

# APPENDIX 2.0-A

## *Alternative Route Evaluation*



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# 1.0 Introduction

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Hydro One is proposing to construct the Waasigan Transmission Line Project (the Project). The Project includes the construction, operation, and maintenance of a double-circuit 230 kilovolt (kV) transmission line in northwestern Ontario between the Lakehead Transformer Station (TS) in the Municipality of Shuniah and the Mackenzie TS in the Town of Atikokan, and a new single-circuit 230 kV transmission line between the Mackenzie TS and the Dryden TS in the City of Dryden. The total length of the Project will be approximately 360 kilometres (km) in total. The Project also includes the separation of approximately 1 km of a double-circuit section of existing 230 kV transmission line outside the Mackenzie TS in Atikokan (circuits F25A and D26A) into two separate single-circuit transmission lines. Modifications will be required to the existing Hydro One TSs that serve as connection points for the undertaking. Figure 1.1-1 depicts the general Project location and the alternative routes evaluated for the Project.

## 1.1 Objectives

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The purpose of this report is to summarize the alternative route evaluation undertaken to identify a preferred route for the Project. The process to identify the alternative routes as described in the approved Amended Terms of Reference (ToR) (Hydro One 2021). The alternative route evaluation leverages and builds on the alternative routes and the criteria and indicators provided in the ToR. The objective of the alternative route evaluation was to compare the alternative routes to identify a preferred route that has, on balance, more advantages than disadvantages with respect to Indigenous culture, values and land use; natural environment; socio-economic environment; and technical and cost considerations.



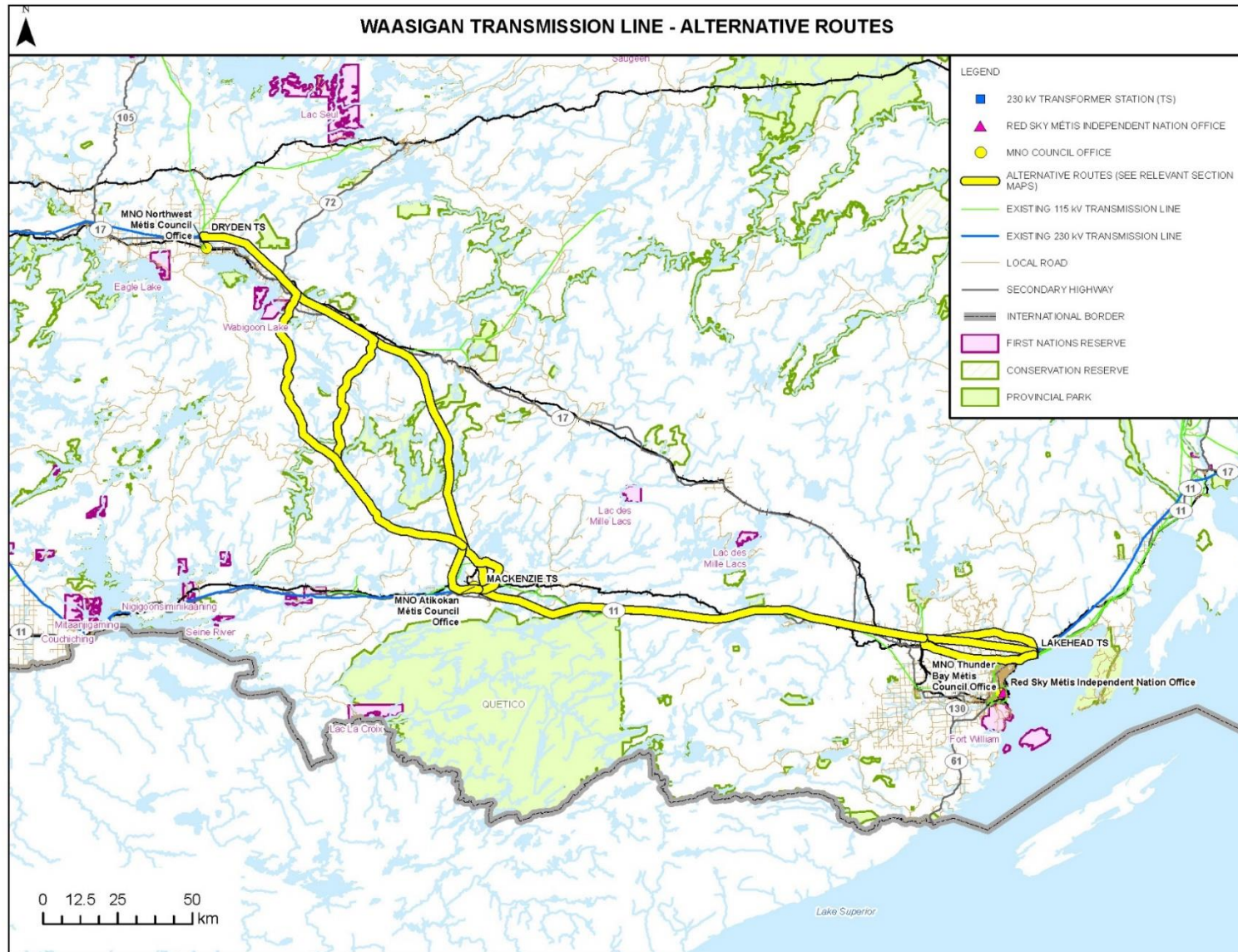


Figure 1.1-1: Project Location





### 1.1.1 GoldSET™ Overview

To evaluate the performance of the alternative routes identified in the approved Amended ToR, the Golder Sustainability Evaluation Option Analysis Web Tool (GoldSET™) was applied. The purpose of applying GoldSET™ was to compare the alternative routes in order to provide a preferred route to be assessed in the environmental assessment (EA).

GoldSET™ effectively implements sustainable planning at the design level by providing a means to better understand and manage risks in the context of new challenges arising from the changing environment. The tool is designed to offer a simple, systematic process to evaluate Project alternatives across the four criteria categories relevant to the Project (Indigenous culture, values, and land use; natural environment; socio-economic environment; and technical and cost considerations). The purpose of the tool for this evaluation was to generate a recommendation about the most optimal and sustainable solution (i.e., preferred route) for the Project.

The tool is based on a simplified multi-criteria analysis, an approach that has been widely used to combine often diverse stakeholder goals with project performance criteria. The evaluation process typically comprises five steps (Figure 1.1-2) to compare project options by scoring performance indicators and assessing the impacts of any given option. Scores are then rolled-up into the four criteria categories. For each criteria category, the total score ranges from 0% to 100%, with the higher the score, the better the result.



**Figure 1.1-2: Five Steps of the Evaluation Process with GoldSET™**

GoldSET™ provides a simple and intuitive visual representation of results to make it easier to interpret their meaning and can also be used to support communications and promote better understanding among various (non-technical) stakeholders. The framework facilitates communication about the key impacts, benefits, and drawbacks of different alternatives, and provides traceability and transparency throughout the decision-making process.

Selecting criteria and indicators, upon which an evaluation can be performed, is a critical step in developing a comprehensive GoldSET™ analytical framework. Criteria and indicators are selected to mirror the key decisions upon which an assessment must be based if it is to be reliable and deemed to be reasonable. In general, the development of a framework of criteria and indicators is informed by a variety of sources, such as the general routing principles, regulatory and act requirements, environmentally specific standards, scientific publications, feedback from Indigenous communities, government officials and agencies, and interested



persons and organizations and landowners, and the technical expertise of the specialists involved.

Facilitated through inputs from subject matter experts and engagement feedback, the criteria and indicators are weighted based on their relative importance across the four criteria categories. The weighting of each alternative is subsequently analyzed and quantitatively compared against each other.

The interpretation and decision-making process consists of reviewing the results, comparing the alternatives, and determining which is the preferred alternative based on the highest overall score.

The GoldSET™ tool allows for the easy configuration of the alternatives, criteria and indicators, and the application of weights. The results are automatically generated and provide an overview of the total scoring for each alternative, but also of scores against the four criteria categories. This allows for a balanced and informed review of the overall multi-criteria analysis results.

### 1.1.2 Study Considerations

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This alternative route evaluation is based on the best available data and information obtained through public sources, including engagement, commercial licence (e.g., protected data from agencies), field studies, and Indigenous knowledge.

Where field data was not collected, the spatial data used in the alternative route evaluation was supplemented with data at a regional scale (greater than 1:20,000), and, as such, local site features may not be detectable in those areas.

Feedback and Indigenous knowledge from Indigenous communities was incorporated where available, including into the development of the criteria and indicators used in the evaluation. Hydro One has committed to considering Indigenous knowledge at key milestones throughout the Project as it is received. Indigenous knowledge will be considered in future stages, such as during the refinement of the Project footprint, and planning of mitigation and monitoring requirements.



## 2.0 Alternative Route Evaluation

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The following sections provide an overview of the methods used for the alternative route evaluation process.

### 2.1 Identification of Alternative Routes

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Alternative routes for the proposed transmission line were identified as part of the Amended ToR (Hydro One 2021). Feedback received during the development of the Amended ToR was used to support the identification of the alternative routes and the identification of the preliminary criteria and indicators for the identification of a preferred route for the proposed transmission line.

Decisions related to identifying alternative routes were based on a variety of factors, including input and data received through engagement (e.g., workshops, public surveys, etc.), the general character of the area (e.g., land use and location of sensitive features), the type and location of existing, previously disturbed rights-of-way (ROWs) that could potentially be paralleled (e.g., many are located very close to each other thus not providing any material difference), and a preference for co-location with existing infrastructure when possible, as outlined in the PPS (2020).

The Amended ToR identified alternative routes for the following sections:

- City of Thunder Bay (Lakehead TS) to the Town of Atikokan (Mackenzie TS);
- Town of Atikokan;
- North Atikokan to Wabigoon Lake; and
- Wabigoon Lake to the City of Dryden (Dryden TS).

In order to effectively compare the alternative routes on a quantitative basis in the alternative route evaluation, the routes from the Amended ToR were divided into four sections with common start and end points and re-numbered. Some routes share common sections. No new routes were added, and no routes were removed from those that were previously included in the ToR. The four alternative route sections and revised alternative route numbers are provided in Table 2.1-1.





**Table 2.1-1: Revised Alternative Route Sections, Groupings and Numbers**

Section	Alternative Routes
Section 1: Thunder Bay Area	<ul style="list-style-type: none"> <li>● Alternative Route 1</li> <li>● Alternative Route 1A</li> <li>● Alternative Route 1B-1</li> <li>● Alternative Route 1B-2</li> </ul>
Section 2: Thunder Bay to Atikokan	<ul style="list-style-type: none"> <li>● Alternative Route 1</li> <li>● Alternative Route 1C</li> </ul>
Section 3: Atikokan Area	<ul style="list-style-type: none"> <li>● Alternative Route 2A</li> <li>● Alternative Route 2B</li> <li>● Alternative Route 2C</li> </ul>
Section 4: Atikokan to Dryden	<ul style="list-style-type: none"> <li>● Alternative Route 3A</li> <li>● Alternative Route 3B</li> <li>● Alternative Route 3C</li> </ul>

Figure 2.1-1 to Figure 2.1-4 geographically illustrate the alternative route groupings.



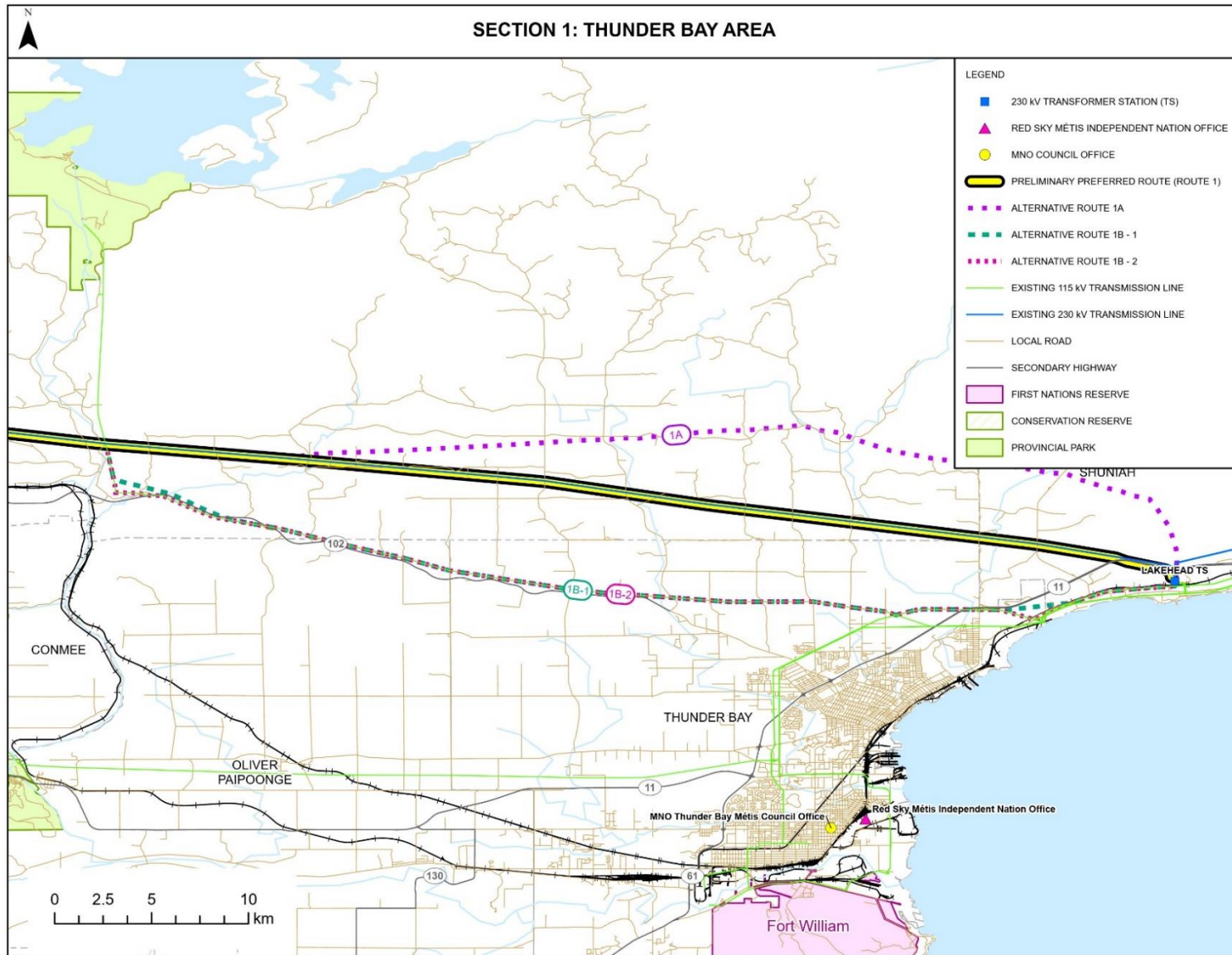


Figure 2.1-1: Section 1 - Thunder Bay Area



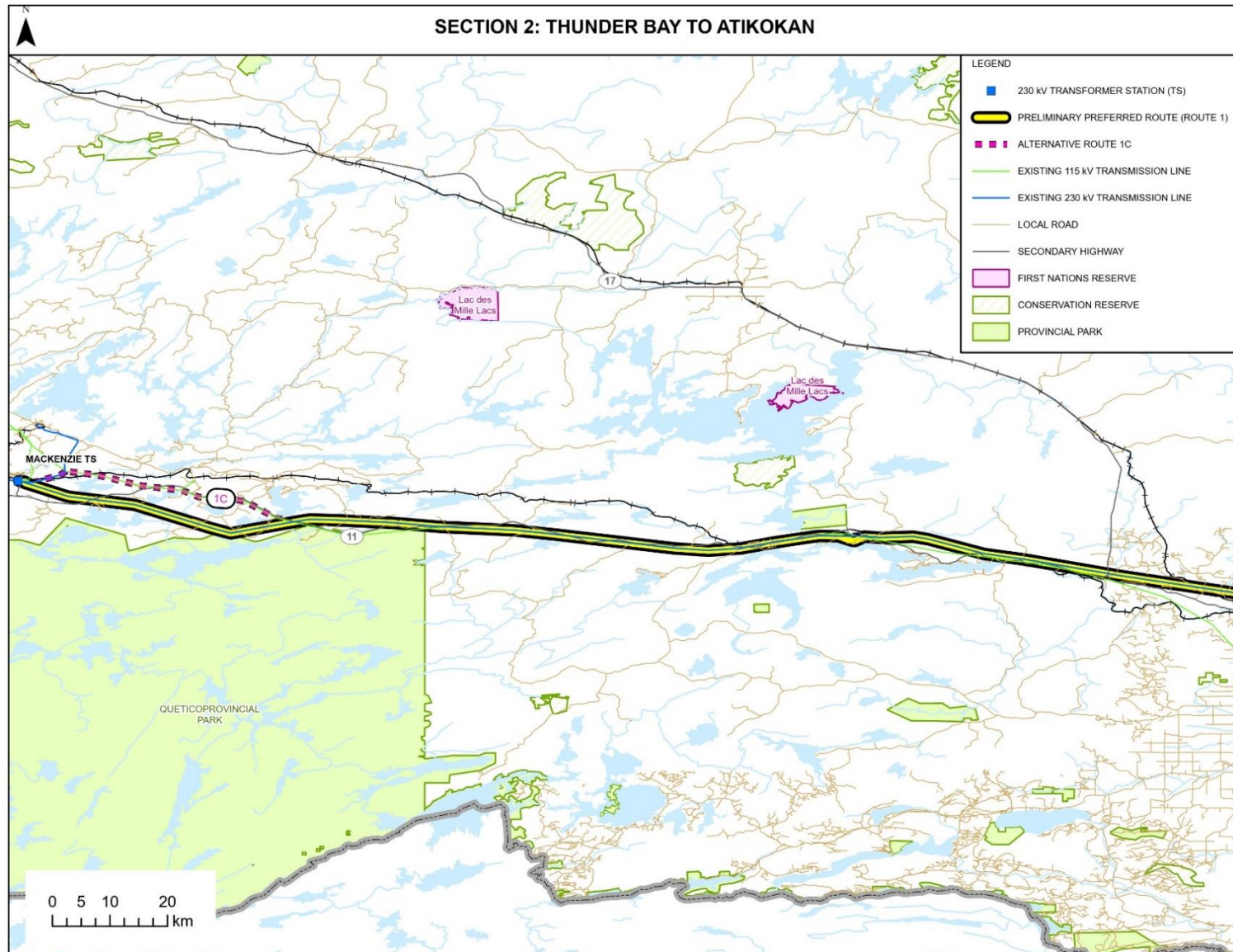


Figure 2.1-2: Section 2 - Thunder Bay to Atikokan



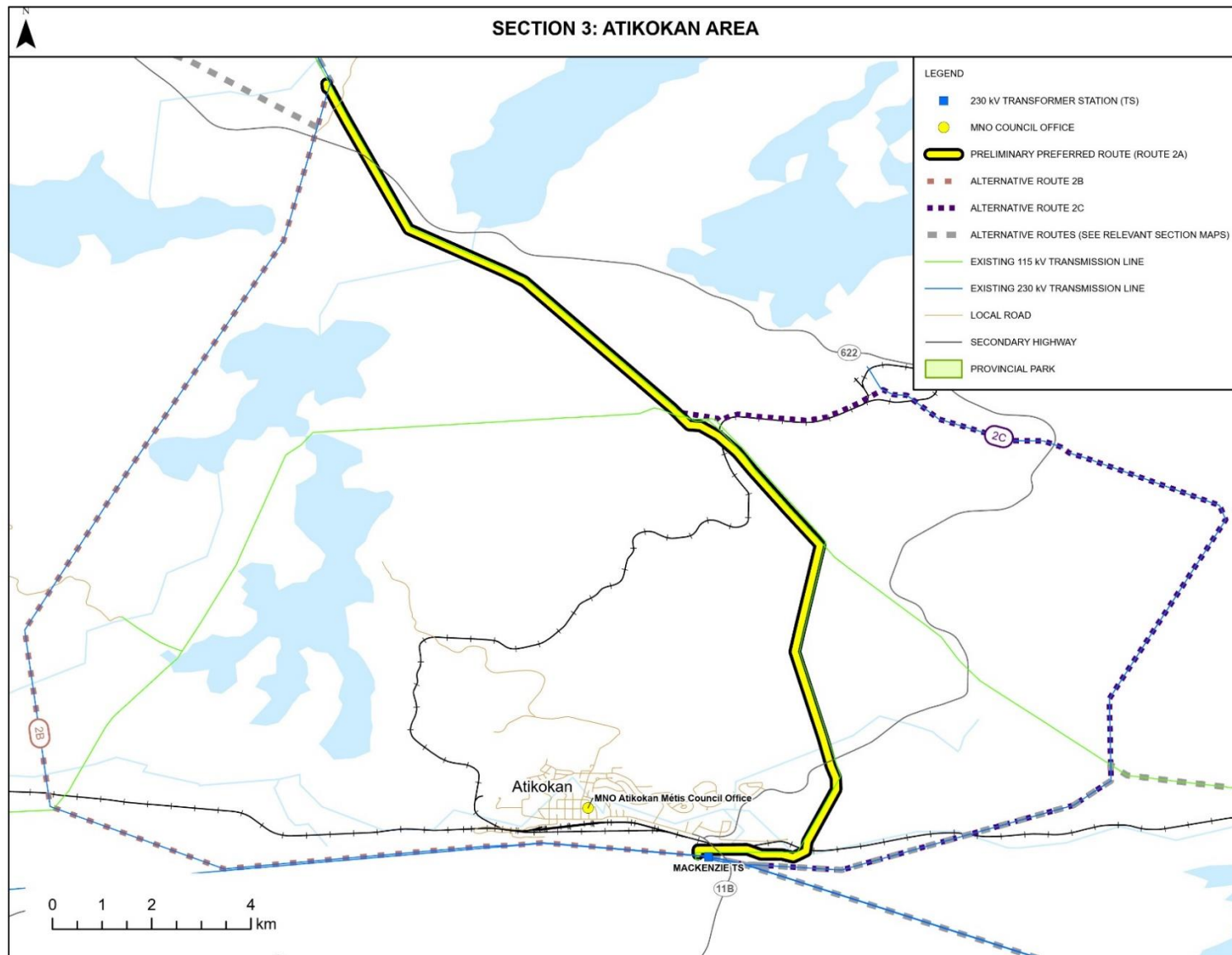


Figure 2.1-3: Section 3 – Atikokan Area





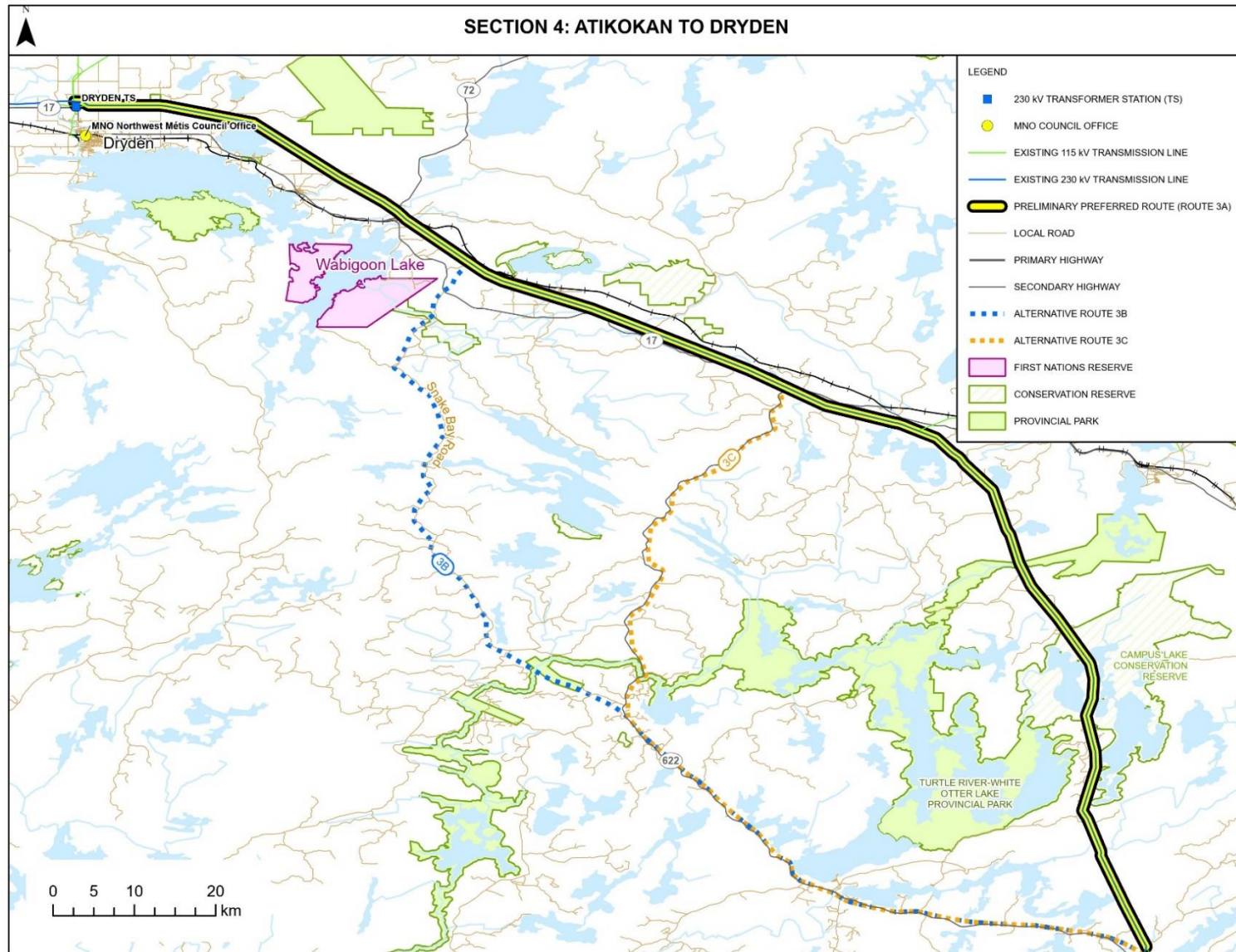


Figure 2.1-4: Section 4 - Atikokan to Dryden



## 2.2 Alternative Route Evaluation Methodology

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The GoldSET™ alternative route analysis process is based on a simplified multi-criteria analysis, which is widely used to combine often diverse regulatory, Indigenous and stakeholder goals with project performance criteria. The alternative route evaluation comprised of three general steps, listed below and on Figure 2.2-1:

- **Data Acquisition and Processing:** This stage includes the development of a list of data relevant to the Project's four criteria categories (Indigenous culture, values and land use; natural environment; socio-economic environment; and technical and cost), screening of data for geographic relevancy, and performing any data processing to prepare the data for the next stage.
- **Criteria and Indicator Assessment:** This stage includes the selection of the criteria and indicators used to compare Project options. Criteria and indicators are categorized into detractors (disadvantages) or attractors (opportunities) and are given weights based on their relative importance across the four criteria categories.
- **Option Analysis:** This stage includes the interpretation and decision-making process, where results are reviewed. Alternatives are compared and for each criteria category, the combined score ranges from 0% to 100%, with the higher the score being the better result.





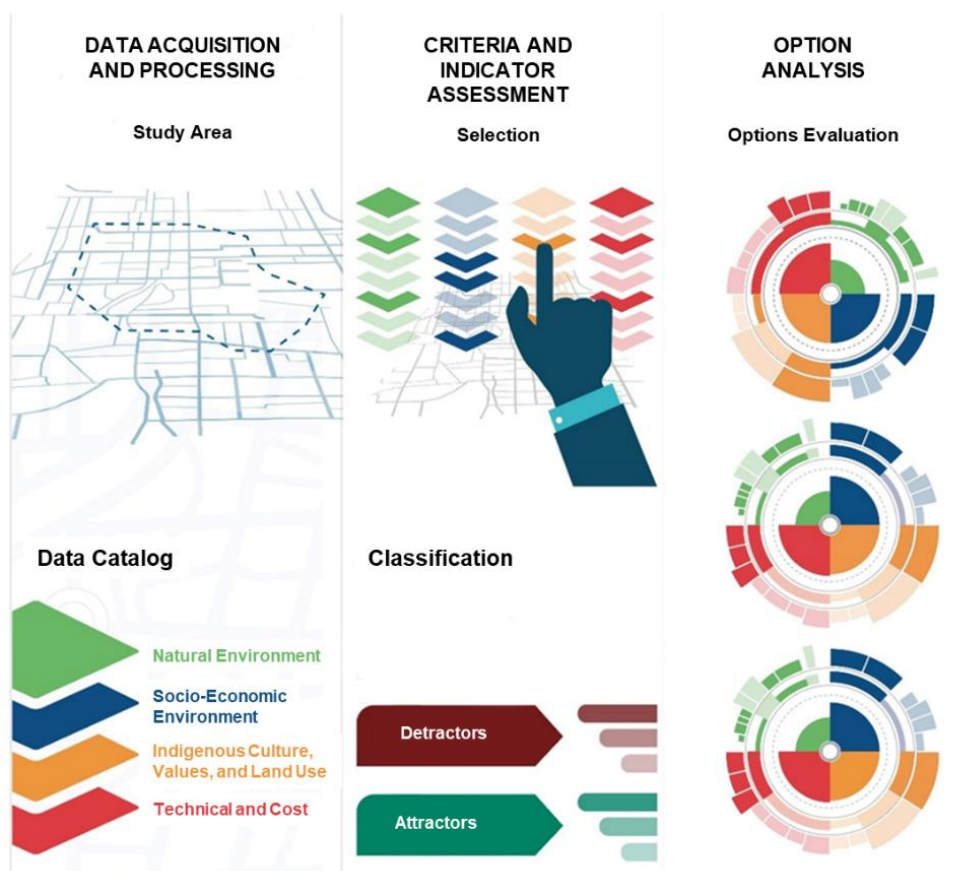


Figure 2.2-1: GoldSET™ Alternative Route Evaluation Process

## 2.3 Alternative Route Preliminary Footprint

The Amended ToR noted that a preferred route would be selected based on the comparison of 150 m wide corridors for the alternative routes identified in the Amended ToR. A preliminary Project footprint would then be developed for the preferred route and assessed in more detail in the EA. Feedback was received during the ToR and the early stages of the EA process that the alternative routes should be compared using a Project footprint that includes supporting infrastructure (e.g., access roads) instead of only comparing the ROW. As such, Hydro One developed preliminary Project footprints for each alternative route for comparison in the alternative route evaluation. The preliminary Project footprint for each alternative route includes the following components:

- Typical 46 m wide transmission right of way (RoW);
- Widened RoW for the separation of circuits F25A and D26A for 1 km, as directed by the Independent Electricity System Operator;

- Modifications to Lakehead TS, Mackenzie TS, and Dryden TS;
- Access roads (improved existing roads and new); and
- Temporary supportive infrastructure associated with construction, including fly yards, construction/stringing pads, laydown areas, construction camps, and helicopter pads; and aggregate pits.

### 2.3.1 Data Acquisition and Processing

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The alternative route evaluation was completed using the GoldSET™ alternative route analysis process and a suite of geographic information system (GIS) based tools were used for this Study. This approach consisted of creating a data catalogue, confirming data sources, acquiring the data, processing the data and quantitatively classifying criteria and indicators based on the ToR into the four criteria categories (Indigenous culture, values and land use; natural environment; socio-economic environment; and technical and cost considerations).

To support the alternative route evaluation the ToR data catalogue was reviewed, and data was sourced and updated using the following sources:

- Ministry of Natural Resources and Forestry (MNR) (Public and Restricted);
- Ministry of Energy, Northern Development and Mines (now Ministry of Northern Development and Ministry of Mines);
- Agriculture and Agri-Food Canada;
- Ministry of the Environment, Conservation and Parks (MECP);
- Conservation Authorities (i.e., Lakehead Region Conservation Authority);
- Environment Canada;
- Ministry of Transportation;
- City, township, and municipality data (e.g., City of Dryden, City of Thunder Bay, Municipality of Shuniah);
- Teranet;
- Ministry of Citizenship and Multiculturalism;
- Historical Atlas of Canada;
- Fisheries and Oceans Canada (DFO);
- Hydro One (Project data and engineering data);



- Previous assessments and consultant work; and
- Project field work.

The criteria and indicators were then processed and developed in GIS under guidance of subject matter experts. Criteria and indicators sometimes relied solely on data provided by the above sources. Most of them required processing on attributes and a combination of datasets, specifically when incorporating field collected data, to create the criteria and indicators listed in Attachment 2.0-A-1.

### 2.3.2 Criteria and Indicator Selection

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A preliminary set of criteria and indicators was provided in Appendix C of the Amended ToR. The preliminary criteria and indicators were reviewed during the early stages of the EA and refinements were made based on feedback from Indigenous communities, government officials and agencies, and interested persons and organizations. The original and revised criteria and indicators were provided to Indigenous communities and agencies for further feedback.

Examples of changes made based on engagement feedback include:

- Modifications to the indicators for bat hibernacula to better reflect their sensitivity and importance on the landscape so that they were more effectively influencing the selection of a preferred route;
- Refinements to the technical criteria and indicators based on further feedback from Hydro One and its contractor such as adding indicators for paralleling pipelines (requires additional corrosion mitigation), area of wetlands crossed (more difficult from a constructability standpoint) and length of off-ROW access required;
- Removal of indicators included in the Amended ToR where the preliminary alternative route Project footprints, plus any applicable buffer, do not cross a particular feature or dataset (e.g., wilderness reserves, provincial wildlife areas, active mines, golf courses);
- Addition of a new indicator for the crossing of Crown land based on feedback from the • Northwestern Ontario Métis Community (NWOMC) and Region 2; and
- Addition of new recreation and tourism indicators based on feedback from the MNRF.

The criteria and indicators included in the Amended ToR for Indigenous culture, values and land use were reliant on the availability of detailed Indigenous knowledge studies. Indigenous communities being engaged as part of the Project are continuing to advance the completion of community-specific and community-led Indigenous knowledge studies. While this work continues, a limited number of proxy or surrogate indicators using available desktop data were identified for the selection of a preferred route. For example, a new indicator was included to measure the amount of significant wildlife habitat that could provide habitat for some species of harvested plants or wildlife species (e.g., wild rice [Zizania] and waterfowl) within the alternative route preliminary footprint and a 1 km buffer area. This was included to recognize the



importance of these species to Indigenous communities and their ability to practice their rights and interests.

The criteria and indicators included appropriate buffers (e.g., Project footprint plus 500 m or 1 km), which were designed to capture the area within which most potential effects of the Project are likely to be measurable.

The criteria and indicators developed for the alternative route evaluation assumed that standard mitigation and best management practices will be implemented for the Project, regardless of the selected route; therefore, specific mitigation is not explicitly considered in the evaluation of the alternative routes. It is expected that similar, if not the same, mitigation would be available and equally effective for all the alternative routes; thus, factoring in mitigation would not assist in the identification of differences among the alternative routes. Mitigation measures for the preferred route will be included in the EA report and become a commitment for the Project.

Overall, across the four criteria categories, 34 individual criteria and 103 indicators were used to compare the alternative routes (see Table 2.3-1 for overall criteria categories and criteria and Attachment 2.0-A-1 for full list of criteria categories and the criteria and indicators for each).

**Table 2.3-1: Criteria Categories and Criteria**

Criteria Categories	Criteria
Natural Environment	<ul style="list-style-type: none"> <li>● Physiography, Geology, Surficial Geology and Soils</li> <li>● Provincial Parks, Conservation Reserves and Areas of Natural and Scientific Interest</li> <li>● Surface Water</li> <li>● Groundwater</li> <li>● Vegetation and Wetlands</li> <li>● Species at Risk                             <ul style="list-style-type: none"> <li>• Little Brown Myotis and Northern Myotis (<i>Myotis lucifugus</i>)</li> <li>• Eastern whip-poor-will (<i>Antrostomus vociferus</i>), Barn Swallow (<i>Hirundo rustica</i>), Bank Swallow (<i>Riparia riparia</i>), Bobolink (<i>Dolichonyx oryzivorus</i>), Chimney swift (<i>Chaetura pelagica</i>), American white pelican (<i>Pelecanus erythrorhynchos</i>), Least Bittern (<i>Ixobrychus exilis</i>)</li> <li>• American Badger (<i>Taxidea taxus</i>), Gray Fox (<i>Urocyon cinereoargenteus</i>)</li> <li>• Lake sturgeon (<i>Acipenser fulvescens</i>) (Great Lakes - Upper St. Lawrence population), Lake sturgeon (Saskatchewan - Nelson River population), American eel (<i>Anguilla rostrata</i>)</li> </ul> </li> <li>● Wildlife and Wildlife Habitat</li> <li>● Fish and Fish Habitat</li> </ul>



Criteria Categories	Criteria
Socio-Economic Environment	<ul style="list-style-type: none"> <li>● Land Use (including residences)</li> <li>● Infrastructure and Community Services</li> <li>● Recreation and Tourism</li> <li>● Visual Landscape</li> <li>● Archaeology</li> <li>● Built Heritage Resources and Cultural Heritage Landscapes</li> </ul>
Technical and Cost	<ul style="list-style-type: none"> <li>● Project Size</li> <li>● Existing Community Infrastructure</li> <li>● Constructability</li> <li>● Existing Right-of-Ways</li> <li>● Cost</li> </ul>
Indigenous Culture, Values and Land Use	<ul style="list-style-type: none"> <li>● Indigenous Community Rights/Interests and Use of Land and Resources for Traditional Purposes</li> <li>● Cultural and Spiritual Areas and Sites</li> <li>● Other Applicable Criteria/Indicators Identified by Communities</li> </ul>

### 2.3.3 Criteria and Indicator Classification

Weights were also used in the model to recognize the varying level of importance of different features. Engagement was completed to request feedback from Indigenous communities, government officials and agencies, and interested persons and organizations on what is most important when selecting a preferred route so this could be considered in the relative weighting of the criteria and indicators. This engagement was completed through emails, phone calls, workshops, community meetings, open houses, and a publicly available routing survey.

To help inform Hydro One’s identification of a preferred route, an online survey was developed for participants to provide feedback on the alternatives routes, rate the importance of criteria used in the alternative route evaluation, and identify areas of interest and/or concern. The survey was completed by 141 individuals between April 28, 2022 and September 30, 2022.

In the first component of the survey, respondents were asked to rate the importance of natural environment (e.g., water, wildlife, and vegetation) and socio-economic environment (e.g., visual landscapes, infrastructure, and built heritage resources) criteria. Regarding assessment criteria, more than 70% of respondents identified water, species at risk habitat, and parks and protected areas as very important within the natural environment (ranked 4 out of 5 or higher). Top socio-economic criteria identified as very important were potential to affect visual landscapes (60% of respondents), recreation and tourism (57% of respondents), and archaeology (47% of



respondents). Multiple respondents also identified concerns with respect to their private property and residences. This feedback was incorporated into the alternative route evaluation where the land use, water, species at risk, parks and protected areas, visual landscapes, recreation and tourism, and archaeology criteria were given higher weights, which then increased their ability to influence the identification of a preferred route.

Feedback was also received from the Neighbours on the Line group regarding the importance of minimizing effects to their private property and residences. Based on this feedback, the residence indicators under the land use criterion were given the highest weight and the land use criterion was given the highest weight in the socio-economic criteria category. This then increased the ability of these factors to influence the identification of a preferred route.

Feedback was also received from the MECP Species at Risk Branch regarding the species at risk criteria and the sensitivity and importance of protecting bat hibernacula. The weight of the little brown myotis and northern myotis criteria was increased and the indicators under this criterion specific to bat hibernacula were increased to reflect the limited mitigation available to minimize adverse effects on hibernacula and the general sensitivity of these features to disturbance.

The following activities were undertaken in order to weight and rank alternative routes.

1) Weighting of Criteria and Indicators

A weight from 0 (less important) to 100 (more important) was used to compare the relative importance of a criteria or indicators (and the issue it represents) with respect to the other criteria or indicators within the same criteria category (see Attachment 2.0-A-2). This weight was modified based on engagement feedback as noted above.

2) Weight of Criteria Category

A weight from 0 (less important) to 100 (more important) was used to compare the relative importance of the four criteria categories (Indigenous culture, values and land use; natural environment; socio-economic environment; and technical and cost considerations), with respect to the other criteria categories. For the purpose of this study, each criteria category was weighted the same (see Attachment 2.0-A-2).

3) Ranking/Suitability of Alternative Routes

Within each criteria category, the aggregate score for each alternative route out of 100% was calculated as follows:

$$\text{Score (DIM}_{k,x}) = \sum_{i=1}^n w'_i x_i$$

**Figure 2.3-1: GoldSET™ Alternative Route Analysis Ranking Equation**



With the assumption that

$$\sum_{i=1}^n w'_i = 1$$

where:

k – Criteria category “K” (e.g., natural environment)

x – Alternative Route “X”

n – Number of indicators in the “k” criteria category

i – Indicator “i” out of “n” indicators in the “k” criteria category

w – Non-negative weights for each “i” indicator

The GoldSET™ Alternative Route Analysis Ranking Equation was used to calculate the relative performance out of 100% for each of the Indigenous culture, values and land use; natural environment; socio-economic environment; and technical and cost criteria categories, and for each alternative route, within each section.

Based on the weighting, the ranking of the alternative routes resulted in the appraisal of the alternative routes with respect to Indigenous culture, values and land use; natural environment; socio-economic environment; and technical and cost considerations.

## 2.4 Alternative Route Evaluation Results

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This section provides the results of the alternative route analysis.

Although all criteria and indicators were reviewed in relation to each route considered, the list of advantages and disadvantages provided in this section focuses primarily on those criteria and indicators with notable difference. This approach was taken to ensure that the evaluation focused on relevant and material criteria and indicators data.

### 2.4.1 Section 1 - Thunder Bay Area Alternative Routes

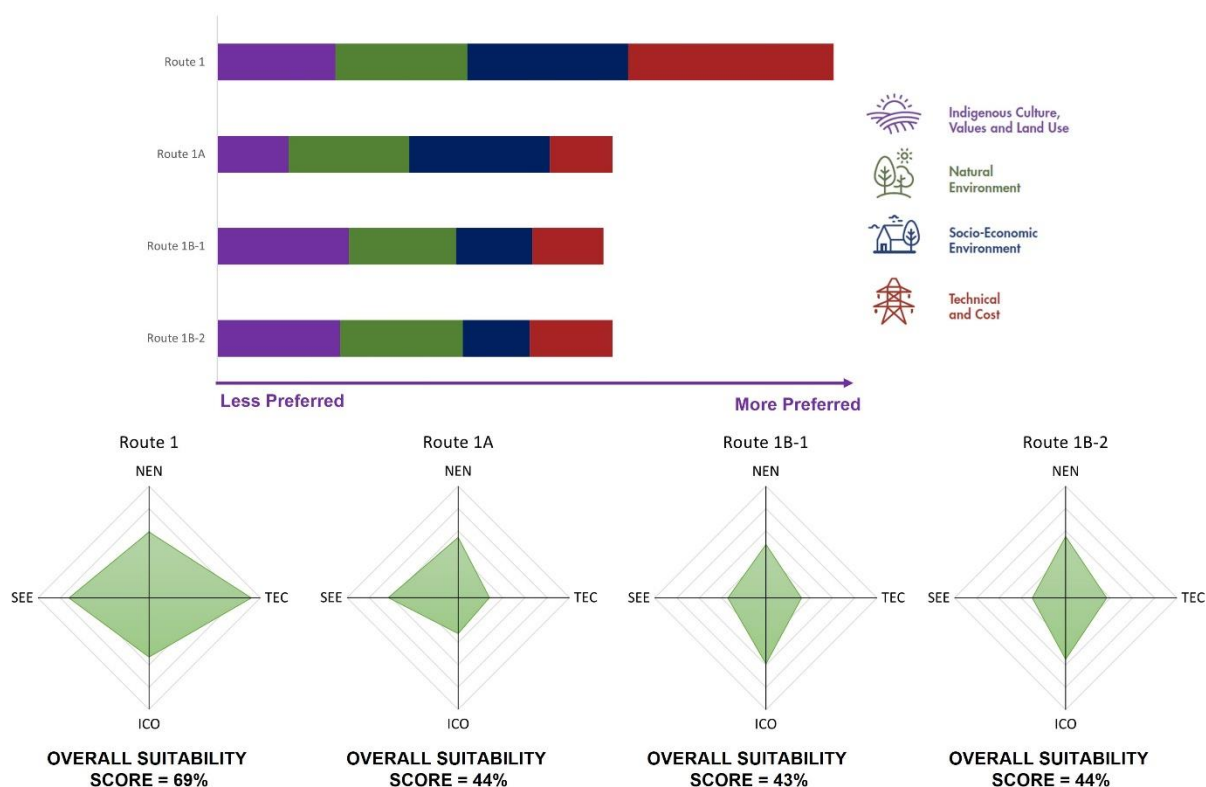
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Four alternative routes were identified, assessed, and compared in the Thunder Bay area. The overall route scores and ranking by criteria category, conclusion of a preferred route, and key advantages and disadvantages for the preferred route are provided in Table 2.4-1 and Figure 2.4-1.



**Table 2.4-1: Section 1 - Comparison of Overall Category Scores for Each Alternative Route**

Criteria Category	Alternative Route 1	Alternative Route 1A	Alternative Route 1B-1	Alternative Route 1B-2
Indigenous Culture, Values and Land Use (ICO)	53%	32%	59%	55%
Natural Environment (NEN)	59%	54%	48%	55%
Socio-Economic Environment (SEE)	72%	63%	34%	30%
Technical and Cost (TEC)	92%	28%	32%	37%


**Figure 2.4-1: Section 1 - Graphical Comparative Results for Alternative Routes**

**Conclusion:** Within Section 1, Alternative Route 1 is preferred when compared to Alternative Routes 1A, 1B-1 and 1B-2 as it best balances the four categories that were considered and has more advantages compared to disadvantages. It scored the highest for the natural environment, socio-economic environment, and technical and costs categories. Alternative Route 1 scored

slightly below Alternative Routes 1B-1 and 1B-2 in the Indigenous culture, values, and land use criteria category. The high-level advantages and disadvantages for Alternative Route 1 are provided in Table 2.4-2.

**Table 2.4-2: Section 1 - Overall Advantages and Disadvantages for the Preferred Route – Alternative Route 1**

Preferred Route	Advantages	Disadvantages
Alternative Route 1	<ul style="list-style-type: none"> <li>● Crosses the smallest area of Significant Wildlife Habitat</li> <li>● Crosses no Areas of Natural and Scientific Interest (ANSI)</li> <li>● Crosses a smaller area of provincially significant wetlands</li> <li>● Fewest potential primary residences and major outbuildings within the Project footprint and fewest within proximity to the Project footprint</li> <li>● Fewest visual scenic viewpoints</li> <li>● Shortest route and has the lowest number of corners and transmission line crossovers</li> <li>● Smaller area of sensitive areas identified by Indigenous communities</li> <li>● Parallels existing transmission line and road ROWs the most</li> <li>● Lowest estimated construction and yearly operations costs</li> </ul>	<ul style="list-style-type: none"> <li>● Crosses the most waterbodies</li> <li>● Crosses fewer watercourses than some of the other routes in this area, but not the fewest</li> <li>● Crosses the largest area of fish habitat</li> <li>● Crosses the largest area designated for planned development</li> <li>● Crosses the largest area with archaeological potential</li> <li>● Crosses a larger wetland area</li> <li>● Crosses the largest area of land where Indigenous communities primarily exercise their Indigenous treaty rights and interests</li> </ul>

ROW = right-of-way

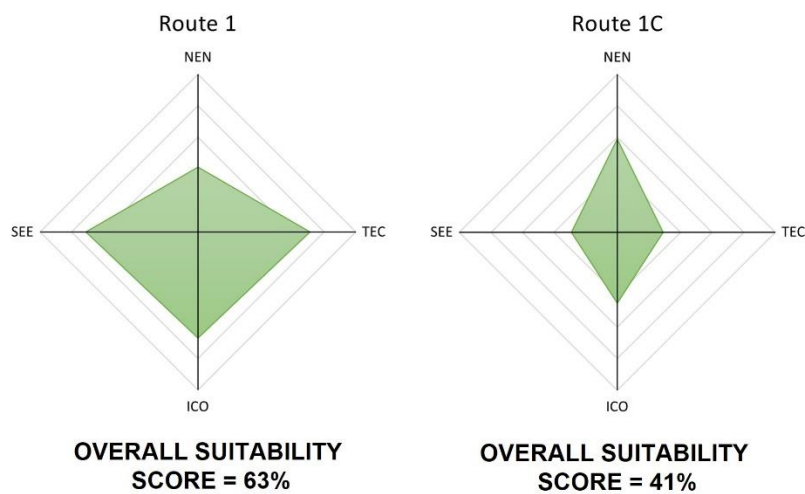
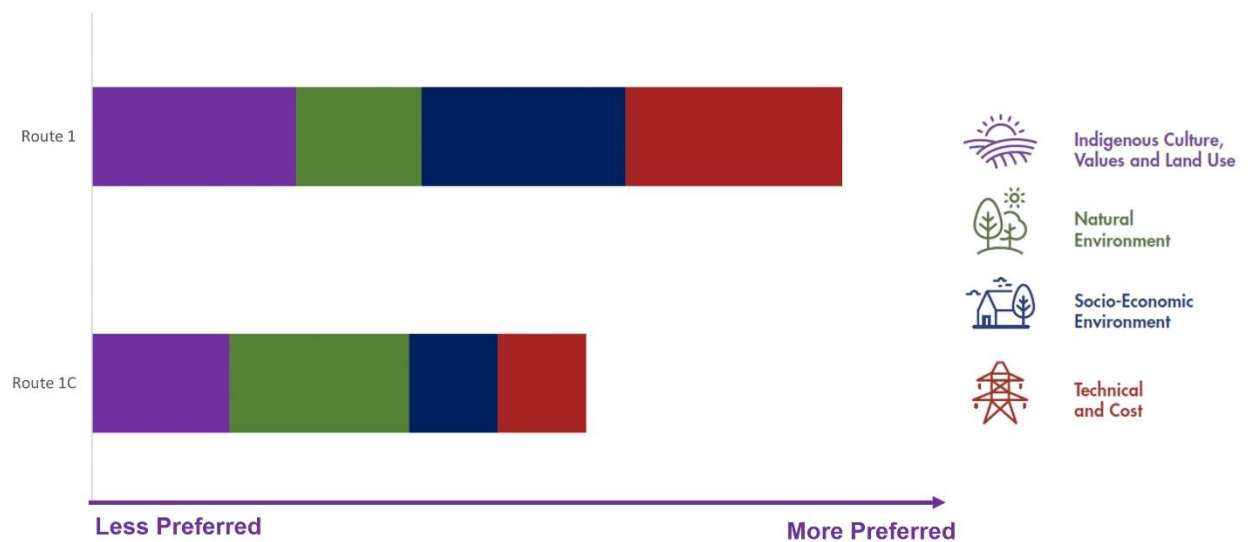
## 2.4.2 Section 2 - Thunder Bay to Atikokan Alternative Routes

Two alternative routes were identified, assessed, and compared in the Thunder Bay to Atikokan area. The overall routes scores and ranking by criteria category, conclusion of preferred route, and key advantages and disadvantages for the preferred route are provided in Table 2.4-3 and Figure 2.4-2.



**Table 2.4-3: Section 2 - Comparison of Overall Category Scores for Each Alternative Route**

Criteria Category	Alternative Route 1	Alternative Route 1C
Indigenous Culture, Values and Land Use (ICO)	67%	45%
Natural Environment (NEN)	41%	59%
Socio-Economic Environment (SEE)	71%	29%
Technical and Cost (TEC)	71%	29%


**Figure 2.4-2: Section 2 - Graphical Comparative Results for Alternative Routes**

**Conclusion:** For Section 2, Alternative Route 1 is preferred when compared to Alternative Route 1C as it best balances the four categories that were considered and has more advantages compared to disadvantages. It scored significantly higher on all criteria categories except for natural environment. The high-level advantages and disadvantages for Alternative Route 1 are provided in Table 2.4-4.

**Table 2.4-4: Section 2 - Overall Advantages and Disadvantages for the Preferred Route – Alternative Route 1**

Preferred Route	Advantages	Disadvantages
Alternative Route 1	<ul style="list-style-type: none"> <li>● Fewest potential primary residences and major outbuildings in proximity to the Project footprint</li> <li>● Crosses the smallest area of productive soils</li> <li>● Fewest recreational features (trails and campgrounds) in proximity to the Project footprint</li> <li>● Fewest visual scenic viewpoints in proximity to the Project footprint</li> <li>● Impacts no known archaeological sites and crosses the smallest area of archaeological potential</li> <li>● Has the fewest corners</li> <li>● Parallels existing transmission line and road ROWs the most</li> <li>● Has the lowest estimated construction cost</li> </ul>	<ul style="list-style-type: none"> <li>● Crosses the largest provincial park area (via an existing road)</li> <li>● Crosses the most waterbodies and watercourses</li> <li>● Crosses the largest area of fish habitat</li> <li>● Crosses the largest area of Significant Wildlife Habitat</li> <li>● Crosses the largest wetland area</li> <li>● Crosses the largest area of land where Indigenous communities primarily exercise their Indigenous treaty rights and interests</li> </ul>

ROW = right-of-way

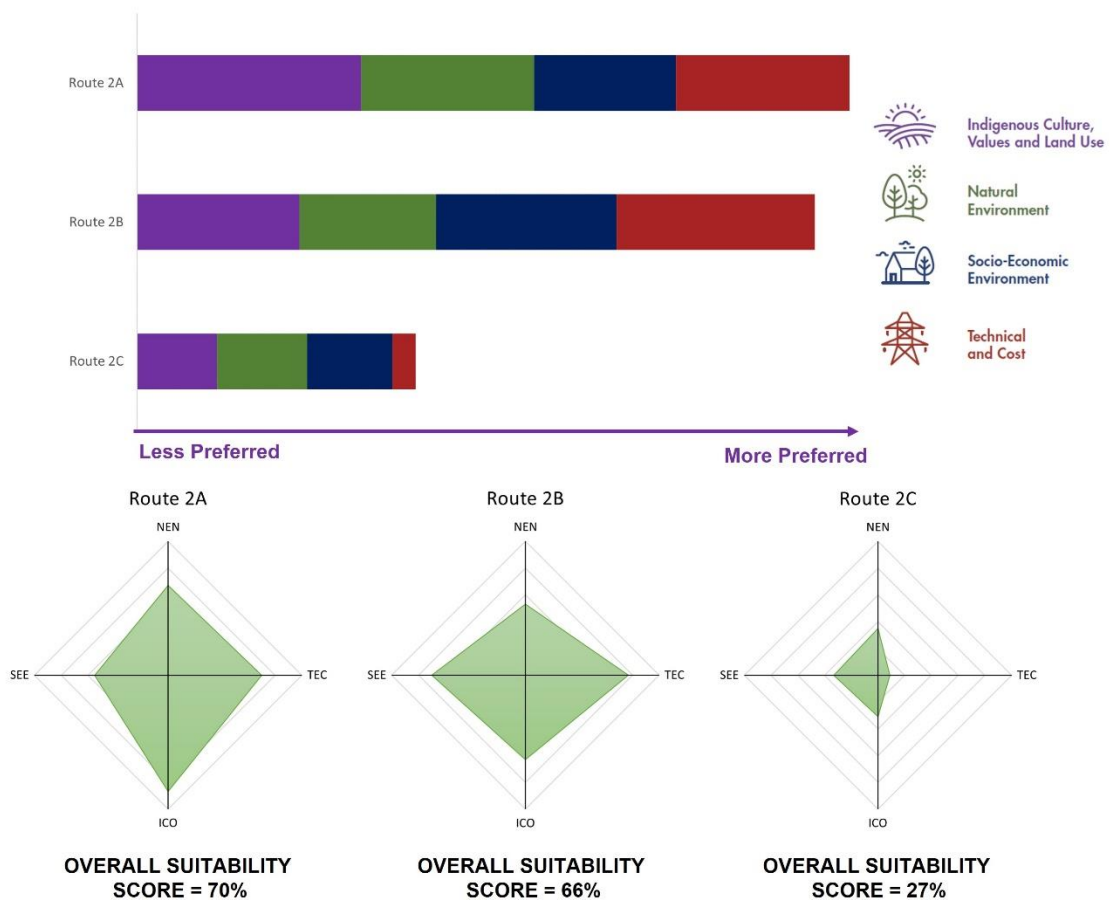
### 2.4.3 Section 3 - Atikokan Area Alternative Routes

Three alternative routes were identified, assessed, and compared in the Atikokan area. The overall routes scores and ranking by criteria category, conclusion of preferred route, along with key advantages and disadvantages for the preferred route are provided in Table 2.4-5 and Figure 2.4-3.



**Table 2.4-5: Section 3 - Comparison of Overall Category Scores for Each Alternative Route**

Criteria Category	Alternative Route 2A	Alternative Route 2B	Alternative Route 2C
Indigenous Culture, Values and Land Use (ICO)	87%	63%	31%
Natural Environment (NEN)	67%	53%	35%
Socio-Economic Environment (SEE)	55%	70%	33%
Technical and Cost (TEC)	70%	77%	9%


**Figure 2.4-3: Section 3 - Graphical Comparative Results for Alternative Routes**




**Conclusion:** In Section 3, Alternative Route 2A is preferred when compared to Alternative Routes 2B and 2C as it best balances the four categories that were considered and has more advantages compared to disadvantages. It scored the highest for the natural environment and Indigenous culture, values, and land use criteria categories. The route scored slightly lower on technical and cost compared to Alternative Route 2B. It scored lower than Alternative Route 2B and higher than Alternative Route 2C on the socio-economic environment category. The high-level advantages and disadvantages for Alternative Route 2A are provided in Table 2.4-6.

**Table 2.4-6: Section 3 - Overall Advantages and Disadvantages for the Preferred Route – Alternative Route 2A**

Preferred Route	Advantages	Disadvantages
Alternative Route 2A	<ul style="list-style-type: none"> <li>● Crosses the fewest watercourses</li> <li>● Crosses the smallest area of Significant Wildlife habitat</li> <li>● Crosses the smallest area of provincially significant wetlands and other wetlands</li> <li>● Avoids sensitive bat hibernacula that are close to Alternative Route 2B</li> <li>● Crosses the smallest area for high potential aggregate resources and planned future developments</li> <li>● Smaller area of archaeological potential</li> <li>● Shortest route</li> <li>● Lowest number of transmission line crossovers</li> <li>● Highest percentage of transmission line with existing access roads close to the ROW</li> <li>● Lowest estimated yearly operation cost</li> <li>● Crosses the smallest amount of land where Indigenous communities primarily exercise their Indigenous treaty rights and interests</li> <li>● Smallest area of sensitive areas identified by Indigenous communities</li> </ul>	<ul style="list-style-type: none"> <li>● Crosses more waterbodies than Alternative Route 2B, but fewer than Alternative Route 2C</li> <li>● Greatest number of potential primary residences and major outbuildings in proximity to the Project footprint</li> <li>● Greater number of recreational features</li> <li>● Crosses a portion of Steep Rock Mine</li> <li>● Greater number of transmission line corners than Alternative Route 2B, but fewer than Alternative Route 2C</li> </ul>

ROW = right-of-way



## 2.4.4 Section 4 - Atikokan to Dryden Alternative Routes

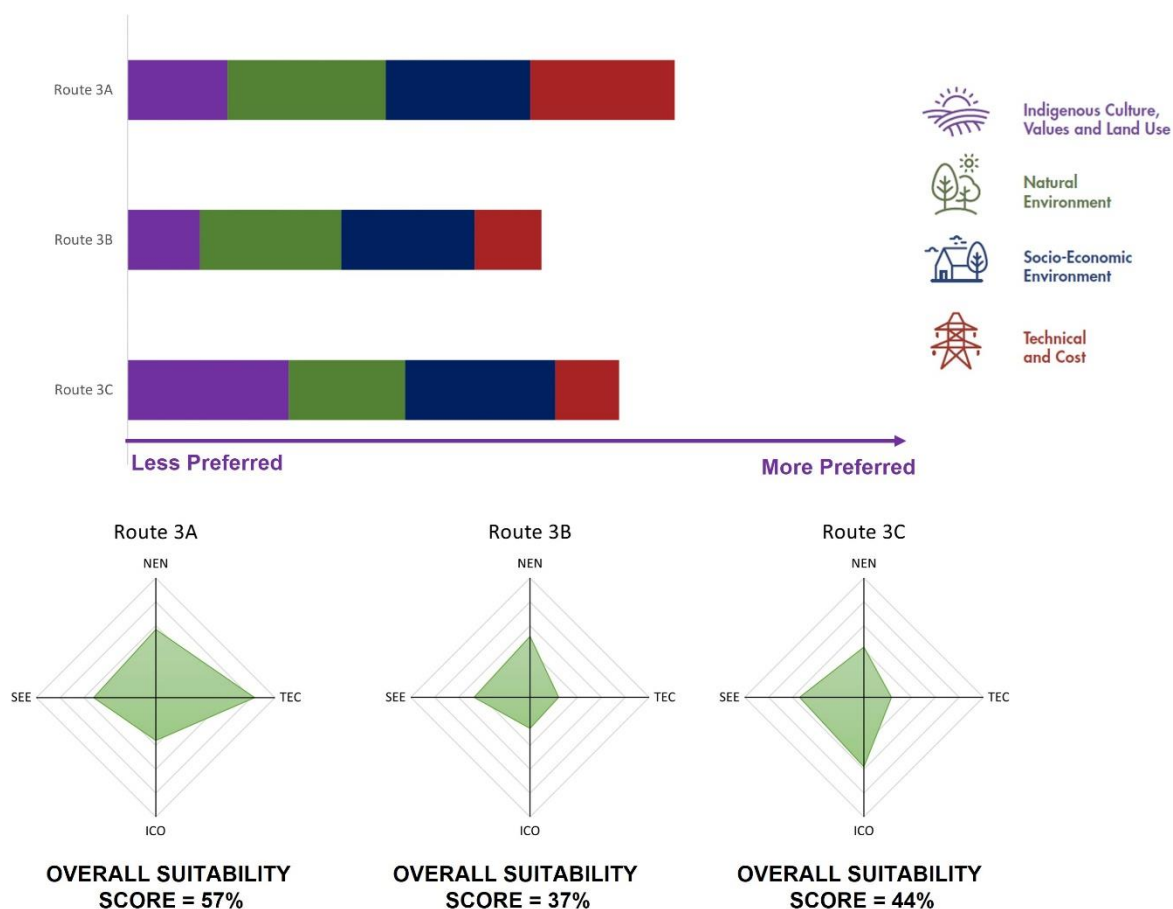
Three alternative routes were identified, assessed, and compared in the Atikokan to Dryden area. The overall routes scores and ranking by criteria category, conclusion of preferred route, along with key advantages and disadvantages for the preferred route are provided

Table 2.4-7 and Figure 2.4-4.

**Table 2.4-7: Section 4 - Comparison of Overall Category Scores for Each Alternative Route**

Criteria Category	Alternative Route 3A	Alternative Route 3B	Alternative Route 3C
Indigenous Culture, Values and Land Use (ICO)	36%	26%	58%
Natural Environment (NEN)	57%	51%	42%
Socio-Economic Environment (SEE)	52%	47%	54%
Technical and Cost (TEC)	83%	24%	23%





**Figure 2.4-4: Section 4 - Graphical Comparative Results for Alternative Routes**

**Conclusion:** In Section 4, Alternative Route 3A is preferred when compared to Alternative Routes 3B and 3C as it best balances the four categories that were considered and has more advantages compared to disadvantages. It scored the highest for the natural environment and technical and costs categories. The route scored slightly lower on socio-economic environment compared to Alternative Route 3C. It scored lower than Alternative Route 3C and higher than Alternative Route 3B on the Indigenous culture, values, and land use category. The high-level advantages and disadvantages for Alternative Route 3A are provided in Table 2.4-8.

**Table 2.4-8: Section 4 - Overall Advantages and Disadvantages for the Preferred Route – Alternative Route 3A**

Preferred Route	Advantages	Disadvantages
Alternative Route 3A	<ul style="list-style-type: none"> <li>● Crosses smallest area of productive soils</li> <li>● Crosses smallest area of provincial parks</li> <li>● Crosses no provincially significant wetlands</li> <li>● Crosses the smallest area of fish habitat</li> <li>● Smallest area for bat maternity roosting habitat</li> <li>● Crosses smallest area for high potential aggregate resources</li> <li>● Fewest visual scenic viewpoints</li> <li>● Shortest route</li> <li>● Smallest area of sensitive areas identified by Indigenous communities</li> <li>● Parallels existing transmission line and road ROWs the most</li> <li>● Lowest estimated construction and yearly operation cost</li> <li>● Farthest away from nearby First Nation reserve</li> </ul>	<ul style="list-style-type: none"> <li>● Crosses the largest area of Conservation Reserves</li> <li>● Crosses the greatest number of waterbodies and watercourses, but a smaller overall area</li> <li>● Crosses less Significant Wildlife Habitat than Alternative Route 3B, but slightly more than Alternative Route 3C</li> <li>● Greatest number of potential primary residences and major outbuildings in proximity to the Project footprint</li> <li>● Crosses the largest area of land where Indigenous communities primarily exercise their Indigenous treaty rights and interests</li> <li>● Crosses the largest area of archaeological potential and has the highest number of known archaeological sites</li> </ul>



## 3.0 Summary and Conclusion

Using a multi-criteria option analysis tool allowed for an objective, transparent and rigorous comparison of alternative routes by identifying their respective advantages and disadvantages, including conflicting interests. This enabled Hydro One to make an informed decision about a preferred route that was presented to Indigenous communities, government officials and agencies, members of the public, interested persons and organizations for review. The evaluation approach considered general routing principles and a revised set of criteria and indicators based on feedback received (Attachment 2.0-A-1). Criteria and indicators were built using spatial data collected for each alternative route that relied on 2020 and 2022 field programs, existing datasets (e.g., Forest Management Plans), and Indigenous knowledge shared by Indigenous communities, where available. The outcome was a recommendation for a preliminary preferred alternative route for each of the four sections.

Table 3.1-1 below provides a summary of the result from the assessment of the four sections and corresponding alternative routes, indicating which overall route in each section best met the criteria identified in Attachment 2.0-A-1, and has the most advantages.

**Table 3.1-1: Summary of Preliminary Preferred Alternative Route by Section**

Section	Preliminary Preferred Alternative Route
Section 1 - Thunder Bay Area	Alternative Route 1
Section 2 - Thunder Bay to Atikokan	Alternative Route 1
Section 3 - Atikokan Area	Alternative Route 2A
Section 4 - Atikokan to Dryden	Alternative Route 3A

Overall, the preferred route best balances the four criteria categories that were considered. When put together as one overall preferred route for the Project from Shuniah to Dryden, the preferred route provides a viable solution using proven technologies, is technically feasible, and consistent with provincial government priorities and direction. Overall, the preferred route is also favourable from an Indigenous, natural environment, and socio-economic environment perspective. It is also within the ability of Hydro One to implement in the context of the study area.

Figure 3.1-1 provides an overview of the preferred route identified as a result of the Alternative Route Evaluation. Hydro One also considered local route refinements to address Indigenous, natural, technical or socio-economic concerns or as new data became available. These local route refinements are discussed in Section 2.2.5 of the Final EA report.





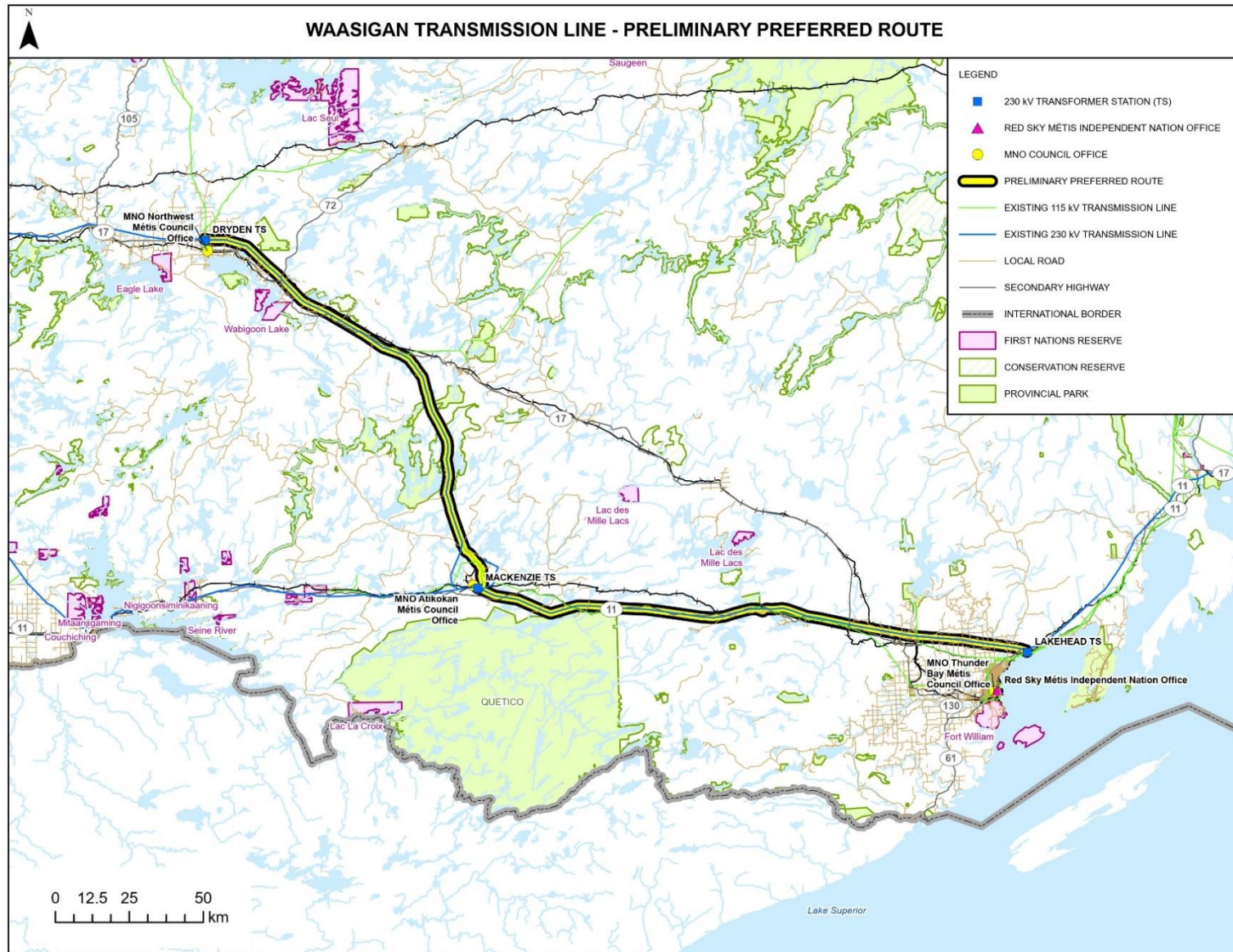


Figure 3.1-1: Preferred Route





## References

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Government of Ontario. 2020. Provincial Policy Statement (2020). Available at:  
<https://www.ontario.ca/page/provincial-policy-statement-2020>.

Hydro One (Hydro One Network Inc.). 2021. Amended Terms of Reference for the Waasigan Transmission Line. Submitted to the Ministry of the Environment Conservation, and Parks. June 2021.



# ATTACHMENT 2.0-A-1

## *Criteria and Indicator Data Workbook*



Criteria Category	Criteria	Indicator	Section 1 - Thunder Bay Area Alternative Routes				Section 2 - Thunder Bay to Atikokan Alternative Routes		Section 3 - Atikokan Area Alternative Routes			Section 4 - Atikokan to Dryden Alternative Routes		
			Alternative Route 1	Alternative Route 1A	Alternative Route 1B-1	Alternative Route 1B-2	Alternative Route 1	Alternative Route 1C	Alternative Route 2A	Alternative Route 2B	Alternative Route 2C	Alternative Route 3A	Alternative Route 3B	Alternative Route 3C
Natural Environment	Physiography, Geology, Surficial Geology and Soils	Area (ha) of productive soils (e.g., agricultural) within the alternative route preliminary footprint	53.6	48.6	57.0	64.7	101.2	116.6	29.6	15.9	38.8	160.6	296.5	187.5
	Provincial Parks, Conservation Reserves and Areas of Natural and Scientific Interest	Area (ha) of Areas of Natural and Scientific Interest (Earth and Life Science) within the alternative route preliminary footprint and a 500 m buffer area	0.0	0.0	0.8	0.8	3.9	3.9	0.0	0.0	0.0	0.0	0.0	0.0
		Area (m <sup>2</sup> ) of conservation reserves within the alternative route preliminary footprint and a 500 m buffer area	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1527.0	176.0	2.0
	Surface Water	Area (ha) of provincial parks within the alternative route preliminary footprint and a 500 m buffer area	0.0	0.0	0.0	0.0	189.4	106.7	0.0	0.0	0.0	76.7	425.7	167.4
		Number of lakes and ponds within the alternative route preliminary footprint	12.0	6.0	7.0	5.0	90.0	73.0	16.0	7.0	36.0	55.0	44.0	53.0
		Area (ha) of lakes and ponds within the alternative route preliminary footprint	2.0	0.1	0.4	0.1	31.0	27.2	2.9	0.7	6.6	7.4	10.7	17.2
		Number of watercourses within the alternative route preliminary footprint	55.0	73.0	53.0	56.0	132.0	119.0	18.0	37.0	28.0	151.0	108.0	141.0
	Groundwater	Area (ha) of watercourses within the alternative route preliminary footprint	1.9	0.7	1.2	1.1	6.5	6.7	0.5	1.2	0.5	4.3	4.2	6.6
		Number of water wells within the alternative route preliminary footprint	3.0	11.0	6.0	7.0	3.0	3.0	2.0	0.0	2.0	4.0	4.0	4.0
	Vegetation and Wetlands	Area (ha) of high potential aquifer deposits within the alternative route preliminary footprint	180.1	198.4	146.2	143.2	971.8	850.8	118.9	149.4	184.7	1020.8	808.0	877.3
		Area (ha) of recently logged lands (last 10 years) within the alternative route preliminary footprint and 1km buffer area	0.6	6.4	0.0	0.0	126.9	126.9	31.8	0.0	31.8	374.7	125.7	151.0
		Area (ha) of mapped vegetation related SWH (or candidate SWH) within the alternative route preliminary footprint and 1 km buffer area	2383.8	3441.0	3116.2	3124.0	15085.5	14610.5	2038.3	2903.9	3359.8	15388.0	14292.4	13383.9
		Area (ha) of critical Landform/Vegetation Associations within the alternative route preliminary footprint and 1 km buffer area	3604.6	5050.3	2329.8	2330.6	957.5	1262.3	339.6	558.4	478.3	2213.7	3335.1	3398.7
		Area (ha) of underrepresented Landform/Vegetation Associations within the alternative route preliminary footprint and 1 km buffer area	210.5	254.8	511.0	514.8	473.1	487.8	194.9	289.2	320.9	1376.2	2445.3	2144.2
		Area (ha) of Provincially Significant Wetlands within the alternative route preliminary footprint and 1 km buffer area	94.4	46.7	528.5	529.7	0.0	0.0	86.5	258.6	178.3	0.0	15.0	15.0
	Little Brown Myotis and Northern Myotis	Area (ha) of other wetlands within the alternative route preliminary footprint and 1 km buffer area	887.0	1281.4	662.1	663.9	6784.5	6562.2	864.5	1204.4	1452.4	7274.7	7457.3	6525.3
		Area (ha) of candidate or known hibernacula habitat within the alternative route preliminary footprint and 200 m buffer area	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0
		Area (ha) of candidate or known hibernacula habitat within the alternative route preliminary footprint and 500 m buffer area	0.1	0.0	2.9	2.8	0.0	0.335184	18.7	10.4	10.8	0.0	0.0	0.0
	Eastern whip-poor-will	Area (ha) of candidate or known maternity roost habitat within the alternative route preliminary footprint and 1 km buffer area	6385.5	8096.4	5225.3	5231.3	14512.4	13700.7	2517.2	3270.2	3294.4	8989.1	9033.5	9278.2
		Number of known occurrence records within the alternative route preliminary footprint and 1 km buffer area	1.0	0.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	8.0	7.0
	Barn swallow	Area (ha) of candidate or known breeding habitat within the alternative route preliminary footprint and 1 km buffer area	5950.9	8442.5	4956.7	4958.3	24227.0	23041.5	2541.0	4066.0	3618.0	27261.4	22242.8	24133.8
		Number of known occurrence records within the alternative route preliminary footprint and 1 km buffer area	3.0	10.0	4.0	4.0	20.0	20.0	9.0	10.0	10.0	2.0	1.0	2.0
			Area (ha) of candidate or known breeding habitat within the alternative route preliminary footprint and 1 km buffer area	0.3	0.3	0.4	0.4	0.4	0.4	0.1	0.1	0.1	0.4	0.5

Criteria Category	Criteria	Indicator	Section 1 - Thunder Bay Area Alternative Routes				Section 2 - Thunder Bay to Atikokan Alternative Routes		Section 3 - Atikokan Area Alternative Routes			Section 4 - Atikokan to Dryden Alternative Routes		
			Alternative Route 1	Alternative Route 1A	Alternative Route 1B-1	Alternative Route 1B-2	Alternative Route 1	Alternative Route 1C	Alternative Route 2A	Alternative Route 2B	Alternative Route 2C	Alternative Route 3A	Alternative Route 3B	Alternative Route 3C
Natural Environment	Bank swallow	Number of known occurrence records within the alternative route preliminary footprint and 1 km buffer area	9.0	10.0	1.0	1.0	1.0	1.0	0.0	2.0	2.0	4.0	0.0	0.0
		Area (ha) of candidate or known breeding habitat within the alternative route preliminary footprint and 1 km buffer area	411.2	936.7	327.1	324.7	29.0	43.5	35.0	16.2	53.5	156.3	78.0	101.4
	Bobolink	Number of known occurrence records within the alternative route preliminary footprint and 1 km buffer area	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0
		Area (ha) of candidate or known breeding habitat within the alternative route preliminary footprint and 1 km buffer area	0.0	0.0	0.3	0.3	355.3	355.3	0.0	0.0	0.0	139.1	139.1	139.1
	Chimney swift	Number of known occurrence records within the alternative route preliminary footprint and 1 km buffer area	0.0	0.0	0.0	0.0	9.0	9.0	9.0	11.0	9.0	0.0	0.0	0.0
		Area (ha) of candidate or known breeding habitat within the alternative route preliminary footprint and 1 km buffer area	175.7	404.7	134.8	134.8	753.4	846.9	121.7	85.1	145.2	351.2	276.3	605.5
	American white pelican	Number of known occurrence records within the alternative route preliminary footprint and 1 km buffer area	2.0	1.0	15.0	15.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
		Area (ha) of candidate or known breeding habitat within the alternative route preliminary footprint and 1 km buffer area	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Least Bittern	Number of known occurrence records within the alternative route preliminary footprint and 1 km buffer area	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
		Area (ha) of candidate or known breeding habitat within the alternative route preliminary footprint and 1 km buffer area	31.2	44.0	58.5	57.9	672.5	804.6	112.5	128.9	252.1	591.8	636.4	621.8
	American Badger	Number of known occurrence records within the alternative route preliminary footprint and 1 km buffer area	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Area (ha) of candidate or known denning/burrowing habitat within the alternative route preliminary footprint and 1 km buffer area	0.0	0.0	0.3	0.3	355.3	355.3	0.0	0.0	0.0	139.1	139.1	139.1
	Gray Fox	Number of known occurrence records within the alternative route preliminary footprint and 1 km buffer area	4.0	2.0	22.0	22.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0
		Area (ha) of known gray fox home range within the alternative route preliminary footprint and 1 km buffer area	305.4	343.6	1795.6	1802.5	284.7	151.0	0.0	0.0	0.0	0.0	0.0	0.0
	Lake sturgeon (Great Lakes - Upper St. Lawrence population)	Number of waterbodies with potential lake sturgeon (Great Lakes - Upper St. Lawrence population) within the alternative route preliminary footprint	1.0	0.0	9.0	9.0	10.0	12.0	0.0	0.0	0.0	0.0	0.0	0.0
		Area (ha) of lake sturgeon (Great Lakes - Upper St. Lawrence population) habitat potential within the alternative route preliminary footprint	0.1	0.0	0.1	0.0	3.2	3.3	0.0	0.0	0.0	0.0	0.0	0.0
	Lake sturgeon (Saskatchewan - Nelson River population)	Number of waterbodies with potential lake sturgeon (Saskatchewan - Nelson River population) within the alternative route preliminary footprint	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Area (ha) of lake sturgeon (Saskatchewan - Nelson River population) habitat potential within the alternative route preliminary footprint	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
American eel	Number of waterbodies with potential American eel within the alternative route preliminary footprint	0.0	0.0	17.0	17.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Area (ha) of American eel habitat potential within the alternative route preliminary footprint	0.0	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

Criteria Category	Criteria	Indicator	Section 1 - Thunder Bay Area Alternative Routes				Section 2 - Thunder Bay to Atikokan Alternative Routes		Section 3 - Atikokan Area Alternative Routes			Section 4 - Atikokan to Dryden Alternative Routes		
			Alternative Route 1	Alternative Route 1A	Alternative Route 1B-1	Alternative Route 1B-2	Alternative Route 1	Alternative Route 1C	Alternative Route 2A	Alternative Route 2B	Alternative Route 2C	Alternative Route 3A	Alternative Route 3B	Alternative Route 3C
Natural Environment	Wildlife and Wildlife Habitat	Percentage (%) of alternative route preliminary alignment paralleling existing permanent linear infrastructure to minimize habitat fragmentation	94.8	71.5	73.4	93.2	97.2	95.4	92.8	98.5	91.2	99.1	33.7	44.3
		Area (ha) of mapped wildlife related SWH (or candidate SWH) within the alternative route preliminary footprint and 1 km buffer area	2141.3	3460.6	2525.4	2538.9	1586.9	1219.4	294.0	1258.4	1105.0	3978.5	4837.6	3553.2
		Number of S1-S3 ranked wildlife species, species provincially designated as Special Concern and/or species listed federally (but not provincially) as Endangered, Threatened or Special Concern within the alternative route preliminary footprint and 1 km buffer area	16.0	28.0	82.0	82.0	116.0	114.0	61.0	73.0	64.0	40.0	30.0	33.0
		Area (ha) of habitat of S1-S3 ranked wildlife species, species provincially designated as Special Concern and/or species listed federally (but not provincially) as Endangered, Threatened or Special Concern within the alternative route preliminary footprint and 1 km buffer area	1178.5	2380.4	4249.8	4271.1	8276.6	8013.5	4084.7	2585.0	5071.7	3539.0	2693.4	3288.1
	Fish and Fish Habitat	Area (ha) of fish habitat, excluding SAR habitat, within the alternative route preliminary footprint	3.3	0.7	1.6	1.2	37.4	33.7	3.4	1.9	7.1	11.7	14.9	23.5
		Number of waterbodies within the alternative route preliminary footprint with sensitive habitats (excluding SAR habitats), including: - lake trout habitat - brook trout habitat - nursery/rearing areas - spawning areas - overwintering areas - other significant aquatic habitat (e.g., feeding refuge, migratory habitats etc.) - habitats of S1-S3 ranked fish species, species provincially designated as Special Concern and/or species listed federally (but not provincially) as Endangered, Threatened or Special Concern and those of species that have local significance (i.e., Coaster Brook Trout [ <i>Salvelinus fontinalis</i> ]) within the alternative route preliminary footprint and 1 km buffer area	65.0	76.0	60.0	61.0	218.0	186.0	33.0	43.0	61.0	198.0	149.0	187.0
Socio-economic Environment	Land Use	Area (ha) of provincial parks within the alternative route preliminary footprint	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	3.3	18.8	5.5
		Area (ha) of conservation reserves within the alternative route preliminary footprint	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	93.0	8.5	0.0
		Area (ha) of enhanced management areas within the alternative route preliminary footprint	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	55.0	0.0	0.0
		Number of mining claims within the alternative route preliminary footprint	9.0	2.0	0.0	0.0	317.0	289.0	26.0	59.0	44.0	221.0	125.0	132.0
		Number of inactive (abandoned) mines within the alternative route preliminary footprint	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0
		Number of aggregate pits and quarries within the alternative route preliminary footprint	6.0	7.0	3.0	3.0	3.0	5.0	3.0	1.0	5.0	11.0	8.0	4.0
		Area (ha) of high potential for aggregate resources within the alternative route preliminary footprint	0.2	0.0	3.2	3.9	29.8	28.8	3.4	5.9	7.8	14.8	25.1	15.5
		Area (ha) of lands designated for recreational, residential, institutional or commercial purposes within the alternative route preliminary footprint	0.8	0.3	12.6	13.1	0.0	1.5	0.5	1.4	4.1	0.5	0.5	0.5
		Area (ha) of reasonably foreseeable planned developments within the alternative route preliminary footprint (development applications)	14.3	5.4	0.0	0.0	113.6	90.4	19.7	19.7	30.6	124.4	135.6	117.6
		Area (ha) of lands associated with a specific land use/tenure (e.g., land use permits, leases, easements, etc.) within the alternative route preliminary footprint	0.5	0.9	0.0	0.0	1.2	1.9	1.0	0.2	2.7	22.4	8.9	17.4
		Number of potential residences, including permanent and seasonal, and major outbuildings, crossed by/within the alternative route preliminary footprint	5.0	12.0	12.0	13.0	4.0	4.0	0.0	0.0	0.0	8.0	8.0	8.0
Number of potential primary residences (including permanent and seasonal) and major outbuildings within 500 m of the alternative route preliminary footprint	257.0	374.0	545.0	545.0	237.0	315.0	63.0	62.0	14.0	185.0	141.0	145.0		



Criteria Category	Criteria	Indicator	Section 1 - Thunder Bay Area Alternative Routes				Section 2 - Thunder Bay to Atikokan Alternative Routes		Section 3 - Atikokan Area Alternative Routes			Section 4 - Atikokan to Dryden Alternative Routes		
			Alternative Route 1	Alternative Route 1A	Alternative Route 1B-1	Alternative Route 1B-2	Alternative Route 1	Alternative Route 1C	Alternative Route 2A	Alternative Route 2B	Alternative Route 2C	Alternative Route 3A	Alternative Route 3B	Alternative Route 3C
Socio-economic Environment	Infrastructure and Community Services	Number of active waste management facilities within the alternative route preliminary footprint	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0
		Number of inactive (closed) waste management facilities within the alternative route preliminary footprint	0.0	0.0	0.0	0.0	0.0	2.0	1.0	0.0	1.0	0.0	0.0	0.0
		Number of healthcare facilities within 500 m of the alternative route preliminary footprint (e.g., hospitals, clinics, etc.)	0.0	0.0	1.0	1.0	0.0	0.0	6.0	6.0	6.0	0.0	0.0	0.0
		Number of educational facilities within 500 m of the alternative route preliminary footprint (e.g., schools, colleges, universities, etc.)	0.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
		Number of community based recreational facilities within 500 m of the alternative route preliminary footprint (e.g., community centres, libraries, etc.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Recreation and Tourism	Number of outpost camps within 1 km of the alternative route preliminary footprint	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.0	4.0
		Number of cabins and cottages within 500 m of the alternative route preliminary footprint	0.0	0.0	0.0	0.0	33.0	69.0	9999.0	9999.0	9999.0	1.0	3.0	3.0
		Number of recreational trails and access points within 500 m of the alternative route preliminary footprint	0.0	0.0	0.0	0.0	8.0	15.0	17.0	12.0	10.0	8.0	4.0	4.0
		Number of other recreational features, including canoe routes, backcountry campsites, main base lodges, resorts, shore launch sites, boat launches within 500 m of the alternative route preliminary footprint	0.0	0.0	1.0	1.0	49.0	93.0	10.0	7.0	7.0	8.0	17.0	15.0
		Number of campgrounds within 500 m of the alternative route preliminary footprint	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
		Percentage (%) of traplines within 500 m of the preliminary alternative route footprint	54.7	38.1	43.0	41.3	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		Percentage (%) of Bear Management Areas within 500 m of the preliminary alternative route footprint	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Percentage (%) of Bear Management Areas within 500 m of the preliminary alternative route footprint	0.0	33.0	0.0	0.0	92.0	91.4	100.0	80.2	100.0	94.9	94.4	95.3	
	Visual Landscape (Aesthetics)	Number of mapped/known public scenic viewpoints within 1 km of the alternative route preliminary footprint right-of-way that have a line of sight toward the towers.	187.0	199.0	283.0	286.0	568.0	637.0	215.0	201.0	251.0	362.0	564.0	512.0
	Archaeology	Number of registered archaeological sites within the alternative route preliminary footprint	0.0	0.0	20.0	20.0	0.0	1.0	0.0	0.0	1.0	2.0	0.0	1.0
		Area (ha) of the alternative route preliminary footprint with archaeological potential	137.1	135.2	124.9	131.1	192.7	248.1	21.1	20.4	55.0	510.2	438.8	375.3
	Built Heritage Resources and Cultural Heritage Landscapes	Number of built heritage resources and cultural heritage landscapes identified within 50 m of the alternative route preliminary footprint	0.0	0.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0

Criteria Category	Criteria	Indicator	Section 1 - Thunder Bay Area Alternative Routes				Section 2 - Thunder Bay to Atikokan Alternative Routes		Section 3 - Atikokan Area Alternative Routes			Section 4 - Atikokan to Dryden Alternative Routes		
			Alternative Route 1	Alternative Route 1A	Alternative Route 1B-1	Alternative Route 1B-2	Alternative Route 1	Alternative Route 1C	Alternative Route 2A	Alternative Route 2B	Alternative Route 2C	Alternative Route 3A	Alternative Route 3B	Alternative Route 3C
Technical	Project Size	Total length (km) of alternative route preliminary right-of-way	37.5	40.7	40.0	40.4	153.0	153.0	19.9	24.5	28.3	148.1	160.5	170.0
	Existing Community Infrastructure	Number of rail lines crossed by the alternative route preliminary footprint right-of-way	0.0	0.0	0.0	0.0	3.0	4.0	2.0	1.0	2.0	1.0	1.0	1.0
		Number of roads crossed by the alternative route preliminary footprint right-of-way	21.0	23.0	23.0	26.0	37.0	45.0	9.0	5.0	10.0	39.0	54.0	49.0
		Area (ha) of proposed/protected MTO right-of-way within the alternative route preliminary footprint	0.0	0.0	3.1	3.1	1.7	1.7	0.0	0.0	0.0	2.6	3.7	1.3
		Number of pipelines within the alternative route preliminary footprint right-of-way	1.0	2.0	1.0	1.0	1.0	1.0	1.0	0.0	2.0	1.0	1.0	1.0
	Constructability	Number of transmission line corners 2° to <15°	3.0	19.0	14.0	20.0	25.0	23.0	8.0	4.0	10.0	33.0	32.0	37.0
		Number of transmission line corners 15° to <30°	1.0	3.0	6.0	2.0	6.0	11.0	7.0	2.0	11.0	7.0	18.0	20.0
		Number of transmission line corners 30° to <45°	1.0	3.0	3.0	4.0	2.0	2.0	4.0	0.0	6.0	3.0	9.0	11.0
		Number of transmission line corners >=45°	0.0	3.0	5.0	6.0	2.0	3.0	6.0	5.0	6.0	1.0	7.0	8.0
		Number of <230 kV transmission line crossovers required	1.0	1.0	3.0	4.0	2.0	3.0	2.0	2.0	4.0	3.0	3.0	3.0
		Number of 230 kV transmission line crossovers required	0.0	2.0	0.0	0.0	3.0	2.0	1.0	2.0	1.0	2.0	2.0	2.0
		Total length of off right-of-way access (km)	25.9	23.1	23.1	33.5	59.8	75.6	11.9	9.1	14.7	67.2	128.3	124.8
		Total area (ha) of wetlands crossed by preliminary footprint right-of-way	16.7	15.8	16.2	14.8	118.1	110.4	7.5	17.2	17.6	102.1	87.0	113.4
		Length (km) of alternative route preliminary footprint with a slope greater than 35%	1.6	1.5	1.2	1.5	7.0	7.0	3.2	2.7	3.4	7.0	7.0	7.0
		Length (km) of alternative route preliminary footprint located parallel to existing pipeline	0.9	26.5	0.2	0.2	0.3	0.3	0.5	0.0	1.0	2.9	0.3	2.9
	Existing Right-of-Ways	Percentage (%) of transmission line with existing access roads within 400 m	69.1	56.7	82.0	82.8	39.1	49.5	59.7	37.2	52.0	45.4	79.9	73.4
		Percentage (%) of alternative route preliminary footprint located parallel to existing Hydro and Road right-of-ways	94.4	79.9	73.2	91.3	98.0	97.2	97.1	100.0	87.8	99.4	23.6	39.7
	Cost	Estimated Construction Project Cost (Ranked)	1	3	2	4	1	2	2	1	3	1	2	3
		Estimated Yearly Operation Cost (Ranked)	1	4	2	3	1	1	1	2	3	1	2	3
	Indigenous Communities	Indigenous Community Rights/Interests and Use of Land and Resources for Traditional Purposes	Area (ha) of Crown land crossed by the alternative route preliminary footprint	28.0	24.5	1.4	2.4	968.6	877.6	92.3	184.7	177.8	995.6	985.1
Percentage (%) of alternative route preliminary footprint located parallel to existing linear infrastructure			94.8	71.5	73.4	93.2	97.2	95.4	92.8	98.5	91.2	99.1	33.7	44.3
Area (ha) of Significant Wildlife Habitat that could provide habitat for traditionally used vegetation and wildlife species (e.g., wild rice and waterfowl) within the alternative route preliminary footprint and 1 km buffer area		14445.0	19239.3	16890.4	16927.6	64994.7	63199.4	8647.0	13433.7	14509.6	71933.7	73432.6	67478.8	
Cultural and Spiritual Areas and Sites		Area (ha) of the alternative route preliminary footprint with archaeological potential	137.1	135.2	124.9	131.1	192.7	248.1	21.1	20.4	55.0	510.2	438.8	375.3
Other Applicable Criteria/ Indicators Identified by Communities		Area (ha) of sensitive areas identified by Indigenous communities within the alternative route preliminary footprint	76.3	75.9	121.2	125.7	155.0	155.0	0.0	41.3	0.0	248.6	388.2	564.5
		Distance (km) of right-of-way to Indigenous reserve lands	17.6	18.3	13.2	13.2	22.1	22.1	46.3	42.1	46.3	3.1	1.3	3.1

# ATTACHMENT 2.0-A-2

## *Criteria and Indicator Weights Workbook*



Criteria Category	Theme Weight (%)	Criteria	Criteria Weight (%)	Indicator	Indicator Weight (%)	Indicator Attractor/Detractor
Natural Environment	25	Physiography, Geology, Surficial Geology and Soils	5	Area (ha) of productive soils (e.g., agricultural) within the alternative route preliminary footprint	100	Detractor
		Provincial Parks, Conservation Reserves and Areas of Natural and Scientific Interest	14	Area (ha) of Areas of Natural and Scientific Interest (Earth and Life Science) within the alternative route preliminary footprint and a 500 m buffer area	16	Detractor
				Area (m <sup>2</sup> ) of conservation reserves within the alternative route preliminary footprint and a 500 m buffer area	42	Detractor
				Area (ha) of provincial parks within the alternative route preliminary footprint and a 500 m buffer area	42	Detractor
		Surface Water	11	Number of lakes and ponds within the alternative route preliminary footprint	25	Detractor
				Area (ha) of lakes and ponds within the alternative route preliminary footprint	15	Detractor
				Number of watercourses within the alternative route preliminary footprint	35	Detractor
				Area (ha) of watercourses within the alternative route preliminary footprint	25	Detractor
		Groundwater	8	Number of water wells within the alternative route preliminary footprint	50	Detractor
				Area (ha) of high potential aquifer deposits within the alternative route preliminary footprint	50	Detractor
		Vegetation and Wetlands	12	Area (ha) of recently logged lands (last 10 years) within the alternative route preliminary footprint and 1km buffer area	15	Attractor
				Area (m <sup>2</sup> ) of mapped vegetation related SWH (or candidate SWH) within the alternative route preliminary footprint and 1 km buffer area	15	Detractor
				Area (ha) of critical Landform/Vegetation Associations within the alternative route preliminary footprint and 1 km buffer area	22	Detractor
				Area (ha) of underrepresented Landform/Vegetation Associations within the alternative route preliminary footprint and 1 km buffer area	11	Detractor
				Area (ha) of Provincially Significant Wetlands within the alternative route preliminary footprint and 1 km buffer area	22	Detractor
				Area (ha) of other wetlands within the alternative route preliminary footprint and 1 km buffer area	15	Detractor
		Little Brown Myotis and Northern Myotis	10	Area (ha) of candidate or known hibernacula habitat within the alternative route preliminary footprint and 200 m buffer area	70	Detractor
				Area (ha) of candidate or known hibernacula habitat within the alternative route preliminary footprint and 500 m buffer area	20	Detractor
				Area (ha) of candidate or known maternity roost habitat within the alternative route preliminary footprint and 1 km buffer area	10	Detractor
		Eastern whip-poor-will	1	Number of known occurrence records within the alternative route preliminary footprint and 1 km buffer area	75	Detractor
				Area (ha) of candidate or known breeding habitat within the alternative route preliminary footprint and 1 km buffer area	25	Detractor
		Barn swallow	1	Number of known occurrence records within the alternative route preliminary footprint and 1 km buffer area	75	Detractor
				Area (ha) of candidate or known breeding habitat within the alternative route preliminary footprint and 1 km buffer area	25	Detractor
		Bank swallow	1	Number of known occurrence records within the alternative route preliminary footprint and 1 km buffer area	75	Detractor
				Area (ha) of candidate or known breeding habitat within the alternative route preliminary footprint and 1 km buffer area	25	Detractor
		Bobolink	1	Number of known occurrence records within the alternative route preliminary footprint and 1 km buffer area	75	Detractor
				Area (ha) of candidate or known breeding habitat within the alternative route preliminary footprint and 1 km buffer area	25	Detractor
		Chimney swift	1	Number of known occurrence records within the alternative route preliminary footprint and 1 km buffer area	75	Detractor
				Area (ha) of candidate or known breeding habitat within the alternative route preliminary footprint and 1 km buffer area	25	Detractor
		American white pelican	1	Number of known occurrence records within the alternative route preliminary footprint and 1 km buffer area	75	Detractor
				Area (ha) of candidate or known breeding habitat within the alternative route preliminary footprint and 1 km buffer area	25	Detractor
		Least Bittern	1	Number of known occurrence records within the alternative route preliminary footprint and 1 km buffer area	50	Detractor
				Area (ha) of candidate or known breeding habitat within the alternative route preliminary footprint and 1 km buffer area	50	Detractor
		American Badger	1	Number of known occurrence records within the alternative route preliminary footprint and 1 km buffer area	75	Detractor
				Area (ha) of candidate or known denning/burrowing habitat within the alternative route preliminary footprint and 1 km buffer area	25	Detractor
		Gray Fox	2	Number of known occurrence records within the alternative route preliminary footprint and 1 km buffer area	50	Detractor
				Area (ha) of known gray fox home range within the alternative route preliminary footprint and 1 km buffer area	50	Detractor
		Lake sturgeon (Great Lakes - Upper St. Lawrence population)	2	Number of waterbodies with potential lake sturgeon (Great Lakes - Upper St. Lawrence population) within the alternative route preliminary footprint	25	Detractor
				Area (ha) of lake sturgeon (Great Lakes - Upper St. Lawrence population) habitat potential within the alternative route preliminary footprint	75	Detractor
		Lake sturgeon (Saskatchewan - Nelson River population)	2	Number of waterbodies with potential lake sturgeon (Saskatchewan - Nelson River population) within the alternative route preliminary footprint	25	Detractor
				Area (ha) of lake sturgeon (Saskatchewan - Nelson River population) habitat potential within the alternative route preliminary footprint	75	Detractor
		American eel	2	Number of waterbodies with potential American eel within the alternative route preliminary footprint	60	Detractor
Area (ha) of American eel habitat potential within the alternative route preliminary footprint	10			Detractor		
Wildlife and Wildlife Habitat	12	Percentage (%) of alternative route preliminary alignment paralleling existing permanent linear infrastructure to minimize habitat fragmentation	60	Attractor		
		Area (ha) of mapped wildlife related SWH (or candidate SWH) within the alternative route preliminary footprint and 1 km buffer area	10	Detractor		
		Number of S1-S3 ranked wildlife species, species provincially designated as Special Concern and/or species listed federally (but not provincially) as Endangered, Threatened or Special Concern within the alternative route preliminary footprint and 1 km buffer area	15	Detractor		
		Area (ha) of habitat of S1-S3 ranked wildlife species, species provincially designated as Special Concern and/or species listed federally (but not provincially) as Endangered, Threatened or Special Concern within the alternative route preliminary footprint and 1 km buffer area	15	Detractor		
Fish and Fish Habitat	12	Area (ha) of fish habitat, excluding SAR habitat, within the alternative route preliminary footprint	75	Detractor		
		Number of waterbodies within the alternative route preliminary footprint with sensitive habitats (excluding SAR habitats), including: - lake trout habitat - brook trout habitat - nursery/rearing areas - spawning areas - overwintering areas - other significant aquatic habitat (e.g., feeding refuge, migratory habitats etc.) - habitats of S1-S3 ranked fish species, species provincially designated as Special Concern and/or species listed federally (but not provincially) as Endangered, Threatened or Special Concern and those of species that have local significance (i.e., Coaster Brook Trout [ <i>Salvelinus fontinalis</i> ]) within the alternative route preliminary footprint and 1 km buffer area	25	Detractor		

Criteria Category	Theme Weight (%)	Criteria	Criteria Weight (%)	Indicator	Indicator Weight (%)	Indicator Attractor/Detractor				
Socio-economic Environment	25	Land Use	25	Area (ha) of provincial parks within the alternative route preliminary footprint	8	Detractor				
				Area (ha) of conservation reserves within the alternative route preliminary footprint	8	Detractor				
				Area (ha) of enhanced management areas within the alternative route preliminary footprint	8	Detractor				
				Number of mining claims within the alternative route preliminary footprint	6	Detractor				
				Number of inactive (abandoned) mines within the alternative route preliminary footprint	4	Detractor				
				Number of aggregate pits and quarries within the alternative route preliminary footprint	7	Detractor				
				Area (ha) of high potential for aggregate resources within the alternative route preliminary footprint	6	Detractor				
				Area (ha) of lands designated for recreational, residential, institutional or commercial purposes within the alternative route preliminary footprint	9	Detractor				
				Area (ha) of reasonably foreseeable planned developments within the alternative route preliminary footprint (development applications)	9	Detractor				
				Area (ha) of lands associated with a specific land use/tenure (e.g., land use permits, leases, easements, etc.) within the alternative route preliminary footprint	9	Detractor				
				Number of potential residences, including permanent and seasonal, and major outbuildings, crossed by/within the alternative route preliminary footprint	14	Detractor				
				Number of potential primary residences (including permanent and seasonal) and major outbuildings within 500 m of the alternative route preliminary footprint	12	Detractor				
		Infrastructure and Community Services	16		Number of active waste management facilities within the alternative route preliminary footprint	19	Detractor			
					Number of inactive (closed) waste management facilities within the alternative route preliminary footprint	15	Detractor			
					Number of healthcare facilities within 500 m of the alternative route preliminary footprint (e.g., hospitals, clinics, etc.)	22	Detractor			
					Number of educational facilities within 500 m of the alternative route preliminary footprint (e.g., schools, colleges, universities, etc.)	22	Detractor			
					Number of community based recreational facilities within 500 m of the alternative route preliminary footprint (e.g., community centres, libraries, etc.)	22	Detractor			
					Recreation and Tourism	20		Number of outpost camps within 1 km of the alternative route preliminary footprint	20	Detractor
								Number of cabins and cottages within 500 m of the alternative route preliminary footprint	16	Detractor
								Number of recreational trails and access points within 500 m of the alternative route preliminary footprint	14	Detractor
		Number of other recreational features, including canoe routes, backcountry campsites, main base lodges, resorts, shore launch sites, boat launches within 500 m of the alternative route preliminary footprint	14	Detractor						
		Number of campgrounds within 500 m of the alternative route preliminary footprint	12	Detractor						
		Percentage (%) of traplines within 500 m of the preliminary alternative route footprint	8	Detractor						
		Percentage (%) of Bait Harvest Areas within 500 m of the preliminary alternative route footprint	8	Detractor						
		Percentage (%) of Bear Management Areas within 500 m of the preliminary alternative route footprint	8	Detractor						
		Visual Landscape (Aesthetics)	21	Number of mapped/known public scenic viewpoints within 1 km of the alternative route preliminary footprint right-of-way that have a line of sight toward the towers.	100	Detractor				
		Archaeology	10		Number of registered archaeological sites within the alternative route preliminary footprint	50	Detractor			
					Area (ha) of the alternative route preliminary footprint with archaeological potential	50	Detractor			
		Built Heritage Resources and Cultural Heritage Landscapes	8	Number of built heritage resources and cultural heritage landscapes identified within 50 m of the alternative route preliminary footprint	100	Detractor				
		Technical	25	Project Size	16	Total length (km) of alternative route preliminary right-of-way	100	Detractor		
Existing Community Infrastructure	17				Number of rail lines crossed by the alternative route preliminary footprint right-of-way	20	Detractor			
					Number of roads crossed by the alternative route preliminary footprint right-of-way	10	Detractor			
					Area (ha) of proposed/protected MTO right-of-way within the alternative route preliminary footprint	50	Detractor			
					Number of pipelines within the alternative route preliminary footprint right-of-way	20	Detractor			
Constructability	20				Number of transmission line corners 2° to <15°	2	Detractor			
					Number of transmission line corners 15° to <30°	4	Detractor			
					Number of transmission line corners 30° to <45°	6	Detractor			
					Number of transmission line corners >=45°	8	Detractor			
					Number of <230 kV transmission line crossovers required	5	Detractor			
					Number of 230 kV transmission line crossovers required	10	Detractor			
					Total length of off right-of-way access (km)	20	Detractor			
					Total area (ha) of wetlands crossed by preliminary footprint right-of-way	10	Detractor			
					Length (km) of alternative route preliminary footprint with a slope greater than 35%	10	Detractor			
					Length (km) of alternative route preliminary footprint located parallel to existing pipeline	5	Detractor			
Percentage (%) of transmission line with existing access roads within 400 m	20			Attractor						
Existing Right-of-Ways	25			Percentage (%) of alternative route preliminary footprint located parallel to existing Hydro and Road right-of-ways	100	Attractor				
Cost	22				Estimated Construction Project Cost (\$)	80	Detractor			
					Estimated Yearly Operation Cost (\$)	20	Detractor			
Indigenous Communities	25			Indigenous Community Rights/Interests and Use of Land and Resources for Traditional Purposes	40	Area (ha) of Crown land crossed by the alternative route preliminary footprint	30	Detractor		
		Percentage (%) of alternative route preliminary footprint located parallel to existing linear infrastructure	40			Attractor				
		Area (ha) of Significant Wildlife Habitat that could provide habitat for traditionally used vegetation and wildlife species (e.g., wild rice and waterfowl) within the alternative route preliminary footprint and 1 km buffer area	30			Detractor				
		Cultural and Spiritual Areas and Sites	30	Area (ha) of the alternative route preliminary footprint with archaeological potential	100	Detractor				
		Other Applicable Criteria/ Indicators Identified by Communities	30		Area (ha) of sensitive areas identified by Indigenous communities within the alternative route preliminary footprint	50	Detractor			
Distance (km) of right-of-way to Indigenous reserve lands	50				Attractor					





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