestrial and Forestry



Scale: 1 : 210,000

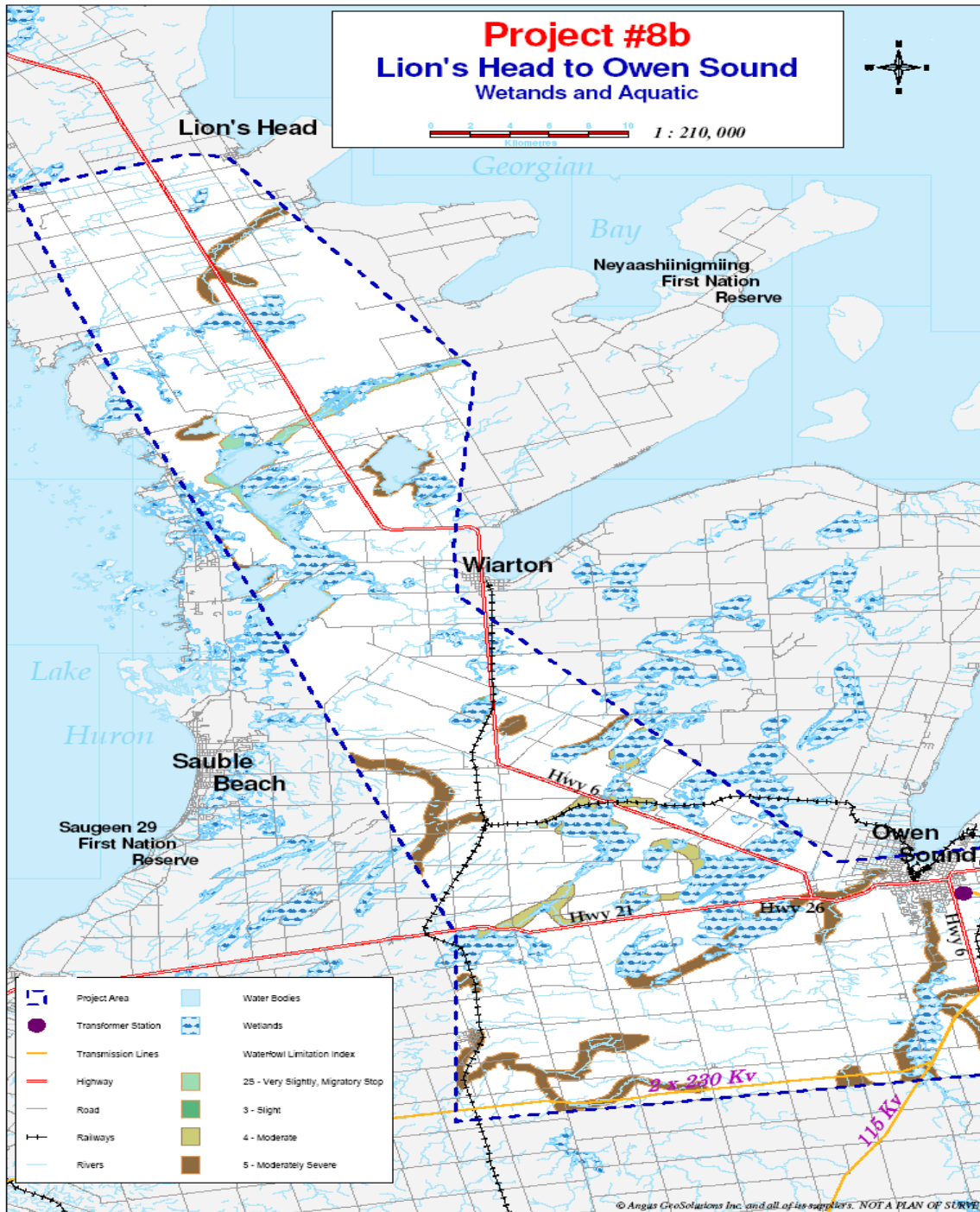


	Study Area		Wetland
	Transformer Stations		Forestry Limitation Index
	Transmission Lines		1 - Unlimited
	Highway		2 - Slight
	Road		3 - Moderate
	Railways		4 - Moderately Severe
	Rivers		5 - Severe
	Water Bodies		

Project #8b Lion's Head to Owen Sound Wetlands and Aquatic



0 2 4 6 8 10
Kilometres 1 : 210,000



	Project Area		Water Bodies
	Transformer Station		Wetlands
	Transmission Lines		Waterfowl Limitation Index
	Highway		25 - Very Slightly, Migratory Stop
	Road		3 - Slight
	Railways		4 - Moderate
	Rivers		5 - Moderately Severe

Nodes for Corridor Analysis

Node	Location
A	New Transformer Station west of Lion's Head
B	

Project Level Assessment

- Are there corridors that can be developed into possible future transmission corridors?
 - All corridors pass through or near potentially sensitive habitat or Conservation Authorities (“CA’s”)
 - All of the corridors traverse wetlands and aquatic habitat areas. Potential aquatic and terrestrial effects can be mitigated. Route alternatives, their impacts and mitigation requirements will need to be considered as part of a future Individual E.A.
 - From Hepworth south there are a number of options, which can be located to avoid Bruce Trail recreation features and Niagara Escarpment.
 - In the vicinity of Owen Sound, crossing the Niagara Escarpment cannot be avoided.
- Southern area more suitable than central Bruce Peninsula area.

Cumulative\ Combined Impact Analysis Bruce Peninsula

- No other corridors, right of way projects or other projects planned for this study area or during this time period.
- Increased transmission access to the Bruce Peninsula to the wind farms will also provide increased power supply to other users – potential demand for new development.

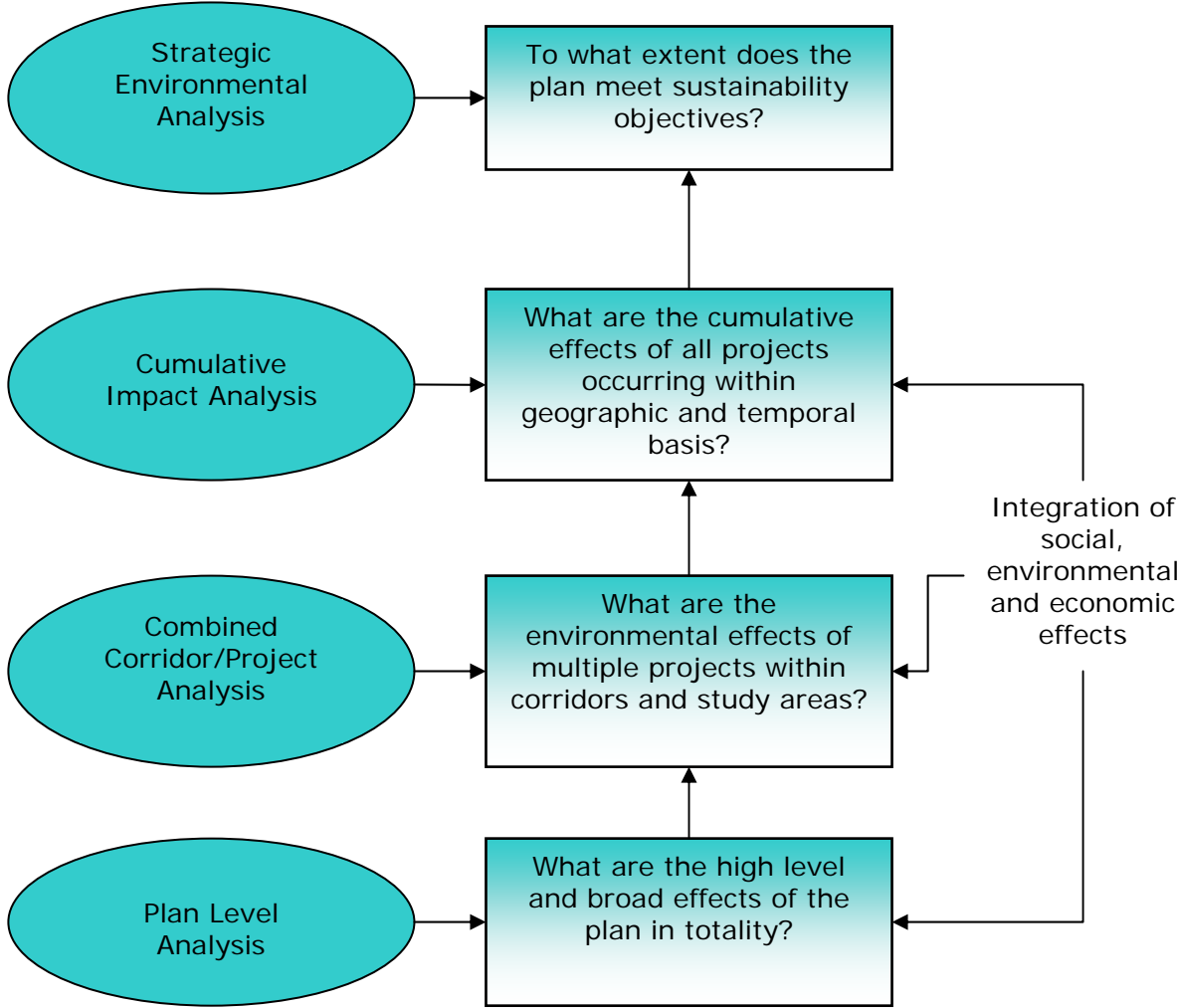
Step 2: SEA

- Project level analysis completed for all 12 potential transmission projects.
- Rolled up Project level analysis into Strategic Environmental Analysis.

SEA-level Methodology

- Cumulative impact analysis
 - Effects of the transmission projects in relation to other projects or activities (new roads, pipelines, etc.)
- Combined Corridor/Project
 - All projects occurring within the same corridor
 - Can existing corridors accommodate a new corridor/ new generation
- Plan level analysis
 - Wider impacts of all alternatives seen together: synergistic, long range and delayed effects

Strategic EA Methodology: IPSP Transmission and Generation Projects



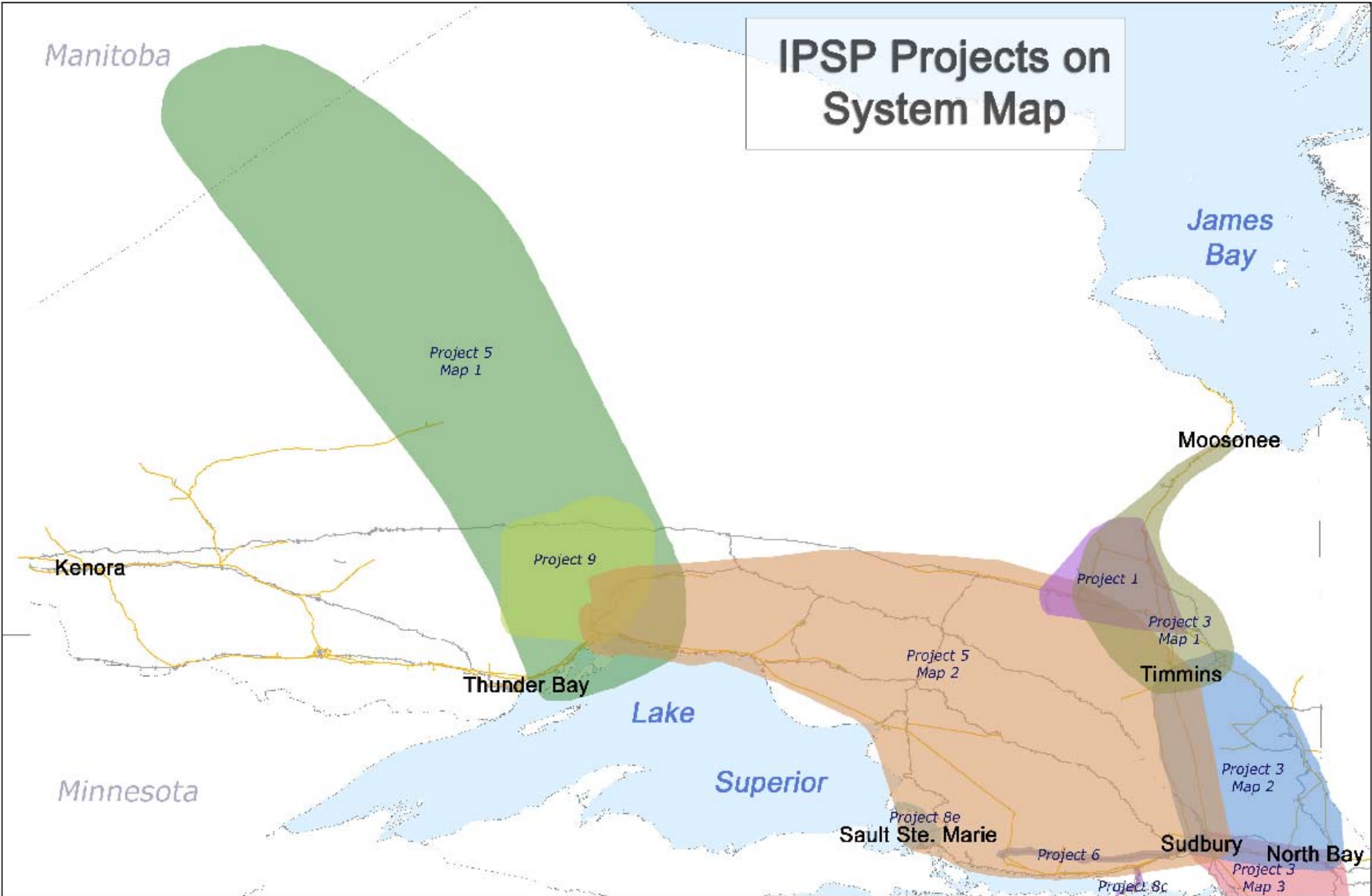
SEA evaluation – sustainability analysis filter

- Type of Effect
- Level of public concern
- Construction and operation
- Location and magnitude
- Predictability
- Risks from Natural Hazards

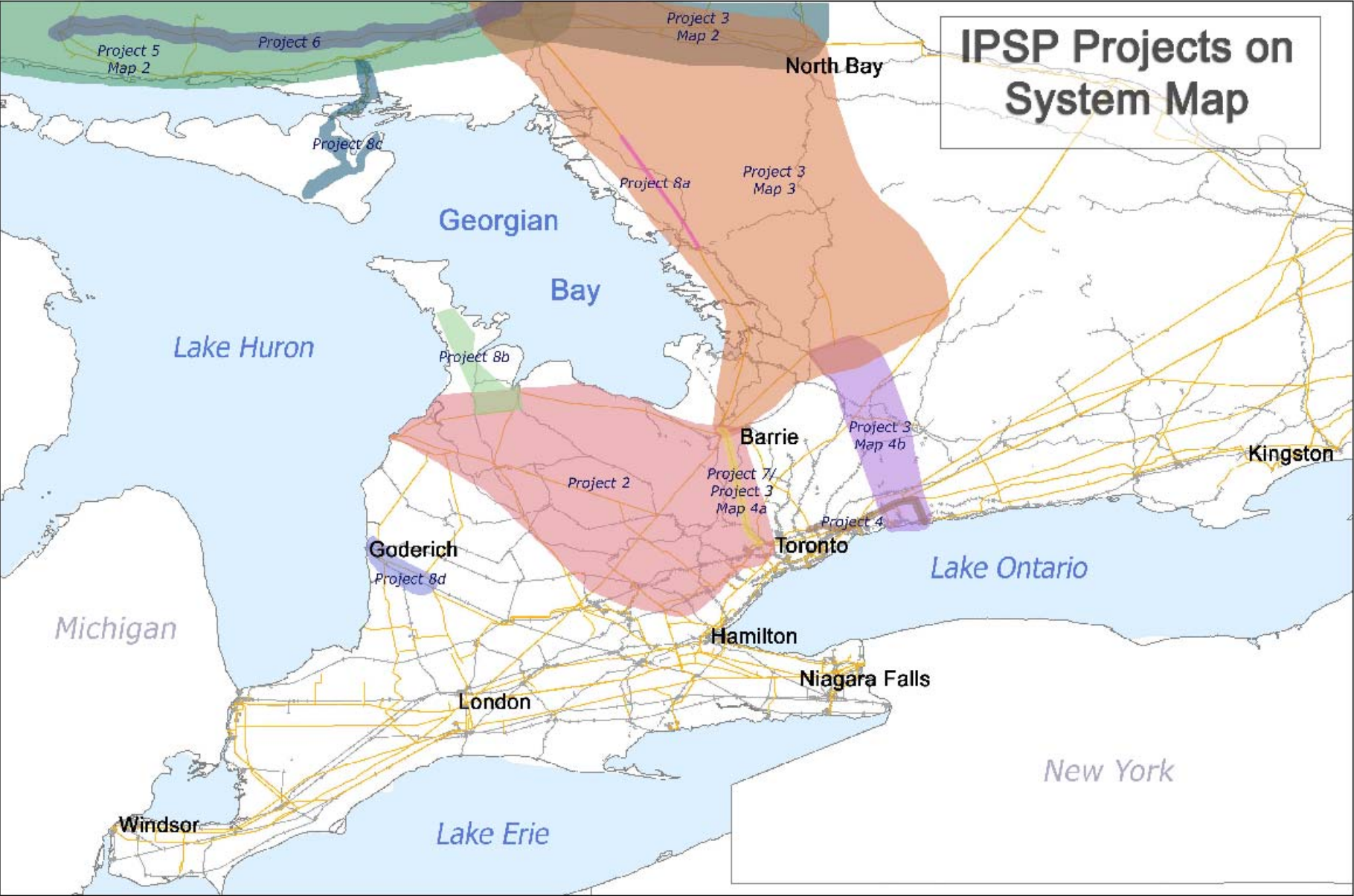
Sustainability Assessment

- Reversibility and Resiliency
- Cumulative nature
- Mitigation, Compensation and Residual effects
- Social Justice
- Do Nothing Alternative

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Strategic Environmental Assessment

Strategic EA Observations:

- Transmission lines can be constructed so as to implement the Plan.
- \$ Billions in investment and massive construction if all lines proceeded in same time period.
- New lines along corridors only designed for existing lines.
- No existing corridors in some areas of southern Ontario.
- Servicing electricity demand in highly urbanized areas may require underground lines.
- Pressure on some areas of GTA for other uses – e.g. Parkway Belt pressure for Metrolinx, water, sewer and natural gas infrastructure to support Places to Grow

Sustainability Issues

- A greenfield East Lake Simcoe corridor will alter a range of future land-uses.
- The Manitoba Interconnection will open up access to remote areas of North-Western Ontario.
- All of the new Generation will require new transmission that interacts with built up areas of the GTA and other load centres.
- Opening up access to the near and far north.
- Significant Natural Features will be traversed.
- Competition for materials and labour at provincial scale.

Strategic EA: Summary

- Need to address sustainability issues pertaining to the shift to Northern Ontario as a dominant location of new additional generation
- Construction activity (and the resultant load) will be dominated by a few strategic corridors
- First Nations and rural settlements will be impacted both positively and negatively
- Opportunities to use existing rights of way
 - Will create competition in some areas

Summary

- 11 projects offer a reasonable range of alternatives, one project problematic
- Can be constructed in sustainable manner
- Identified effects associated with potential corridor choices that would be addressed at Individual EA stage.