

Preliminary Assessment Pipeline Safety Impacts



OEB Energy East Consultation and Review

Ontario Energy Board
Commission de l'énergie de l'Ontario

Overview

1. Background

- Who We Are
- What the OEB Asked us to Do
- Approach to the Assessment

2. Pipeline Integrity

3. Emergency Management



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Who We Are

DNV GL is a leading technical advisor to the global oil and gas industry, the world's leading ship and offshore classification society, and a leading expert for the energy value chain including renewables and energy efficiency. Operating in more than 100 countries, our 16,000 professionals are dedicated to helping our customers make the world safer, smarter and greener.



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What the OEB Asked Us to Do

The OEB retained DNV GL to provide independent expert advice on the pipeline safety considerations that relate to the Energy East Pipeline project.

Our work focused on two main aspects of pipeline safety:

- Pipeline integrity.
- Emergency management.



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Approach to Assessment

- Consider risk:
 - Probability of failure (Pipeline Integrity).
 - Consequences (Emergency Management).
- Consider principles in Minister's letter:
 - Pipelines must meet the highest technical standards for public safety and environmental protection.
 - Pipelines must have world leading contingency planning and emergency response programs.



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Pipeline Integrity

Factors that affect probability of a pipeline failure:

- Threats (failure modes) to the pipeline.
- Measures for managing threats.

Relevant elements of Energy East Application:

- Mechanical properties of the pipe.
- Pipe manufacturing process.
- Coating system.
- In-line inspection.



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Mechanical Properties of the Pipe

- The specifications for the new pipeline meet or exceed the requirements of the national pipeline standard.
- The existing pipeline inherently has a higher resistance to fracture initiation and propagation than would a new oil pipeline manufactured in accordance with the current pipeline standard.

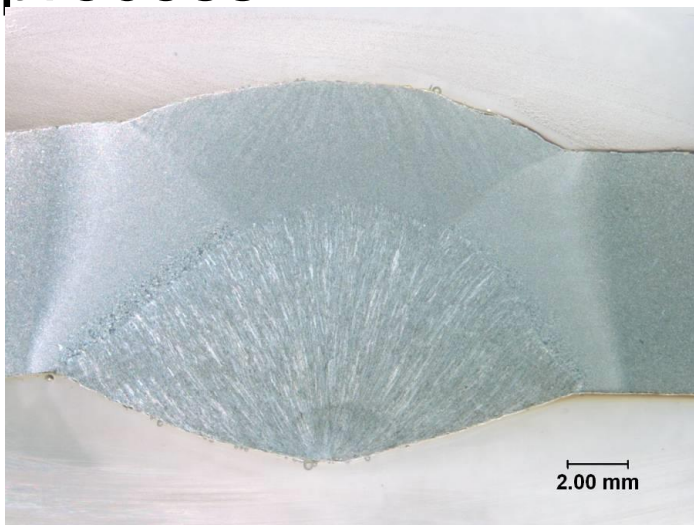


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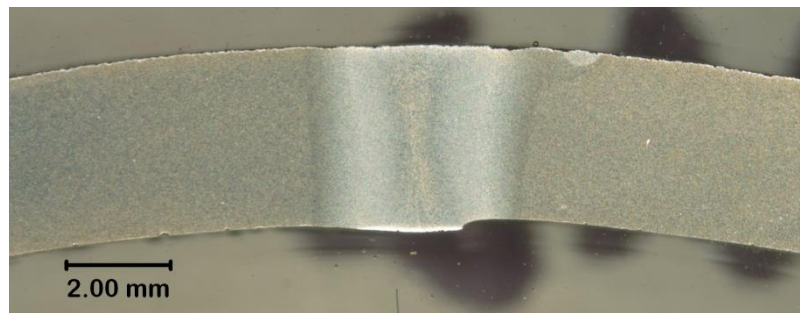
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Pipe manufacturing process

100% of the existing pipeline was manufactured using the double submerged arc welding (DSAW) process



DSAW Pipe



ERW Pipe



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Coating System

~ 95% of the existing pipeline is coated with Fusion Bond Epoxy (FBE).

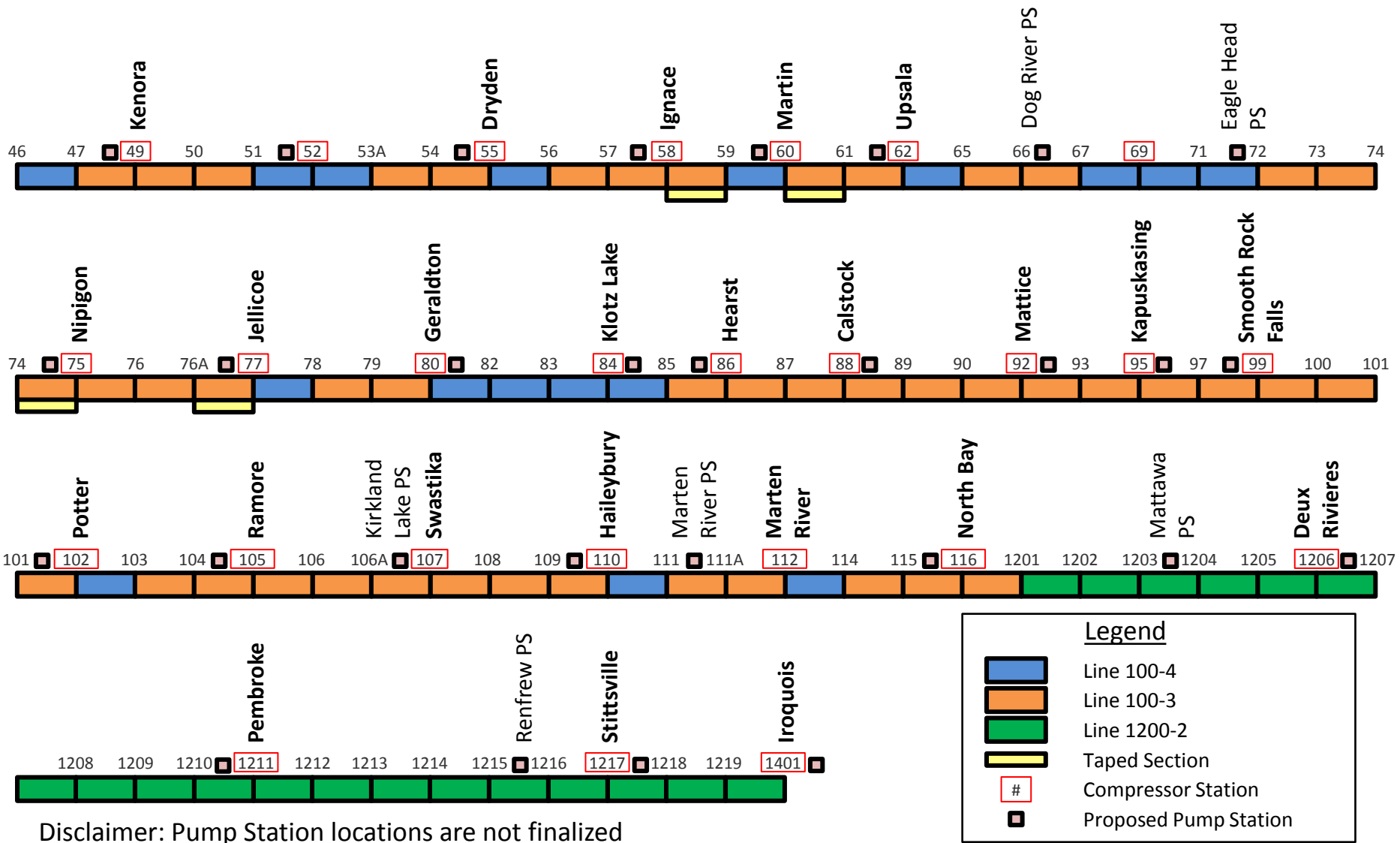


~ 5% is coated with double wrap polyethylene coating.



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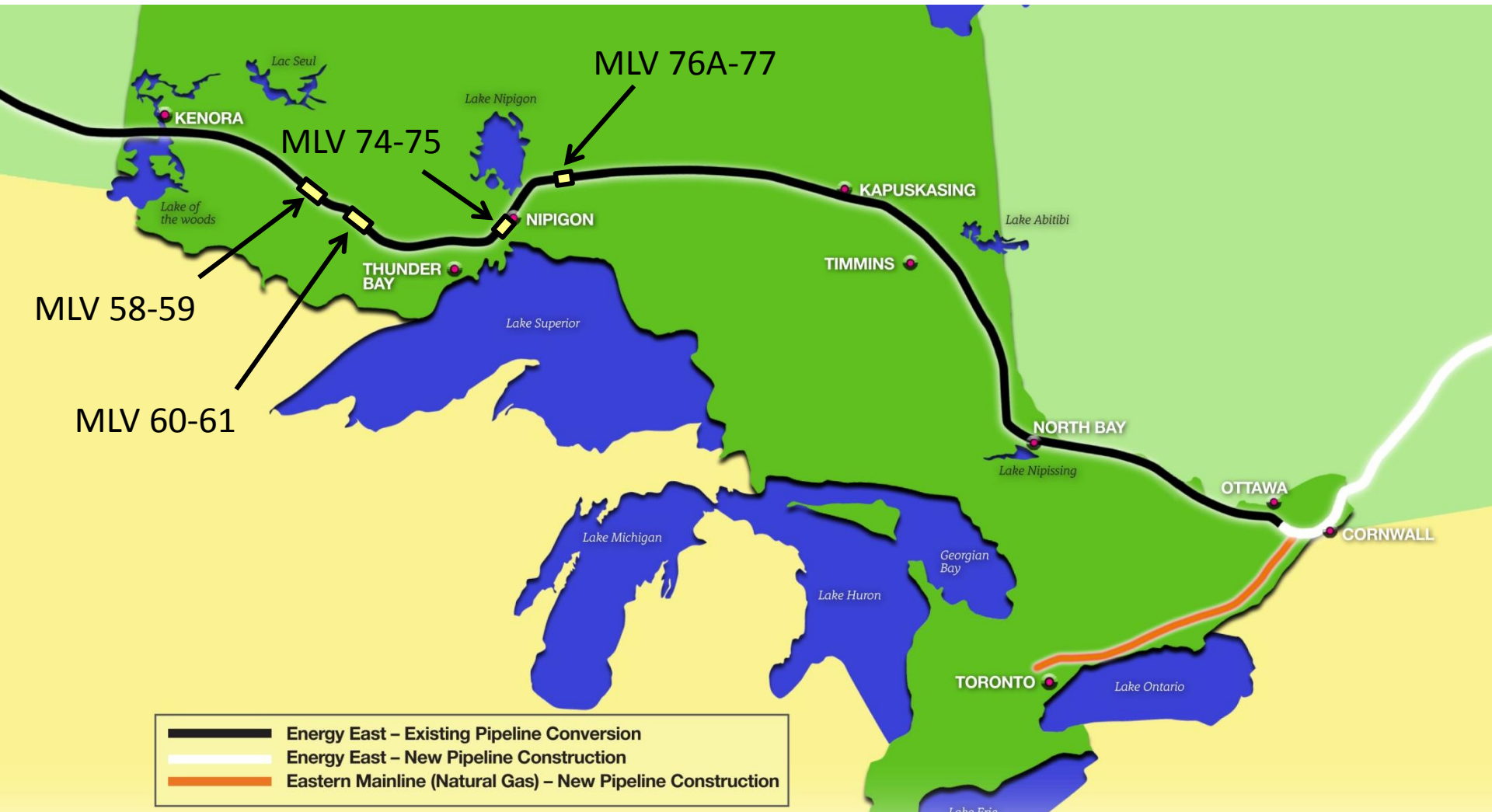
Disclaimer: Pump Station locations are not finalized



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Tape-Coated Sections



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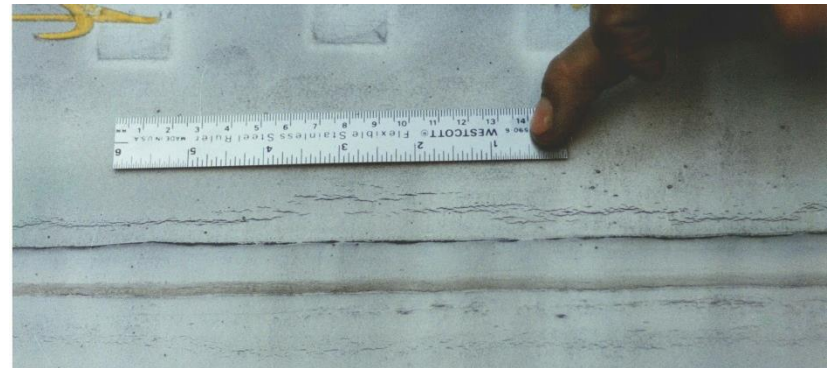
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In-line Inspection

Modern in-line inspection tools can reliably detect and size corrosion.



Stress Corrosion Cracks (SCC) are more difficult to accurately detect and size.



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Pipeline Integrity

Preliminary Assessment:

The primary integrity-related issue for the Energy East pipeline in Ontario is the potential for **stress corrosion cracking on tape-coated sections.**

For consideration:

Hydrostatically test Line 100-3 between MLV 58 and 59 prior to operation to verify the findings from the planned crack detection in-line inspections.



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Emergency Management

Key factors that affect the consequences of a pipeline failure:

- Volume of product released.
- Location.
- Product type.

Relevant elements of the Energy East Application:

- Valve type and placement.
- Leak detection system.
- Emergency response.



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Valve type and placement

- Preliminary valve locations and types have been chosen.
- The Energy East Application indicates that valve site locations will be confirmed during detailed design, taking into consideration site-specific factors and feedback from regulatory authorities, landowners, stakeholders and Aboriginal communities.



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Leak Detection System

- If an alarm cannot be conclusively explained as a non-leak within 10 minutes, a pipeline shutdown is immediately initiated.
- Pipeline shutdowns, including pump shutdown and valve closure, are expected to be completed within 12 minutes of the initiation of a shutdown.



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Emergency Response

- TransCanada (in the Application) has committed to developing emergency response plans (ERP) in consultation with emergency service agencies and communities along the route.
- TransCanada to file the final ERPs with the National Energy Board and distribute them to applicable emergency service agencies, as necessary, before Project commissioning.



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Emergency Management

For consideration:

- With respect to valve placements, demonstrate that potential release volumes are as low as reasonably practicable.
- Provide a list of water crossings in Ontario that will be protected by additional valves.
- Confirm conformance with CSA Z662 Annex E.
- Provide performance specifications for the leak detection system and provide evidence that specifications are met or exceeded in operation.



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Emergency Management

For consideration:

- Conduct detailed analysis of potential spill release and trajectory for critical locations in Ontario and perform a response capability assessment to demonstrate that TransCanada will be able to respond effectively and that impacts can be mitigated to acceptable levels.
- Demonstrate financial capability (\$1 Billion) to respond to a pipeline failure and remedy the situation.



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Preliminary Assessment Natural Environment Impacts



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Overview

- The OEB asked DNV GL to review TransCanada's Energy East Application with respect to impacts on the natural environment in Ontario.
- We reviewed about 2,500 pages of the Application (including the ESA) to assess how well it addressed industry best practices and environmental issues raised by First Nations and the general public.



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Approach to Preliminary Assessment

TCPL's Application was reviewed in regards to:

- the six principles stated in the Minister's letter;
- the Part One Public Consultation Report by Swerhun Inc.;
- the Part One First Nations and Métis Report by Counsel Public Affairs;
- the Background Environmental Considerations Report prepared by TERA;
- the NEB Filing Manual; and
- professional judgement.



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General Observations

- TCPL’s application is incomplete. Additional information is expected in the New Year.
- It is premature to assess:
 1. the Application’s conclusion of “no significant adverse environmental effects”;
 2. if the Application meets “the highest available technical standards for environmental protection”; and
 3. if the Application reflects “world leading contingency planning”.



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General Observations

- The converted pipeline portion only addresses 28 new pump stations and roads, 2 trenchless river crossings and operations/maintenance.
- No distinction in routing an oil pipeline vs. a gas pipeline even though the NEB has recognized the importance of route selection in mitigating environmental impacts of oil pipelines.



Impacts on Water

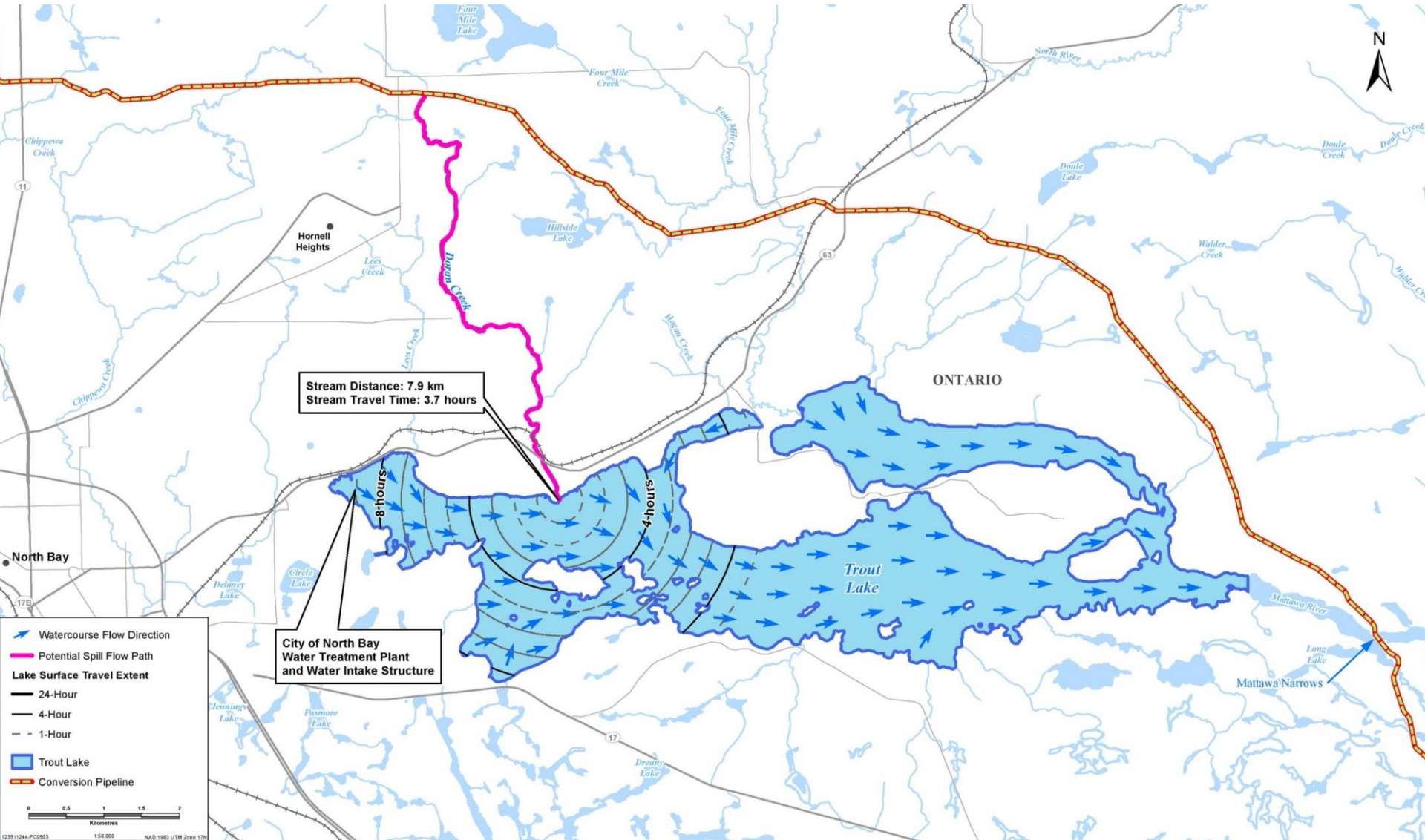
- TCPL's Application is incomplete with respect to impacts on drinking water.
- Trout Lake, Rideau River and Private Well Clusters in Rideau Area and other water wells are recognized but rest of route not covered.
- 102 water crossings identified on 104 km new pipeline portion.
- Alternative route north of St. Lawrence River has not been examined.
- TransCanada commits to provide alternative sources of drinking water in event of a spill.



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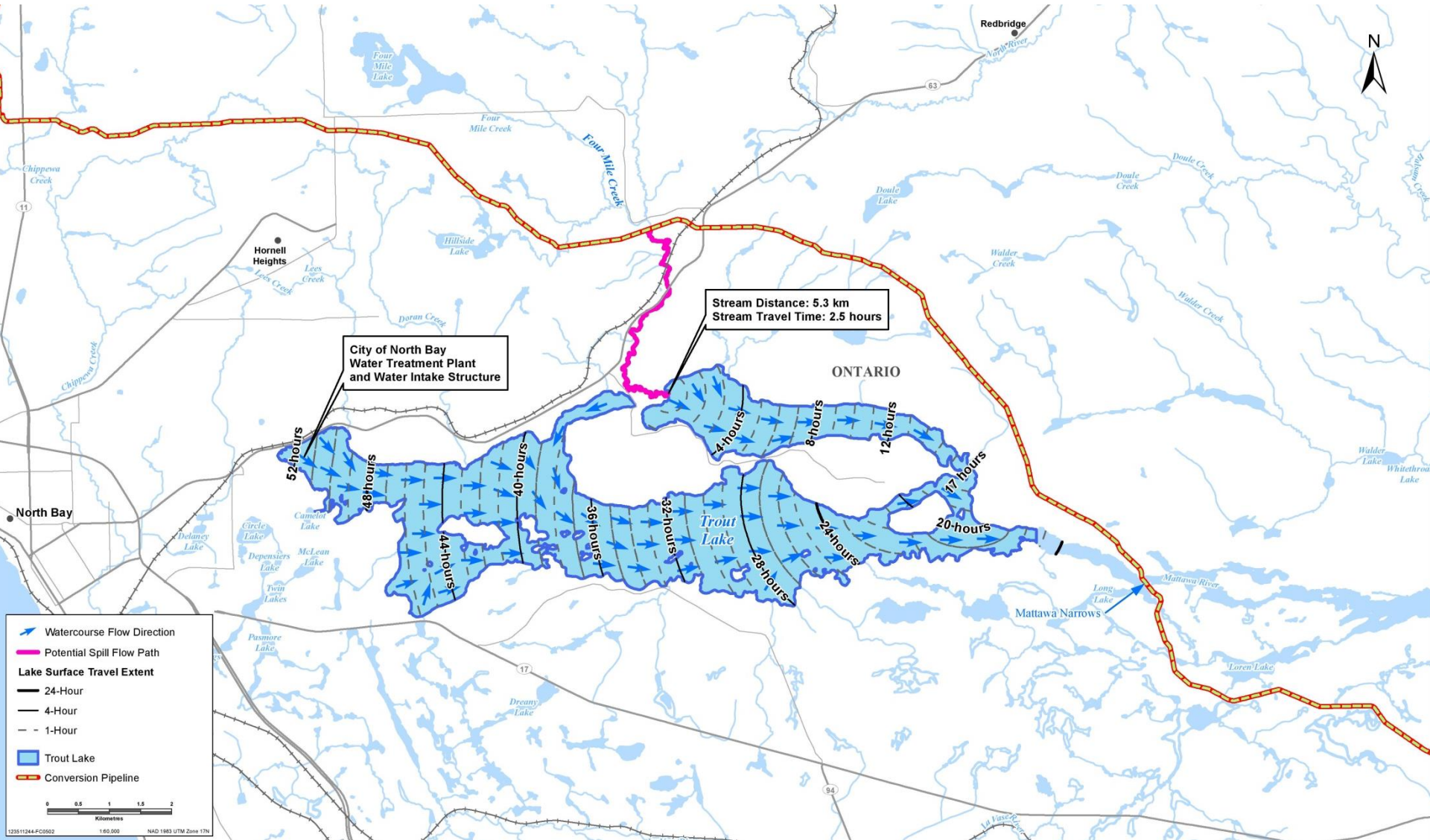
Impacts on Water



Watercourse Flow Direction
 Potential Spill Flow Path
Lake Surface Travel Extent
 24-Hour
 4-Hour
 1-Hour
 Trout Lake
 Conversion Pipeline

0 0.5 1 1.5 2
 Kilometres
 1:50,000
 NAD 1983 UTM Zone 17N

Impacts on Water



Impacts on Trout Lake

TCPL Proposed Mitigation:

- Emergency response equipment will be staged in North Bay.
- A release at or near the Doran Creek crossing or the Four Mile Creek crossing would have a transit time of 9 hours and 54 hours respectively.
- Energy East's Emergency Response Plan requires operators to immediately notify the Ontario Clean Water Agency and North Bay regional operators, who would close the municipal water intake as a preventative measure.



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Impacts on Trout Lake

TCPL Proposed Mitigation:

- Emergency crews would deploy pre-positioned containment and absorbent booms to contain the spill as close to the release site as practical.
- Water samples will be collected during containment and cleanup to monitor water quality to determine the areal extent of contamination and efficacy of the clean up.



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Impacts on Trout Lake

TCPL Summary of Effects:

In summary, TCPL does not anticipate adverse effects to North Bay's intake from a pipeline release because TransCanada has determined:

- the probability of a spill is low,
- spill volumes would likely be small,
- pathways to the site of intake range from unlikely to improbable due to the lake's configuration,



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Impacts on Trout Lake

TCPL Summary of Effects:

- concentrations are not expected to exceed water quality criteria above the intake under most scenarios,
- and the depth of the intake precludes contamination.

TransCanada's Application concludes that "no effects to the water quality at the North Bay intake are expected".



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Impacts on Rideau River and Canal

- Rideau Canal recognized as National Historic Park and UNESCO World Heritage Site.
- Rideau River recognized as a Canadian Heritage River.
- Application proposes a trenchless crossing with a contingency open-cut if the trenchless technique proves infeasible.



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Impacts on Rideau River and Canal

For consideration:

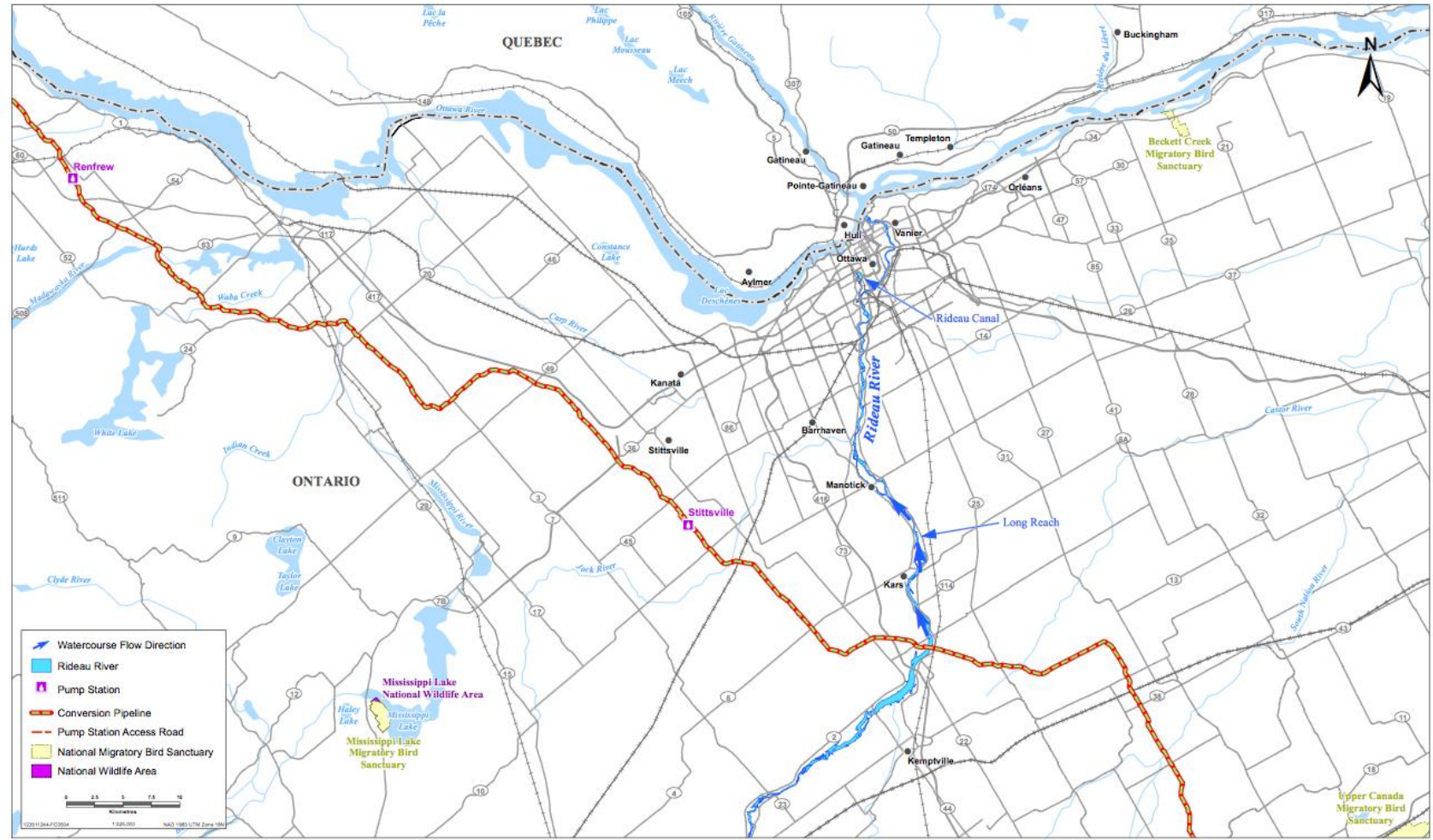
- Prepare a detailed Rideau Canal Trenchless Crossing Environmental Protection Plan complete with open-cut crossing protection measures if the trenchless crossing methodology proves infeasible.



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Impacts on Rideau River and Canal



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Impacts on Rideau River and Canal

TCPL Proposed Mitigation:

- Trenchless technology
- Use of lock-and-dam system to control spill within Long Reach
- Leak detection, valves closed and emergency response personnel dispatched to contain and clean up spill in coordination with appropriate agencies



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Impacts on Rideau River and Canal

TCPL Summary of Effects:

TransCanada does not anticipate effects to recreational activities and aquatic resources in the Rideau River from a spill because:

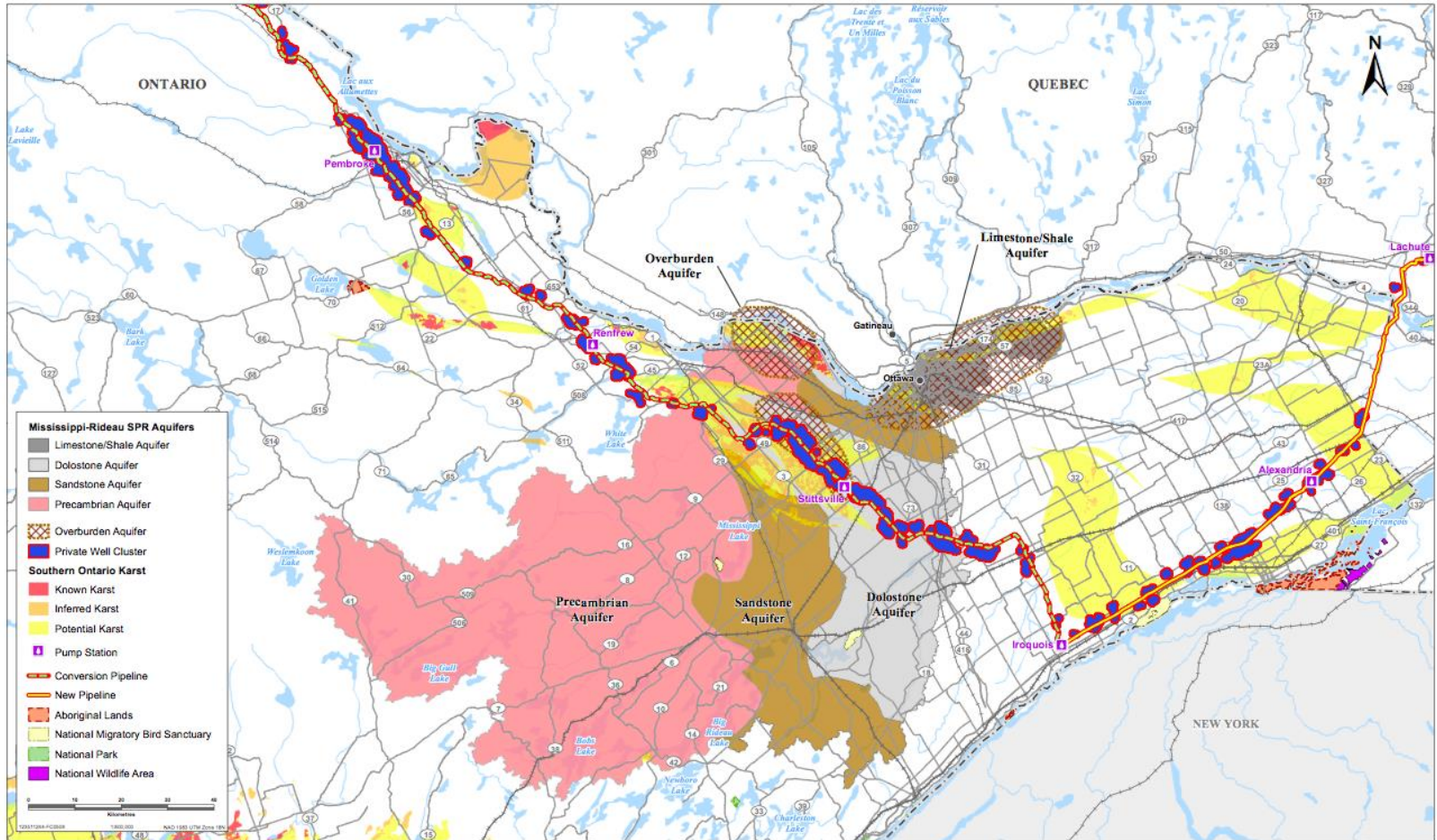
- the probability of a spill is low,
- spill volumes would likely be small, and
- effects would be short-term, localized, low magnitude and reversible.



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Impacts on Well Clusters in the Mississippi-Rideau Sources Protection Region



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Impacts on Well Clusters in the Mississippi-Rideau Sources Protection Region

TransCanada's Application states that the probability of a release from the pipeline near private well clusters is very low because:

- The majority of petroleum hydrocarbon plumes are 100m or less,
- The Project's pipeline materials and design are expected to minimize the likelihood of a spill and reduce the volume of oil released in the event of a spill,



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Impacts on Well Clusters in the Mississippi-Rideau Sources Protection Region

- valves are strategically located along the Project route to reduce the amount of crude oil that potentially could be spilled,
- a small spill of 50 bbl has a probability of occurring once in 110 years,
- a large spill of 10,000 bbl is estimated to occur only once in over 10,600 years, and
- if drinking water intake was affected, Energy East has committed to provide an alternative drinking water source



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Impacts on Water

For consideration:

- Conduct a full-bore rupture modelling.
- Map all surface water intakes and springs.
- Consult with public and First Nations.
- Reroute where pipeline may be too close to sensitive water resources such as in the vicinity of the St. Lawrence River.
- Designate significant water crossings, valve spacing and Emergency Response Plans (ERP).
- Prepare source water protection plans and watercourse crossing management plans.



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Impacts on Fish and Wildlife

- Application indicates that no significant effects are anticipated except potential for cumulative effects on woodland caribou habitat at two pump stations in Kesagami Range.
- Application proposes offset measures consistent with the Woodland Caribou Recovery Program to compensate for habitat loss but details not provided.



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Impacts on Parks and Natural Areas

- Converted pipeline crosses 8 Provincial Parks, 4 Conservation Reserves and 4 Conservation Areas but no details provided.
- Application addresses wetlands at a high level but no detail on impacts or mitigation.



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Impacts on Parks and Natural Areas

For consideration:

- Provide detailed park protection plans.
- Provide detailed wetland studies addressing avoidance, function, mitigation, monitoring and compensation for wetland loss.



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Impacts on Agricultural Resources

- Application describes and maps agricultural soils and land use but no detailed Emergency Response Plans for land based spills are provided.
- No drain tile noted on new pipeline segment.



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Impacts on Agricultural Resources

For consideration:

- Develop a project specific Emergency Response Plan.
- Map and repair any drain tiles crossed.



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Other Considerations

- Complete Traditional Ecological Knowledge (TEK) and Traditional Land Resource Use (TLRU) studies and demonstrate how they have been integrated into the ESA and changed project planning.
- Study the 125+ km of power lines that serve pump stations and remotely controlled mainline valves and incorporate mitigation into this project.



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