

Figure 12 Comparative Impacts Proposed Route, AR-2 and AR-3

Title	Comparison Applicable	Proposed Route	Alternative Route AR-2	Alternative Route AR-3
Project Description	Each of the routes differs slightly; however, the start and end of each route connect with the existing 16 Line.	<p>The proposed Project is located south of Fayal Township and approximately four miles east of McDavitt Township in St. Louis County, Minnesota. The proposed HVTL would connect to Minnesota Power’s existing 16 Line on the east side of United Taconite’s existing tailings basin and proceed southeast, parallel to an existing railroad grade for approximately 1.25 miles. The line would then proceed southwest for approximately 1.75 miles where it would connect to the existing 16 Line.</p> <p>An existing three-mile 115 kV HVTL section would be taken out of service and removed.</p>	<p>The proposed Project is located south of Fayal Township and approximately four miles east of McDavitt Township in St. Louis County, Minnesota. The proposed HVTL would connect to Minnesota Power’s existing 16 Line on the east side of United Taconite’s existing tailings basin and proceed southeast, parallel to an existing railroad grade for approximately 0.65 miles. The line would then proceed south for approximately 1.10 miles and then it would proceed west for approximately 0.60 miles where it would connect to the existing 16 Line.</p> <p>An existing three-mile 115 kV HVTL section would be taken out of service and removed.</p>	<p>The proposed Project is located south of Fayal Township and approximately four miles east of McDavitt Township in St. Louis County, Minnesota. The proposed HVTL would connect to Minnesota Power’s existing 16 Line on the east side of United Taconite’s existing tailings basin and proceed southeast, parallel to an existing railroad grade for approximately 0.65 miles. The line would then proceed south for approximately 1.30 miles and then it would proceed southwest for approximately 0.75 miles where it would connect to the existing 16 Line.</p> <p>An existing three-mile 115 kV HVTL section would be taken out of service and removed.</p>
Project Costs	The options for constructing the structure foundations with mine tailings or constructing the structure foundations with select granular fill have been compared and the cost differences are noted. Mine tailings would be preferred due to their proximity and cost.	Assumes Structure Foundations require no fill material Total Cost = \$4,699,349.38	Structure Foundations Constructed with Mine Tailings Cost Difference = \$396,118.24 Structure Foundations Constructed with Select Granular Fill = \$533,729.14	Structure Foundations Constructed with Mine Tailings Cost Difference = \$831,698.01 Structure Foundations Constructed with Select Granular Fill = \$861,838.42
Location	Each of the routes would impact the same Township, Range, and Sections. The routes and the Township, Range, and Section are displayed in Figure 2 .	<p>Township 56 North, Range 17 West, Section 16 Township 56 North, Range 17 West, Section 17 Township 56 North, Range 17 West, Section 18 Township 56 North, Range 17 West, Section 20 Township 56 North, Range 17 West, Section 21 Township 56 North, Range 17 West, Section 28 Township 56 North, Range 17 West, Section 29</p>		
Route Width	Each of the routes would have the same route and ROW widths.	The route width for each route would be 500-feet and the ROW width would be 100 feet. For each route engineering challenges associated with the project would require a 500-foot route width to allow adequate flexibility in developing a final alignment.		
Transmission Structures	Each of the routes would utilize the same structures; however, the placement of each structure may be different depending on the route. More specific information regarding the structure design is included in Table 3 .	The transmission line for each route would be designed to meet or exceed relevant local and state codes including the National Electric Safety Code (NESC) and Company standards. Appropriate standards will be met for construction and installation, and applicable safety procedures will be followed during and after installation.		
Right-of-Way Width	Each of the routes would have the same ROW width.	The ROW width for each route would be 100 feet.		
Transmission Removal Procedures	Transmission Removal Procedures, which is not specific to the route. (see Section 5.1.5 RPA)	NA		

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Restoration Procedures	Not applicable, the text in this section describes Restoration Procedures, which is not specific to the route. (see Section 5.2.6 RPA)		NA	
Maintenance Procedures	Not applicable, the text in this section describes Maintenance Procedures, which is not specific to the route. (see Section 5.1.7 RPA)		NA	
Electric Fields	Each of the routes would have the same EF Values. Detailed information regarding the calculated EF is located in Table 10 .	Due to the conductor configuration of the single circuit 115 kV H-Frame type structure, the maximum EF for this configuration actually occurs at approximately 16 feet from the centerline of the ROW, this would be the same for all routes. The maximum EF was calculated to be 1.55 kV/m at one meter above ground for all routes.		
Magnetic Fields	Each of the routes would have the same MF Values. Detailed information regarding the calculated MF is located in Table 11 .	Due to the conductor configuration of the single circuit 115 kV H-Frame type structure, the peak MF for this configuration actually occurs at the centerline of the ROW, this would be the same for all routes. This peak MF was calculated to be 104.90 mG under the conductor thermal limit condition and 70.69 mG under the expected peak loading condition for all routes.		
Stray Voltage	Each of the routes would have the same mitigation measures for stray voltage.	Appropriate measures would be taken to prevent stray voltage problems when the proposed HVTL parallels or crosses distribution lines for each route.		
Farm Operations, Vehicle Use and Metal Buildings Near Power Lines	Each of the routes would have the same mitigation measures.	Minnesota Power would design the Project to exceed NESC minimum clearances for each route.		
Environmental Setting	Each of the routes is located in close proximity; therefore, they are within the same environmental setting.	Each route area is located within the Northern Minnesota Drift and Lake Plains Section, a section within the biogeographic province known as the Laurentian Mixed Forest Province under the Ecological Classification System developed by the Minnesota Department of Natural Resources. Each route is located in the Tamarack Lowlands Subsection of the Northern Minnesota Drift and Lake Plains Section, near the transition between the St. Louis Moraines and Toimi Uplands Subsections. The Tamarack Lowlands Subsection is characterized by level to gently rolling topography. The largest landform is a lake plain. Around the edges of the old glacial lake is a till plain (Aurora Till Plain) formed in Superior lobe sediments. There is also a small piece of end moraine north of Sandy Lake that is related to the St. Louis moraines. The most common forest communities include lowland hardwoods and conifers. Additionally, northern hardwood and aspen-birch forests were common on the other portions of this region. Presently, much of the land is in public ownership. Forestry and tourism, along with some agriculture are the most common land uses.		
Public Health and Safety	Each of the routes is located in close proximity; therefore, the public health and safety concerns are the same.	Minnesota Power would implement proper safeguards during construction and operation to avoid potential impacts to public health and safety for each route. Concerns related to health and safety include hazards associated with coming into contact with energized equipment, induction, and stray voltage. In general, impacts to public health and safety from the project are not anticipated for any of the routes. Additionally, each route would be equipped with protective devices (circuit breakers and relays located in the substation where the transmission lines terminate) to safeguard the public if an accident occurs, such as a structure or conductor falling to the ground.		

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Residential and Non-Residential Land Use	<p>Each of the routes are located in close proximity; therefore, the public health and safety concerns are the same.</p> <p>Each of the routes differ slightly; therefore, the amount of residential land impact is different. The Proposed Route crosses 1.6 acres of areas zoned residential; AR-2 does not cross areas zoned residential; and AR-3 crosses 1.3 acres of areas zoned residential. The most proximate structure is the same for each route; which is a dwelling located at least 1950 feet from the routes.</p>	<p>The Proposed Route would cross areas zoned as industrial, residential, and forest agricultural management. Construction of the Proposed Route is primarily located in open wetland areas and wetlands adjacent to railroad tracks. Approximately 1.6 acres of the Proposed Route would cross an area zoned residential. There are no residences are located within the proposed ROW and within 1,000 feet of the Proposed Route.</p>	<p>The AR-2 would cross areas zoned as industrial, and forest agricultural management. Construction of AR-2 is primarily located in open wetland areas and wetlands adjacent to railroad tracks. No areas zoned residential would be crossed by AR-2. There are no residences located within the proposed ROW and within 1,000 feet of AR-2.</p>	<p>The AR-3 cross areas zoned as industrial, residential, and forest agricultural management. Construction of AR-3 is primarily located in open wetland areas and wetlands adjacent to railroad tracks. Approximately 1.3 acres of AR-3 would cross an area zoned residential. There are no residences located within the proposed ROW nor within 1,000 feet of the Proposed Route.</p>
Noise	<p>The routes would be constructed in a similar fashion; therefore, there are no differences regarding noise produced by the HVTL.</p>	<p>The noise generated from the each of the routes would not exceed background noise levels and would, therefore, not be audible at any receptor location. The noise level is well below the MPCA limits for the relevant noise area classifications (NAC 1, NAC 2, and NAC 3). The proposed HVTLs would be designed and constructed to comply with state noise standards established by the MPCA. Any audible noise would be below the MPCA noise standards established for NAC 1. Additionally, it is not anticipated that the proposed Project would increase noise from transmission line conductors or any associated facilities above the levels already experienced in the area. With implementation of state design and construction standards, the proposed project is not anticipated to result in adverse or significant impacts on the public as a result of noise.</p>		
Television and Radio Interference	<p>The routes would be constructed in a similar fashion; therefore, there are no differences regarding television and radio interference associated with the HVTL.</p>	<p>If television or radio interference is caused by or from the operation of the routes in those areas where good reception is presently obtained, the Applicant would inspect and repair any loose or damaged hardware, or take other necessary action to restore reception to the present level, including the appropriate modification of receiving antenna systems if deemed necessary.</p>		
Aesthetics	<p>Each of the routes are located in close proximity; therefore, the aesthetic impacts for all routes would be the same.</p>	<p>Each of the routes is within areas zoned as either industrial, residential, or forest agricultural management. There are no residential structures located within the proposed project area. The closest dwelling to each of the routes is at least 1950 feet away in a forested area. Therefore, the aesthetics resources of this area would not be adversely affected by any of the routes.</p>		
Socioeconomic	<p>Each of the routes are located in close proximity; therefore, the socioeconomic impacts for all routes would be the same.</p>	<p>None of the routes would create any permanent jobs; however, the construction activities for each route would provide a seasonal influx of additional dollars into the communities during the construction phase, and materials, such as concrete, may be purchased from local vendors where feasible. Long-term beneficial impacts from each of the routes would be measured as the value of the United Taconite tailings basin expansion, which would allow United Taconite to continue operating.</p>		
Cultural Values	<p>Each of the routes are located in close proximity; therefore, the cultural impacts for all routes would be the same.</p>	<p>No impacts are anticipated for any of the routes and, therefore, no mitigative measures are proposed.</p>		
Recreation	<p>Each of the routes are located in close proximity; therefore, the impacts to recreation for all routes would be the same.</p>	<p>None of the routes are located in the immediate vicinity of any recognized recreational area; however, Hiekkila and Murphy Lakes are located within one mile of each of the routes as shown in Figure 5. Several properties have shoreline property on these water bodies. These property owners and the general public may use the lakes for a variety of recreational activities; including boating, fishing, and watersports. None of the routes are located within the immediate vicinity of these lakes and, thus, no impacts are anticipated.</p>		

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Public Services	Each of the routes is located in close proximity; therefore, the impacts to public services for all routes would be the same.	No impacts to public services are anticipated for any of the routes and, therefore, no mitigative measures are proposed.		
Utilities	Each of the routes is located in close proximity; therefore, the impacts to utilities for all routes would be the same.	No impacts to utilities are anticipated for any of the routes and, therefore, no mitigative measures are proposed.		
Transportation and Traffic	Each of the routes is located in close proximity; therefore, the impacts to transportation and traffic for all routes would be the same.	No impacts to emergency services are anticipated for any of the routes, Minnesota Power would minimize potential impacts through coordination of the construction with local and state road authorities for all routes and use signage during construction to alert drivers. No significant conflicts are anticipated. Operation of the transmission line is not expected to impact vehicular or rail traffic for any of the routes.		
Agriculture	Each of the routes is located in close proximity; therefore, the impacts to agriculture for all routes would be the same.	No farmland is present within the any of the routes as displayed on Figure 6.		
Forestry	Each of the routes is located in close proximity; therefore, the impacts to forestry for all routes would be the same.	There are no known tree farms or federal or state forests located within any of the routes.		
Tourism	Each of the routes is located in close proximity; therefore, the impacts to tourism for all routes would be the same.	No formal tourist areas are present within the any of the routes.		
Mining	Each of the routes would accommodate expanding United Taconite's tailing basin; therefore, the impacts to mining for all routes would be the same.	Although all three routes would allow for United Taconite to complete its planned expansion of the tailings basin, AR-2 and AR-3 would be located in close proximity to the basin. This could impact future expansion or maintenance by United Taconite or require the proposed line to be relocated in the future.		

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Archaeological and Historic Resources	Each of the routes are located in close proximity; therefore, the impacts to archaeological and historic resources for all routes would be the same.	Two Pines Resource Group, LLC (Two Pines) conducted a cultural resources literature search for the proposed Project in December of 2014. Based on the data from Two Pines, no archaeological or historic resources have been documented within one mile of the Proposed Route. Both AR-2 and AR-3 are within one mile of the Proposed Route; therefore, there are no anticipated impacts to archaeological and historic resources for any of the routes. All routes would be subject to conditions of the route permit regarding encountering such items/features during construction																																																																							
Air Quality	Each of the routes would be constructed in a similar fashion with the same materials; therefore, the impacts air quality for all routes would be the same.	None of the routes would result in adverse or significant effects on air quality.																																																																							
Water Quality	Each of the routes would be constructed in a similar fashion with the same materials in similar environmental settings; therefore, the impacts air quality for all routes would be the same.	Each route may have minor, short term effects on water quality. Impacts on water quality are possible during the construction phase of each route; when sediment could possibly reach surface waters due to excavation, grading, and construction traffic disturb the ground. In the event that a National Pollutant Discharge Elimination System (NPDES) construction storm water permit and Stormwater Pollution Prevention Plan (SWPPP) is required for any of the routes the Applicant would obtain the permit and prepare a SWPPP as a condition of the route permit.																																																																							
MnDNR Public Waters Inventory	Each of the routes would be constructed in a similar fashion with the same materials.	No PWI basins are located within the ROW of any of the routes, PWIs are displayed on Figure 8.																																																																							
Wetlands	Each of the routes differs slightly; therefore, the amount of wetlands impacted is different. The Proposed Route impacts 157.7 acres of Forested/Shrub Wetlands; AR-2 impacts 144.5 acres of Forested/Shrub Wetlands; and AR-3 impacts 161.1 acres of Forested/Shrub Wetlands. Wetland impacts are displayed on Figure 8.	Based on NWI data approximately 157.5 acres of Forested/Shrub Wetland have been mapped within the Proposed Route.	Based on NWI data approximately 144.5 acres of Forested/Shrub Wetland have been mapped within AR-2.	Based on NWI data approximately 161.1 acres of Forested/Shrub Wetland have been mapped within AR-3.																																																																					
Floodplain	Each of the routes is located in close proximity; therefore, the impacts to floodplains for all routes would be the same.	None of the routes would impact floodplain resources. The location of the routes and nearby floodplains is displayed on Figure 8.																																																																							
Flora	Each of the routes is located in close proximity; however, they differ slightly. Therefore, the amount of flora impacted by each route differs.	<table border="1"> <thead> <tr> <th>Land Cover Type</th> <th>Acres</th> <th>Percent</th> </tr> </thead> <tbody> <tr> <td>Aquatic</td> <td>0.75</td> <td>2.15%</td> </tr> <tr> <td>Lowland Shrub</td> <td>11.02</td> <td>31.57%</td> </tr> <tr> <td>Marsh</td> <td>1.86</td> <td>5.33%</td> </tr> <tr> <td>Tamarack</td> <td>4.89</td> <td>14.01%</td> </tr> <tr> <td>Lowland Black Spruce</td> <td>15</td> <td>42.97%</td> </tr> <tr> <td>Aspen/White Birch</td> <td>0.55</td> <td>1.58%</td> </tr> <tr> <td>Pine</td> <td>0.6</td> <td>1.72%</td> </tr> <tr> <td>Grassland</td> <td>0.25</td> <td>0.72%</td> </tr> </tbody> </table>	Land Cover Type	Acres	Percent	Aquatic	0.75	2.15%	Lowland Shrub	11.02	31.57%	Marsh	1.86	5.33%	Tamarack	4.89	14.01%	Lowland Black Spruce	15	42.97%	Aspen/White Birch	0.55	1.58%	Pine	0.6	1.72%	Grassland	0.25	0.72%	<table border="1"> <thead> <tr> <th>Land Cover</th> <th>Acres</th> <th>Percent</th> </tr> </thead> <tbody> <tr> <td>Aquatic</td> <td>3.82</td> <td>13.53%</td> </tr> <tr> <td>Lowland Black</td> <td>14.62</td> <td>51.76%</td> </tr> <tr> <td>Lowland Shrub</td> <td>5.46</td> <td>19.32%</td> </tr> <tr> <td>Tamarack</td> <td>4.35</td> <td>15.39%</td> </tr> </tbody> </table>	Land Cover	Acres	Percent	Aquatic	3.82	13.53%	Lowland Black	14.62	51.76%	Lowland Shrub	5.46	19.32%	Tamarack	4.35	15.39%	<table border="1"> <thead> <tr> <th>Land Cover Type</th> <th>Acres</th> <th>Percent</th> </tr> </thead> <tbody> <tr> <td>Aquatic</td> <td>3.72</td> <td>10.65%</td> </tr> <tr> <td>Aspen/White Birch</td> <td>0.55</td> <td>1.57%</td> </tr> <tr> <td>Grassland</td> <td>0.25</td> <td>0.71%</td> </tr> <tr> <td>Lowland Black Spruce</td> <td>17.87</td> <td>51.20%</td> </tr> <tr> <td>Lowland Shrub</td> <td>3.69</td> <td>10.56%</td> </tr> <tr> <td>Marsh</td> <td>1.34</td> <td>3.85%</td> </tr> <tr> <td>Pine</td> <td>0.05</td> <td>0.15%</td> </tr> <tr> <td>Tamarack</td> <td>5.42</td> <td>15.54%</td> </tr> </tbody> </table>	Land Cover Type	Acres	Percent	Aquatic	3.72	10.65%	Aspen/White Birch	0.55	1.57%	Grassland	0.25	0.71%	Lowland Black Spruce	17.87	51.20%	Lowland Shrub	3.69	10.56%	Marsh	1.34	3.85%	Pine	0.05	0.15%	Tamarack	5.42	15.54%
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Fauna	Each of the routes are located in close proximity; therefore, the impacts to fauna for all routes would be the same.	<p>The Anchor Lake MnDNR Wildlife Management Area (WMA) is located approximately 0.75 miles east of each of the routes; however, this area will not be impacted by any of the routes. Additionally, no USFWS Waterfowl Production Areas (WPA) are located within the vicinity of the any of the routes. Displacement of fauna would be minor and temporary for each route, and no long-term population-level impacts are anticipated. The Applicant would construct the selected route according to Avian Power Line Interaction Committee (APLIC) recommended safety design standards regarding avian collisions and avian electrocution with HVTLs. In addition, the Applicant would work with the MnDNR and the USFWS to identify any areas that may require marking transmission line shield wires and/or using alternative structures to reduce the likelihood of avian collisions.</p>		
Rare and Unique Natural Resources	Each of the routes are located in close proximity; therefore, the impacts to rare and unique natural resources for all routes would be the same.	<p>The USFWS list of federally threatened, endangered, proposed, and candidate species was reviewed to obtain information on federally-listed species that could be present along or near the Proposed Route. According to the USFWS list, St. Louis County, where the Proposed Route is located, is within the overall range of the Canada Lynx (<i>Lynx canadensis</i>; federally threatened), Gray Wolf (<i>Canis lupus</i>; federally threatened), the piping plover (<i>Charadrius melodus</i>; federally endangered), the rufa red knot (<i>Calidris canutus rufa</i>; federal threatened), and the northern long-eared bat (<i>Myotis septentrionalis</i>; federally threatened). Since AR-2 and AR-3 are very proximate to the Proposed Route the habitat and impacts to these species is the same. If Canada Lynx or Grey Wolf are present along any route it would not likely adversely affect them as it would not limit their movement and would not have direct impacts on active denning sites. Piping plover, which occupies shoreline and open sandy habitats, would not be present within any of the routes. No rufa red knot are expected to be found in the project vicinity, as the species only utilizes shoreline areas during migration through this county. Suitable habitat for the northern long-eared bat is potentially present near the proposed route, however, all impacts to the species will be avoided by adhering to seasonal tree-clearing restrictions. Trees will not be cleared from April 1st through September 30th. Additionally, there are no known bat hibernacula in close proximity to any of the proposed routes.</p> <p>The Minnesota Natural Heritage Inventory System (NHIS) database was reviewed for state-listed threatened, endangered, and special concern species that have been documented within one mile of the proposed Project. There are records of five northern goshawk (<i>Accipiter gentilis</i>; state special concern) nests comprising one territory as well as one bald eagle (<i>Haliaeetus leucocephalus</i>) nest within one mile of the project as shown in Figure 5.</p>		