Chapter 7:
Summary and Conclusion

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7.0 SUMMARY AND CONCLUSION

7.1 Summary

7.1.1 All-Season Road Network

The East Side Road Authority (ESRA) was established as a provincial Crown Agency to manage the East Side Transportation Initiative (ESTI) to increase transportation opportunities for communities on the east side of Lake Winnipeg. ESRA has been absorbed into Manitoba Infrastructure (MI), which is a provincial government department. MI is the proponent and will continue to manage the proposed Project 6 – All-Season Road linking Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation (Project). Linking the communities will provide economic and social benefits. The proposed alignment for the Project consists of a total 141 kilometres (km) of all-season road on a new right-of-way (ROW) on provincial Crown land. Construction and operation of the proposed 141 km two-lane gravel all-season road requires federal and provincial regulatory approval.

In 2008, the Province commissioned a multi-disciplinary planning and engineering study to identify a preferred network of all-season roads connecting communities on the east side of Lake Winnipeg. The study, known as the *Large Area Transportation Network Study*, set out to assess the best route network of all-season roads, the likely scope of social and economic effects and benefits of the road network on local communities, potential environmental and cultural effects and construction and operations and maintenance cost estimates and was completed in 2011. Engagement with Indigenous peoples on the east side of Lake Winnipeg was a key element of the study and served as the initial formal "round" of engagement with Manto Sipi Cree Nation, Bunibonibee Cree Nation, God's Lake First Nation and God's Lake Narrows Northern Affairs Community as well as other east side of Lake Winnipeg communities.

Construction of ESTI all-season roads began with an all-season road from PR 304 to Berens River First Nation, also known as Project P1, which officially opened in December 2017. Advancement of the *Large Area Transportation Network Study* recommendations is currently underway with several other sections of all-season road. Construction of an all-season road between St. Theresa Point First Nation and Wasagamack First Nation (Project P3a) began in 2016. Two additional sections of all-season road connecting Berens River First Nation to Poplar River First Nation (Project P4) and Pauingassi First Nation and Little Grand Rapids First Nation (Project P7a) are currently in process for approval. To date, community economic development has occurred with over 300 participants receiving construction-related training and construction contracts awarded to Indigenous companies.

7.1.2 Proposed Project

As part of the *Large Area Transportation Network Study* described above, MI is proposing to construct and maintain a 141 km two-lane gravel all-season road on provincial Crown Land on the east side of Lake

Winnipeg linking Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation. Details of the proposed Project are provided in **Chapter 3**. The main components of the proposed Project are:

- gravel-surface two-lane all-season road (141 km) on new ROW
- potential major water crossings over the God's River and Magill Creek
- culvert crossings at fish-bearing watercourse crossings
- culverts for conveyance and drainage at non-fish-bearing watercourse crossings
- culverts for drainage equalization outside of watercourse crossing to maintain hydraulic functioning of the local landscape
- temporary water crossings to facilitate permanent crossing construction
- temporary construction access routes
- temporary construction laydown areas
- temporary construction camps
- construction quarry sites
- construction borrow areas
- explosives storage facilities

It is expected that this Environmental Impact Statement (EIS) for the proposed Project will be jointly reviewed by the federal and provincial governments. Federally, the construction and operation of an all-season public highway that requires a total of 50 km or more of new ROW to be constructed is considered a Designated Project pursuant to the *Regulation Designating Physical Activities* SOR/2012-147 under the *Canadian Environmental Assessment Act* (CEAA), 2012 (S.C. 2012, c. 19, s. 52). This Project is, therefore, considered a Designated Project under CEAA 2012 and requires a federal Environmental Assessment (EA). Provincially, the proposed Project is considered a 'Class 2' development (a two lane road at a new location with associated facilities and borrow pits) under the *Classes of Development Regulation* (164/88) of Manitoba's *The Environment Act*. Therefore, the Project requires an *Environment Act* Licence.

7.1.3 Environmental Setting

The proposed Project is located on the east side of Lake Winnipeg in a remote and largely unsettled and undeveloped area of the Province. The proposed Project is located within the Hayes River Upland Ecoregion of the Boreal Shield Ecozone. The landscape is generally characterized by broad sloping uplands and lowlands comprised predominantly of coniferous forest (primarily black spruce), with abundant wetland areas and smaller areas of deciduous forest, mixedwood and tall shrub. Surface waters in the area drain to the northeast as part of the Hayes River Drainage Basin. Mammal, bird, fish, amphibians and reptile species, including some of conservation concern inhabit the area.

Manto Sipi Cree Nation, Bunibonibee Cree Nation, God's Lake First Nation and God's Lake Narrows Northern Affairs Community are the only communities in the Indigenous Lane/Resource Use Local Assessment Area. They are connected by winter road through Norway House to the all-season road network for a brief period each year. Transportation to and from these communities is otherwise primarily

by aircraft. Land use in the Local Assessment Area is mainly traditional activities by local community members such as hunting, trapping, fishing, camping, timber harvest for firewood, recreation activities, sacred/ceremonial uses and food and medicinal plant gathering. Details of the project setting and baseline conditions are provided in **Chapter 6, Section 6.1**.

7.1.4 Engagement Program

An Indigenous and Public Engagement Program (IPEP) (**Chapter 5**) was undertaken to provide meaningful opportunities to engage in dialogue and exchange information about the proposed Project and other proposed transportation initiatives on the east side of Lake Winnipeg. Engagement activities were focused on interaction with and obtaining feedback from interested and directly affected communities and community members, as well as other stakeholders and the general public. The engagement program included meetings and discussions with community leadership, community members, registered trapline holders, lodge owners, outfitters, members of the general public and regulatory authorities.

7.1.5 Environmental Assessment

An EA of the Project was completed using a values-based framework through the consideration of linkages between Valued Components (VCs) of the environment and anticipated Project activities. Information provided through the engagement program, workshops, published literature, baseline studies and professional perspectives was relied upon for the EA. Details of the EA approach are provided in **Chapter 4**. Mitigation measures and procedures for their effective implementation (**Chapter 6, Section 6.4**) were identified from regulatory and industry standards, environmental guidance documents and MI-developed environmental protection procedures specifications (**Chapter 8**) to avoid, minimize or offset potential adverse environmental effects of the Project. The effects of accidents and malfunctions and potential effects of the environment on the Project were also assessed, as were sustainability, climate change and cumulative effects (**Chapter 6, Section 6.6**). Follow-up actions, such as construction and post-construction monitoring programs, were identified where required by legislation and/or guidance documents and to address uncertainty arising in the identification of environmental effects or the ability to mitigate those effects (**Chapter 9**). Residual environmental effects were evaluated based on a significance evaluation framework as per the Canadian Environmental Assessment Agency (Agency) Guidelines for the Project (Canadian Environmental Assessment Agency 2017a).

An environmental assessment summary table outlining VCs, potential environmental effects, proposed mitigation measures to address adverse effects and potential residual effects is provided in **Appendix 7-1**. While the Guidelines for the Project (Canadian Environmental Assessment Agency 2017a) state that a second table will summarize all key mitigation measures and commitments made by MI to specifically mitigate any significant adverse effects of the Project on VCs, this table is not required as the Project is not expected to cause significant adverse environmental effects.

7.1.6 Environmental Protection

MI is committed to implementing a broad suite of mitigation measures and follow-up actions identified by the EA through MI's comprehensive Environmental Program. The Environmental Program incorporates MI's Environmental Protection Procedures and Environmental Protection Specifications for the Project and identifies Project-specific environmental protection guidelines and requirements directly in construction contract documents (**Chapter 8**). Construction contractors will be responsible for the preparation and implementation of environmental protection plans, health and safety plans, emergency response plan, erosion and sediment control plans, hazardous materials management plans and the completion of applicable monitoring programs. As the Project proponent, MI will be responsible for implementing, inspecting and reporting on this program through the construction and operations and maintenance phases of the Project.

7.2 Conclusion

Based on the information and analysis provided in this EIS, it is concluded that the proposed all-season road linking Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation is not likely to cause significant adverse environmental effects. The EIS also concludes that Project benefits (positive effects such as training, employment and business opportunities) can be expected.

CHAPTER 7 APPENDICES

Appendix 7-1 :
Environmental Assessment Summary Table

System / VC / Feature	Area of Federal Jurisdiction	Project Activity	Potential Effects	Proposed Mitigation	Residual Effects	Key Criteria for Determining Significance							Significance of Residual Effect
						Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Physical Environment													
Factor													
Atmospheric Environment – Air Quality	-	Construction activities (ex: blasting, rock crushing, stockpiling, roadbed construction, hauling) and use of construction vehicle and equipment	Increase in particulates (dust)	▪ dust suppression (EP18 [1] and ES 130.11[2]) ▪ construction vehicle speed limits	Increase in particulates (dust)	Short-Term, associated with discrete activities	Emission above baseline but within regulations and guidelines	N/A	Limited to the immediate vicinity of portions of the Project Footprint under active construction	Sporadic during construction phase	Readily reversible	No adverse ecosystem and social effects	Not Significant
						Level I	Level I	N/A	Level I	Level II	Level I	Level I	
		Maintenance activities (ex: blasting, rock crushing, stockpiling, roadbed/surface repair and hauling) and use of maintenance equipment	Increase in particulates (dust)	▪ dust suppression (EP18 and ES 130.11) ▪ vehicle speed limits	Increase in particulates (dust)	Long-Term, life of Project	Emission above baseline but within regulations and guidelines	N/A	Limited to the immediate vicinity of portions of the Project Footprint under active construction	Sporadic during maintenance activities	Readily reversible	Potential reduction in driver visibility resulting in collisions	Not Significant
						Level III	Level I	N/A	Level I	Level II	Level I	Level I	
		Public road traffic during operation	Increase in particulates (dust)	▪ dust control product application in key problem areas (EP18 and ES 130.11) ▪ vehicle speed limits ▪ aggregate size control and use of granitic material reduces dust generation from roadbed	Increase in particulates (dust)	Long-Term, life of Project	Emission above baseline but within regulations and guidelines	N/A	Limited to the immediate vicinity of the Project Footprint	Regular and frequent during summer and fall	Readily reversible	Potential reduction in driver visibility resulting in collisions	Not Significant
						Level III	Level I	N/A	Level I	Level III	Level I	Level I	
		Vehicle and equipment use during construction, maintenance and operation	Increase in vehicle emissions (ex: sulfur oxide, nitrogen oxide and diesel particulates)	▪ use low sulphur fuels ▪ require a high standard of maintenance of equipments and vehicles ▪ limit unnecessary long-term idling	Increase in vehicle emissions (ex: sulfur oxide, nitrogen oxide and diesel particulates)	Long-Term, life of Project	Emission above baseline but within regulations and guidelines	N/A	Emission sources limited to the Project Footprint	Regular and frequent	Readily reversible	No adverse ecosystem and social effects	Not Significant
						Level III	Level I	N/A	Level I	Level III	Level I	Level I	
		Blasting activities and vehicle and equipment use during construction, maintenance and operation	Increase in ambient noise levels	▪ apply typical noise suppression techniques (EP4 and ES 130.12) ▪ forest buffers will be retained, unless clearing is required for safety reasons, around quarries to reduce noise from blasting operations	Increase in ambient noise levels	Long-Term, life of Project	Levels below guidelines at receptors	N/A	Effect beyond the Project Footprint within the LAA	Regular and frequent	Readily reversible	No adverse ecosystem and social effects	Not Significant
						Level III	Level I	N/A	Level II	Level III	Level I	Level I	
Atmospheric Environment – Greenhouse Gas Emissions	-	Use of vehicles and equipment during construction	Increase in greenhouse gas emissions	▪ limit vehicle idling and use low sulphur fuels ▪ regular vehicle/equipment maintenance (ES 130.6.3) ▪ limit traffic to construction vehicles and equipment	Increase in greenhouse gas emissions	Medium-Term, until construction completion	<0.1 % of Canada's 2030 target	N/A	Emission sources limited to the Project Footprint	Regular and frequent	Reversible over a long period	No adverse ecosystem and social effects	Not Significant
						Level II	Level I	N/A	Level I	Level III	Level II	Level I	
		Operation and maintenance of the all-season road and ROW clearing	Increase in greenhouse gas emissions and loss of carbon sink	▪ alignment selected to traverses some already disturbed areas to reduce the loss of carbon sink ▪ limit operation and maintenance equipment idling ▪ improved road surface reduces GHG production by improved road surface and reducing air traffic among communities	Increase in greenhouse gas emissions and loss of carbon sink	Long-Term, life of Project	<0.1 % of Canada's 2030 target	N/A	Emission sources limited to the Project Footprint	Regular and frequent	Reversible over a long period	No adverse ecosystem and social effects	Not Significant
						Level III	Level I	N/A	Level I	Level III	Level II	Level I	

[1] Details of the mitigation measures outlined in the 25 Environmental Protection Procedures (EP1 to EP25) can be found in Appendix 8.2 of Chapter 8.

[2] Details of the construction specifications, outlined in the Environmental Protection Specifications – 130 (ES 130) can be found in Appendix 8.3 of Chapter 8.

System / VC / Feature	Area of Federal Jurisdiction	Project Activity	Potential Effects	Proposed Mitigation	Residual Effects	Key Criteria for Determining Significance							Significance of Residual Effect
						Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Topography and Soils	-	Development of quarries and borrow pits during construction	Terrain alterations	▪ alignment avoids low lying areas requiring extensive fill ▪ design to minimize requirements for terrain alterations associated with construction, borrow and quarrying activities ▪ decommission and rehabilitate disturbed areas not required for Project operation and maintenance (EP22 and ES 130.8.7)	Terrain alterations	Short-Term, associated with discrete activities	Effects considered minor	N/A	Limited to the Project Footprint	Once	Reversible over a long period	No adverse ecosystem and social effects	Not Significant
						Level I	Level I	N/A	Level I	Level I	Level II	Level I	
		Spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents	Increase in contaminant concentrations (ex: hydrocarbons) in soil	▪ designated re-fuelling areas and fuel handling procedures (EP2 and ES 130.9.2.5 ex: secondary containment, approved storage tanks, maintain spill control and clean-up equipment, emergency response plan with spill containment/clean-up procedures) ▪ improved road conditions, sight lines and approaches will reduce likelihood and frequency of accidents and improve access for spill response crews ▪ soil remediation to CCME guidelines (EP3 and ES 130.10)	Increase in contaminant concentrations (ex: hydrocarbons) in soil	Long-Term, life of Project	Contaminant concentrations will be remediated to applicable regulations	N/A	Limited to the Project Footprint	Infrequent during operation but likely sporadic during construction	Readily reversible	No adverse ecosystem and social effects	Not Significant
						Level III	Level I	N/A	Level I	Level II	Level I	Level I	
		Use of granular/lacustrine soils (sand and gravel) as construction materials	Loss of granular/lacustrine soils (sand and gravel)	▪ alignment avoids low lying areas requiring extensive fill ▪ design to minimize requirements for terrain alterations associated with construction, borrow and quarrying activities	Loss of granular/lacustrine soils (sand and gravel)	Long-Term, life of Project	Effects considered minor	N/A	Limited to the Project Footprint	Infrequent	Irreversible	No adverse ecosystem and social effects	Not Significant
						Level III	Level I	N/A	Level I	Level I	Level III	Level I	
		Use of granular/lacustrine soils (sand and gravel) as maintenance materials throughout operation	Loss of granular/lacustrine soils (sand and gravel)	▪ road design minimizes long term maintenance and wash out potential to reduce need for materials	Loss of granular/lacustrine soils (sand and gravel)	Long-Term, life of Project	Effects considered minor	N/A	Limited to the Project Footprint	Sporadic during maintenance activities	Irreversible	No adverse ecosystem and social effects	Not Significant
						Level III	Level I	N/A	Level I	Level II	Level III	Level I	
Surface Water	-	Development of quarries and borrow pits, access roads, road drainage during construction and construction and maintenance of the all-season road and watercourse crossings	Disruption of surface drainage and flow systems resulting in increased or decreased flows in watercourses	▪ bridges and culverts at watercourse crossings and equalization culverts will accommodate 1:50 year flood events ▪ regular culvert maintenance and cleanouts (EP11 and ES 130.15.9) ▪ adhere to Manitoba Stream Crossing Guidelines for Protection of Fish and Fish Habitat, DFO's measures to avoid causing harm to fish and fish habitat including aquatic species at risk, EP7 and ES 130.15.5	Disruption of surface drainage and flow systems resulting in increased or decreased flows in watercourses	Long-Term, life of Project	Change in flows likely within range of natural variation	No critical life stage concerns as no anticipated effects on fish	May alter flow in watercourses beyond the Project Footprint within the LAA	Infrequent	Readily reversible	No adverse ecosystem and social effects	Not Significant
						Level III	Level I	Level I	Level II	Level I	Level I	Level I	
		Development of quarries and borrow pits, access roads and associated work areas during construction and construction and maintenance of the all-season road and watercourse crossing	Reduced surface water quality as a result of erosion and sedimentation	▪ minimize clearing and soil disturbance ▪ limit vehicle/equipment use to ROW ▪ install erosion and sediment control measures (EP16 and ES 130.16, ex: silt fencing, erosion control blanket, straw wattle, geotextile) ▪ maintain natural drainage and re-grade disturbed areas to limit erosion ▪ conduct clearing during winter months (ES 130.17) ▪ preserve vegetation buffers at watercourses (ES 130.15.1) ▪ suspend construction activities during extreme weather events (EP6) ▪ energy dissipation controls (ex: ditching, rip-rap, collection ponds) ▪ decommission and rehabilitate disturbed areas not required for Project operation and maintenance (EP22 and ES 130.8.7)	Reduced surface water quality as a result of erosion and sedimentation	Medium-Term, >1 year to 10 years	Suspended sediment concentrations within applicable regulations, no anticipated adverse effects beyond defined mixing zones	Effects could occur during a critical life stage for fish	May alter water quality within the Project Footprint	Sporadic	Readily reversible	No adverse ecosystem and social effects	Not Significant
						Level II	Level I	Level III	Level I	Level II	Level I	Level I	

System / VC / Feature	Area of Federal Jurisdiction	Project Activity	Potential Effects	Proposed Mitigation	Residual Effects	Key Criteria for Determining Significance							Significance of Residual Effect
						Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Surface Water	-	Spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents	Reduced surface water quality	▪ designated re-fuelling areas and fuel handling procedures (EP2 and ES 130.9.2.5 ex: at least 100 m from water bodies, secondary containment, approved storage tanks, maintain spill control and clean-up equipment, emergency response plan with spill containment/clean-up procedures) ▪ equipment and vehicles will be clean and free of leaks upon arrival to site and kept in good repair (EP6 and ES 130.15.3) ▪ improved road conditions, sight lines and approaches will reduce likelihood and frequency of accidents and improve access for spill response crews ▪ soil remediation to CCME guidelines (EP3 and ES 130.10)	Reduced surface water quality	Long-Term, life of Project	Contaminant concentrations within applicable regulations, no anticipated adverse effects beyond defined mixing zones	Effects could occur during a critical life stage for fish	May alter water quality within the Project Footprint	Spills to soil would be remediated preventing effect to water	Readily reversible	No adverse ecosystem and social effects	Not Significant
						Level III	Level I	Level III	Level I	Level I	Level I	Level I	
Groundwater	-	Dewatering of local groundwater at construction quarries and borrow pits	Reduced groundwater table	▪ quarries will be appropriately located (EP20, ex: locate quarries and borrow pits away from existing wells)	Reduced groundwater table	Short-Term, associated with discrete activities	Potential change <15% of seasonal average	N/A	Localized to areas around quarries and borrow pits within Project Footprint	Sporadic	Readily reversible	No adverse ecosystem and social effects	Not Significant
						Level I	Level I	N/A	Level I	Level II	Level I	Level I	
		Spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents	Reduced groundwater quality	▪ designated re-fuelling areas and fuel handling procedures (EP2 and ES 130.9.2.5 ex: away from existing wells, secondary containment, approved storage tanks, maintain spill control and clean-up equipment, emergency response plan with spill containment/clean-up procedures) ▪ improved road conditions, sight lines and approaches will reduce likelihood and frequency of accidents and improve access for spill response crews ▪ soil and groundwater remediation to CCME guidelines (EP3 and ES 130.10)	Reduced groundwater quality	Long-Term, life of Project	Contaminant concentrations within applicable regulations, no anticipated adverse effects	N/A	May alter groundwater quality within the Project Footprint	Spills to soil would be remediated preventing effect to groundwater	Reversible over a long period	No adverse ecosystem and social effects	Not Significant
						Level III	Level I	N/A	Level I	Level I	Level II	Level I	
Biological Environment – Fish and Fish Habitat													
Factor													
Fish	√ 5(1)(a)(i), *Fisheries Act*	Spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents	Decrease in fish populations as result of reduced surface water quality	▪ designated re-fuelling areas and fuel handling procedures (EP2 and ES 130.9.2.5 ex: at least 100 m from water bodies, secondary containment, approved storage tanks, maintain spill control and clean-up equipment, emergency response plan with spill containment/clean-up procedures) ▪ equipment and vehicles will be clean and free of leaks upon arrival to site and kept in good repair (EP6 and ES 130.15.3) ▪ improved road conditions, sight lines and approaches will reduce likelihood and frequency of accidents and improve access for spill response crews ▪ soil remediation to CCME guidelines (EP3 and ES 130.10)	Decrease in fish populations as result of reduced surface water quality	Short-Term, associated with discrete activities	No measurable reduction to fish communities and populations	Effects could occur during a critical life stage for fish	May alter water quality within the Project Footprint	Spills to soil would be remediated preventing effect to fish	Readily reversible	Moderate ecosystem effect important to local communities	Not Significant
						Level I	Level I	Level III	Level I	Level I	Level I	Level II	
		Blasting activities resulting in compressive shock waves near blast site	Injury or death of fish	▪ adhere to Manitoba Stream Crossing Guidelines for Protection of Fish and Fish Habitat, DFO Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters, EP12 and ES 130.15.11	Injury or death of fish	Short-Term, associated with discrete activities	No measurable reduction to fish communities and populations	Critical life stages would be avoided	Localized to blasting areas within Project Footprint	Sporadic	Readily reversible	Moderate ecosystem effect important to local communities	Not Significant
						Level I	Level I	Level I	Level I	Level II	Level I	Level II	

System / VC / Feature	Area of Federal Jurisdiction	Project Activity	Potential Effects	Proposed Mitigation	Residual Effects	Key Criteria for Determining Significance							Significance of Residual Effect
						Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Fish	√ 5(1)(a)(i), *Fisheries Act*	Clearing of ROW and construction of the all-season road near watercourses	Increased fishing pressures on local fish populations from increased access	▪ restrict fishing access of the construction crews ▪ alignment and temporary crossings located to avoid sensitive habitat ▪ decommission and reclaim temporary access roads and winter road access points following completion of construction ▪ restrict access to potential parking areas at watercourse crossings ▪ install large riprap/aggregate on slopes to limit access to streams at crossing sites where access did not exist prior to the Project	Increased fishing pressures on local fish populations from increased access	Long-Term, life of Project	No measurable reduction to fish communities and populations	Effects could occur during a critical life stage for fish	Limited to the Project Footprint	Infrequent	Reversible over a long period	No adverse ecosystem effect but important to local communities	Not Significant
						Level III	Level I	Level III	Level I	Level I	Level II	Level II	
		Temporary construction crossings and permanent watercourse crossings	Blockage or reduction in fish passage and disruption of spawning	▪ bridges and culverts at watercourse crossings will accommodate 1:50 year flood events ▪ regular culvert maintenance and cleanouts (EP11 and ES 130.15.9) ▪ adhere to Manitoba Stream Crossing Guidelines for Protection of Fish and Fish Habitat, DFO's measures to avoid causing harm to fish and fish habitat including aquatic species at risk, EP7, EP9, ES 130.15.5 and ES 130.15.6	Blockage or reduction in fish passage and disruption of spawning	Long-Term, life of Project	No measurable reduction to fish communities and populations	Critical life stages would be avoided	Localized to crossings within Project Footprint	Infrequent	Readily reversible	Moderate ecosystem effect	Not Significant
						Level III	Level I	Level I	Level I	Level I	Level I	Level II	
Fish and Fish Habitat	√ 5(1)(a)(i), *Fisheries Act*	Disturbed banks, right-of-way runoff and in-stream works during construction and maintenance of watercourse crossings	Decreased quality of fish habitat and effects to fish as a result of previously identified effects (increased suspended solids)	▪ minimize clearing and soil disturbance ▪ install erosion and sediment control measures (EP16 and ES 130.16, ex: silt fencing, erosion control blanket, straw wattle, geotextile) ▪ preserve vegetation buffers at watercourses (ES 130.15.1) ▪ suspend construction activities during extreme weather events ▪ energy dissipation controls (ex: ditching, rip-rap, collection ponds) ▪ reclamation and re-vegetation of disturbed areas ▪ adhere to DFO timing windows for in-stream work (EP6, EP7, EP11, and ES 130.15.2) ▪ isolate in-stream construction areas with fish salvage in fish bearing water (EP10 and ES 130.15.7) ▪ follow Manitoba Stream Crossing Guidelines for Protection of Fish and Fish Habitat (EP6 and ES 130.15)	Decreased quality of fish habitat and effects to fish as a result of previously identified effects (increased suspended solids)	Short-Term, associated with discrete activities	Net loss of the productive capacity of fish habitat affecting local fish communities and population	Critical life stages would be avoided	Effects may extend beyond the Project Footprint within the LAA	Infrequent	Readily reversible	Moderate ecosystem effect	Not Significant
						Level I	Level II	Level I	Level II	Level I	Level I	Level II	
Fish Habitat	√ 5(1)(a)(i), *Fisheries Act*	Construction and maintenance of watercourse crossings	Alteration and loss of riparian habitat (shorelines) and fish habitat (in-stream)	▪ minimize vegetation clearing and disturbance (ES 130.15.3) ▪ reclamation and re-vegetation of disturbed areas ▪ implement DFO approved fish habitat offsetting plan for unavoidable habitat losses ▪ adhere to Manitoba Stream Crossing Guidelines for Protection of Fish and Fish Habitat, DFO's measures to avoid causing harm to fish and fish habitat including aquatic species at risk, EP7, EP10, ES 130.15.5 and ES 130.15.7	Alteration and loss of riparian habitat (shorelines) and fish habitat (in-stream)	Long-Term, life of Project	Net loss of the productive capacity of fish habitat affecting local fish communities and population	Critical life stages would be avoided	Localized to crossings within Project Footprint	Infrequent	Reversible over a long period	Moderate ecosystem effect	Not Significant
						Level III	Level II	Level I	Level I	Level I	Level II	Level II	

System / VC / Feature	Area of Federal Jurisdiction	Project Activity	Potential Effects	Proposed Mitigation	Residual Effects	Key Criteria for Determining Significance							Significance of Residual Effect
						Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Fish Habitat	√ 5(1)(a)(i), *Fisheries Act*	In-water works during construction and maintenance and recreational vehicles during operation	Increased risk for introduction of aquatic invasive species (ex: zebra mussel) that can reduce diversity and populations of native species and modify habitat	▪ clean construction equipment and vehicles prior to bringing them to site (EP25, ES 130.15.1.5 and ES 130.15.3)	Increased risk for introduction of aquatic invasive species (ex: zebra mussel) that can reduce diversity and populations of native species and modify habitat	Short-Term, associated with construction equipment	No measurable reduction to fish communities and populations	Impacts to fish have high sensitivity	Introduction not likely to occur	Infrequent	Irreversible	Moderate ecosystem effect	Not Significant
						Level I	Level I	Level III	Level I	Level I	Level III	Level II	
Biological Environment – Terrestrial Environment													
Factor													
Vegetation (Plant Communities, and Wetlands)	-	Clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps during construction and maintenance	Disturbance to or loss of plant communities (reduced diversity) and fragmentation	▪ limit clearing to designated areas within the ROW (EP1 and ES 130.17.1) ▪ restrict equipment and vehicle use outside of cleared areas (ES 130.6.1) ▪ decommission and rehabilitate disturbed areas not required for Project operation and maintenance (EP22 and ES 130.8.7) ▪ follow clearing and grubbing timelines and restrictions (EP1 and ES 130.17.1) ▪ re-vegetation will use locally and regionally compatible species (native) (ES 130.16.13)	Disturbance to or loss of plant communities (reduced diversity) and fragmentation	Long-Term, life of Project	May measurably affect common vegetation species or communities	Critical life stages would be avoided	Limited to the Project Footprint	Infrequent	Reversible over a long period	No adverse ecosystem effects	Not Significant
						Level III	Level II	Level I	Level I	Level I	Level II	Level I	
		Clearing and construction of the all-season road	Disturbance to or loss of wetlands (ex: fens, bogs, marshes, peatlands)	▪ alignment avoids low lying wetland areas where there are better conditions in the immediate vicinity ▪ undertake construction activities in bog/fens during winter months to extent possible ▪ camps, temporary access roads, work areas and quarries and borrow pits will not be located in wetlands (EP20) ▪ equalization culverts will accommodate 1:50 year flood events and maintain local landscape hydraulics ▪ regular culvert maintenance and cleanouts (EP11 and ES 130.15.9)	Disturbance to or loss of wetlands (ex: fens, bogs, marshes, peatlands)	Long-Term, life of Project	May measurably affect common vegetation species or communities	Critical life stages would be avoided	Limited to the Project Footprint	Infrequent	Reversible over a long period	Moderate ecosystem effect	Not Significant
						Level III	Level II	Level I	Level I	Level I	Level II	Level II	
		Clearing of native vegetation and use of equipment and vehicles during construction, maintenance and operation	Increased risk for invasive and non-native plant species to displace native plant communities, modifying the vegetation composition and structure	▪ limit clearing to designated areas within the ROW (EP1 and ES 130.17.1) ▪ restrict equipment and vehicle use outside of cleared areas (ES 130.6.1) ▪ clean construction equipment and vehicles prior to bringing them to site (EP25) ▪ follow clearing and grubbing timelines and restrictions (EP1 and ES 130.17.1) ▪ decommission and rehabilitate disturbed areas not required for Project operation and maintenance (EP22 and ES 130.8.7) ▪ re-vegetation will use locally and regionally compatible species (native) (ES 130.16.13) ▪ pesticides will be used, as required, to manage invasive weedy species	Increased risk for invasive and non-native plant species to displace native plant communities, modifying the vegetation composition and structure	Long-Term, life of Project	May measurably affect common vegetation species or communities	Critical life stages would be avoided	Limited to the Project Footprint	Continuous	Reversible over a long period	No adverse ecosystem effects	Not Significant
						Level III	Level II	Level I	Level I	Level III	Level II	Level I	

System / VC / Feature	Area of Federal Jurisdiction	Project Activity	Potential Effects	Proposed Mitigation	Residual Effects	Key Criteria for Determining Significance							Significance of Residual Effect
						Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Vegetation (Plant Communities, and Wetlands)	-	Spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents and potential use of herbicides during maintenance	Impairment or loss of vegetation and desirable species	▪ designated re-fuelling areas and fuel handling procedures (EP2 and ES 130.9.2.5, ex: secondary containment, approved storage tanks, maintain spill control and clean-up equipment, emergency response plan with spill containment/clean-up procedures) ▪ improved road conditions, sight lines and approaches will reduce likelihood and frequency of accidents and improve access for spill response crews ▪ soil remediation to CCME guidelines (EP3 and ES 130.10) ▪ limit herbicide application beyond road shoulder and apply according to manufacturers' guidelines and permit terms and conditions	Impairment or loss of vegetation and desirable species	Long-Term, life of Project	Effect considered minor and to common vegetation species or communities	Critical life stages would be avoided	Limited to the Project Footprint	Sporadic	Reversible over a long period	No adverse ecosystem effects	Not Significant
						Level III	Level I	Level I	Level I	Level II	Level II	Level I	
		Blasting, burning and use of equipment during construction and maintenance and carelessness during operation	Increased risk of wildfires from fires and explosions	▪ combustible materials and explosives will be stored and handled in a safe manner (EP2 and ES 130.9) ▪ burning will only be done under controlled conditions (monitored), according to burning permits and avoid windy and dry conditions (EP1, EP15 and ES 130.20) ▪ wildfires will be immediately reported to MSD and construction activities stopped until safe to resume (ES 130.20.11) ▪ reasonable attempts will be made to extinguish wildfires (ES 130.20.12)	Increased risk of wildfires from fires and explosions	Long-Term, life of Project	May measurably affect common vegetation species or communities	Burning would avoid critical life stages	Effect may extend beyond the LAA	Sporadic	Reversible over a long period	No adverse ecosystem and social effects	Not Significant
						Level III	Level II	Level I	Level III	Level II	Level II	Level I	
Mammals (Ungulates)	-	Clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps during construction and maintenance	Alteration, fragmentation and/or loss of moose and caribou habitat	▪ follow clearing and grubbing timelines and restrictions to avoid critical calving times (EP1 and ES 130.17.1) ▪ use baseline studies to identify location of calving areas and mineral licks to be avoided ▪ limit clearing to designated areas within the ROW using existing cutlines, routes and trails where they are present (EP1 and ES 130.17.1) ▪ restrict equipment and vehicle use outside of cleared areas (ES 130.6.1) ▪ decommission and rehabilitate disturbed areas not required for Project operation and maintenance (EP22 and ES 130.8.7) ▪ bridges and culverts at watercourse crossings will accommodate 1:50 year flood events with regular culvert maintenance and cleanouts (EP11 and ES 130.15.9) to maintain wetland hydrologic regime ▪ preserve vegetation buffers at watercourses (ES 130.15.1)	Alteration, fragmentation and/or loss of moose and caribou habitat	Long-Term, life of Project	May measurably affect populations	Critical life stages would be avoided	Limited to the Project Footprint	Sporadic	Reversible over a long period	Moderate ecosystem effect important to local communities	Not Significant
						Level III	Level II	Level I	Level I	Level II	Level II	Level II	

System / VC / Feature	Area of Federal Jurisdiction	Project Activity	Potential Effects	Proposed Mitigation	Residual Effects	Key Criteria for Determining Significance							Significance of Residual Effect
						Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Mammals (Ungulates)	-	Vehicle and equipment noise and vibration during construction, maintenance and operation	Increased sensory disturbance to and displacement of moose and caribou	▪ stage construction activities to limit the extent of noise disturbance during critical calving times to defined areas ▪ follow clearing and grubbing (EP1 and ES 130.17.1) and blasting (EP14 and ES 130.19) timelines and restrictions to avoid critical calving times ▪ limit clearing to designated areas within the ROW using existing cutlines, routes and trails where they are present (EP1 and ES 130.17.1) ▪ restrict equipment and vehicle use outside of cleared areas (ES 130.6.1) ▪ apply typical noise (EP4 and ES 130.12) and dust suppression (EP18 and 130.11) techniques	Increased sensory disturbance to and displacement of moose and caribou	Long-Term, life of Project	Effect likely to occur at the individual level, not measurably affecting the population	Critical life stages would be avoided	Effects may extend beyond the Project Footprint within the LAA	Continuous	Reversible over a long period	Moderate ecosystem effect important to local communities	Not Significant
						Level III	Level I	Level I	Level II	Level III	Level II	Level II	
		Construction, maintenance and operation of the ROW, watercourse crossings, temporary access roads, quarries, borrow pits and work areas	Increased caribou mortality due to increased hunting pressure from the all-season road providing increased access to caribou habitat	▪ prohibit hunting by MI employees and contractors working on the Project (EP14 and ES 130.19.1) ▪ firearm possession prohibited in construction camps ▪ decommission and reclaim temporary access roads and winter road access points following completion of construction (EP21, EP22, and ES 130.8.7) ▪ restrict access to quarry areas during operation and maintenance phase ▪ design road with no pullouts or parking areas ▪ MI will liaise with Manitoba Sustainable Development and participate on committees and working groups and share wildlife information obtained through monitoring efforts	Increased caribou mortality due to increased hunting pressure from the all-season road providing increased access to caribou habitat	Long-Term, life of Project	Effect likely to occur at the individual level, not measurably affecting the population	Hunted in winter outside of critical life stages	Effects may extend beyond the Project Footprint within the LAA	Seasonally hunted typically in winter	Reversible over a long period	Woodland caribou listed by SARA and ESEA	Not Significant
						Level III	Level I	Level I	Level II	Level II	Level II	Level III	
		Construction, maintenance and operation of the ROW, watercourse crossings, temporary access roads, quarries, borrow pits and work areas	Increased moose mortality due to increased hunting pressure from the all-season road providing increased access in spring, summer and fall to moose habitat	▪ prohibit hunting by MI employees and contractors working on the Project (EP14 and ES 130.19.1) ▪ firearm possession prohibited in construction camps ▪ decommission and reclaim temporary access roads and winter road access points following completion of construction (EP21, EP22, and ES 130.8.7) ▪ restrict access to quarry areas during operation and maintenance phase ▪ design road without pullouts or parking areas ▪ MI will liaise with Manitoba Sustainable Development and participate on committees and working groups and share wildlife information obtained through monitoring efforts	Increased moose mortality due to increased hunting pressure from the all-season road providing increased access in spring, summer and fall to moose habitat	Long-Term, life of Project	May measurably affect populations	Hunters will avoid critical life stages	Effects may extend beyond the Project Footprint within the LAA	Continuous	Reversible over a long period	Moderate ecosystem effect important to local communities	Not Significant
						Level III	Level II	Level I	Level II	Level III	Level II	Level II	
		Vehicle and equipment use during construction, maintenance and operation	Increased moose and caribou mortality due to vehicular collisions	▪ design road to optimize line of sight and reduce collisions ▪ provide wildlife awareness information to construction workers ▪ reduce speed limits at identified problem areas ▪ construction vehicle speeds adhere to posted limits and wildlife warning signs shall be installed at identified problem areas (EP14) ▪ remove trees and tall shrubs to maintain line of sight ▪ avoid using wildlife-attracting road salts	Increased moose and caribou mortality due to vehicular collisions	Long-Term, life of Project	Effect likely to occur at the individual level, not measurably affecting the population	Effect could occur during critical life stage	Limited to the Project Footprint	Infrequent	Reversible over a long period	Moderate ecosystem effect important to local communities	Not Significant
						Level III	Level I	Level III	Level I	Level I	Level II	Level II	

System / VC / Feature	Area of Federal Jurisdiction	Project Activity	Potential Effects	Proposed Mitigation	Residual Effects	Key Criteria for Determining Significance							Significance of Residual Effect
						Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Mammals (Ungulates)	-	Construction, maintenance and operation of the all-season road, access roads, work areas and watercourse crossings	Increased moose and caribou mortality due to increased access and predation by wolves along the ROW	▪ decommission and reclaim temporary access roads and winter road access points following completion of construction (EP21, EP22, and ES 130.8.7) ▪ no additional mitigation proposed as access during late spring, summer and early fall to areas off the road surface will be no different with the Project as the terrain and habitat beyond the Project Footprint will not change	Increased moose and caribou mortality due to increased access and predation by wolves along the ROW	Long-Term, life of Project	Effect likely to occur at the individual level, not measurably affecting the population	Effect could occur during critical life stage	Effects may extend beyond the Project Footprint within the LAA	Sporadic	Reversible over a long period	Moderate ecosystem effect important to local communities	Not Significant
						Level III	Level I	Level III	Level II	Level II	Level II	Level II	
		Construction, maintenance and operation of the all-season road, access roads, work areas and watercourse crossings	Increased moose and caribou mortality due to due to increased wildlife access and introduction of disease from white-tailed deer (ex: brainworm, liverfluke)	▪ limit clearing to designated areas within the ROW using existing cutlines, routes and trails where they are present (EP1 and ES 130.17.1) ▪ decommission and rehabilitate disturbed areas not required for Project operation and maintenance (EP22 and ES 130.8.7)	Increased moose and caribou mortality due to due to increased wildlife access and introduction of disease from white-tailed deer (ex: brainworm, liverfluke)	Long-Term, life of Project	Effect likely to occur at the individual level, not measurably affecting the population	Effect could occur during critical life stage	Effect may extend beyond the LAA	Infrequent	Readily reversible	Moderate ecosystem effect important to local communities	Not Significant
						Level III	Level I	Level III	Level III	Level I	Level I	Level II	
Mammals (Aquatic and Terrestrial Furbearers)	-	Clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps	Alteration, fragmentation and/or loss of furbearer (ex: beaver, marten) habitat	▪ use baseline studies to identify location of denning areas and lodges to be isolated with construction setbacks ▪ limit clearing to designated areas within the ROW (EP1 and ES 130.17.1) ▪ restrict equipment and vehicle use outside of cleared areas (ES 130.6.1) ▪ if required beaver dams will be removed gradually (ES 130.15.10) ▪ alignment selected so no work within 100 m of a waterbody (retained vegetated buffer) except at crossings (EP6 and 130.15.1) ▪ decommission and rehabilitate disturbed areas not required for Project operation and maintenance (EP22 and ES 130.8.7) ▪ bridges and culverts at watercourse crossings will accommodate 1:50 year flood events with regular culvert maintenance and cleanouts (EP11 and ES 130.15.9) to maintain wetland hydrologic regime	Alteration, fragmentation and/or loss of furbearer (ex: beaver, marten) habitat	Long-Term, life of Project	Effect likely to occur at the individual level, not measurably affecting the population	Critical life stages would be avoided	Limited to the Project Footprint	Infrequent	Reversible over a long period	No adverse ecosystem effects	Not Significant
						Level III	Level I	Level I	Level I	Level I	Level II	Level I	
		Vehicle and equipment noise and vibration during construction, maintenance and operation	Increased sensory disturbance to and displacement of furbearers (ex: beaver, marten)	▪ stage construction activities to limit the extent of noise disturbance at a given time to defined areas ▪ limit clearing to designated areas within the ROW using existing cutlines, routes and trails where they are present (EP1 and ES 130.17.1) ▪ restrict equipment and vehicle use outside of cleared areas (ES 130.6.1) ▪ apply typical noise (EP4 and ES 130.12) and dust suppression (EP18 and ES 130.11) techniques	Increased sensory disturbance to and displacement of furbearers (ex: beaver, marten)	Long-Term, life of Project	Effect likely to occur at the individual level, not measurably affecting the population	Critical life stages would be avoided	Limited to the Project Footprint	Continuous	Reversible over a long period	No adverse ecosystem effects	Not Significant
						Level III	Level I	Level I	Level I	Level III	Level II	Level I	

System / VC / Feature	Area of Federal Jurisdiction	Project Activity	Potential Effects	Proposed Mitigation	Residual Effects	Key Criteria for Determining Significance							Significance of Residual Effect
						Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Mammals (Aquatic and Terrestrial Furbearers)	-	Construction, maintenance and operation activities including general vehicular use and nuisance wildlife management	Increased furbearer (ex: beaver, marten) mortality due to vehicular collisions and nuisance wildlife management	▪ design road to optimize line of sight and reduce collisions ▪ wildlife awareness information provided to construction workers ▪ reduce speed limits at identified problem areas ▪ construction vehicle speeds adhere to posted limits and wildlife warning signs shall be installed at identified problem areas (EP14) ▪ remove trees and tall shrubs to maintain line of sight ▪ preserve vegetation buffers at watercourses (ES 130.15.1) ▪ bridges and culverts at watercourse crossings will accommodate 1:50 year flood events with regular culvert maintenance and cleanouts (EP11 and ES 130.15.9) to maintain wetland hydrologic regime	Increased furbearer (ex: beaver, marten) mortality due to vehicular collisions and nuisance wildlife management	Long-Term, life of Project	Effect likely to occur at the individual level, not measurably affecting the population	Effect could occur during critical life stage	Limited to the Project Footprint	Sporadic	Reversible over a long period	No adverse ecosystem effects	Not Significant
						Level III	Level I	Level III	Level I	Level II	Level II	Level I	
Amphibians and Reptiles	-	Clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps	Alteration, fragmentation and/or loss of amphibian (ex: spring peeper) habitat	▪ follow clearing and grubbing timelines and restrictions to avoid critical breeding times (EP1 and ES 130.17.1) ▪ limit clearing to designated areas within the ROW (EP1 and ES 130.17.1) ▪ restrict equipment and vehicle use outside of cleared areas (ES 130.6.1) ▪ alignment selected so no work within 100 m of a waterbody (retained vegetated buffer) except at crossings (EP6 and ES 130.15.1) ▪ decommission and rehabilitate disturbed areas not required for Project operation and maintenance (EP22 and ES 130.8.7) ▪ bridges and culverts at watercourse crossings will accommodate 1:50 year flood events with regular culvert maintenance and cleanouts (EP11 and ES 130.15.9) to maintain wetland hydrologic regime	Alteration, fragmentation and/or loss of amphibian (ex: spring peeper) habitat	Long-Term, life of Project	Effect likely to occur at the individual level, not measurably affecting the population	Critical life stages would be avoided	Limited to the Project Footprint	Infrequent	Irreversible	No adverse ecosystem effects	Not Significant
						Level III	Level I	Level I	Level I	Level I	Level III	Level I	
		Vehicle and equipment use during construction and maintenance	Increase in winter mortality through compaction and freezing of soils in habitat where amphibians (ex: spring peeper) may be over wintering	▪ limit clearing to designated areas within the ROW (EP1 and ES130.17.1) ▪ restrict equipment and vehicle use outside of cleared areas (ES 130.6.1) ▪ alignment selected so no work within 100 m of a waterbody (retained vegetated buffer) except at crossings (EP6 and ES 130.15.1)	Increase in winter mortality through compaction and freezing of soils in habitat where amphibians (ex: spring peeper) may be over wintering	Long-Term, life of Project	Effect likely to occur at the individual level, not measurably affecting the population	Critical life stages would be avoided	Limited to the Project Footprint	Sporadic	Readily reversible	No adverse ecosystem effects	Not Significant
						Level III	Level I	Level I	Level I	Level II	Level I	Level I	

System / VC / Feature	Area of Federal Jurisdiction	Project Activity	Potential Effects	Proposed Mitigation	Residual Effects	Key Criteria for Determining Significance							Significance of Residual Effect
						Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Birds / Migratory Birds (Songbirds, Raptors, Waterfowl, Upland)	√ 5(1)(a)(iii), *Migratory Birds Convention Act*	Clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps	Alteration, fragmentation and/or loss of migratory (ex: raptors, waterfowl, forest birds) and non-migratory (ex: upland game birds) bird[3] habitat	▪ alignment selected so no work within 100 m of a waterbody (retained vegetated buffer) except at crossings (EP6 and ES 130.15.1) ▪ follow clearing and grubbing timelines and restrictions to avoid breeding and nesting times (EP1 and ES 130.17.1) ▪ limit clearing to designated areas within the ROW (EP1 and ES130.17.1) ▪ restrict equipment and vehicle use outside of cleared areas (ES 130.6.1) ▪ decommission and rehabilitate disturbed areas not required for Project operation and maintenance (EP22 and ES 130.8.7) ▪ bridges and culverts at watercourse crossings will accommodate 1:50 year flood events with regular culvert maintenance and cleanouts (EP11 and ES 130.1.9) to maintain wetland hydrologic regime	Alteration, fragmentation and/or loss of migratory (ex: raptors, waterfowl, forest birds) and non-migratory (ex: upland game birds) bird habitat	Long-Term, life of Project	Effect likely to occur at the individual level, not measurably affecting the population	Critical life stages would be avoided	Limited to the Project Footprint	Infrequent	Reversible over a long period	No adverse ecosystem effects	Not Significant
						Level III	Level I	Level I	Level I	Level I	Level II	Level I	
		Clearing of native vegetation during construction and maintenance activities	Loss of nests and mortality to young migratory (ex: raptors, waterfowl, forest birds) and non-migratory (ex: upland game birds) birds	▪ alignment selected so no work within 100 m of a waterbody (retained vegetated buffer) except at crossings (EP6 and ES 130.15.1) ▪ follow clearing and grubbing timelines and restrictions to avoid breeding and nesting times (EP1 and ES 130.17.1) ▪ limit clearing to designated areas within the ROW (EP1 and ES 130.17.1) ▪ restrict equipment and vehicle use outside of cleared areas (ES 130.6.1) ▪ bridges and culverts at watercourse crossings will accommodate 1:50 year flood events with regular culvert maintenance and cleanouts (EP11 and ES 130.15.9) to maintain wetland hydrologic regime	Loss of nests and mortality to young migratory (ex: raptors, waterfowl, forest birds) and non-migratory (ex: upland game birds) birds	Long-Term, life of Project	Effect likely to occur at the individual level, not measurably affecting the population	Critical life stages would be avoided	Limited to the Project Footprint	Infrequent	Readily reversible	No adverse ecosystem effects	Not Significant
						Level III	Level I	Level I	Level I	Level I	Level I	Level I	
		Vehicle and equipment noise and vibration during construction, maintenance and operation	Increased sensory disturbance to and displacement of migratory (ex: raptors, waterfowl, forest birds) and non-migratory (ex: upland game birds) birds	▪ stage construction activities to limit the extent of noise disturbance at a given time to defined areas ▪ follow clearing and grubbing (EP1 and ES 130.17.1) and blasting (EP14 and ES 130.19) timelines and restrictions to avoid critical breeding and nesting times ▪ limit clearing to designated areas within the ROW using existing cutlines, routes and trails where they are present (EP1 and ES 130.17.1) ▪ restrict equipment and vehicle use outside of cleared areas (ES 130.6.1) ▪ apply typical noise (EP4 and ES 130.12) and dust suppression (EP18 and ES 130.11) techniques	Increased sensory disturbance to and displacement of migratory (ex: raptors, waterfowl, forest birds) and non-migratory (ex: upland game birds) birds	Long-Term, life of Project	Effect likely to occur at the individual level, not measurably affecting the population	Critical life stages would be avoided	Limited to the Project Footprint	Continuous	Reversible over a long period	No adverse ecosystem effects	Not Significant
						Level III	Level I	Level I	Level I	Level III	Level II	Level I	

[3] Raptors, waterfowl, forest birds and upland game birds are grouped in this effects assessment summary table for the EIS, however, they were assessed individually in the Wildlife Characterization and Effects Assessment report (Joro Consultants 2017a).

System / VC / Feature	Area of Federal Jurisdiction	Project Activity	Potential Effects	Proposed Mitigation	Residual Effects	Key Criteria for Determining Significance							Significance of Residual Effect
						Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Birds / Migratory Birds (Songbirds, Raptors, Waterfowl, Upland)	√ 5(1)(a)(iii), *Migratory Birds Convention Act*	Construction, maintenance and operation of the ROW, watercourse crossings, temporary access roads, quarries, borrow pits and work areas	Increased mortality of migratory (ex: waterfowl) and non-migratory (ex: upland game birds) birds due to increased hunting pressure from the all-season road providing increased access in spring, summer and fall to bird habitat	▪ prohibit hunting by MI employees and contractors working on the Project (EP14 and ES 130.19.1) ▪ firearm possession prohibited in construction camps ▪ decommission and reclaim temporary access roads and winter road access points following completion of construction (EP21, EP22, and ES 130.8.7) ▪ restrict access to operation phase quarry areas (ES 130.8.8) ▪ design road with no pullouts or parking areas	Increased mortality of migratory (ex: waterfowl) and non-migratory (ex: upland game birds) birds due to increased hunting pressure from the all-season road providing increased access in spring, summer and fall to bird habitat	Long-Term, life of Project	May measurably affect populations	Hunters will avoid critical life stages	Effects may extend beyond the Project Footprint within the LAA	Continuous	Reversible over a long period	Moderate ecosystem effect	Not Significant
						Level III	Level II	Level I	Level II	Level III	Level II	Level II	
		Vehicle and equipment use during construction, maintenance and operation	Increased mortality of migratory (ex: waterfowl, forest birds) and non-migratory (ex: upland game birds) birds due to vehicular collisions	▪ design road to optimize line of sight and reduce collisions ▪ wildlife awareness information provided to construction workers ▪ reduce speed limits at identified problem areas ▪ construction vehicle speeds adhere to posted limits and wildlife warning signs shall be installed at identified problem areas (EP14) ▪ remove trees and tall shrubs to maintain line of sight	Increased mortality of migratory (ex: waterfowl, forest birds) and non-migratory (ex: upland game birds) birds due to vehicular collisions	Long-Term, life of Project	Effect likely to occur at the individual level, not measurably affecting the population	Effect could occur during critical life stage	Limited to the Project Footprint	Infrequent	Readily reversible	No adverse ecosystem effects	Not Significant
						Level III	Level I	Level III	Level I	Level I	Level I	Level I	
Species at Risk													
Factor													
Aquatic Environment	√ 5(1)(a)(ii), *Species at Risk Act*	▪ General construction, maintenance and operation activities [4]	Decrease in the population and/or habitat of rare fish species (ex: lake sturgeon) as a result of previously identified effects (water quality, shock waves, fishing pressure, fish passage, habitat and invasive species)	▪ employ general mitigation applicable to all Species at Risk [5] ▪ employ mitigation measures previously noted for erosion and sediment control, spill prevention and clean up and fish and fish habitat protection	Decrease in the population and/or habitat of rare fish species (ex: lake sturgeon) as a result of previously identified effects (water quality, shock waves, fishing pressure, fish passage, habitat and invasive species)	Long-Term, life of Project	Minor effect, habitat alteration/loss restricted to non-limiting habitat	In-water work would not occur during critical life stage	Localized to God's River crossing in Project Footprint	Sporadic	Reversible over a long period	Lake sturgeon assessed by COSEWIC	Not Significant
						Level III	Level I	Level I	Level I	Level II	Level II	Level III	

[4] General construction, maintenance and operation activities include clearing, use of equipment for construction and maintenance and vehicle traffic.

[5] General mitigation applicable to all Species at Risk include the following.

- Right-of-way selected to use existing disturbed/cleared areas and avoid waterbodies (except at crossings) and sensitive habitat (ex: spawning sites, calving sites, raptor nests, multi-generational stick nests, nesting colonies).
- Existing water flow patterns, water levels and wetland hydrologic regimes will be maintained along with vegetated buffers between disturbed areas and waterbodies.
- Follow clearing and grubbing timelines and restrictions to avoid critical calving and nesting times (EP1 and ES 130.17.1).
- Decommission and rehabilitate all disturbed areas not required for Project operation and maintenance (EP22).
- Contract Administrators, inspectors and construction staff will receive training and handbooks to facilitate identification of potential Species at Risk that could be encountered and a member of the Environmental Inspection team will be advised when encounters occur to document and report on species presence and management strategies applied, as required.
- Prohibit herbicide application near identified environmentally sensitive sites or beyond road ROW and apply by hand within 30 m of any waterbody.

System / VC / Feature	Area of Federal Jurisdiction	Project Activity	Potential Effects	Proposed Mitigation	Residual Effects	Key Criteria for Determining Significance							Significance of Residual Effect
						Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Terrestrial Environment – Vegetation	√ 5(2)(a), *Species at Risk Act*	Clearing during construction and maintenance	Disturbance or loss of vegetation Species at Risk	▪ employ general mitigation applicable to all Species at Risk ▪ identify/survey and flag species of concern prior to clearing (no species observed in 2016) ▪ adjust road alignment where there are appropriate conditions in the immediate vicinity to avoid protected species ▪ limit clearing to designated areas (EP1 and ES 130.17.1) ▪ limit vehicle/equipment use to ROW (ES 130.6.1) ▪ pesticides will be used, as required, to manage invasive weedy species	Disturbance or loss of vegetation Species at Risk	Long-Term, life of Project	No measurable effect to rare or protected species	Critical life stages would be avoided	Limited to the Project Footprint	Infrequent	Reversible over a long period	Species listed by SARA or ESEA	Not Significant
						Level III	Level I	Level I	Level I	Level I	Level II	Level III	
Terrestrial Environment – Mammals	√ 5(2)(a), *Species at Risk Act*	General construction, maintenance and operation activities	Decrease in the population and/or habitat of woodland caribou as a result of previously identified effects (clearing, sensory disturbance, hunting pressure, vehicle collisions, predation and disease)	▪ employ general mitigation applicable to all Species at Risk ▪ employ mitigation measures previously noted to mitigate adverse effects to caribou associated with habitat loss, sensory disturbance, hunting pressure, vehicle collisions, predation and disease	Decrease in the population and/or habitat of woodland caribou as a result of previously identified effects (clearing, sensory disturbance, hunting pressure, vehicle collisions, predation and disease)	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Critical life stages would be avoided	Effects beyond the Project Footprint within the LAA	Infrequent	Irreversible	Boreal woodland caribou listed by SARA and ESEA, Eastern Migratory caribou assessed by COSEWIC	Not Significant
						Level III	Level I	Level I	Level II	Level I	Level III	Level III	
		General construction, maintenance and operation activities	Decrease in the population and/or habitat of wolverine as a result of previously identified effects (clearing, sensory disturbance and vehicle collisions)	▪ employ general mitigation applicable to all Species at Risk ▪ use baseline studies to identify natal and maternal den sites, if present, and provide construction staff information on identification of potential den sites	Decrease in the population and/or habitat of wolverine as a result of previously identified effects (clearing, sensory disturbance and vehicle collisions)	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Critical life stages would be avoided	Effects beyond the Project Footprint within the LAA	Infrequent	Irreversible	Wolverine assessed by COSEWIC	Not Significant
						Level III	Level I	Level I	Level II	Level I	Level III	Level III	
		Clearing activities and sensory disturbances from general construction, maintenance and operation activities	Decrease in the population and/or habitat of little brown myotis as a result of previously identified effects (clearing and sensory disturbance)	▪ employ general mitigation applicable to all Species at Risk ▪ provide construction staff with information on potential bat hibernacula, such as abandoned mine shafts to avoid if observed during construction	Decrease in the population and/or habitat of little brown myotis as a result of previously identified effects (clearing and sensory disturbance)	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Critical life stages would be avoided	Limited to the Project Footprint	Infrequent	Irreversible	Little brown myotis listed by SARA and ESEA	Not Significant
						Level III	Level I	Level I	Level I	Level I	Level III	Level III	

System / VC / Feature	Area of Federal Jurisdiction	Project Activity	Potential Effects	Proposed Mitigation	Residual Effects	Key Criteria for Determining Significance							Significance of Residual Effect
						Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Terrestrial Environment – Forest Birds	√ 5(1)(a)(iii), *Migratory Birds Convention Act;* 5(2)(a), *Species at Risk Act*	General construction, maintenance and operation activities	Decrease in the population and/or habitat of bank swallow as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions)	▪ employ general mitigation applicable to all Species at Risk ▪ identify and avoid vertical and near vertical faces for road routing and quarry selection where possible ▪ prior to reinstating a quarry or borrow site for maintenance survey the rock or face and if bank swallow nests are identified they will not be disturbed during the breeding season	Decrease in the population and/or habitat of bank swallow as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions)	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Critical life stages would be avoided	Effects beyond the Project Footprint within the LAA	Infrequent	Irreversible	Bank swallow listed by SARA	Not Significant
						Level III	Level I	Level I	Level II	Level I	Level III	Level III	
		General construction, maintenance and operation activities	Decrease in the population and/or habitat of barn swallow as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions)	▪ employ general mitigation applicable to all Species at Risk ▪ identify and avoid vertical and near vertical faces, ledges or overhangs for road routing and quarry selection where possible ▪ inspect temporary structures prior to removal for presence of nests during the breeding and rearing season, if barn swallow nests are identified they will not be disturbed during the breeding season	Decrease in the population and/or habitat of barn swallow as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions)	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Critical life stages would be avoided	Limited to the Project Footprint	Infrequent	Irreversible	Barn swallow listed by SARA	Not Significant
						Level III	Level I	Level I	Level I	Level I	Level III	Level III	
		General construction, maintenance and operation activities	Decrease in the population and/or habitat of Canada warbler as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions)	▪ employ general mitigation applicable to all Species at Risk	Decrease in the population and/or habitat of Canada warbler as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions)	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Critical life stages would be avoided	Limited to the Project Footprint	Infrequent	Irreversible	Canada warbler listed by SARA and ESEA	Not Significant
						Level III	Level I	Level I	Level I	Level I	Level III	Level III	
		General construction, maintenance and operation activities	Decrease in the population and/or habitat of common nighthawk as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions)	▪ employ general mitigation applicable to all Species at Risk ▪ prior to reinstating a quarry or borrow site for maintenance conduct a survey and if common nighthawk nests are identified they will not be disturbed during the breeding season	Decrease in the population and/or habitat of common nighthawk as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions)	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Critical life stages would be avoided	Limited to the Project Footprint	Infrequent	Irreversible	Common nighthawk listed by SARA and ESEA	Not Significant
						Level III	Level I	Level I	Level I	Level I	Level III	Level III	

System / VC / Feature	Area of Federal Jurisdiction	Project Activity	Potential Effects	Proposed Mitigation	Residual Effects	Key Criteria for Determining Significance							Significance of Residual Effect
						Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Terrestrial Environment – Forest Birds	√ 5(1)(a)(iii), *Migratory Birds Convention Act;* 5(2)(a), *Species at Risk Act*	General construction, maintenance and operation activities	Decrease in the population and/or habitat of eastern wood-pewee [6] as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions)	▪ employ general mitigation applicable to all Species at Risk	Decrease in the population and/or habitat of eastern wood-pewee as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions)	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Critical life stages would be avoided	Limited to the Project Footprint	Infrequent	Irreversible	Eastern wood-pewee listed by SARA	Not Significant
						Level III	Level I	Level I	Level I	Level I	Level III	Level III	
		General construction, maintenance and operation activities	Decrease in the population and/or habitat of olive-sided flycatcher as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions)	▪ employ general mitigation applicable to all Species at Risk	Decrease in the population and/or habitat of olive-sided flycatcher as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions)	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Critical life stages would be avoided	Limited to the Project Footprint	Infrequent	Irreversible	Olive-sided flycatcher listed by SARA and ESEA	Not Significant
						Level III	Level I	Level I	Level I	Level I	Level III	Level III	
		General construction, maintenance and operation activities	Decrease in the population and/or habitat of peregrine falcon [7] as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions)	▪ employ general mitigation applicable to all Species at Risk	Decrease in the population and/or habitat of peregrine falcon as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions)	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Critical life stages would be avoided	Limited to the Project Footprint	Infrequent	Irreversible	Peregrine falcon listed by SARA and ESEA	Not Significant
						Level III	Level I	Level I	Level I	Level I	Level III	Level III	
		General construction, maintenance and operation activities	Decrease in the population and/or habitat of rusty blackbird as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions)	▪ employ general mitigation applicable to all Species at Risk	Decrease in the population and/or habitat of rusty blackbird as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions)	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Critical life stages would be avoided	Limited to the Project Footprint	Infrequent	Irreversible	Rusty blackbird listed by SARA	Not Significant
						Level III	Level I	Level I	Level I	Level I	Level III	Level III	

[6] While eastern wood-pewee is listed as potentially present in the Ecoregion it was not observed during the field studies and the Project Regional Assessment Area is well outside of the published range for this species.

[7] The Project Regional Assessment Area is well outside of the known breeding range for peregrine falcon, but it may migrate through the region.

System / VC / Feature	Area of Federal Jurisdiction	Project Activity	Potential Effects	Proposed Mitigation	Residual Effects	Key Criteria for Determining Significance							Significance of Residual Effect
						Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Terrestrial Environment – Forest Birds	√ 5(1)(a)(iii), *Migratory Birds Convention Act;* 5(2)(a), *Species at Risk Act*	General construction, maintenance and operation activities	Decrease in the population and/or habitat of short-eared owl as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions)	▪ employ general mitigation applicable to all Species at Risk	Decrease in the population and/or habitat of short-eared owl as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions)	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Critical life stages would be avoided	Limited to the Project Footprint	Infrequent	Irreversible	Short-eared owl listed by SARA and ESEA	Not Significant
						Level III	Level I	Level I	Level I	Level I	Level III	Level III	
Terrestrial Environment – Waterbirds	√ 5(1)(a)(iii), *Migratory Birds Convention Act;* 5(2)(a), *Species at Risk Act*	General construction, maintenance and operation activities	Decrease in the population and/or habitat of horned grebe as a result of previously identified effects (drainage alteration, clearing, sensory disturbance, loss of nests, hunting pressure and vehicle collisions)	▪ employ general mitigation applicable to all Species at Risk, in particular pertaining to maintaining wetlands and water flows at water crossings ▪ when reclaiming disturbed areas slope excavations to promote retention of water for creation of ponds	Decrease in the population and/or habitat of horned grebe as a result of previously identified effects (drainage alteration, clearing, sensory disturbance, loss of nests, hunting pressure and vehicle collisions)	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Critical life stages would be avoided	Limited to the Project Footprint	Infrequent	Irreversible	Horned grebe listed by SARA	Not Significant
						Level III	Level I	Level I	Level I	Level I	Level III	Level III	
		General construction, maintenance and operation activities	Decrease in the population and/or habitat of yellow rail as a result of previously identified effects (drainage alteration, clearing, sensory disturbance, loss of nests, hunting pressure and vehicle collisions)	▪ employ general mitigation applicable to all Species at Risk, in particular pertaining to maintaining wetlands and water flows at water crossings ▪ when reclaiming disturbed areas slope excavations to promote retention of water for creation of ponds	Decrease in the population and/or habitat of yellow rail as a result of previously identified effects (drainage alteration, clearing, sensory disturbance, loss of nests, hunting pressure and vehicle collisions)	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Critical life stages would be avoided	Limited to the Project Footprint	Infrequent	Irreversible	Yellow rail listed by SARA	Not Significant
						Level III	Level I	Level I	Level I	Level I	Level III	Level III	

System / VC / Feature	Area of Federal Jurisdiction	Project Activity	Potential Effects	Proposed Mitigation	Residual Effects	Key Criteria for Determining Significance							Significance of Residual Effect
						Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Indigenous and Human Environment													
Factor													
Land and Resource Use	√ 5(1)(c)(iii)	General construction, maintenance and operation activities	Reduction in food supply and culturally important species as a result of previously identified effects on ungulates (ex: moose, caribou) and their habitat (clearing, sensory disturbance, hunting pressure, vehicle collisions, predation and disease)	▪ design and adjust alignment where there are equitable conditions in the immediate vicinity based on community input to avoid loss of valued habitat and hunting areas ▪ limit clearing to designated areas within the ROW (EP1 and ES 130.17.1) ▪ limit access during construction and decommission and reclaim temporary access roads and winter road access points following completion of construction (EP21, EP22, ES 130.6.1 and ES 130.8.7) ▪ restrict access to operation phase quarry areas (ES 130.8.8) ▪ apply typical noise (EP4 and ES 130.12) and dust suppression (EP18 and ES 130.11) techniques ▪ design road to optimize sightlines with reduced speed and signage to reduce the potential for accidental wildlife-vehicle collisions ▪ design road with no pullouts or parking areas ▪ prohibit hunting by MI employees and contractors working on the Project (EP14 and ES 130.19.1) ▪ firearm possession prohibited in construction camps ▪ schedule maintenance activities to avoid sensitive life stages unless required for safety reasons	Reduction in food supply and culturally important species as a result of previously identified effects on ungulates (ex: moose, caribou) and their habitat (clearing, sensory disturbance, hunting pressure, vehicle collisions, predation and disease)	Long-Term, life of Project	Indigenous people/ communities in the Indigenous/ Resource Use RAA are able to adapt with relative ease and maintain pre-development activities	Critical life stages would be avoided	Effects may extend beyond the Project Footprint within the LAA	Sporadic	Reversible over a long period	Potential adverse effects to traditional use activities	Not Significant
						Level III	Level I	Level I	Level II	Level II	Level II	Level II	

System / VC / Feature	Area of Federal Jurisdiction	Project Activity	Potential Effects	Proposed Mitigation	Residual Effects	Key Criteria for Determining Significance							Significance of Residual Effect
						Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Land and Resource Use	√ 5(1)(c)(iii)	General construction, maintenance and operation activities	Reduction in food supply as a result of previously identified effects on furbearers and birds and their habitat (clearing, sensory disturbance, hunting pressure, vehicle collisions and loss of nests)	▪ design and adjust alignment where there are equitable conditions in the immediate vicinity based on community input to avoid loss of important habitat and hunting areas ▪ alignment selected so no work within 100 m of a waterbody (retained vegetated buffer) except at crossings (EP6 and ES 130.15.1) ▪ follow clearing and grubbing (EP1 and ES 130.17.1) and blasting (EP14 and ES 130.19.6) timelines and restrictions to avoid important nesting and breeding times ▪ limit clearing to designated areas within the ROW using existing cutlines, routes and trails where they are present (EP1 and ES 130.17.1) ▪ restrict equipment and vehicle use outside of cleared areas (ES 130.6.1) ▪ apply typical noise (EP4 and ES 130.12) and dust suppression (EP18 and ES 130.11) techniques ▪ limit access during construction and decommission and reclaim temporary access roads and winter road access points following completion of construction (EP21, EP22, and ES 130.8.7) ▪ restrict access to operation phase quarry areas (ES 130.8.8) ▪ design road to optimize sightlines with reduced speed and signage to reduce the potential for accidental wildlife-vehicle collisions ▪ prohibit hunting by MI employees and contractors working on the Project (EP14 and ES 130.19.1) ▪ firearm possession prohibited in construction camps ▪ schedule maintenance activities to avoid sensitive life stages unless required for safety reasons	Reduction in food supply as a result of previously identified effects on furbearers and birds and their habitat (clearing, sensory disturbance, hunting pressure, vehicle collisions and loss of nests)	Long-Term, life of Project	Indigenous people/ communities in the Indigenous/ Resource Use RAA are able to adapt with relative ease and maintain pre-development activities	Critical life stages would be avoided	Effects may extend beyond the Project Footprint within the LAA	Sporadic	Reversible over a long period	No adverse social effects	Not Significant
						Level III	Level I	Level I	Level II	Level II	Level II	Level I	

System / VC / Feature	Area of Federal Jurisdiction	Project Activity	Potential Effects	Proposed Mitigation	Residual Effects	Key Criteria for Determining Significance							Significance of Residual Effect
						Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Land and Resource Use	√ 5(1)(c)(iii)	General construction, maintenance and operation activities	Reduction in food supply as a result of previously identified effects on fish and their habitat (water quality, shock waves, fishing pressure, fish passage, habitat and invasive species)	▪ install erosion and sediment control measures (EP16 and ES 130.16, ex: silt fencing, erosion control blanket, straw wattle, geotextile) ▪ alignment selected so no work within 100 m of a waterbody (retained vegetated buffer) except at crossings (EP6 and ES 130.15.1) ▪ adhere to DFO timing windows for in-stream work (EP6, EP7, EP11, and ES 130.15.2) ▪ bridges and culverts at watercourse crossings will accommodate 1:50 year flood events ▪ regular culvert maintenance and cleanouts (EP11 and ES 130.15.9) ▪ apply typical noise (EP4 and ES 130.12) and dust suppression (EP18 and ES 130.11) techniques ▪ decommission and rehabilitate disturbed areas not required for Project operation and maintenance to prevent access (EP22 and ES 130.8.7)) ▪ restrict fishing access of the construction crews ▪ restrict access to potential parking areas at watercourse crossings ▪ install large riprap/aggregate on slopes to limit access to streams at crossing sites where access did not exist prior to the Project ▪ designated re-fuelling areas and fuel handling procedures (EP2, EP3, ES 130.9.2.5 and ES 130.10, ex: at least 100 m from water bodies, secondary containment, approved storage tanks, maintain spill control and clean-up equipment, emergency response plan with spill containment/clean-up procedures) ▪ equipment and vehicles will be clean and free of leaks upon arrival to site and kept in good repair (EP6 and ES 130.15.3) ▪ schedule maintenance activities to avoid sensitive life stages unless required for safety reasons	Reduction in food supply as a result of previously identified effects on fish and their habitat (water quality, shock waves, fishing pressure, fish passage, habitat and invasive species)	Long-Term, life of Project	Indigenous people/ communities in the Indigenous/ Resource Use RAA are able to adapt with relative ease and maintain pre-development activities	Critical life stages would be avoided	Effects may extend beyond the Project Footprint within the LAA	Sporadic	Reversible over a long period	No adverse social effects	Not Significant
						Level III	Level I	Level I	Level II	Level II	Level II	Level I	

System / VC / Feature	Area of Federal Jurisdiction	Project Activity	Potential Effects	Proposed Mitigation	Residual Effects	Key Criteria for Determining Significance							Significance of Residual Effect
						Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Land and Resource Use	√ 5(1)(c)(iii)	General construction, maintenance and operation activities	Reduction in food supply as a result of previously identified effects on harvested vegetation (ex: berries) (clearing, drainage alterations, invasive species and wildfires)	▪ identify and map areas of cultural importance prior to clearing for Project planning and design (routing and setbacks) ▪ design and adjust alignment where there are equitable conditions in the immediate vicinity based on community input to avoid loss of important harvesting areas ▪ limit clearing to designated areas within the ROW using existing cutlines, routes and trails where they are present (EP1 and ES 130.17.1) ▪ restrict equipment and vehicle use outside of cleared areas (ES 130.6.1) ▪ clean construction equipment and vehicles prior to bringing them to site to control spread of invasive species (EP25 and ES 130.15.1) ▪ decommission and rehabilitate disturbed areas not required for Project operation and maintenance (EP22 and ES 130.8.7)	Reduction in food supply as a result of previously identified effects on harvested vegetation (ex: berries) (clearing, drainage alterations, invasive species and wildfires)	Long-Term, life of Project	Indigenous people/ communities in the Indigenous/ Resource Use RAA are able to adapt with relative ease and maintain pre-development activities	Moderate sensitivity	Limited to the Project Footprint	Sporadic	Reversible over a long period	No adverse social effects	Not Significant
						Level III	Level I	Level II	Level I	Level II	Level II	Level I	
Travel Routes	√ 5(1)(c)(iii)	General construction, maintenance and operation activities	Decreased access to traditional travel routes used for resource use and recreation	▪ crossing designs to maintain navigability of navigable watercourses ▪ provide an approach (ramps) for users (ex: boats, snowmobiles, ATVs) to cross the road and post warning signs showing the road crossings	Decreased access to traditional travel routes used for resource use and recreation	Long-Term, life of Project	Indigenous people/ communities in the Indigenous/ Resource Use RAA are able to adapt with relative ease and maintain pre-development activities	N/A	Effects may extend beyond the Project Footprint within the LAA	Infrequent	Readily reversible	No adverse social effects	Not Significant
						Level III	Level I	N/A	Level II	Level I	Level I	Level I	
Economy	√ 5(1)(c)(i)	ROW clearing and general construction activities	Reduction in trapping income for local trappers as a result of reduced trapping harvest from previously identified effects (clearing, sensory disturbance, hunting pressure and vehicle-collision)	▪ follow the mitigation measures to minimize effects to furbearers due to habitat loss, sensory disturbance and vehicle collisions ▪ TK interviews, workshops and studies were conducted to identify and minimize interaction with areas of importance to trappers ▪ provide current Project information to affected trappers to minimize potential for traps to be set in areas to be disturbed by construction ▪ maintain trapper access to traplines and trails during construction; design trail crossings to maintain trapper access and trails (EP1 and ES 130.17.3.3) ▪ if active traps are discovered during construction, work will stop and the trapper will be notified ▪ construction contracts will require indigenous involvement to increase economic opportunities for local communities	Reduction in trapping income for local trappers as a result of reduced trapping harvest from previously identified effects (clearing, sensory disturbance, hunting pressure and vehicle-collision)	Long-Term, life of Project	Indigenous trappers in the Indigenous/ Resource Use RAA are able to adapt with relative ease and maintain pre-development activities	N/A	Effects may extend beyond the Project Footprint within the LAA	Infrequent	Readily reversible	No adverse social effects	Not Significant
						Level III	Level I	N/A	Level II	Level I	Level I	Level I	

System / VC / Feature	Area of Federal Jurisdiction	Project Activity	Potential Effects	Proposed Mitigation	Residual Effects	Key Criteria for Determining Significance							Significance of Residual Effect
						Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Heritage and Archaeological Resources	√ 5(1)(c)(iv)	ROW clearing and general construction activities	Loss or disturbance to heritage, culture (sacred) or community use resources and sites	▪ field assessment of the alignment has identified areas for further investigation prior to construction (EP13 and ES 130.18) ▪ protection measures (ex: avoidance and maintaining buffers around heritage resources near the alignment) shall be employed in discussion with HRB and the local communities ▪ limit equipment and workers to construction areas (ES 130.6.1) ▪ in the event that artifacts are uncovered, work at the location will be stopped and a recovery or protection plan implemented by a qualified archaeologist in consultation with HRB and the local communities (EP13 and ES 130.18) ▪ conduct appropriate community and cultural activities prior to construction	Loss or disturbance to heritage, culture (sacred) or community use resources and sites	Short-Term, associated with discrete activities	Potential disturbance of resources that are of local importance and are not recoverable	N/A	Limited to the Project Footprint	Sporadic	Reversible with a managed heritage resources artifact recovery protocol	Potential adverse effects to heritage resources	Not Significant
						Level I	Level II	N/A	Level I	Level II	Level II	Level II	
		ROW clearing and general construction activities	Loss or disturbance to heritage resources as a result of increased access	▪ non-disclosure of heritage and archaeological sites to minimize potential for disturbance to sites ▪ limit access during construction and decommission and reclaim temporary access roads and winter road access points following completion of construction (EP21, EP22, and ES 130.8.7) ▪ restrict access to operation phase quarry areas (ES 130.8.8) ▪ where appropriate, implement access controls to adjacent heritage sites	Loss or disturbance to heritage resources as a result of increased access	Long-Term, life of Project	Potential disturbance of resources that are of local importance and are not recoverable	N/A	Limited to the Project Footprint	Infrequent (or not at all)	Reversible with a managed heritage resources artifact recovery protocol	Potential adverse effects to heritage resources	Not Significant
						Level III	Level II	N/A	Level I	Level I	Level II	Level II	
Human Health and Safety	√ 5(1)(c)(i)	General construction, maintenance and operation activities	Community member and worker safety risk	▪ post “no entry” warning signs and restrict access around active construction sites ▪ provide safe access for trappers and other traditional users ▪ provide updates to local communities regarding location and timing of construction and maintenance activities ▪ workers to be educated regarding safe construction practices including use of Personal Protective Equipment ▪ develop and implement Site Health and Safety Plans prior to construction and conduct regular site safety meetings and inspections ▪ blasting crews to be trained and certified ▪ blasting locations secured prior to blasting and warning sirens activated prior to detonation of explosives ▪ equip and maintain equipment, machinery and vehicles with appropriate safety features (ex: back-up warning devices) ▪ road geometric design standard based on recognized safety standards ▪ warning signs of reduced speed limits at wildlife hazard locations ▪ ramps for snowmobiles/ATVs to be placed at road/trail crossing intersections with warning signs marking crossing locations ▪ remove trees and tall shrubs to maintain line of sight ▪ dust control product application in key problem areas (EP18 and ES 130.11)	Community member and worker safety risk	Long-Term, life of Project	Potential for injuries	N/A	Limited to the Project Footprint	Infrequent during operation, likely sporadic during construction	Readily reversible	Public safety is very important to local communities	Not Significant
						Level III	Level II	N/A	Level I	Level II	Level I	Level III	

System / VC / Feature	Area of Federal Jurisdiction	Project Activity	Potential Effects	Proposed Mitigation	Residual Effects	Key Criteria for Determining Significance							Significance of Residual Effect
						Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Human Health and Safety	√ 5(1)(c)(i)	Clearing of native vegetation for the all-season road, quarries, borrow pits, access roads, watercourse crossings and associated work areas and camps	Loss of medicinal plant harvest areas used by community members for therapeutic or healing purposes	▪ identify and map important medicinal and cultural plants and harvesting areas prior to clearing for Project planning and design (routing and setbacks) ▪ adjust alignment where possible to avoid the loss of important harvesting areas ▪ limit clearing to designated areas within the ROW (EP1 and ES 130.17.1) ▪ restrict equipment and vehicle use outside of cleared areas (ES 130.6.1) ▪ clean construction equipment and vehicles prior to bringing them to site to control spread of invasive species (EP25 and ES 130.15.1)	Loss of medicinal plant harvest areas used by community members for therapeutic or healing purposes	Long-Term, life of Project	Likely to measurably affect plants important to local communities	Moderate sensitivity	Limited to the Project Footprint	Sporadic	Reversible by locating other harvest areas or in reclaimed areas	No adverse social effects	Not Significant
						Level III	Level II	Level II	Level I	Level II	Level II	Level I	
		General construction, maintenance and operation activities	Risk to human health from decreased quality of the community water supply as a result of previously identified effects (surface and/or ground water quality)	▪ alignment selected so no work within 100 m of a waterbody (retained vegetated buffer) except at crossings where in-stream work will be conducted during winter months or low flow conditions (EP6, ES 130.15.1 and ES 130.15.2) to the extent possible ▪ equipment and vehicles will be clean and free of leaks upon arrival to site and kept in good repair (EP6 and ES 130.15.3) ▪ minimize clearing and soil disturbance and limit vehicle/equipment use to ROW (ES 130.6.1) ▪ install erosion and sediment control measures (EP16 and ES 130.16, ex: silt fencing, erosion control blanket, straw wattle, geotextile) ▪ maintain natural drainage and re-grade disturbed areas to limit erosion ▪ conduct clearing during winter months (EP1 and ES 130.17.1) ▪ suspend construction activities during extreme weather events (EP6 and ES 130.16) ▪ energy dissipation controls (ex: ditching, rip-rap, collection ponds) ▪ decommission and rehabilitate disturbed areas not required for Project operation and maintenance (EP22 and ES 130.8.7) ▪ designated re-fuelling areas and fuel handling procedures (EP2 and ES 130.9.2.5, ex: at least 100 m from water bodies and away from existing wells, secondary containment, approved storage tanks, maintain spill control and clean-up equipment, emergency response plan with spill containment/clean-up procedures) ▪ improved road conditions, sight lines and approaches will reduce likelihood and frequency of accidents and improve access for spill response crews ▪ soil and groundwater remediation to CCME guidelines (EP3 and ES 130.10)	Risk to human health from decreased quality of the community water supply as a result of previously identified effects (surface and/or ground water quality)	Long-Term, life of Project	Contaminant concentrations within applicable regulations, no anticipated adverse effects	N/A	Water quality may be altered within the Project Footprint	Spills to soil would be remediated preventing effects to groundwater and surface water	Readily reversible	No adverse social effects	Not Significant
						Level III	Level I	N/A	Level I	Level I	Level I	Level I	

System / VC / Feature	Area of Federal Jurisdiction	Project Activity	Potential Effects	Proposed Mitigation	Residual Effects	Key Criteria for Determining Significance							Significance of Residual Effect
						Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Human Health and Safety	√ 5(1)(c)(i)	Use of equipment and vehicles during general construction, maintenance and operation activities	Risk to human health and disturbance to local communities as a result of reduce air quality	▪ dust suppression (EP18 and ES 130.11) ▪ activities that generate dust or smoke (ex: blasting, burning) will not take place during high wind conditions ▪ vehicle speed limits at construction sites and quarries within close proximity to local communities when dust problems occur ▪ use low sulphur fuels ▪ require a high standard of maintenance of equipments and vehicles ▪ limit unnecessary long-term idling ▪ decommission and rehabilitate disturbed areas not required for Project operation and maintenance (EP22 and ES 130.8.7) ▪ control aggregate size and use of granitic material to reduce dust generation from roadbed	Risk to human health and disturbance to local communities as a result of reduced air quality	Long-Term, life of Project	Potential change in air quality <10% of baseline conditions	N/A	Limited to the Project Footprint	Sporadic during construction and maintenance; frequent during operation in summer	Readily reversible	Potential reduction in driver visibility due to dust resulting in collisions	Not Significant
						Level III	Level I	N/A	Level I	Level II	Level I	Level I	
		Use of equipment and vehicles during general construction, maintenance and operation activities	Disturbance to local communities as a result of increased noise levels	▪ apply typical noise suppression techniques (EP4 and ES 130.12) ▪ locate quarry activities as far away from local communities as reasonably possible ▪ forest buffers will be retained, unless clearing is required for safety reasons, around quarries to reduce noise from quarry operations ▪ limit quarrying and blasting to daytime hours when working close to local communities	Disturbance to local communities as a result of increased noise levels	Long-Term, life of Project	Potential change in noise <10% of baseline conditions	N/A	Limited to the Project Footprint	Sporadic during construction and maintenance	Readily reversible	No adverse social effects	Not Significant
						Level III	Level I	N/A	Level I	Level II	Level I	Level I	