Common Name	Scientific Name	SARA	COSEWIC	MBCDC	MESEA
Songbirds (Passeriformes)					
Olive-sided flycatcher[2,3,4,6]	*Contopus cooperi*	THR	THR	S3B	THR
Eastern wood-peewee[4]	*Contopus virens*	No schedule, no status	SC	S4B	Not listed
Yellow-bellied flycatcher[2]	*Empidonax flaviventris*			S5B	
Alder flycatcher[2,3]	*Empidonax alnorum*			S5B	
Least flycatcher[2]	*Empiodnax minimus*			S5B	
Eastern phoebe	*Sayornis phoebe*			S5B	
Eastern kingbird[2]	*Tyrannus tyrannus*			S4B	
Northern shrike	*Lanius excubitor*			S3B S5N SUM	
Blue-headed vireo[2,3]	*Vireo solitarius*			S5B	
Philadelphia vireo	*Vireo philadelphicus*			S4B	
Red-eyed vireo[2]	*Vireo olivaceus*			S5B	
Gray jay[2,3,6]	*Perisoreus canadensis*			S5	
Blue jay[3]	*Cyanocitta cristata*			S5	
American crow[2,3,6]	*Corvus brachyrhychos*			S5B SUN	
Common raven[2,3,6]	*Corvus corax*			S5	
Horned lark[1]	*Eremophila alpestris*			S3B SUM	
Tree swallow[6]	*Tachycineta bicolor*			S4B	
Bank swallow[6]	*Riparia riparia*	No schedule, no status	THR	S5B	Not listed
Cliff swallow	*Petrochelidon pyrrhonota*			S4B	
Barn swallow[4,6]	*Hirundo rustica*	No schedule, no status	THR	S4B	Not listed
Black-capped chickadee[2,3]	*Poecile atricapillus*			S5	
Boreal chickadee[2,3]	*Poecile hudsonicus*			S4	
Red-breasted nuthatch[2,3]	*Sitta canadensis*			S5	
Brown creeper[2,3]	*Certhia americana*			S5B	
Winter wren[2,3]	*Troglodytes hiemalis*			S5B	
Golden-crowned kinglet	*Regulus satrapa*			S4B	
Ruby-crowned kinglet[2,3]	*Regulus calendula*			S5B	
Gray-cheeked thrush	*Catharus minimus*			S5B S5M	
Swainson's thrush[3,5]	*Catharus ustulatus*			S5B	
Hermit thrush[2,3]	*Catharus guttatus*			S5B	
American robin[2,3]	*Turdus migratorius*			S5B	
Gray catbird[3]	*Dumetella carolinensis*			S5B	

Common Name	Scientific Name	SARA	COSEWIC	MBCDC	MESEA
European starling	*Sturnus vulgaris*			SNA	
Bohemian waxwing	*Bombycilla garrulus*			S4B SUN	
Cedar waxwing[2,3]	*Bombycilla cedrorum*			S5B SUN	
House sparrow	*Passer domesticus*			SNA	
American pipit[1]	*Anthus rubescens*			S3B	
Evening grosbeak[3]	*Coccothraustes vespertinus*			S3	
Pine grosbeak[3]	*Pinicola enucleator*			S4	
Purple finch[2]	*Haemorhous purpureus*			S5B	
Common redpoll[3]	*Acanthis flammea*			S4B S5N	
Hoary redpoll[3]	*Acanthis hornemanni*			S3B S5N	
Red crossbill[3]	*Loxia curvirostra*			S4B SUN	
White-winged crossbill[2,3]	*Loxia leucoptera*			S5	
Pine siskin[2]	*Spinus pinus*			S5	
American goldfinch[2]	*Spinus tristis*			S5B	
Lapland longspur[1]	*Calcarius lapponicus*			S4B SUM SUN	
Smith's longspur[1]	*Calcarius pictus*			S3B SUM	
Snow bunting[1]	*Plectrophenax nivalis*			S4N SUM	
American tree sparrow[1,3]	*Spizella arborea*			S5B SUM	
Chipping sparrow[2,3]	*Spizella passerina*			S5B	
Clay-colored sparrow[2]	*Spizella pallida*			S5B	
Vesper sparrow	*Pooecetes gramineus*			S5B	
Savannah sparrow[2]	*Passerculus sandwichensis*			S5B	
Le Conte’s sparrow[2,3]	*Ammodramus leconteii*			S5B	
Fox sparrow[2]	*Passerella iliaca*			S5B S4M	
Song sparrow[2]	*Melospiza melodia*			S5B	
Lincoln's sparrow[2,3]	*Melospiza lincolnii*			S5B	
Swamp sparrow[3]	*Melospiza georgiana*			S5B	
White-throated sparrow[2,3]	*Zonotrichia albicollis*			S5B	
Harris's sparrow[3]	*Zonotrichia querula*			S4B S5M	
White-crowned sparrow[1,3]	*Zonotrichia leucophrys*			S5B	
Dark-eyed junco[2,3]	*Junco hyemalis*			S5B SUN	
Red-winged blackbird[2,3,6]	*Agelaius phoeniceus*			S5B	
Rusty blackbird[2,4,6]	*Euphagus carolinus*	SC	SC	S4B	Not listed
Common grackle[2,3]	*Quiscalus quiscula*			S5B	

Common Name	Scientific Name	SARA	COSEWIC	MBCDC	MESEA
Ovenbird[2,3]	*Seiurus aurocapilla*			S5B	
Northern waterthrush[2]	*Parkesia noveboracensis*			S5B	
Black-and-white warbler[2]	*Mniotilta varia*			S5B	
Tennessee warbler[2,3]	*Oreothlypis peregrina*			S5B	
Orange-crowned warbler[2,3]	*Oreothlypis celata*			S5B	
Nashville warbler[2,3,5]	*Oreothlypis ruficapilla*			S5B	
Connecticut warbler[2,3]	*Oporornis agilis*			S4B	
Common yellowthroat[2]	*Geothlypis trichas*			S5B	
American redstart	*Setophaga ruticilla*			S5B	
Cape May warbler[2]	*Setophaga tigrina*			S5B	
Magnolia warbler[2]	*Setophaga magnolia*			S5B	
Bay-breasted warbler	*Setophaga castanea*			S5B	
Blackburnian warbler[2]	*Setophaga fusca*			S5B	
Yellow warbler[2,3]	*Setophaga petechia*			S5B	
Blackpoll warbler[2]	*Setophaga striata*			S5B SUM	
Palm warbler[2]	*Setophaga palmarum*			S5B	
Yellow-rumped warbler[2,3]	*Setophaga coronata*			S5B	
Black-throated green warbler	*Setophaga virens*			S4B	
Wilson's warbler[2]	*Cardellina pusilla*			S5B SUM	
Canada warbler[4,6]	*Cardellina canadensis*	THR	THR	S3B	THR
Rose-breasted grosbeak[3]	*Pheucticus ludovicianus*			S5B	
Kingfishers (Coraciiformes)					
Belted kingfisher[2]	*Megaceryle alcyon*			S5B	
Non-Migratory Birds					
Upland Game Birds (Galliformes)					
Ruffed grouse[2,3,5,6]	*Bonasa umbellus*			S4S5	
Spruce grouse[3,5,6]	*Falcipennis canadensis*			S4	
Willow ptarmigan[1,6]	*Lagopus lagopus*			S4B SUN	
Sharp-tailed grouse[5,6]	*Tympanuchus phasianellus*			S5	
Accipiters (Accipitriformes)					
Northern goshawk	*Accipiter gentilis*			S4B S5N	

Common Name	Scientific Name	SARA	COSEWIC	MBCDC	MESEA
Owls (Strigiformes)					
Great gray owl[2,3]	*Strix nebulosa*			S4	
Great horned owl[6]	*Bubo virginianus*			S4	
Northern hawk owl	*Surnia ulula*			S4	
Barred owl[4]	*Strix varia*			S4	
Boreal owl[6]	*Aegolius funereus*			S4	
Woodpeckers and Relatives (Piciformes)					
Downy woodpecker[2,3]	*Picoides pubescens*			S5	
Hairy woodpecker[2,3]	*Picoides villosus*			S5	
American three-toed woodpecker[3]	*Picoides dorsalis*			S5	
Black-backed woodpecker[2]	*Picoides arcticus*			S5	
Pileated woodpecker[2,3]	*Dryocopus pileatus*			S5	

Sources: Manitoba Avian Research Committee, 2003; MBBA, 2014; Cornell Lab of Ornithology, 2015; COSEWIC, 2017; Joro, 2017b; MBCDC, 2016a; MESEA, 2017, SARA, 2017.
Bolded species are Species of Conservation Concern: THR – Threatened, SC – Special Concern, END – Endangered; NAR – Not at Risk
[1]Species is a migrant or non-breeding visitor in the RAA; [2]Observation during the Manitoba Breeding Bird Atlas Surveys, [3]Observation heard on ARU recordings, [4]Species occurrence listed on the Manitoba Conservation Data Centre for the Hayes River Upland Ecoregion [5]Observation during Joro Field Programs, 6Species of First Nation Interest

MBCDC (n.d.) Definitions for Status Listing:

1 Very rare throughout its range or in the province (5 or fewer occurrences, or very few remaining individuals). May be especially vulnerable to extirpation.

2 Rare throughout its range or in the province (6 to 20 occurrences). May be vulnerable to extirpation.

3 Uncommon throughout its range or in the province (21 to 100 occurrences).

4 Widespread, abundant, and apparently secure throughout its range or in the province, with many occurrences, but the element is of long-term concern (> 100 occurrences).

5 Demonstrably widespread, abundant, and secure throughout its range or in the province, and essentially impossible to eradicate under present conditions.

U Possibly in peril, but status uncertain; more information needed.

Appendix 6-3: Interaction Between the VCs and Key Project Activities

Project Activities	Physical Environment VCs					Biological Environment – Fish and Fish Habitat		Biological Environment – Terrestrial Environment					Species at Risk					Indigenous and Human Environment				
	Atmospheric Environment – Air Quality	Atmospheric Environment – Greenhouse Gas Emissions	Topography and Soils	Surface Water	Groundwater	Fish	Fish Habitat	Vegetation (Plant Communities, and Wetlands)	Mammals (Ungulates)	Mammals (Aquatic and Terrestrial Furbearers)	Amphibians and Reptiles	Birds / Migratory Birds (Songbirds, Raptors, Waterfowl, Upland)	Aquatic Environment	Terrestrial Environment – Vegetation	Terrestrial Environment – Mammals	Terrestrial Environment – Forest Birds	Terrestrial Environment – Waterbirds	Land and Resource Use	Travel Routes	Economy	Heritage and Archaeological Resources	Human Health and Safety
Operation and staging of equipment, machinery and vehicles and transportation of equipment as necessary during construction phase*.	✔	✔	✔	✔	✔	✔	✔		✔	✔			✔		✔			✔	✔	✔	✔	✔
Clearing road right-of-way including clearing vegetation, salvaging, burning, stockpiling, grubbing and mechanical brushing.	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Blasting.	✔		✔			✔	✔		✔	✔		✔	✔		✔	✔	✔	✔	✔	✔	✔	✔
Road construction including topsoil stripping, soil removal, rock placement/compaction, rock crushing, traffic control/signage and contouring.	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔	✔
Grading and gravelling of road surface.	✔		✔			✔	✔						✔						✔	✔		✔
Bridge construction including construction of components, batching/pouring concrete and steel girder placement.		✔	✔	✔		✔	✔		✔	✔	✔		✔		✔		✔	✔	✔	✔	✔	✔
Culvert installation including coffer damming, stream excavation, geotextile material placement, filling, crossing streams, culvert placement, backfilling and compaction.		✔	✔	✔		✔	✔		✔	✔	✔	✔	✔		✔	✔	✔	✔	✔			✔
Erosion and sediment control including placing silt fencing and re-vegetation.			✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔		
Establishment of staging areas and temporary components (i.e., quarry and borrow areas, temporary access and crossings, staging areas, camps).		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔	✔
Solid and liquid waste management.	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔					✔
Storage and handling of hazardous materials.	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔		✔
Site cleanup including waste removal, contaminated soil removal, stockpiling and recycling materials.		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Closure and reclamation of temporary components (quarry and borrow areas, access, crossings, staging areas) including excavation, slope stabilization, re-vegetation and barrier installation.		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔	✔
Operations and Maintenance Phase																						
Road maintenance including vegetation maintenance, grading, washout repair and traffic controls.		✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔			✔			✔
Ditch maintenance including excavation and debris removal.		✔	✔	✔	✔	✔	✔			✔	✔	✔	✔			✔		✔	✔	✔	✔	✔
Bridge and culvert maintenance including seasonal inspections and debris removal.		✔	✔	✔		✔	✔			✔	✔	✔	✔			✔	✔	✔	✔	✔	✔	✔
Erosion and sediment control including re-vegetation.			✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔					
Clearing snow.		✔	✔	✔		✔	✔		✔	✔			✔		✔			✔	✔			✔
Operation and staging of equipment, machinery and vehicles and transportation of equipment as necessary during maintenance.	✔		✔			✔	✔		✔	✔	✔	✔	✔		✔	✔	✔			✔		✔

Note: Other activities require the operation of equipment/vehicles/machinery. Therefore, influences on VCs for subsequent activities relate to how the completion of the activity potentially influences the VC.

Appendix 6-4: Assessment of Environmental Effects Before Application of Proposed Mitigation Measures

System / VC / Feature	Potential Environmental Effects	Assessment of Environmental Effects Before Application of Mitigation Measures								Proposed Mitigation Measures (Refer to Table 2 for Assessment of Residual Effects following Mitigation)
		Direction of Change	Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Physical Environment										
Factor										
Atmospheric Environment – Air Quality	Increase in particulates (dust) from construction activities (ex: blasting, rock crushing, stockpiling, roadbed construction, hauling) and use of construction vehicle and equipment	Negligible	Short-Term, associated with discrete activities	Emission may exceed 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	▪ dust suppression (EP18 [1] and ES 130.11[2]) ▪ construction vehicle speed limits
			Level I	Level II	N/A	Level I	Level II	Level I	Level I	
	Increase in particulates (dust) from maintenance activities (ex: blasting, rock crushing, stockpiling, roadbed/surface repair and hauling) and use of maintenance equipment	Negative	Long-Term, life of Project	Emission may exceed guidelines	N/A	Limited to the immediate vicinity of the Project Footprint	Sporadic during maintenance activities	Readily reversible	Reduction in driver visibility may result in collisions	▪ dust suppression (EP18 and ES 130.11) ▪ vehicle speed limits
			Level III	Level II	N/A	Level I	Level II	Level I	Level II	
	Increase in particulates (dust) from public road traffic during operation	Negative	Long-Term, life of Project	Emissions may exceed guidelines	N/A	Limited to the immediate vicinity of the Project Footprint	Regular and frequent during summer and fall	Readily reversible	Reduction in driver visibility may result in collisions	▪ 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
			Level III	Level II	N/A	Level I	Level III	Level I	Level II	
	Increase in vehicle emissions (ex: sulfur oxide, nitrogen oxide and diesel particulates) from vehicle and equipment use during construction, maintenance and operation	Negative	Long-Term, life of Project	Emissions may exceed guidelines	N/A	Emission sources limited to the Project Footprint	Regular and frequent	Readily reversible	No adverse ecosystem and social effects	▪ use low sulphur fuels ▪ require a high standard of maintenance of equipments and vehicles ▪ limit unnecessary long-term idling
			Level III	Level II	N/A	Level I	Level III	Level I	Level I	
	Increase in ambient noise levels from blasting and vehicle and equipment use during construction, maintenance and operation	Negative	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	▪ 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
			Level III	Level I	N/A	Level II	Level III	Level I	Level I	
Atmospheric Environment – Greenhouse Gas Emissions	Increase in greenhouse gas emissions from construction vehicles and equipment	Negative	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	▪ limit vehicle idling and use low sulphur fuels ▪ regular vehicle/equipment maintenance (ES 130.6.3) ▪ limit traffic to construction vehicles and equipment
			Level II	Level I	N/A	Level I	Level III	Level II	Level I	
	Increase in greenhouse gas emissions from operation of the ASR and loss of carbon sink from ROW clearing	Negligible (could be positive)	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	▪ 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
			Level III	Level I	N/A	Level I	Level III	Level II	Level I	
Topography and Soils	Terrain alterations resulting from quarries and borrow pits developed during construction	Negligible	Short-Term, associated with discrete activities	Effects considered minor	N/A	Limited to the Project Footprint	Once	Irreversible	No adverse ecosystem and social effects	▪ 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)
			Level I	Level I	N/A	Level I	Level I	Level III	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	Potential Environmental Effects	Assessment of Environmental Effects Before Application of Mitigation Measures								Proposed Mitigation Measures (Refer to Table 2 for Assessment of Residual Effects following Mitigation)
		Direction of Change	Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Topography and Soils	Increase in contaminant concentrations (ex: hydrocarbons) in soil due to spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents	Negative	Long-Term, life of Project	Contaminant concentrations may exceed 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	▪ 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)
			Level III	Level II	N/A	Level I	Level II	Level I	Level I	
	Loss of granular/lacustrine soils (sand and gravel) for use as construction materials	Negative	Long-Term, life of Project	Effects considered minor	N/A	Limited to the Project Footprint	Infrequent	Irreversible	No adverse ecosystem and social effects	▪ alignment avoids low lying areas requiring extensive fill ▪ design to minimize requirements for terrain alterations associated with construction, borrow and quarrying activities
			Level III	Level I	N/A	Level I	Level I	Level III	Level I	
	Loss of granular/lacustrine soils (sand and gravel) for use as maintenance materials throughout operation	Negative	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	▪ road design minimizes long term maintenance and wash out potential to reduce need for materials
			Level III	Level I	N/A	Level I	Level II	Level III	Level I	
Surface Water	Disruption of surface drainage and flow systems from ASR, quarries and borrow pits, access roads, watercourse crossings and road drainage resulting in increased or decreased flows in watercourses	Negative	Long-Term, life of Project	Change in flows likely outside range of natural variation and >25%	Effects to fish have high sensitivity	May alter flow in watercourses beyond the Project Footprint within the LAA	Continuous	Readily reversible	Moderate ecosystem effect important to local communities	▪ 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
			Level III	Level III	Level III	Level II	Level III	Level I	Level II	
	Reduced surface water quality as a result of erosion and sedimentation from ASR, quarries, borrow pits, access roads, watercourse crossings and associated work areas	Negative	Long-Term, life of Project	Suspended sediment concentrations may exceed regulations and guidelines and may adversely affect fish and wildlife	Effects to fish have high sensitivity	May alter water quality beyond the Project Footprint within the LAA	Sporadic	Readily reversible	Moderate ecosystem effect important to local communities	▪ 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)
			Level III	Level II	Level III	Level II	Level II	Level I	Level II	
	Reduced surface water quality as a result of spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents	Negative	Long-Term, life of Project	Contaminant concentrations may exceed applicable federal and provincial guidelines and affect water beyond a defined mixing zone	Effects to fish have high sensitivity	May alter water quality beyond the Project Footprint within the LAA	Infrequent during operation but likely sporadic during construction	Reversible over a long period	Moderate ecosystem effect important to local communities for drinking water	▪ 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)
			Level III	Level II	Level III	Level II	Level II	Level II	Level II	
Groundwater	Dewatering of local groundwater at construction quarries and borrow pits	Negative	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	▪ quarries will be appropriately located (EP20, ex: locate quarries and borrow pits away from existing wells)
			Level I	Level I	N/A	Level I	Level II	Level I	Level I	

System / VC / Feature	Potential Environmental Effects	Assessment of Environmental Effects Before Application of Mitigation Measures								Proposed Mitigation Measures (Refer to Table 2 for Assessment of Residual Effects following Mitigation)
		Direction of Change	Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Groundwater	Reduced groundwater quality as a result of spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents	Negative	Long-Term, life of Project	Contaminant concentrations may exceed applicable federal and provincial guidelines and may affect groundwater	N/A	May alter groundwater quality beyond the Project Footprint within the LAA	Infrequent during operation but likely sporadic during construction	Reversible over a long period	Moderate social effect related to drinking water	▪ 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)
			Level III	Level II	N/A	Level II	Level II	Level II	Level II	
Biological Environment – Fish and Fish Habitat										
Factor										
Fish	Decrease in fish populations as result of reduced surface water quality from spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents	Negative	Long-Term, life of Project	Net loss of the productive capacity of fish habitat affecting fish communities and population	Effects to fish have high sensitivity	May alter water quality beyond the Project Footprint within the LAA	Infrequent during operation but likely sporadic during construction	Reversible over a long period	Moderate ecosystem effect important to local communities	▪ 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)
			Level III	Level III	Level III	Level II	Level II	Level II	Level II	
	Injury or death of fish from compressive shock waves close to blasting activities	Negative	Short-Term, associated with discrete activities	Net loss of the productive capacity of fish habitat affecting fish communities and population	Effects to fish have high sensitivity	Localized to blasting areas within Project Footprint	Sporadic	Reversible over a long period	Moderate ecosystem effect important to local communities	▪ 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
			Level I	Level III	Level III	Level I	Level II	Level II	Level II	
	Increased fishing pressures on local fish populations resulting from increased access to watercourses	Negative	Long-Term, life of Project	Net loss of the productive capacity of fish habitat affecting fish communities and population	Effects to fish have high sensitivity	Effect beyond the Project Footprint within the LAA	Sporadic	Irreversible	Moderate ecosystem effect important to local communities	▪ 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
			Level III	Level III	Level III	Level II	Level II	Level III	Level II	
	Blockage or reduction in fish passage and disruption of spawning from temporary construction crossings and permanent watercourse crossings	Negative	Long-Term, life of Project	Net loss of the productive capacity of fish habitat affecting local fish communities and population	Effects to fish have high sensitivity	Localized to crossings within Project Footprint	Infrequent	Reversible over a long period	Moderate ecosystem effect	▪ 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
			Level III	Level II	Level III	Level I	Level I	Level II	Level II	

System / VC / Feature	Potential Environmental Effects	Assessment of Environmental Effects Before Application of Mitigation Measures								Proposed Mitigation Measures (Refer to Table 2 for Assessment of Residual Effects following Mitigation)
		Direction of Change	Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Fish and Fish Habitat	Decreased quality of fish habitat and effects to fish as a result of previously identified effects (increased suspended solids) from disturbed banks, right-of-way runoff and in-stream works during construction	Negative	Medium-Term, until completion of construction and remediation	Net loss of the productive capacity of fish habitat affecting fish communities and population	Effects to fish have high sensitivity	Effect beyond the Project Footprint within the LAA	Sporadic	Readily reversible	Moderate ecosystem effect	▪ 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)
			Level II	Level III	Level III	Level II	Level II	Level I	Level II	
Fish Habitat	Alteration and loss of riparian habitat (shorelines) and fish habitat (in-stream) at water crossings	Negative	Long-Term, life of Project	Net loss of the productive capacity of fish habitat affecting fish communities and population	Effects to fish have high sensitivity	Localized to crossings within Project Footprint	Infrequent	Reversible over a long period	Moderate ecosystem effect	▪ 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
			Level III	Level III	Level III	Level I	Level I	Level II	Level II	
	Increased risk during construction, maintenance and operation for introduction of aquatic invasive species (ex: zebra mussel) that can reduce diversity and populations of native species and modify habitat	Negligible	Short-Term, associated with construction equipment	Net loss of the productive capacity of fish habitat affecting local fish communities and population	Effects to fish have high sensitivity	Effect may extend beyond the LAA	Infrequent	Irreversible	Moderate ecosystem effect	▪ clean construction equipment and vehicles prior to bringing them to site (EP25, ES 130.15.1.5 and ES 130.15.3)
			Level I	Level II	Level III	Level III	Level I	Level III	Level II	
Biological Environment – Terrestrial Environment										
Factor										
Vegetation (Plant Communities and Wetlands)	Disturbance to or loss of plant communities (reduced diversity) and fragmentation due to clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps during construction and maintenance	Negative	Long-Term, life of Project	Likely to measurably affect vegetation species or communities	Effect could occur during critical life stage	Effects beyond the Project Footprint within the LAA	Infrequent	Reversible over a long period	No adverse ecosystem effects	▪ 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)
			Level III	Level III	Level III	Level II	Level I	Level II	Level I	
	Disturbance to or loss of wetlands (ex: fens, bogs, marshes, peatlands) due to clearing and construction of the all-season road	Negative	Long-Term, life of Project	Likely to measurably affect vegetation species or communities	Effect could occur during critical life stage	Limited to the Project Footprint	Infrequent	Reversible over a long period	Moderate ecosystem effect	▪ 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)
			Level III	Level III	Level III	Level I	Level I	Level II	Level II	

System / VC / Feature	Potential Environmental Effects	Assessment of Environmental Effects Before Application of Mitigation Measures								Proposed Mitigation Measures (Refer to Table 2 for Assessment of Residual Effects following Mitigation)
		Direction of Change	Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Vegetation (Plant Communities and Wetlands)	Increased risk for invasive and non-native plant species to displace native plant communities, modifying the vegetation composition and structure during construction, maintenance and operation	Negative	Long-Term, life of Project	Likely to measurably affect vegetation species or communities	Effect could occur during critical life stage	Effects potentially beyond the Project Footprint within the LAA	Continuous	Reversible over a long period	No adverse ecosystem effects	▪ 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
			Level III	Level III	Level III	Level II	Level III	Level II	Level I	
	Impairment or loss of vegetation and desirable species as result of spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents and potential use of herbicides during maintenance	Negative	Long-Term, life of Project	May measurably affect common vegetation species or communities	Effect could occur during critical life stage	Limited to the Project Footprint	Sporadic	Reversible over a long period	No adverse ecosystem effects	▪ 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
			Level III	Level II	Level III	Level I	Level II	Level II	Level I	
	Increased risk of wildfires from fires and explosions during construction and maintenance and carelessness during operation	Negative	Long-Term, life of Project	Likely to measurably affect vegetation species or communities	Effect could occur during critical life stage	Effect may extend beyond the LAA	Sporadic	Reversible over a long period	No adverse ecosystem and social effects	▪ 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)
			Level III	Level III	Level III	Level III	Level II	Level II	Level I	
Mammals (Ungulates)	Alteration, fragmentation and/or loss of moose and caribou habitat due to clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps during construction and maintenance	Negative	Long-Term, life of Project	May measurably affect populations and considered moderate relative to habitat availability	Effect could occur during critical life stage	Effects beyond the Project Footprint within the LAA	Sporadic	Irreversible	Moderate ecosystem effect important to local communities	▪ 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)
			Level III	Level II	Level III	Level II	Level II	Level III	Level II	
	Increased sensory disturbance to and displacement of moose and caribou due to vehicle and equipment noise and vibration during construction, maintenance and operation	Negative	Long-Term, life of Project	May measurably affect populations and considered moderate relative to habitat availability	Effect could occur during critical life stage	Effects beyond the Project Footprint within the LAA	Continuous	Irreversible	Woodland caribou listed by SARA and ESEA	▪ 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
			Level III	Level II	Level III	Level II	Level III	Level III	Level III	

System / VC / Feature	Potential Environmental Effects	Assessment of Environmental Effects Before Application of Mitigation Measures								Proposed Mitigation Measures (Refer to Table 2 for Assessment of Residual Effects following Mitigation)
		Direction of Change	Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Mammals (Ungulates)	Increased caribou mortality due to increased hunting pressures during construction and with increased access along the all-season road during operation	Negative	Long-Term, life of Project	May measurably affect populations	Typically hunted in winter avoiding critical life stages	Effects beyond the Project Footprint within the LAA	Seasonally hunted typically in winter	Irreversible	Woodland caribou listed by SARA and ESEA	▪ 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
			Level III	Level II	Level I	Level II	Level II	Level III	Level III	
	Increased moose mortality due to increased hunting pressures during construction and with increased access in spring, summer and fall along the all-season road during operation	Negative	Long-Term, life of Project	Effect on populations easily observed or measured	Effect could occur during critical life stage	Effect may extend beyond the LAA	Continuous	Irreversible	Moderate ecosystem effect important to local communities	▪ 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
			Level III	Level III	Level III	Level III	Level III	Level III	Level II	
	Increased moose and caribou mortality due to vehicular collisions during construction, maintenance and operation	Negative	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	Irreversible	Moderate ecosystem effect important to local communities	▪ 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
			Level III	Level I	Level III	Level I	Level II	Level III	Level II	
	Increased moose and caribou mortality due to increased predation by wolves from increased access beyond that provided by the existing winter road and transmission lines	Negative	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 beyond the Project Footprint within the LAA	Sporadic	Reversible over a long period	Moderate ecosystem effect important to local communities	▪ 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
			Level III	Level I	Level III	Level II	Level II	Level II	Level II	
	Increased moose and caribou mortality due to introduction of disease from white-tailed deer (ex: brainworm, liverfluke)	Negligible	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	Reversible over a long period	Moderate ecosystem effect important to local communities	▪ 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)
			Level III	Level I	Level III	Level III	Level I	Level II	Level II	

System / VC / Feature	Potential Environmental Effects	Assessment of Environmental Effects Before Application of Mitigation Measures								Proposed Mitigation Measures (Refer to Table 2 for Assessment of Residual Effects following Mitigation)
		Direction of Change	Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Mammals (Aquatic and Terrestrial Furbearers)	Alteration, fragmentation and/or loss of furbearer (ex: beaver, marten) habitat due to clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps	Negative	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 beyond the Project Footprint within the LAA	Infrequent	Irreversible	No adverse ecosystem effects	▪ 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
			Level III	Level I	Level III	Level II	Level I	Level III	Level I	
	Increased sensory disturbance to and displacement of furbearers (ex: beaver, marten) due to vehicle and equipment noise and vibration during construction, maintenance and operation	Negative	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	Continuous	Irreversible	No adverse ecosystem effects	▪ 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
			Level III	Level I	Level III	Level I	Level III	Level III	Level I	
	Increased furbearer (ex: beaver, marten) mortality due to vehicular collisions and nuisance wildlife management during construction, maintenance and operation	Negative	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	Irreversible	No adverse ecosystem effects	▪ 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
			Level III	Level I	Level III	Level I	Level II	Level III	Level I	
Amphibians and Reptiles	Alteration, fragmentation and/or loss of amphibian (ex: spring peeper) habitat due to clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps	Negative	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	Irreversible	No adverse ecosystem effects	▪ 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
			Level III	Level I	Level III	Level I	Level I	Level III	Level I	
	Increase in winter mortality through compaction and freezing of soils in habitat where amphibians (ex: spring peeper) may be over wintering	Negative	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	Irreversible	No adverse ecosystem effects	▪ 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)
			Level III	Level I	Level III	Level I	Level II	Level III	Level I	

System / VC / Feature	Potential Environmental Effects	Assessment of Environmental Effects Before Application of Mitigation Measures								Proposed Mitigation Measures (Refer to Table 2 for Assessment of Residual Effects following Mitigation)
		Direction of Change	Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Migratory and Non-Migratory Birds	Alteration, fragmentation and/or loss of migratory (ex: raptors, waterfowl, forest birds) and non-migratory (ex: upland game birds) bird[3] habitat due to clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps	Negative	Long-Term, life of Project	May measurably affect populations and considered moderate relative to habitat availability	Effect could occur during critical life stage	Effects beyond the Project Footprint within the LAA	Infrequent	Irreversible	No adverse ecosystem effects	▪ 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
			Level III	Level II	Level III	Level II	Level I	Level III	Level I	
	Loss of nests and mortality to young migratory (ex: raptors, waterfowl, forest birds) and non-migratory (ex: upland game birds) birds during construction, maintenance and operation	Negative	Long-Term, life of Project	May measurably affect populations	Effect could occur during critical life stage	Limited to the Project Footprint	Sporadic	Reversible over a long period	No adverse ecosystem effects	▪ 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
			Level III	Level II	Level III	Level I	Level II	Level II	Level I	
	Increased sensory disturbance to and displacement of migratory (ex: raptors, waterfowl, forest birds) and non-migratory (ex: upland game birds) birds due to vehicle and equipment noise and vibration during construction, maintenance and operation	Negative	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 beyond the Project Footprint within the LAA	Continuous	Irreversible	No adverse ecosystem effects	▪ 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
			Level III	Level I	Level III	Level II	Level III	Level III	Level I	
	Increased mortality of migratory (ex: waterfowl) and non-migratory (ex: upland game birds) birds due to increased hunting pressures during construction and with increased access in spring, summer and fall along the all-season road	Negative	Long-Term, life of Project	Effect on populations easily observed or measured	Effect could occur during critical life stage	Effects beyond the Project Footprint within the LAA	Continuous	Irreversible	Moderate ecosystem effect	▪ 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
			Level III	Level III	Level III	Level II	Level III	Level III	Level II	
	Increased mortality of migratory (ex: waterfowl, forest birds) and non-migratory (ex: upland game birds) birds due to vehicular collisions during construction, maintenance and operation	Negligible	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	No adverse ecosystem effects	▪ 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
			Level III	Level I	Level III	Level I	Level I	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	Potential Environmental Effects	Assessment of Environmental Effects Before Application of Mitigation Measures								Proposed Mitigation Measures (Refer to Table 2 for Assessment of Residual Effects following Mitigation)
		Direction of Change	Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Species at Risk / Species of Conservation Concern										
Factor										
Aquatic Environment	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) from construction, maintenance and operation activities	Negative	Long-Term, life of Project	Minor effect, habitat alteration/loss restricted to non-limiting habitat	Effect could 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	▪ employ general mitigation applicable to all Species at Risk [4] ▪ employ mitigation measures previously noted for erosion and sediment control, spill prevention and clean up and fish and fish habitat protection
			Level III	Level I	Level III	Level I	Level II	Level II	Level III	
Terrestrial Environment - Vegetation	Disturbance or loss of vegetation Species at Risk resulting from clearing during construction and maintenance	Negative	Long-Term, life of Project	May affect rare or protected species	Effect could occur during critical life stage	Limited to the Project Footprint	Infrequent	Reversible over a long period	Species listed by SARA or ESEA	▪ 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
			Level III	Level III	Level III	Level I	Level I	Level II	Level III	
Terrestrial Environment – Mammals	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) from construction, maintenance and operation activities	Negative	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Effect could occur during critical life stage	Effects beyond the Project Footprint within the LAA	Sporadic	Irreversible	Boreal woodland caribou listed by SARA and ESEA, Eastern Migratory caribou assessed by COSEWIC	▪ 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
			Level III	Level I	Level III	Level II	Level II	Level III	Level III	
	Decrease in the population and/or habitat of wolverine as a result of previously identified effects (clearing, sensory disturbance and vehicle collisions) from construction, maintenance and operation activities	Negative	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Effect could occur during critical life stage	Effects beyond the Project Footprint within the LAA	Sporadic	Irreversible	Wolverine assessed by COSEWIC	▪ 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
			Level III	Level I	Level III	Level II	Level II	Level III	Level III	

[4] General mitigation applicable to all Species at Risk include:

- 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	Potential Environmental Effects	Assessment of Environmental Effects Before Application of Mitigation Measures								Proposed Mitigation Measures (Refer to Table 2 for Assessment of Residual Effects following Mitigation)
		Direction of Change	Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Terrestrial Environment – Mammals	Decrease in the population and/or habitat of little brown myotis as a result of previously identified effects (clearing and sensory disturbance) from construction, maintenance and operation activities	Negative	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Effect could occur during critical life stage	Limited to the Project Footprint	Infrequent	Irreversible	Little brown myotis listed by SARA and ESEA	▪ 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
			Level III	Level I	Level III	Level I	Level I	Level III	Level III	
Terrestrial Environment – Forest Birds	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) from construction, maintenance and operation activities	Negative	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Effect could occur during critical life stage	Effects beyond the Project Footprint within the LAA	Infrequent	Irreversible	Bank swallow listed by SARA	▪ 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
			Level III	Level I	Level III	Level II	Level I	Level III	Level III	
	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) from construction, maintenance and operation activities	Negative	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Effect could occur during critical life stage	Effects beyond the Project Footprint within the LAA	Infrequent	Irreversible	Barn swallow listed by SARA	▪ 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
			Level III	Level I	Level III	Level II	Level I	Level III	Level III	
	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) from construction, maintenance and operation activities	Negative	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Effect could occur during critical life stage	Effects beyond the Project Footprint within the LAA	Sporadic	Irreversible	Canada warbler listed by SARA and ESEA	▪ employ general mitigation applicable to all Species at Risk
			Level III	Level I	Level III	Level II	Level II	Level III	Level III	
	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) from construction, maintenance and operation activities	Negative	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Effect could occur during critical life stage	Effects beyond the Project Footprint within the LAA	Sporadic	Irreversible	Common nighthawk listed by SARA and ESEA	▪ 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
			Level III	Level I	Level III	Level II	Level II	Level III	Level III	
	Decrease in the population and/or habitat of eastern wood-pewee [5] as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions) from construction, maintenance and operation activities	Negligible	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Effect could occur during critical life stage	Effects beyond the Project Footprint within the LAA	Sporadic	Irreversible	Eastern wood-pewee listed by SARA	▪ employ general mitigation applicable to all Species at Risk
			Level III	Level I	Level III	Level II	Level II	Level III	Level III	

[5] 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.

System / VC / Feature	Potential Environmental Effects	Assessment of Environmental Effects Before Application of Mitigation Measures								Proposed Mitigation Measures (Refer to Table 2 for Assessment of Residual Effects following Mitigation)
		Direction of Change	Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Terrestrial Environment – Forest Birds	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) from construction, maintenance and operation activities	Negative	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Effect could occur during critical life stage	Effects beyond the Project Footprint within the LAA	Sporadic	Irreversible	Olive-sided flycatcher listed by SARA and ESEA	▪ employ general mitigation applicable to all Species at Risk
			Level III	Level I	Level III	Level II	Level II	Level III	Level III	
	Decrease in the population and/or habitat of peregrine falcon [6] as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions) from construction, maintenance and operation activities	Negative	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Effect could occur during critical life stage	Effects beyond the Project Footprint within the LAA	Infrequent	Irreversible	Peregrine falcon listed by SARA and ESEA	▪ employ general mitigation applicable to all Species at Risk
			Level III	Level I	Level III	Level II	Level I	Level III	Level III	
	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) from construction, maintenance and operation activities	Negative	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Effect could occur during critical life stage	Effects beyond the Project Footprint within the LAA	Sporadic	Irreversible	Rusty blackbird listed by SARA	▪ employ general mitigation applicable to all Species at Risk
			Level III	Level I	Level III	Level II	Level II	Level III	Level III	
	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) from construction, maintenance and operation activities	Negative	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Effect could occur during critical life stage	Effects beyond the Project Footprint within the LAA	Sporadic	Irreversible	Short-eared owl listed by SARA and ESEA	▪ employ general mitigation applicable to all Species at Risk
			Level III	Level I	Level III	Level II	Level II	Level III	Level III	
Terrestrial Environment – Waterbirds	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) from construction, maintenance and operation activities	Negative	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Effect could occur during critical life stage	Effects beyond the Project Footprint within the LAA	Sporadic	Irreversible	Horned grebe listed by SARA	▪ 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
			Level III	Level I	Level III	Level II	Level II	Level III	Level III	
	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) from construction, maintenance and operation activities	Negative	Long-Term, life of Project	Effect is considered minor, alteration or loss of non-critical habitat and effect is minor relative to habitat availability	Effect could occur during critical life stage	Effects beyond the Project Footprint within the LAA	Sporadic	Irreversible	Yellow rail listed by SARA	▪ 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
			Level III	Level I	Level III	Level II	Level II	Level III	Level III	

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

System / VC / Feature	Potential Environmental Effects	Assessment of Environmental Effects Before Application of Mitigation Measures								Proposed Mitigation Measures (Refer to Table 2 for Assessment of Residual Effects following Mitigation)
		Direction of Change	Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Indigenous and Human Environment										
Factor										
Land and Resource Use	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) from construction, maintenance and operation activities	Negative	Long-Term, life of Project	Indigenous people/ communities in the Indigenous/ Resource Use RAA are able to adapt with some adjustments	Effect could occur during critical life stage	Effects beyond the Project Footprint within the LAA	Sporadic	Reversible over a long period	Potential adverse effects to traditional use activities	▪ 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
			Level III	Level II	Level III	Level II	Level II	Level II	Level II	
	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) from construction, maintenance and operation activities	Negative	Long-Term, life of Project	Indigenous people/ communities in the Indigenous/ Resource Use RAA are able to adapt with some adjustments	Effect could occur during critical life stage	Effects beyond the Project Footprint within the LAA	Sporadic	Reversible over a long period	Potential adverse effects to traditional use activities	▪ 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
			Level III	Level II	Level III	Level II	Level II	Level II	Level II	

System / VC / Feature	Potential Environmental Effects	Assessment of Environmental Effects Before Application of Mitigation Measures								Proposed Mitigation Measures (Refer to Table 2 for Assessment of Residual Effects following Mitigation)
		Direction of Change	Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Land and Resource Use	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) from construction, maintenance and operation activities	Negative	Long-Term, life of Project	Indigenous people/ communities in the Indigenous/ Resource Use RAA are able to adapt with some adjustments	Effect could occur during critical life stage	Effects beyond the Project Footprint within the LAA	Sporadic	Reversible over a long period	Potential adverse effects to traditional use activities	▪ 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
			Level III	Level II	Level III	Level II	Level II	Level II	Level II	
	Reduction in food supply as a result of previously identified effects on harvested vegetation (ex: berries) (clearing, drainage alterations, invasive species and wildfires) from construction, maintenance and operation activities	Negative	Long-Term, life of Project	Indigenous people/ communities in the Indigenous/ Resource Use RAA are able to adapt with some adjustments	Moderate sensitivity	Effects beyond the Project Footprint within the LAA	Sporadic	Reversible over a long period	Potential adverse effects to traditional use activities	▪ 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)
			Level III	Level II	Level II	Level II	Level II	Level II	Level II	
	Improved year round connection and interaction among the local communities connected by the all-season road	Positive	Long-Term, life of Project	N/A	N/A	Effects beyond the Project Footprint within the LAA	Continuous	N/A	Potential positive social effects	N/A
			Level III	N/A	N/A	Level II	Level III	N/A	Level I	

System / VC / Feature	Potential Environmental Effects	Assessment of Environmental Effects Before Application of Mitigation Measures								Proposed Mitigation Measures (Refer to Table 2 for Assessment of Residual Effects following Mitigation)
		Direction of Change	Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Travel Routes	Decreased access to traditional travel routes used for resource use and recreation during construction, maintenance and operation	Negative	Long-Term, life of Project	Indigenous people/ communities in the Indigenous/ Resource Use RAA are able to adapt with some adjustments	N/A	Effects beyond the Project Footprint within the LAA	Sporadic	Reversible over a long period	Potential adverse effects to traditional use activities	▪ 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
			Level III	Level II	N/A	Level II	Level II	Level II	Level II	
Economy	Increase in economic conditions (ex: employment, services, improved access) for local communities during construction, maintenance and operation	Positive	Long-Term, life of Project	N/A	N/A	N/A	Infrequent	N/A	Potential positive social effects	N/A
			Level III	N/A	N/A	N/A	Level I	N/A	Level I	
	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) during construction	Negative	Medium-Term, until completion of construction and remediation	Indigenous trappers in the Indigenous/ Resource Use RAA are able to adapt with some adjustments	N/A	Effects beyond the Project Footprint within the LAA	Sporadic	Reversible over a long period	Potential adverse effects to traditional use activities	▪ 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
			Level II	Level II	N/A	Level II	Level II	Level II	Level II	
	Increase in trapping income for local trappers as a result of improved access along the all-season road during operation	Positive	Long-Term, life of Project	N/A	N/A	Effects beyond the Project Footprint within the LAA	Continuous	N/A	Potential positive social effects	N/A
			Level III	N/A	N/A	Level II	Level III	N/A	Level I	
Heritage and Archaeological Resources	Loss or disturbance to heritage, culture (sacred) or community use resources and sites during ROW clearing and construction activities	Negative	Short-Term, associated with discrete activities	Resources affected are of local importance and are not recoverable	N/A	Effects beyond the Project Footprint within the LAA	Sporadic	Irreversible	Heritage and sacred sites are very important to local communities	▪ 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
			Level I	Level II	N/A	Level II	Level II	Level III	Level III	
	Loss or disturbance to heritage resources as a result of increased access	Negative	Long-Term, life of Project	Resources affected are of local importance and are not recoverable	N/A	Effects beyond the Project Footprint within the LAA	Sporadic	Irreversible	Heritage resources are very important to local communities	▪ 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
			Level III	Level II	N/A	Level II	Level II	Level III	Level III	

System / VC / Feature	Potential Environmental Effects	Assessment of Environmental Effects Before Application of Mitigation Measures								Proposed Mitigation Measures (Refer to Table 2 for Assessment of Residual Effects following Mitigation)
		Direction of Change	Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Human Health and Safety	Community member and worker safety risk during construction, maintenance and operation activities	Negative	Long-Term, life of Project	Potential for loss of life	N/A	Limited to the Project Footprint	Infrequent during operation but likely sporadic during construction	Readily reversible	Public safety is very important to local communities	▪ 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)
			Level III	Level III	N/A	Level I	Level II	Level I	Level III	
	Loss of medicinal plant harvest areas used by community members for therapeutic or healing purposes due to clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps	Negative	Long-Term, life of Project	Likely to measurably affect plants important to local communities	Moderate sensitivity	Effects beyond the Project Footprint within the LAA	Sporadic	Irreversible	Potential adverse effects to traditional use activities	▪ 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)
			Level III	Level II	Level II	Level II	Level II	Level III	Level II	

System / VC / Feature	Potential Environmental Effects	Assessment of Environmental Effects Before Application of Mitigation Measures								Proposed Mitigation Measures (Refer to Table 2 for Assessment of Residual Effects following Mitigation)
		Direction of Change	Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context	
Human Health and Safety	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) during construction, maintenance and operation	Negative	Long-Term, life of Project	Contaminant concentration may exceed applicable federal and provincial guidelines and may affect surface water beyond a defined mixing zone and/or groundwater	N/A	May alter water quality beyond the Project Footprint within the LAA	Infrequent during operation but sporadic during construction	Reversible over a long period	Moderate social effect related to drinking 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)
			Level III	Level II	N/A	Level II	Level II	Level II	Level II	
	Risk to human health and disturbance to local communities as a result of reduced air quality during construction, maintenance and operation	Negative	Long-Term, life of Project	Dust and emission levels may change by 10 to 20% from baseline conditions	N/A	Effects beyond the Project Footprint within the LAA	Sporadic during construction and maintenance; frequent during operation in summer	Readily reversible	Moderate effects to human health as a result of dust and emissions	▪ 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
			Level III	Level II	N/A	Level II	Level II	Level I	Level II	
	Disturbance to local communities as a result of increased noise levels during construction, maintenance and operation	Negative	Long-Term, life of Project	Levels below guidelines at receptors	N/A	Effect beyond the Project Footprint within the LAA	Sporadic during construction and regular and frequent during operation	Readily reversible	No adverse social effects	▪ 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
			Level III	Level I	N/A	Level II	Level III	Level I	Level I	

Appendix 6-5: Assessment of Environmental Effects After Application of Proposed Mitigation Measures

System / VC / Feature	Residual Environmental Effects	Assessment of Environmental Effects Following Application of Mitigation Measures							Evaluation of Significance	Likelihood	Follow-up/ Monitoring (See EIS Chapter 9 for details)
		Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context			
Physical Environment											
Factor											
Atmospheric Environment – Air Quality	Increase in particulates (dust) from construction activities (ex: blasting, rock crushing, stockpiling, roadbed construction, hauling) and use of construction vehicle and equipment	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	N/A	Visual observation of particulate levels during construction to determine need for wetting
		Level I	Level I	N/A	Level I	Level II	Level I	Level I			
	Increase in particulates (dust) from maintenance activities (ex: blasting, rock crushing, stockpiling, roadbed/surface repair and hauling) and use of maintenance equipment	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	N/A	Visual observation of particulate levels during construction to determine need for wetting
		Level III	Level I	N/A	Level I	Level II	Level I	Level I			
	Increase in particulates (dust) from public road traffic during operation	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	N/A	Visual observation of particulate levels during maintenance to determine need for or adjustment to wetting and speed controls
		Level III	Level I	N/A	Level I	Level III	Level I	Level I			
	Increase in vehicle emissions (ex: sulfur oxide, nitrogen oxide and diesel particulates) from vehicle and equipment use during construction, maintenance and operation	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	N/A	No
		Level III	Level I	N/A	Level I	Level III	Level I	Level I			
	Increase in ambient noise levels from blasting and vehicle and equipment use during construction, maintenance and operation	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	N/A	No
		Level III	Level I	N/A	Level II	Level III	Level I	Level I			
Atmospheric Environment – Greenhouse Gas Emissions	Increase in greenhouse gas emissions from construction vehicles and equipment	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	N/A	No
		Level II	Level I	N/A	Level I	Level III	Level II	Level I			
	Increase in greenhouse gas emissions from operation of the ASR and loss of carbon sink from ROW clearing	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	N/A	No
		Level III	Level I	N/A	Level I	Level III	Level II	Level I			
Topography and Soils	Terrain alterations resulting from quarries and borrow pits developed during construction	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	N/A	No
		Level I	Level I	N/A	Level I	Level I	Level II	Level I			

System / VC / Feature	Residual Environmental Effects	Assessment of Environmental Effects Following Application of Mitigation Measures							Evaluation of Significance	Likelihood	Follow-up/ Monitoring (See EIS Chapter 9 for details)
		Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context			
Topography and Soils	Increase in contaminant concentrations (ex: hydrocarbons) in soil due to spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents	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	N/A	Monitoring for spills during construction
		Level III	Level I	N/A	Level I	Level II	Level I	Level I			
	Loss of granular/lacustrine soils (sand and gravel) for use as construction materials	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	N/A	No
		Level III	Level I	N/A	Level I	Level I	Level III	Level I			
	Loss of granular/lacustrine soils (sand and gravel) for use as maintenance materials throughout operation	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	N/A	No
		Level III	Level I	N/A	Level I	Level II	Level III	Level I			
Surface Water	Disruption of surface drainage and flow systems from ASR, quarries and borrow pits, access roads, watercourse crossings and road drainage 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	N/A	Appropriate follow-up monitoring will be outlined in the Aquatic Environment Monitoring Plan that will be developed in the future through discussion with Manitoba Sustainable Development and the communities
		Level III	Level I	Level I	Level II	Level I	Level I	Level I			
	Reduced surface water quality as a result of erosion and sedimentation from ASR, quarries, borrow pits, access roads, watercourse crossings and associated work areas	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	N/A	Monitoring during construction until re-establishment of vegetation
		Level II	Level I	Level III	Level I	Level II	Level I	Level I			
	Reduced surface water quality as a result of spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents	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	N/A	Monitoring for spills and leaks during construction and maintenance at stream crossings
		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	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	N/A	No
		Level I	Level I	N/A	Level I	Level II	Level I	Level I			
	Reduced groundwater quality as a result of spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents	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	N/A	Monitoring for spills and leaks during construction
		Level III	Level I	N/A	Level I	Level I	Level II	Level I			

System / VC / Feature	Residual Environmental Effects	Assessment of Environmental Effects Following Application of Mitigation Measures							Evaluation of Significance	Likelihood	Follow-up/ Monitoring (See EIS Chapter 9 for details)
		Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context			
Biological Environment – Fish and Fish Habitat											
Factor											
Fish	Decrease in fish populations as result of reduced surface water quality from spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents	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	N/A	Monitoring for spills and leaks during construction and maintenance at stream crossings
		Level I	Level I	Level III	Level I	Level I	Level I	Level II			
	Injury or death of fish from compressive shock waves close to blasting activities	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	N/A	No
		Level I	Level I	Level I	Level I	Level II	Level I	Level II			
	Increased fishing pressures on local fish populations resulting from increased access to watercourses	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	N/A	Monitoring of closures to ensure access is blocked
		Level III	Level I	Level III	Level I	Level I	Level II	Level II			
	Blockage or reduction in fish passage and disruption of spawning from temporary construction crossings and permanent watercourse crossings	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	N/A	Appropriate follow-up monitoring will be outlined in the Aquatic Environment Monitoring Plan that will be developed in the future through discussion with Manitoba Sustainable Development, Fisheries and Oceans and the communities
		Level III	Level I	Level I	Level I	Level I	Level I	Level II			
Fish and Fish Habitat	Decreased quality of fish habitat and effects to fish as a result of previously identified effects (increased suspended solids) from disturbed banks, right-of-way runoff and in-stream works during construction	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	N/A	Monitoring during construction phase and maintenance activities for effectiveness of mitigation measures
		Level I	Level II	Level I	Level II	Level I	Level I	Level II			
Fish Habitat	Alteration and loss of riparian habitat (shorelines) and fish habitat (in-stream) at water crossings	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	N/A	Appropriate follow-up monitoring will be outlined in the Aquatic Environment Monitoring Plan that will be developed in the future through discussion with Manitoba Sustainable Development, Fisheries and Oceans and the communities
		Level III	Level II	Level I	Level I	Level I	Level II	Level II			
	Increased risk during construction, maintenance and operation 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	Effects to fish have high sensitivity	Introduction not likely to occur	Infrequent	Irreversible	Moderate ecosystem effect	Not Significant	N/A	No
		Level I	Level I	Level III	Level I	Level I	Level III	Level II			

System / VC / Feature	Residual Environmental Effects	Assessment of Environmental Effects Following Application of Mitigation Measures							Evaluation of Significance	Likelihood	Follow-up/ Monitoring (See EIS Chapter 9 for details)
		Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context			
Biological Environment – Terrestrial Environment											
Factor											
Vegetation (Plant Communities, and Wetlands)	Disturbance to or loss of plant communities (reduced diversity) and fragmentation due to clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps during construction and maintenance	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	N/A	Monitoring of reestablishment of vegetation following construction
		Level III	Level II	Level I	Level I	Level I	Level II	Level I			
	Disturbance to or loss of wetlands (ex: fens, bogs, marshes, peatlands) due to clearing and construction of the all-season road	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	N/A	No
		Level III	Level II	Level I	Level I	Level I	Level II	Level II			
	Increased risk for invasive and non-native plant species to displace native plant communities, modifying the vegetation composition and structure during construction, maintenance and operation	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	N/A	Monitoring of reestablishment of vegetation following construction
		Level III	Level II	Level I	Level I	Level III	Level II	Level I			
	Impairment or loss of vegetation and desirable species as result of spills of fuel or hazardous materials from construction equipment or vehicles and vehicular accidents and potential use of herbicides during maintenance	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	N/A	Monitoring for spills and leaks during construction
		Level III	Level I	Level I	Level I	Level II	Level II	Level I			
	Increased risk of wildfires from fires and explosions during construction and maintenance and carelessness during operation	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	N/A	Monitoring for and report wildfires during construction
		Level III	Level II	Level I	Level III	Level II	Level II	Level I			
Mammals (Ungulates)	Alteration, fragmentation and/or loss of moose and caribou habitat due to clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps during construction and maintenance	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	N/A	Appropriate follow-up monitoring will be outlined in the Terrestrial Environment Monitoring Plan that will be developed in the future through discussion with Manitoba Sustainable Development and the communities
		Level III	Level II	Level I	Level I	Level II	Level II	Level II			
	Increased sensory disturbance to and displacement of moose and caribou due to vehicle and equipment noise and vibration during construction, maintenance and operation	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	N/A	No
		Level III	Level I	Level I	Level II	Level III	Level II	Level II			
	Increased caribou mortality due to increased hunting pressures during construction and with increased access along the all-season road during operation	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	N/A	No
		Level III	Level I	Level I	Level II	Level II	Level II	Level III			

System / VC / Feature	Residual Environmental Effects	Assessment of Environmental Effects Following Application of Mitigation Measures							Evaluation of Significance	Likelihood	Follow-up/ Monitoring (See EIS Chapter 9 for details)
		Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context			
Mammals (Ungulates)	Increased moose mortality due to increased hunting pressures during construction and with increased access in spring, summer and fall along the all-season road during operation	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	N/A	No
		Level III	Level II	Level I	Level II	Level III	Level II	Level II			
	Increased moose and caribou mortality due to vehicular collisions during construction, maintenance and operation	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	N/A	Record collisions to determine need for adaptive management
		Level III	Level I	Level III	Level I	Level I	Level II	Level II			
	Increased moose and caribou mortality due to increased predation by wolves from increased access beyond that provided by the existing winter road and transmission lines	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	N/A	No
		Level III	Level I	Level III	Level II	Level II	Level II	Level II			
	Increased moose and caribou mortality due to 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	N/A	No
		Level III	Level I	Level III	Level III	Level I	Level I	Level II			
Mammals (Aquatic and Terrestrial Furbearers)	Alteration, fragmentation and/or loss of furbearer (ex: beaver, marten) habitat due to clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps	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	N/A	Monitoring timing and extent of clearing activities during construction
		Level III	Level I	Level I	Level I	Level I	Level II	Level I			
	Increased sensory disturbance to and displacement of furbearers (ex: beaver, marten) due to vehicle and equipment noise and vibration during construction, maintenance and operation	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	N/A	No
		Level III	Level I	Level I	Level I	Level III	Level II	Level I			
	Increased furbearer (ex: beaver, marten) mortality due to vehicular collisions and nuisance wildlife management during construction, maintenance and operation	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	N/A	No
		Level III	Level I	Level III	Level I	Level II	Level II	Level I			
Amphibians and Reptiles	Alteration, fragmentation and/or loss of amphibian (ex: spring peeper) habitat due to clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps	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	N/A	No
		Level III	Level I	Level I	Level I	Level I	Level III	Level I			
	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	N/A	No
		Level III	Level I	Level I	Level I	Level II	Level I	Level I			

System / VC / Feature	Residual Environmental Effects	Assessment of Environmental Effects Following Application of Mitigation Measures							Evaluation of Significance	Likelihood	Follow-up/ Monitoring (See EIS Chapter 9 for details)
		Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context			
Birds / Migratory Birds (Songbirds, Raptors, Waterfowl, Upland)	Alteration, fragmentation and/or loss of migratory (ex: raptors, waterfowl, forest birds) and non-migratory (ex: upland game birds) bird[1] habitat due to clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps	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	N/A	Monitoring timing and extent of clearing activities during construction
		Level III	Level I	Level I	Level I	Level I	Level II	Level I			
	Loss of nests and mortality to young migratory (ex: raptors, waterfowl, forest birds) and non-migratory (ex: upland game birds) birds during construction, maintenance and operation	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	N/A	No
		Level III	Level I	Level I	Level I	Level I	Level I	Level I			
	Increased sensory disturbance to and displacement of migratory (ex: raptors, waterfowl, forest birds) and non-migratory (ex: upland game birds) birds due to vehicle and equipment noise and vibration during construction, maintenance and operation	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	N/A	No
		Level III	Level I	Level I	Level I	Level III	Level II	Level I			
	Increased mortality of migratory (ex: waterfowl) and non-migratory (ex: upland game birds) birds due to increased hunting pressures during construction and with increased access in spring, summer and fall along the all-season road	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	N/A	No
		Level III	Level II	Level I	Level II	Level III	Level II	Level II			
	Increased mortality of migratory (ex: waterfowl, forest birds) and non-migratory (ex: upland game birds) birds due to vehicular collisions during construction, maintenance and operation	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	N/A	No
		Level III	Level I	Level III	Level I	Level I	Level I	Level I			
Species at Risk											
Factor											
Aquatic Environment	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) from construction, maintenance and operation activities	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	N/A	Appropriate follow-up monitoring will be outlined in the Aquatic Environment Monitoring Plan that will be developed in the future through discussion with Manitoba Sustainable Development, Fisheries and Oceans and the communities
		Level III	Level I	Level I	Level I	Level II	Level II	Level III			
Terrestrial Environment – Vegetation	Disturbance or loss of vegetation Species at Risk resulting from clearing during construction and maintenance	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	N/A	No
		Level III	Level I	Level I	Level I	Level I	Level II	Level III			

[1] 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	Residual Environmental Effects	Assessment of Environmental Effects Following Application of Mitigation Measures							Evaluation of Significance	Likelihood	Follow-up/ Monitoring (See EIS Chapter 9 for details)
		Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context			
Terrestrial Environment – Mammals	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) from construction, maintenance and operation activities	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	N/A	Appropriate follow-up monitoring will be outlined in the Terrestrial Environment Monitoring Plan that will be developed in the future through discussion with Manitoba Sustainable Development and the communities
		Level III	Level I	Level I	Level II	Level I	Level III	Level III			
	Decrease in the population and/or habitat of wolverine as a result of previously identified effects (clearing, sensory disturbance and vehicle collisions) from construction, maintenance and operation activities	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	N/A	No
		Level III	Level I	Level I	Level II	Level I	Level III	Level III			
	Decrease in the population and/or habitat of little brown myotis as a result of previously identified effects (clearing and sensory disturbance) from construction, maintenance and operation activities	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	N/A	No
		Level III	Level I	Level I	Level I	Level I	Level III	Level III			
Terrestrial Environment – Forest Birds	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) from construction, maintenance and operation activities	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	N/A	No
		Level III	Level I	Level I	Level II	Level I	Level III	Level III			
	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) from construction, maintenance and operation activities	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	N/A	No
		Level III	Level I	Level I	Level I	Level I	Level III	Level III			
	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) from construction, maintenance and operation activities	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	N/A	No
		Level III	Level I	Level I	Level I	Level I	Level III	Level III			
	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) from construction, maintenance and operation activities	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	N/A	No
		Level III	Level I	Level I	Level I	Level I	Level III	Level III			

System / VC / Feature	Residual Environmental Effects	Assessment of Environmental Effects Following Application of Mitigation Measures							Evaluation of Significance	Likelihood	Follow-up/ Monitoring (See EIS Chapter 9 for details)
		Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context			
Terrestrial Environment – Forest Birds	Decrease in the population and/or habitat of eastern wood-pewee [2] as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions) from construction, maintenance and operation activities	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	N/A	No
		Level III	Level I	Level I	Level I	Level I	Level III	Level III			
	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) from construction, maintenance and operation activities	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	N/A	No
		Level III	Level I	Level I	Level I	Level I	Level III	Level III			
	Decrease in the population and/or habitat of peregrine falcon [3] as a result of previously identified effects (clearing, sensory disturbance, loss of nests and vehicle collisions) from construction, maintenance and operation activities	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	N/A	No
		Level III	Level I	Level I	Level I	Level I	Level III	Level III			
	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) from construction, maintenance and operation activities	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	N/A	No
		Level III	Level I	Level I	Level I	Level I	Level III	Level III			
	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) from construction, maintenance and operation activities	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	N/A	No
		Level III	Level I	Level I	Level I	Level I	Level III	Level III			
Terrestrial Environment – Waterbirds	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) from construction, maintenance and operation activities	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	N/A	No
		Level III	Level I	Level I	Level I	Level I	Level III	Level III			
	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) from construction, maintenance and operation activities	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	N/A	No
		Level III	Level I	Level I	Level I	Level I	Level III	Level III			

[2] 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.

[3] 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	Residual Environmental Effects	Assessment of Environmental Effects Following Application of Mitigation Measures							Evaluation of Significance	Likelihood	Follow-up/ Monitoring (See EIS Chapter 9 for details)
		Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context			
Indigenous and Human Environment											
Factor											
Land and Resource Use	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) from construction, maintenance and operation activities	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	N/A	No
		Level III	Level I	Level I	Level II	Level II	Level II	Level II			
	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) from construction, maintenance and operation activities	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	N/A	No
		Level III	Level I	Level I	Level II	Level II	Level II	Level I			
	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) from construction, maintenance and operation activities	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	N/A	No
		Level III	Level I	Level I	Level II	Level II	Level II	Level I			
	Reduction in food supply as a result of previously identified effects on harvested vegetation (ex: berries) (clearing, drainage alterations, invasive species and wildfires) from construction, maintenance and operation activities	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	N/A	No
		Level III	Level I	Level II	Level I	Level II	Level II	Level I			
Travel Routes	Decreased access to traditional travel routes used for resource use and recreation during construction, maintenance and operation	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	N/A	No
		Level III	Level I	N/A	Level II	Level I	Level I	Level I			

System / VC / Feature	Residual Environmental Effects	Assessment of Environmental Effects Following Application of Mitigation Measures							Evaluation of Significance	Likelihood	Follow-up/ Monitoring (See EIS Chapter 9 for details)
		Duration	Magnitude	Timing	Extent	Frequency	Reversibility	Ecological and Social Context			
Economy	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) during construction	Medium-Term, until completion of construction and remediation	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	N/A	No
		Level II	Level I	N/A	Level II	Level I	Level I	Level I			
Heritage and Archaeological Resources	Loss or disturbance to heritage, culture (sacred) or community use resources and sites during ROW clearing and construction activities	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	N/A	No
		Level I	Level II	N/A	Level I	Level II	Level II	Level II			
	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	N/A	No
		Level III	Level II	N/A	Level I	Level I	Level II	Level II			
Human Health and Safety	Community member and worker safety risk during construction, maintenance and operation activities	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	N/A	Record occurrence of construction accidents
		Level III	Level II	N/A	Level I	Level II	Level I	Level III			
	Loss of medicinal plant harvest areas used by community members for therapeutic or healing purposes due to clearing of native vegetation within the ROW, temporary access roads, quarries, borrow pits, work areas and camps	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	N/A	No
		Level III	Level II	Level II	Level I	Level II	Level II	Level I			
	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) during construction, maintenance and operation	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	N/A	No
		Level III	Level I	N/A	Level I	Level I	Level I	Level I			
	Risk to human health and disturbance to local communities as a result of reduced air quality during construction, maintenance and operation	Long-Term, life of Project	Dust and emission levels may change <10% of baseline conditions	N/A	Limited to the Project Footprint	Sporadic during construction and maintenance; frequent during operation in summer	Readily reversible	No adverse social effects	Not Significant	N/A	Record reports of air quality concerns during construction and visual observations to determine need for adaptive management
		Level III	Level I	N/A	Level I	Level II	Level I	Level I			
	Disturbance to local communities as a result of increased noise levels during construction, maintenance and operation	Long-Term, life of Project	Levels below guidelines at receptors	N/A	Limited to the Project Footprint	Sporadic during construction and maintenance	Readily reversible	No adverse social effects	Not Significant	N/A	Record reports of noise concerns during construction to determine need for adaptive management
		Level III	Level I	N/A	Level I	Level II	Level I	Level I			

Chapter 7:
Summary and Conclusion

TABLE OF CONTENTS

LIST OF APPENDICES

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	

Chapter 8: Environmental Protection and Sustainable Development

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

8.0 ENVIRONMENTAL PROTECTION AND SUSTAINABLE DEVELOPMENT

This chapter outlines the environmental protection measures that will be integrated during development of the Project 6 – All-Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation (the Project). The chapter describes mitigation plans and specifications that will be implemented throughout project design, construction planning, construction and operations and maintenance phases. Environmental protection measures are derived from Manitoba Infrastructure's (MI) corporate policies and environmental and industry standards and best practices and include such measures as design mitigation measures; environmental protection procedures; detailed construction and operational phase environmental management plans; contract specifications; health and safety protocols; and contractor plans. Collectively, these measures are incorporated into the Project's Environmental Management Plan (EMP) along with MI's commitment to sustainable development.

MI's Environmental Protection Procedures and Specifications, health and safety protocols, design mitigation measures and the contractor's emergency response plans are examples of the environmental protection tools and guidance that will be implemented for this Project.

Specific mitigation measures that will be applied to avoid or minimize potential adverse effects on environmental components, including measures to mitigate the effects of the environment on the Project and measures to mitigate accidents and malfunctions, are provided in **Chapter 6**. MI's commitments to environmental monitoring and follow-up are provided in **Chapter 9**.

8.1 MI's Environmental Commitment

MI's commitment to environmental protection reflects the corporate policies conveyed through the Vision, Mission, Values and Priorities statements (**Chapter 1**) and is outlined in the EMP. The EMP will address all phases of the project including:

- Project planning
- construction planning
- construction
- operations and maintenance (**Figure 8-1**)

8.2 Environmental Protection – Project Planning

The Project Environmental Management Plan Framework (EMP Framework, **Appendix 8-1**) describes the environmental protection processes and procedures that will be followed during construction and operation of the Project. The goal of the EMP Framework is to ensure that environmental protection

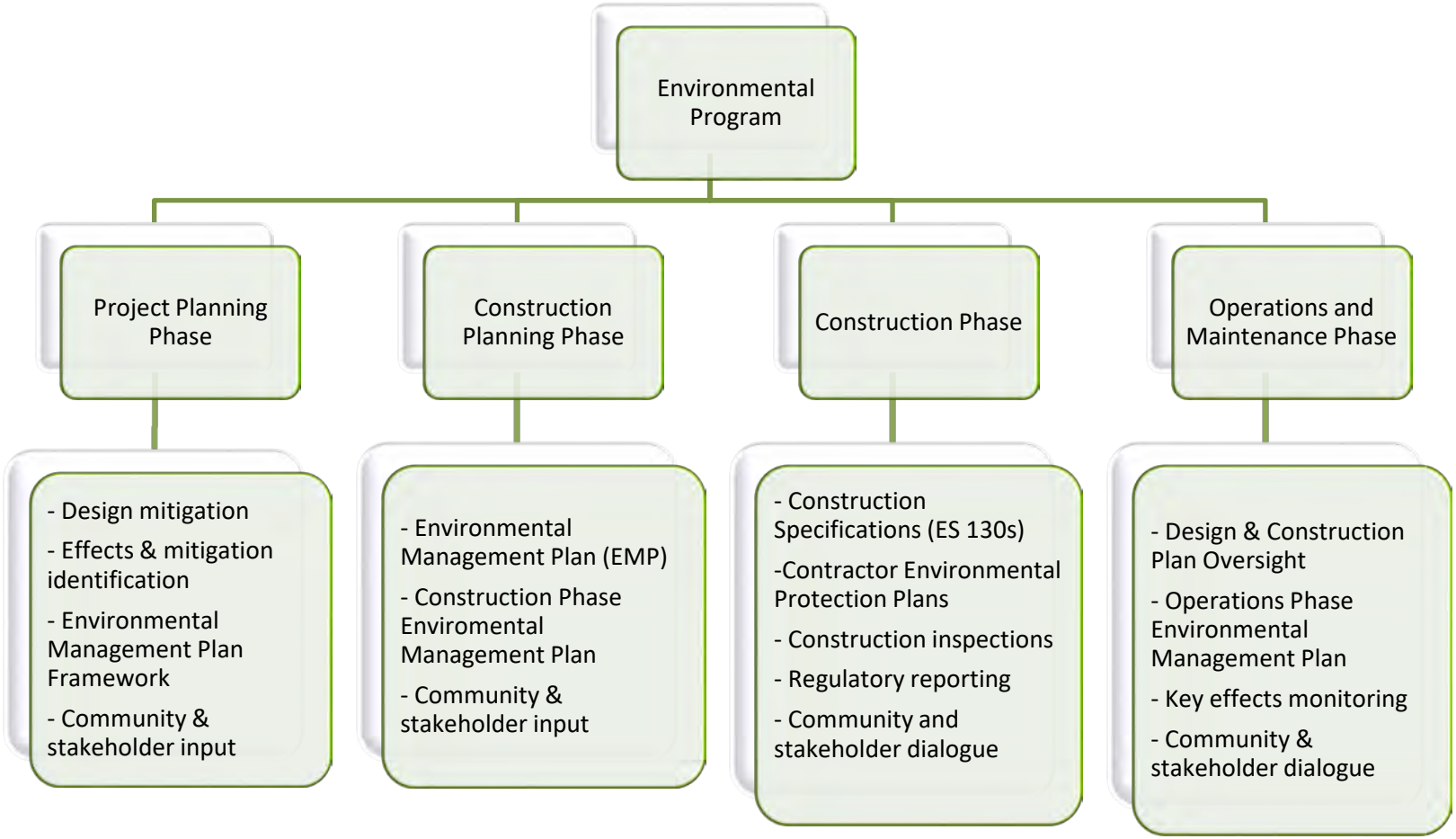

Figure 8-1: MI's environmental program across Project stages

measures are undertaken in a timely and effective manner. A hierarchy of environmental plans will be undertaken to achieve the Project's legislative requirements and environmental objectives.

- Subject-specific Environmental Protection Procedures (EPs) describe environmental protection measures for key environmental areas (**Appendix 8-2**). These are supplemented with Environmental Protection Specifications (ES 130s) that will be included in each construction contract (**Appendix 8-3**).
- Ongoing monitoring plans will assess the effects of construction on specific components of the environment. A strategic plan for wildlife monitoring and an Aquatic Environment Monitoring Plan will be developed in association with local liaison committees and appropriate federal and provincial departments to meet regulatory obligations.
- A Construction Phase Environmental Management Plan (CPEMP) will detail the environmental management measures described in the overall EMP that pertain to specific construction components (ex: a specific bridge or section of road). The CPEMP will be updated if measures change substantially. Construction contracts will include special provisions that reflect EPs, which will address individual construction works once design and construction plans are near completion.
- The Operations Phase Environmental Management Plan (OPEMP) will address operational and maintenance activities needed for the commissioned or operational portions of the all-season road. The OPEMP will be updated as new portions of the road are commissioned or otherwise made operational. This plan will include decommissioning activities such as winter road closure and reclamation. Maintenance contracts will include special provisions that reflect EPs and address individual maintenance areas.
- Inspection, Monitoring, Follow-up and Reporting plans will also be put into effect during construction, operation and maintenance phases.

Alternative plans and design will be continually evaluated as more information about the physical and environmental conditions pertaining to detailed design are gathered. During the detailed design phase environmental effects will be weighed with community input and engineering constraints.

8.2.1 Stakeholder Involvement and Design Mitigation

MI, as the overall project manager and owner, is responsible for implementing, monitoring and amending the environmental protection measures for the Project. MI engages local communities and the general public through its website and publications in print media such as Grassroots News. MI will engage the local communities to discuss various aspects of the Project through the Indigenous and Public Engagement Program (IPEP, **Chapter 5**). The program is able to be adapted to meet the needs and interests of each local community and includes engagement through:

- newsletters and local radio
- meetings with Chief and Council, other local representatives, land use coordinators and a local liaison committee, if requested by the community

- periodic community meetings

MI will participate in and/or initiate other committees as required, including local liaison committees. Technical committees will be established, as needed, to plan for and respond to the environmental management requirements of the Project.

Reporting will be conducted in order to provide regulatory authorities, Indigenous communities, stakeholders and general public with information as the project progresses. This will also afford opportunities for comments, suggestions and opinions on the Project to be provided in relation to the environment protection measures and monitoring programs. This will allow interested parties to provide feedback about the ongoing implementation of environmental protection measures and monitoring in order to continuously improve the environmental protection through adaptive management. The environmental management and communication structure for the Project is shown in **Figure 8-2**.

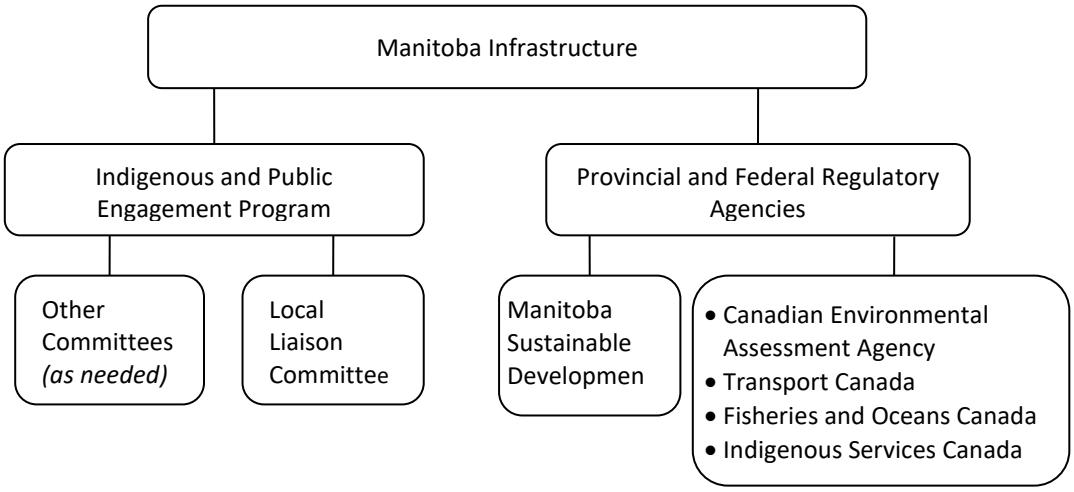

Figure 8-2: Environmental management and communication structure

Design mitigation involves modifying the design of a proposed project, before or during the environmental impact assessment stage, to mitigate potential adverse environmental effects prior to completion of the final project design and commencement of construction. At this current Planning Phase for the Project, design mitigation has been accomplished by various means including complying with legislation, adopting national and international design standards and codes, adhering to established design guidelines and best management practices and implementing mitigation measures identified from the Environmental Assessment (EA) process including:

- information from baseline studies
- input from the IPEP (**Chapter 5**)
- environmental effects identification, assessment and mitigation

A particularly important influence on the Project design mitigation has been Project-specific input received from elders, elected officials and members of local First Nations, as well as other indigenous communities and stakeholders during the Large Area Transportation Network Study (SNC-Lavalin *et al.* 2010a,b,c; 2011a,b). Receipt of local and traditional knowledge of environmentally and culturally sensitive areas allowed for the mitigation of potential adverse effects through a series of modifications to the proposed road corridor culminating in the selection of the preferred road alignment as proposed and assessed in this Environmental Impact Statement (EIS). The history of project route alternatives and mitigation incorporated into revised alignments is provided in **Chapter 2**. A summary of some of the design modifications that were incorporated into the current proposed alignment to mitigate potential adverse environmental and socio-economic effects identified through the IPEP is provided in **Table 8.1**. Additional design mitigation measures identified through the effects assessment (**Chapter 6**) will be incorporated into design requirements for the design engineer. MI will maintain responsibility for design oversight to monitor that these measures are implemented as planned.

Table 8.1: Design Mitigation Resulting from Community Feedback

Identified through Engagement	Design Mitigation	Resulting Benefit
Preference was expressed to more closely parallel existing winter roads.	Alignment from God's Lake First Nation shifted south and from Manto Sipi Cree Nation shifted north to follow portions of winter road.	Locating the road to more closely follow the winter road reduces potential for fragmentation and disturbance of the land.
Preference was expressed by God's Lake First Nation to move the route further away from Reserve land near the intersection and Hawkins Lake.	Alignment near intersection shifted northeast and near Hawkins Lake shifted to north away from the noted Reserve lands.	Adjusting alignment reduces potential to affect Reserve land and also a Manitoba Hydro transmission line right-of-way.
Manto Sipi Cree Nation indicated they wanted more information to select a preferred option for an 8 km section of alignment near their TLE parcel.	MI conducted a fly over of the four options with a Councillor to help select the best route with appropriate construction materials.	MI's preferred option reduces potential effects on the wetland environment and provides better terrain for road construction.
An Elder noted a portion of the proposed alignment crosses through his trapline. He was interested in how it may affect	MI has discussed the request with Chief and Council and is awaiting their approval to proceed with the alignment revision.	Adjusting the alignment will reduce the potential effect to an Elder's trapline.

A particularly important influence on the Project design mitigation has been input received from the local First Nations communities, other indigenous communities and stakeholders.

Identified through Engagement	Design Mitigation	Resulting Benefit
the trapline and whether the alignment could be revised.		
Potential effects on archaeological materials and low areas in proximity to God's Lake First Nation.	Realignments were made based on community input and because of archaeological and engineering concerns.	Realignments minimize potential adverse effects to archaeological resources; moving away from wet areas reduces potential effects on aquatic environment.
Consideration of safe crossing locations for trails and portages.	Approaches will be constructed to accommodate recreation vehicles crossing the alignment at intersections with key community use trails and enhance visibility.	Approaches will facilitate travel along established snowmobile/travel routes, which will preclude the need to cut additional/alternative trails.
Consideration of watercourse navigation and fish passage requirements.	Bridges will be designed with appropriate vertical clearance and will be clear-span, where possible, to avoid in-water piers. Culverts will be appropriately sized to allow for fish passage.	Appropriate bridge design will minimize potential for obstructing navigation and fish passage as well as reduced potential of adverse effects to instream fish habitat.
Desire to maintain access for traplines that the road passes through.	Traditional Knowledge studies were conducted to help avoid areas of concern such as hunting and trapping areas. MI will work with trappers so that their traps are not damaged by construction. If active traps are discovered, work will stop and the trapper will be notified. Access will be maintained to traplines and trails during construction and trail crossings will be designed to maintain trapper access and trails.	Traplines will be respected during clearing and construction. Trappers will likely have greater access to their traplines with the road in place.

MI is committed to considering community input relating to the EMP and will continue to involve the communities and stakeholders by meeting with local liaison committees for God's Lake First Nation, God's Lake Northern Affairs Community, Bunibonibee Cree Nation and Manto Sipi Cree Nation. The liaison committees will facilitate dialogue among the communities and MI to discuss project updates and solicit community feedback and collaboration on project related items.

8.3 Environmental Protection - Construction Planning

8.3.1 Environmental Management Plan

The EMP describes the management system that will be implemented to ensure compliance with federal and provincial requirements using an adaptive management approach to enable continuous improvement for monitoring, evaluation and adjustment, as required. The EMP reflects MI's Vision, Mission, Values and

Priorities statements (**Chapter 1**) and is modeled after the ISO 14001 Environmental Management System (**Figure 8-3**). The EMP provides the framework for the management of environmental components relative to the construction, maintenance and operation of the Project and requires development of the following plans and procedures:

- Environmental Protection Procedures
- Construction Phase Environmental Management Plans
- Environmental Inspection Plans
- Monitoring and Follow-up Plans

Figure 8-3: ISO 14001 environmental management system structure

8.3.2 Environmental Protection Procedures

MI has reviewed best management practices and standard procedures and approved the use of the EPs, previously developed for all-season road projects on the East Side of Lake Winnipeg that document the suite of possible environmental protection and mitigation measures. These procedures will be reviewed periodically and updated as required. MI will share updates to the EPs with the local liaison committees, Manitoba Sustainable Development (MSD) and the Canadian Environmental Assessment Agency (Agency), as required. The EPs are provided in **Appendix 8-2** and address the following environmental subjects:

- clearing and grubbing
- petroleum handling and storage
- spill response
- noise control
- materials handling and storage
- working within or near fish bearing waters
- stream crossings
- temporary stream diversions
- fish passage
- fish salvage
- culvert maintenance and replacement
- blasting near a watercourse
- heritage resources
- wildlife
- wildfires
- erosion and sediment control
- concrete washout management practices
- dust suppression procedures
- borrow pit decommissioning
- quarry site selection and requirements
- winter road closure and reclamation plan
- temporary site decommissioning
- mussel salvage
- water quality monitoring
- prevention of the transfer of invasive species

The EPs and monitoring requirements are further reflected in the ES 130s that will be included in the Project's construction contract tender packages. These will be supplemented with additional conditions specific to each construction contract.

8.4 Environmental Protection - Construction

Environmental protection will be incorporated into the construction phase through the CPEMP and a variety of contract specifications, special provisions and contractor submittals. The CPEMP will highlight specific protection measures to be applied during construction and updated by MI, as needed. The plan will be created in consultation with government departments that have jurisdiction over aspects of the Project and the local liaison committees. Once finalized, the plan will be forwarded to the MSD Environmental Approvals Branch and the Agency, if required. If major changes or additions to the CPEMP are required, they will be forwarded to MSD Environmental Approvals Branch and the Agency. The CPEMP will document items as follows.

- Commitments made to environmental protection and sustainable development by the parties responsible to implement the plans.
- Roles and responsibilities of each party in fulfilling that commitment.
- Planned construction activity and the potential environmental effects.

- Environmental protection measures that will be taken.
- Protocols regarding inspection and reactions to inspection findings.
- Emergency plans including training and awareness.
- Monitoring and follow-up to be undertaken.
- Documentation and reporting procedures.
- Auditing, management review, evaluation and adjustment procedures.

The responsibilities of various parties relating to environmental protection are noted below.

- Detailed design engineers (either MI staff or consultants under the direction of MI) are responsible for incorporating the appropriate environmental protection measures into the design of project components. Worksite specific environmental contract documents will be prepared by the detailed design engineers and added to MI's standard specifications.
- MI environmental coordinators will review best management practices and standard procedures available and provide input into environmental specifications developed by the detailed design engineers to meet environmental requirements.
- The contractor will be responsible for implementing the environmental protection measures specified in the contract documents and providing specific plans for approval by MI. The plans will detail how the contractor will meet the specifications (ex: in-water work plan).
- The MI project manager/site inspector will monitor construction contract and maintenance contract compliance with environmental specifications and legislated health and safety requirements.
- MI's environmental services staff will conduct a scheduled audit of the construction work being done.

8.4.1 Contract Specifications

Construction contract specifications detail the technical design as well as project-specific restrictions in how the work is to be completed. For the proposed Project, multiple contracts will be tendered for specific Project components (ex: road segment, bridge). Contract specifications will be tailored to the component-specific conditions. Each contract will include site-specific requirements for environmental protection. For example, bridge and stream crossing designs incorporate erosion and sediment controls to provide permanent protection for local watercourses.

The ES 130s that are included in MI construction contracts provide general environmental protection direction and requirements for environmental topics encountered for most road construction projects. ES 130s will be periodically updated to reflect evolving best practices and regulatory requirements. ES 130s relevant to the Project are provided in **Appendix 8-3** and include:

- record keeping
- inspections
- designated areas and access
- materials handling, storage and disposal
- spills, remediation and emergency response
- dust and particulate control
- noise and noise limitations
- planned and unplanned shutdowns
- staff training and awareness
- working within or near water
- erosion and sediment control
- clearing and grubbing
- heritage resources
- wildlife
- wildfires
- cement batch plant and concrete wash-out area

In addition to the implementation of the ES 130s in their construction activities, the contractor will be required to develop and implement a series of detailed environmental submittals specific to the contract (ex: Safety Data Sheets, copies of required approvals, clearances, permits, licences, certificates). Contractors will be required to develop operational safety policies, procedures and plans to prevent loss or injury to any person or property on or travelling through the worksite. Contractors and sub-contractors must be familiar with the terms of *The Workplace Safety and Health Act* and Regulations to ensure a complete understanding respecting their responsibilities. An example of a Safe Work Plan is included in **Appendix 8-4**. To assist the contractor with their environmental submittals outlined in the ES 130s, guidance materials will be provided upon contract award.

8.4.2 Contractor-Required Plans

MI's ES 130s outline the specific environmental protection plans that each construction contractor is responsible for providing. For consistency, MI will provide contractors with an environmental pre-construction guidance document and associated contractor reporting forms. Prior to construction, the contactor will be required to submit plans in accordance with the ES 130s for acceptance by the Contract Administrator. Some of the plans to be provided by the contractors are described in the following sub-sections.

8.4.2.1 Waste Management Plan

The contractor will be responsible for managing wastes associated with the construction contract. The plan describes the management of waste products and how they are collected, stored, transported and disposed of in accordance with provincial and federal legislation and guidelines. Wastes include solid non-hazardous waste, kitchen waste, liquid wastes (sewage and grey water) and hazardous wastes including contaminated soil. The Waste Management Plan will include procedures to check that the collection, storage, transportation and disposal of all wastes generated will be conducted in a safe, environmentally responsible and compliant manner. The plan will define roles and responsibilities to be undertaken by the various site contractors and project personnel and establish guidelines for storing and processing the wastes. The intent is to provide a high degree of control over the management of wastes thereby minimizing adverse environmental effects. The Waste Management Plan will also make appropriate

references to other environmental component management plans with regard to health and safety, hazardous materials management and emergency response.

8.4.2.2 Dust Control Plan

Fugitive dust will be generated during construction activities from operation of construction equipment and vehicles, blasting, rock quarrying and crushing, concrete batching, excavating, placing fill and grading. A Dust Control Plan may be required to establish procedures for the control of dust during Project construction.

8.4.2.3 Explosives and Blasting Management Plan

An Explosives and Blasting Management Plan for the Project will be prepared and submitted by applicable contractors after contract award for each segment of road tendered for construction and prior to initiation of blasting activities. The plan will outline best practices and regulatory requirements for the safe transportation, handling, storage and use of explosives. Storage facilities for explosives at quarry sites will meet the federal standards and licensing requirements as specified in the *Explosives Regulation* of the *Explosives Act* as well as provincial standards and licensing requirements as specified in the *Operation of Mines Regulation* of *The Workplace Safety and Health Act* of Manitoba. Blasting restriction "windows" for the protection of aquatic and terrestrial species described in **Chapter 6** will also be addressed in the plan.

8.4.2.4 Emergency Response Plan

An Emergency Response Plan will be developed by the contractor to provide procedures to be followed in the event of unanticipated emergency situations that may occur during construction of the Project. The Emergency Response Plan will adhere to regulatory requirements including provincial Workplace Safety and Health regulations.

The objective of the Emergency Response Plan is to provide procedures for the safety and protection of life, environment and property, identifying a predetermined course of actions and responsible personnel for emergency situations arising from incidents, release of hazardous/toxic substances, or other emergency situations during the construction phase of the Project. The Emergency Response Plan will be structured to provide clear and easily-accessible information and will define:

- roles and responsibilities of response personnel and organizations
- internal and external communication structure
- mandatory response actions and procedures to be executed
- reporting protocols to be followed
- follow-up actions to be taken

The Emergency Response Plan will cover various emergency response situations that are most likely to occur such as personal injury, fire, explosions and hazardous substance spills. The Emergency Response

Plan will be refined and finalized in preparation for construction and in consultation with communities and relevant regulatory authorities. The procedures in the plan may be revised during construction, as required.

8.5 Environmental Protection - Operations and Maintenance

During the operations and maintenance phase of the Project, standard operating procedures and environmental best management practices will be implemented to promote the protection of environmental values along the all-season road and surrounding areas. Project-specific environmental protection measures may be developed for implementation during the operations phase. Ongoing communications with local communities and all-season road users will advise them of routine and unscheduled maintenance activities or changes in operations. An OPEMP will be drafted to describe how long-term environmental protection will be maintained during operation of the Project. The OPEMP will address both maintenance and operational topics including the practices and procedures of the environmental mitigation programs. The OPEMP will document:

- commitments made to environmental protection and sustainable development
- roles and responsibilities of any party identified to fulfill that commitment
- environmental measures and mitigation programs
- monitoring and follow-up plans
- reporting
- auditing, management review, evaluation and adjustment procedures

8.6 Management Structure, Compliance and Reporting

MI is the owner of the Project and therefore may undertake all or part of contract administration responsibilities and, in doing so, may enlist the services of outside contract administrators, as needed. If outside contract administrators are required, the responsibilities of MI and others will be identified in the Contract Administrator Agreements and described in the CPEMP and OPEMP. The organizational structure for Manitoba Infrastructure is shown in **Figure 8-4**.

The work on the Project will be managed as follows:

- MI's Engineering & Operations Division (Region 1) - Road and equalization culvert works.
  - MI engineers typically complete road design, although work is sometimes tendered via competitive bidding process for large, complex works and to manage staff workloads.
  - MI tenders construction and maintenance work via competitive bidding process.
- MI's Water Management & Structures Division - Bridge and culverts crossing waterways.
  - MI engineers typically review bridge designs prepared by external consultants awarded contracts through an open, competitive bid tendering process.
  - MI tenders construction and maintenance work via competitive bidding process.

- MI Project Manager and inspectors will monitor the Project. The objectives of monitoring programs are to ensure compliance with construction contracts, environmental commitments, approvals and legislation and health and safety legislation. MI Environmental Services & Water Management & Structures environmental staff will serve as a quality control (service/product oriented) and assurance (process oriented) through audit function for environmental aspects. The MI health and safety group is responsible for the health and safety aspects.

Construction tenders for the Project will be issued using standard MI tendering practices. Competitive bids will be sought and tenders will be posted on MERX. Contracts will include a condition that a minimum percentage (typically a minimum 10%, based on local community capacity) of total contract bid price is to be delivered through Indigenous involvement and resources that includes:

- hiring equipment from companies in the Government of Canada's Aboriginal Business Directory
- labour from local communities
- purchasing of supplies sold or produced by firms in the Government of Canada's Aboriginal Business Directory

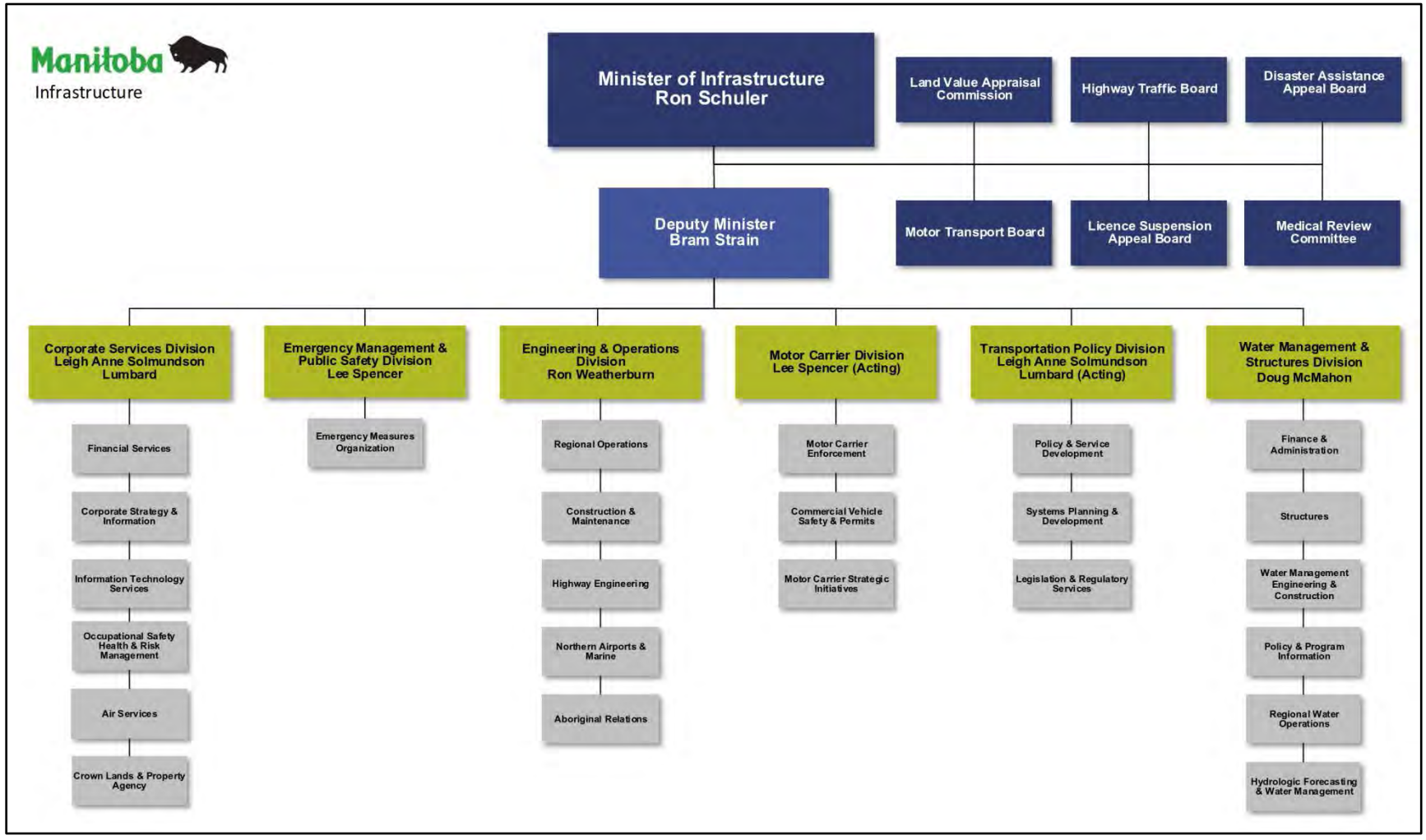

Figure 8-4: Manitoba Infrastructure organizational chart

8.6.1 Monitoring and Compliance

MI is committed to implementing the broad suite of project mitigation measures and monitoring activities as identified in this EIS. The environment component monitoring programs that have been or will be developed and associated plans, protection procedures and protection specifications are identified in **Table 8.2**.

Table 8.2: Environmental Components and Associated Protections

Component	Monitoring Plan and Environmental Protection Procedures and Specifications
Wildlife	▪ EP14 - Wildlife ▪ ES 130.19 - Wildlife ▪ Wildlife Monitoring Plan (to be developed prior to construction), may include moose, caribou, migratory bird and furbearers.
Aquatic Environment	▪ EP6 - Working Within or Near Fish Bearing Waters ▪ EP7 - Stream Crossings ▪ EP8 - Temporary Stream Diversions ▪ EP9 - Fish Passage ▪ EP10 - Fish Salvage ▪ EP11 - Culvert Maintenance and Replacement ▪ EP12 - Blasting Near a Watercourse ▪ EP16 - Erosion and Sediment Control ▪ EP23 - Mussel Salvage ▪ EP24 - Water Quality Monitoring ▪ EP25 - Prevention of the Transfer of Invasive Species ▪ ES 130.15 - Working within or Near Water ▪ Aquatic Environment Monitoring Plan (to be developed prior to construction), may include water quality, fish passage, fish habitat offsetting, bank stabilization.
Erosion and Sediment Control	▪ EP16 - Erosion and Sediment Control ▪ ES 130.16 - Erosion and Sediment Control
Dust Control	▪ EP18 - Dust Suppression Procedures ▪ ES 130.11 - Dust and Particulate Control
Waste Management	▪ EP5 - Material Handling and Storage ▪ EP17 - Concrete Washout Management Practices ▪ ES 130.7 - Inspections ▪ ES 130.9 - Materials Handling, Storage and Disposal
Hazardous Materials Management	▪ EP2 - Petroleum Handling and Storage ▪ EP3 - Spill Response ▪ EP5 - Material Handling and Storage ▪ ES 130.7 - Inspections ▪ ES 130.9 - Materials Handling, Storage and Disposal
Decommissioning of Temporary Construction Facilities and Borrow Pits	▪ EP22 - Temporary Site Decommissioning ▪ EP19 - Borrow Pit Decommissioning ▪ ES 130.7 - Inspections ▪ ES 130.8 - Designated Areas and Access ▪ Decommissioning Plans (to be provided in OPEMP).

Component	Monitoring Plan and Environmental Protection Procedures and Specifications
Emergency Response for Accidents and Spills	▪ EP3 - Spill Response ▪ ES 130.10 - Spills, Remediation and Emergency Response ▪ Emergency Response Plan for environmental accidents and spill (to be developed by Contractor).
Vegetation Restoration	▪ EP 21 - Winter Road Closure and Reclamation Plan ▪ EP 22 - Temporary Site Decommissioning ▪ ES 130.7 - Inspections ▪ Winter Road Closure and Reclamation Plan to be incorporated into OPEMP measures.

Site-specific monitoring will be conducted in conjunction with the overall monitoring programs where appropriate.

8.6.2 Schedule and Activity Tracking

Schedule and activity tracking will be conducted to ensure that planning, approvals, construction, studies, environmental submittal requirements and project commitments are anticipated and undertaken in a timely, efficient and effective manner. In view of the complexity and the number of individual actions required for successful completion of the Project, project management practices and support software will be utilized. Included in the program schedule will be critical environmental management events such as authorization submissions and reporting requirements.

MI, the detailed design engineers (either MI staff or consultants) and construction contractors will develop the schedule and determine tracking priorities. Scheduling will address submittals for permits, approvals and authorizations and reporting requirements. MI management and project managers will receive and review progress reports prepared by MI's project managers, construction inspectors, environmental unit staff and/or other consultants. Progress will be shared and discussed with local communities. The project management program will schedule and track administrative and environmental functions within the following guidelines.

- Standard project management tools such as the Critical Path Method will be used as the basis of developing the network logic for the project schedule.
- Engineers will develop pertinent schedule details of the engineering design and construction phases of the Project.
- MI's Indigenous liaison staff, environmental coordinators and project managers will develop the portion of the overall project schedule that contain third party input and approvals obtained by MI. This includes environmental submittals and authorizations, regulatory compliance reporting and submittals, land acquisition (if required), utility relocations, community and public engagement and consultation with Indigenous groups.

- Engagement, approvals, design and construction schedules will be interlinked referencing milestones for critical path items such as submission dates, permits, approvals and authorizations, monitoring and reporting and other constraints important to environmental management.
- Project managers will be kept aware of external constraints such as in-water work windows and requirements to conduct ceremonies prior to construction, to critical aspects such as tender and construction start dates that others may be responsible for, the delivery of which can have significant effects on the Project.

The project management program will be developed during final design and updated throughout the Project as construction timelines are dependent on annual funding allocations. Additional information regarding environmental monitoring and the management structure and reporting during all phases of project development is provided in **Chapter 9**.

8.6.3 Project Construction and Contractor Requirements

MI's inspectors and Contract Administrators oversee the construction activities of the tendered contracts and monitor for compliance with the construction specifications and regulatory requirements. The contractor is required to adhere to the ES 130s and site specific environmental protection measures covered under the special provisions found in their contract. 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 and reporting on applicable monitoring programs. Post-construction monitoring will continue for the appropriate duration of the condition being monitored. The contractor will be required to submit monthly environmental report and incident reports.

The prime contractor will have several key personnel on their construction team who will have responsibilities for environmental protection and safety. These individuals will be responsible for:

- facilitating implementation of the environmental policy
- implementing required environmental protection plans and specifications
- planning for environmental protection during construction
- conducting environmental inspections during site construction activities
- implementing the emergency response and health and safety plans
- checking that environmental issues are resolved in a timely and sensitive manner

8.6.4 Reporting

MI will ensure reporting and communication activities are conducted in accordance with requirements in the Environment Act Licence, *Canadian Environmental Assessment Act* (CEAA), 2012 Decision Statement and other permits, authorizations and approvals. Regular contact will be made with the local Conservation Officer in Thompson and with MSD's North-Eastern Region Integrated Resource Management Team to keep them informed of MI activities relating to the Project. The established communication channels

formed as a part of the delivery of the IPEP will be used to exchange information and provide opportunities for interested parties to voice their opinions, comments and suggestions. Information will include:

- progress of the Project
- up-coming construction activities in local areas
- opportunities for community involvement and dates of community information meetings
- environmental monitoring plans
- wildlife monitoring activities
- measures to protect heritage resources
- records of actions taken to address environmental incidents such as accidents, spills, leaks and releases and the reporting and clean-up procedures used
- other items of special interest

8.6.4.1 Indigenous and Public Engagement Program

Indigenous and public engagement for all of the all-season road projects and activities on the east side of Lake Winnipeg is a fundamental component of the project planning process and is intended to engage multiple parties in all phases of project development. The former East Side Road Authority developed the IPEP to provide opportunities for ongoing involvement of and dialogue with Indigenous communities and local governments on the Project that MI will continue to manage. The IPEP consists of the following principal elements.

- **Meetings with Chiefs and Councils and Mayor and Councils** – MI will continue to meet with Chiefs and Councils from the east side First Nation communities and Northern Affairs Communities to update them on the status of the all-season road project.
- **East Side Community Meetings** – MI will continue to host community meetings, in collaboration with local Chiefs and Councils, to update local residents in all east side communities on the progress of the all-season road project.
- **Local Liaison Committees** – MI is committed to communicating with Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation and God's Lake Northern Affairs Community on the progress of the Project.
- **Meeting with Resource Users and Elders and other Stakeholders** – MI is committed to working with community members and other stakeholders, as requested or required, concerning issues of cultural and socio-economic significance.
- **Ongoing Communications** – MI will continue to maintain and update Manitoba Infrastructure's website (http://www.gov.mb.ca/mit/hpd/environment/index.html) to ensure that local residents and others have access to information on the all-season road projects. MI will also utilize community radio, newspapers, presentations and other media to communicate with residents on the east side of Lake Winnipeg. MI also maintains a telephone line (204-945-3660) for public inquiries related to the Project environmental licensing.

8.7 Commitment to Sustainable Development

Producing and improving strategies towards sustainable development is an important component of an EA. One of the nine purposes of CEAA 2012 is to encourage federal authorities to take actions that promote sustainable development in order to achieve or maintain a healthy environment and a healthy economy. Development of the Project is in itself essentially a move toward sustainable development for the region as it will provide economic benefits. Some offsetting of the overall greenhouse gas emissions associated with the project will occur as a result of long-term use of the road rather than alternate modes of transportation (planes/helicopters).

The East Side Transportation Initiative was developed to increase transportation opportunities for communities on the east side of Lake Winnipeg while recognizing the uniqueness of the region, the importance and abundance of natural resources in the area and the need for sustainable planning. The East Side Transportation Initiative evolved from the Government of Manitoba's commitment to support sustainable development through the creation of broad area plans for large areas of the province. Broad area planning is defined as integrated and coordinated planning based on the sustainability of the ecosystem. This type of planning process considers the environmental, social, health, cultural and economic needs of the public, local communities, First Nations and various stakeholders and interest groups in future land, resource and development decisions.

The Government of Manitoba made a commitment to support sustainable development in Manitoba in July 2000 when it accepted the Report of the Consultation on Sustainable Development Implementation (COSDI) (Government of Manitoba 1999). COSDI was a multi-stakeholder, consensus-based process commissioned in 1997 by the government of Manitoba to "*consider and make recommendations… on how Manitoba can best implement sustainable development principles and guidelines into decision-making, including environmental management, licensing, land-use planning, and regulatory processes*." A draft status report titled "Promises to Keep" was issued in 2004 that outlined the stakeholder engagement, particularly residents of the east side of Lake Winnipeg and the recommendations towards sustainable development in the region. *The Sustainable Development Act* defines the principles and guidelines of sustainable development. These principles and guidelines form the basis of a sustainability evaluation framework that can be used to describe and assess the sustainability of the Project. Actions taken by MI in relation to the principles and guidelines of sustainable development are provided in **Appendix 8-5**.

Examples of specific initiatives that will be undertaken to promote sustainable development as part of the proposed Project include the following.

- **Local Procurement** – provide opportunities for residents on the east side of Lake Winnipeg to benefit from the Project through a minimum 10% of a construction tender to be supplied from local content (ex: equipment, services, employment).

- **Project Engagement** – provide engagement opportunities for residents on the east side of Lake Winnipeg and other indigenous peoples to address environmental interests in the Project including the mitigation of potential effects on the environment.
- **Traditional Knowledge Studies** – Provide opportunities to learn about traditional ways and land and resource use in order to reduce effects on trappers, resource users and to protect cultural and heritage resource sites.
- **Re-vegetation Program** – Seed is purchased from commercial sources using MI's recommended native seed mixture.
- **Wildlife Monitoring – Trapper Program** – Involve east side trappers in data collection from their traplines to mitigate effects on wildlife, MI has undertaken a multi-year wildlife monitoring study that is providing valuable information on caribou, wolves, moose, furbearers, small animals and bird species.

CHAPTER 8 APPENDICES

Appendix 8-1: Project 6 - All-Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation Environmental Management Plan Framework

Project 6 - All-Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation

Environmental Management Plan Framework

January 2018

TABLE OF CONTENTS

List of Appendices

List of Figures

List of Tables

1 Introduction

The following introduction provides context for this Environmental Management Plan. As noted in the Table of Contents, the appendices will be developed once the proposed Project is approved and hence are not appended to this document. The exception is the Appendix C, Environmental Protection Procedures and Environmental Protection Specifications which are provided in Chapter 8.

1.1 Background

The Manitoba East Side Road Authority (ESRA) was formed by the *Manitoba East Side Road Authority Act* with a mandate to construct and maintain the east side road. In carrying out this mandate, ESRA was responsible for obtaining all necessary environmental approvals and for coordinating and supervising the construction of all-season road projects on the east side of Lake Winnipeg, including the proposed All-Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation (the Project). In 2017, *Manitoba East Side Road Authority Act* was repealed, ESRA projects were assumed by the government of Manitoba and ESRA's mandate was repatriated to Manitoba Infrastructure (MI). The Province of Manitoba is currently providing the sole source of funding for the Project.

An Environmental Assessment (EA) was prepared to meet the requirements of the *Manitoba Environment Act,* and the *Canadian Environmental Assessment Act, 2012.* The Project is a "Development" that requires a Licence pursuant to *The Environment Act* and is also a "Designated Project" that requires the Minister of Environment and Climate Change's approval (via Decision Statement) pursuant to the *Canadian Environmental Assessment Act, 2012.* The EA compares and describes the pre-development baseline conditions in relation to predicted conditions and identified environmental protection measures to minimize negative project effects.

This Environmental Management Plan describes the environmental management processes that will be followed during the construction and operation of the Project. The goal of the Environmental Management Plan is to ensure that the environmental protection measures committed to in the EA and the requirements of the Environment Act Licence and Decision Statement Conditions are undertaken in a timely and effective manner. The Environmental Management Plan describes the roles and responsibilities of the parties involved in implementing the Project. An adaptive management approach to enable continuous improvement is an integral principle of this Environmental Management Plan.

1.2 Project Overview – Project 6 All Season Road

The work to be completed consists of the construction and operation of an all-season road (ASR) linking Manto Sipi Cree Nation, Bunibonibee Cree Nation, and God's Lake First Nation (Project 6).

Key activities include:

- clearing and grubbing of the all-season road Right of Way (ROW)
- construction of a new two lane all-season gravel road
- installation of erosion and sediment control measures
- construction of new crossings and bridges and installation of equalization culverts
- revegetation of disturbed areas
- decommissioning sections of the winter road made obsolete by the all-season road

- maintenance of the road, bridges and culverts

To the extent possible, the road layout and design will attempt to balance "cut and fill" quantities; however, additional fill and aggregate is known to be required from local quarries and borrow areas for Project construction. Additional auxiliary components of the project will include work camps, laydown areas, access roads and temporary crossings.

EA commitments and legislative requirements for the Project will be met and environmental objectives will be achieved through a hierarchy of environmental plans.

- The Project Environmental Management Plan provides an overall management framework to address potential environmental risks associated with the Project. The Environmental Management Plan describes the management system in terms of the why, what, how, who, and when of these plans.
- Subject-specific Environmental Protection Procedures (EPs) describe the suite of environmental protection measures for key individual environmental areas (Appendix C-Part A). These are supplemented with standard specifications, Environmental Protection Specifications (Appendix C-Part B), included in each construction contract.
- Monitoring plans assess the effects of construction on specific components of the environment (ex: wildlife and aquatic environment). A strategic plan for wildlife monitoring and an Aquatic Environment Monitoring Plan will be developed in concert with local liaison committees and appropriate federal and provincial departments to meet regulatory obligations.
- Construction Phase Environmental Management Plan (CPEMP) will detail individual environmental protection measures to be implemented during construction. The plan will reference the EPs and will be developed prior to the start of construction.
- Operation Phase Environmental Management Plan (OPEMP) will describe the long-term operation and maintenance procedures and environmental protection measures to be implemented after construction is completed and the road is fully operational for all-season use. The plan will reference the Environmental Protection Procedures and will be developed at a later date.

1.3 Environmental Oversight

The environmental management reporting and structure for the Project is shown below in **Figure 1**. MI, as the overall project manager and owner, is responsible for implementing, monitoring and amending the environmental aspects of the Project. MI will engage the local communities to discuss various aspects of the Project through the Indigenous and Public Engagement Program (IPEP). The program adapts to the needs and interests of each local community and includes regular engagement through:

- newsletters and local radio
- meetings with Chief and Council, and other local representatives, land use coordinators and local liaison committee where requested by the community
- periodic community meetings

In addition, MI engages the communities as well as the general public through its website, and publications in print media, such as Grassroots News.

MI will also participate on, and or initiate other committees as required, including local liaison committees. Technical committees will be established as needed to plan for and respond to various environmental management aspects of the Project.

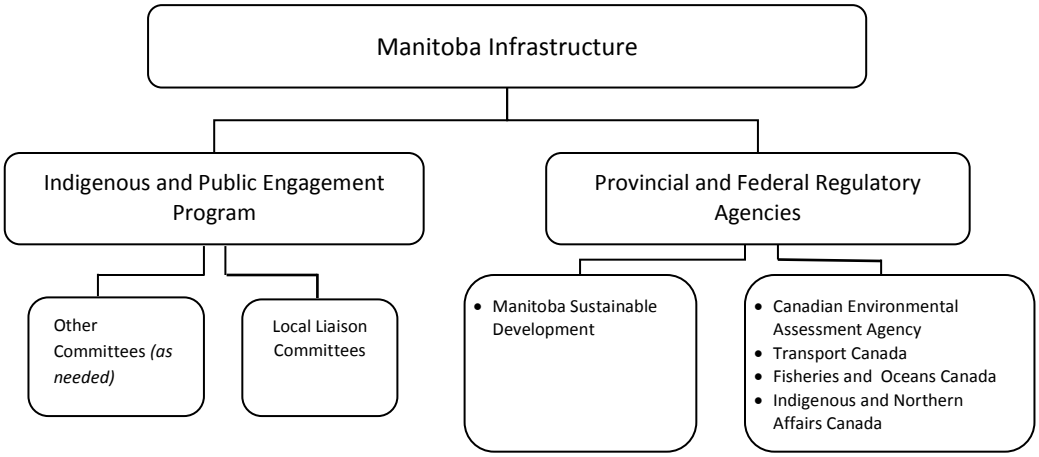

Figure 1: Environmental Management Reporting and Communication Structure for Project 6

1.4 Purpose and Structure of the Environmental Management Plan

1.4.1 Purpose

The purpose of the Environmental Management Plan is:

To describe the management system that will be implemented to ensure compliance with the federal and provincial requirements including the verification that environmental commitments are executed, monitored, evaluated for effectiveness, and that information is reported back to the project management for adjustment if required.

1.4.2 Structure and Elements of the Environmental Management Plan

The Environmental Management Plan is designed after the 5-step model for an environmental management system produced by the International Organization for Standardization (ISO) Standard 14001. These steps are outlined in **Figure 2**.

Figure 2. The 5 steps of ISO 14001

Environmental Policy

MI has recently developed new Vision, Mission, Values and Priorities statements (Appendix C). An Environmental Policy that is with consistent MI's strategic direction is currently being developed.

Planning and Implementation

Step 2 of the ISO 14001 model is to plan the subsequent steps, which are the implementation and monitoring activities. Section 2 of this Environmental Management Plan describes the activities that MI will undertake to comply with the environmental requirements for the Project. The Environmental Management Plan is a tool with which to confirm that these activities have occurred. The key elements of the Environmental Management Plan include:

- schedule and activity tracking
- Environmental Protection Procedures
- Environmental Inspection Plan
- Construction Phase Environmental Management Plan

- Operation Phase Environmental Management Plan
- monitoring and follow-up plans
- reporting
- any other conditions of the Licence and environmental approvals as appropriate

These elements form the main sections of this Environmental Management Plan. This Environmental Management Plan consists of a coordinated set of key points for each element of the Environmental Management Plan as follows:

- objective of the element
- how the objective will be achieved
- who has the roles and responsibilities for the element
- what action will be taken
- when key milestones will be reached

Management Review

The final step in the ISO14001 model is Management Review. The Environmental Management Plan embodies an adaptive management approach and allows for adjustments to the environmental protection activities as necessary, and for continuous improvement of the Project. MI acknowledges the need to monitor the residual effects of the Project and to evaluate the effectiveness of the environmental protection measures implemented. MI also acknowledges the possibility that adjustments to the mitigation measures may be indicated by the data collected respecting the predictions made or the success of the environmental protection measures implemented. Monitoring, reporting and management decision making are integral to the various levels and elements of environmental management planning. Section 2.8 describes the Management Review process.

1.5 Community and Stakeholder Involvement

The Environmental Management Plan is based on the public comments, concerns and issues that were expressed during community meetings, open houses, traditional knowledge (TK) studies and stakeholder meetings as documented in the Environmental Impact Statement (EIS). This Environmental Management Plan is also based on on-going involvement with the communities since the completion of the report.

MI will continue to involve the communities, stakeholders and the public by meeting with local liaison committees will be identified for Manto Sipi Cree Nation, Bunibonibee Cree Nation, God's Lake First Nation and God's Lake Northern Affairs Community to facilitate dialogue between the communities and MI to discuss Project updates and solicit community feedback and collaboration on Project related items. MI is committed to considering community input provided in regards to the Environmental Management Plan and its implementation.

2 Environmental Management Plan Elements

2.1 Schedule and Activity Tracking

2.1.1 Objective

To ensure that planning, approval, construction, studies, environmental submittal requirements and Project commitments are anticipated and undertaken in a timely, efficient and effective manner.

2.1.2 How

In view of the complexity and the number of individual actions required for successful completion of the Project, project management practices and support software will be utilized. Included in the program schedule will be critical environmental management events such as authorization submissions and reporting requirements.

2.1.3 Who

MI, the detailed design engineers (either MI staff or consultants) and construction contractors will develop the scheduling and tracking for projects. Included in this scheduling will be submittals for permits, approvals, and authorizations and reporting requirements. MI management and project managers will receive and review the Project progress reports prepared by MI's project managers, construction inspectors, environmental unit staff and/or other consultants. Progress will be shared and discussed with local communities.

2.1.4 What

The project management program will schedule and track administrative and environmental functions within the following guidelines:

- Standard project management tools such as the Critical Path Method (CPM) will be used as the basis of developing the network logic for the Project schedule.
- Engineers will develop pertinent schedule details of the engineering design and construction phases of the Project.
- MI's Indigenous Relations Officer, environmental coordinators and project managers will develop the portion of the overall project schedule that contain third party input and approvals that are obtained by MI, including environmental submittals and authorizations, regulatory compliance reporting and submittals, land acquisition, utility relocations, community and public engagement and consultation with Indigenous groups.
- Engagement, approvals, design and design and construction schedules will be interlinked referencing milestones for critical path items such as submission dates, permits, approvals and authorizations, monitoring and reporting and other constraints important to environmental management.
- Project managers will be kept aware of external constraints such as in-water work windows and requirements to conduct ceremonies prior to construction, to critical aspects such as tender and construction start dates that others may be responsible for, the delivery of which can have significant effects on the Project.

2.1.5 When

The project management system for the Project will be developed during final design and updated throughout the Project as construction timelines are dependent on annual funding allocations.

2.2 Environmental Protection Procedures (EPs)

2.2.1 Objective

To identify the suite of best management practices for the various activities of all project phases.

2.2.2 How

The EPs attached as Appendix C – Part A were developed through a review of best management practices and regulatory requirements. The EPs document the environmental measures to address key environmental issues. These procedures will be reviewed periodically and updated as required.

2.2.3 Who

MI has reviewed best management practices and standard procedures available and approved the use of the EPs, previously developed by ESRA in consultation with engineering design team and environmental consultants, for submission with this Environmental Management Plan. MI share updates with the local liaison committees, Manitoba Sustainable Development (MSD) and the Canadian Environmental Assessment Agency (Agency) as required.

2.2.4 What

EPs (Appendix C – Part A) were developed for all-season road projects on the East Side of Lake Winnipeg that document the suite of possible environmental protection and mitigation measures considered appropriate to address each of the following environmental subjects:

1. Clearing and grubbing
2. Petroleum handling and storage
3. Spill response
4. Noise control
5. Materials handling and storage
6. Working within or near fish bearing waters
7. Stream crossings
8. Temporary stream diversions
9. Fish passage
10. Fish salvage
11. Culvert maintenance and replacement
12. Blasting near a watercourse
13. Heritage resources
14. Wildlife
15. Wildfires
16. Erosion and sediment control
17. Concrete washout area management practices

18. Dust suppression practices
19. Borrow pit decommissioning
20. Quarry site selection and requirements
21. Winter road closure and reclamation plan
22. Temporary site decommissioning
23. Mussel salvage
24. Water quality monitoring
25. Prevention of the transfer of invasive species

EPs and monitoring are further documented in the Environmental Protection Specifications (Appendix C – Part B) that will be included in all construction contract tender packages. These are supplemented with additional special conditions specifications to each construction contract.

2.2.5 When

The EPs are reviewed and revised annually. Major changes or additions will be forwarded to local communities, MSD and the Agency once finalized.

2.3 Construction Phase Environmental Management Plan (CPEMP)

2.3.1 Objective

To describe how environmental protection will be maintained during the construction of each element and component of the Project.

2.3.2 How

The CPEMP will detail the environmental management measures described in the overall Environmental Management Plan that pertain to specific construction components (ex: a specific bridge or section of road). The CPEMP will be updated if measures change significantly. Construction contracts will include special provisions that reflect EPs, which will address individual construction works once design and construction plans are near finalization.

2.3.3 Who

MI will prepare, maintain and submit CPEMP documents and updates to the local liaison committees for review and feedback prior to finalization, and once finalized, the documents will be submitted to MSD Approvals Branch, the Agency and local communities as required. When necessary, detailed design engineers or environmental consultants will be consulted on the CPEMP.

- Detailed design engineers (either MI staff or consultants under the direction of MI) are responsible for incorporating the appropriate environmental protection measures into the design of Project components. Work site specific environmental contract documents will be prepared by the detailed design engineers and added to MI's standard specifications.
- MI environmental coordinators will review the best management practices and standard procedures available as presented in the environmental specifications developed by the detailed design engineers.

- The contractor will be responsible for implementing the environmental protection measures specified in the contract documents and providing specific plans to MI for MI's approval detailing how the contractor will meet specifications (ex: in-water work plan).

2.3.4 What

The CPEMP will document:

- Commitments made to environmental protection and sustainable development by the parties responsible to implement the plans.
- Roles and responsibilities of each party in fulfilling that commitment.
- Planned construction activity and the potential environmental effects.
- Environmental protection measures that will be taken.
- Protocols regarding inspection and reactions to inspections findings.
- Emergency plans including training and awareness.
- Monitoring and follow-up to be undertaken.
- Documentation and reporting procedures.
- Auditing, management review, evaluation and adjustment procedures.

2.3.5 When

The CPEMP will be produced to highlight specific protection measures that will be applied during construction and updated by MI as needed, in consultation with other government departments that have jurisdiction over aspects of the Project and the local liaison committees. Once finalized, the draft will be forwarded to MSD Approvals Branch and the Agency if required. Major changes or additions to the CPEMP will be forwarded to MSD Approvals Branch and the Agency once finalized, if required.

2.4 Operation Phase Environmental Management Plan (OPEMP)

2.4.1 Objective

To describe how environmental protection will be maintained during the on-going active operation of the Project.

2.4.2 How

The OPEMP is the long-term action plan that will address maintenance and other operational activities needed for the commissioned or operational portions of the all-season road. The OPEMP will be updated as new portions of the road are commissioned or otherwise made operational. This plan will include decommissioning activities such as winter road closure and reclamation. Maintenance contracts will include special provisions that reflect EPs and address individual maintenance areas.

2.4.3 Who

MI is responsible for the operation of the all-season road after construction of the Project has been completed. The OPEMP will be produced and updated by MI as needed, in consultation with other government departments that have jurisdiction over aspects of the Project. The draft plan and updates

will be circulated to the local liaison committees for review and feedback prior to finalization and once finalized, it will be forwarded to MSD and the Agency if required.

2.4.4 What

The OPEMP will involve both maintenance and operational aspects including the practices and procedures of the environmental mitigation programs. The OPEMP will document the:

- Commitments made to environmental protection and sustainable development.
- Roles and responsibilities of any party identified to fulfill that commitment.
- Environmental measures and mitigation programs that will be taken.
- Monitoring and follow-up plans.
- Reporting.
- Auditing, management review, evaluation, and adjustment procedures.

2.4.5 When:

The OPEMP will be submitted and/or updated at the time of commissioning of various components of the project.

2.5 Environmental Inspection Program

2.5.1 Objective

To describe how MI will ensure appropriate field inspection during construction activities of the Project. The purpose of inspection activities is to ensure environmental performance is met in terms of contract requirements and environmental permit, licence, and approval requirements.

2.5.2 How

MI is the owner of the Project and therefore may undertake all or part of contract administration responsibilities and in doing so may contract outside contract administrators as needed to provide technical expertise or to better manage MI staff workloads. If outside contract administrators are required, MI and the contract administrators' inspection responsibilities will be identified in the Contract Administrator Agreements and described in the CPEMP.

Regular inspections of construction, operation and maintenance components and activities will be documented in the contractor's monthly environmental reports and MI Inspection Reports. Results from the inspection program will be reported to MI senior leadership, local liaison committees, Indigenous communities, other stakeholders and federal and provincial authorities as appropriate.

2.5.3 Who

Environmental inspection and reporting will be undertaken by staff from MI, a contract administrator external to MI, if employed, and contractors as further described below.

2.5.3.1 Manitoba Infrastructure

MI staff will assume general contract administration duties if an external contract administrator is not employed.

The environmental inspections team will consist of environmental coordinators and or site inspectors with environmental inspection experience, led by a senior environment coordinator with experience in managing an environmental field inspection unit and administering contract documents. The senior environmental coordinator will report to the manager of the Environmental Services Section of MI's Highway Planning and Design group. The composition of the MI environmental inspection team will be reviewed and evaluated at least annually. Additional staff or staff with a specific expertise will be engaged as determined necessary.

A member of the environmental inspections team will be on-site to conduct inspections regularly and during higher risk activities, and will communicate the results of their inspections to MI's project manager. MI's project manager will be on the work site regularly and a construction inspector will be on site continually while work is being undertaken. MI environmental coordinators will maintain regular contact with the site inspectors and project manager in order to evaluate environmental conditions on site.

2.5.3.2 Contract Administrator

The contract administrator, if employed, will have a site engineer or inspector on the work site at all times work is being undertaken and will administer the construction contract. The administrator's environmental inspector will be on site on a regular basis but not at all times.

2.5.3.3 Contractor

The contractor shall have staff, trained and certified in the handling of dangerous goods, present on-site whenever said dangerous goods are being utilized for the performance of the work.

2.5.4 What

The environmental inspection program activities are summarized in sub-sections below.

2.5.4.1 Manitoba Infrastructure

MI inspectors will examine the site to ensure that the site is managed in accordance with the environmental protection requirements outlined in the contract documents. These requirements will be referenced in the CPEMP. The inspectors will ensure that the construction and installation of environmental protection measures, such as silt fences and materials handling facilities, are in accordance with the contract document, which reference environmental approvals.

The inspectors will focus on the maintenance of environmental protection measures employed and on the adequacy of the measures to achieve the required level of environmental protection. A standardized inspection form will be used to maintain a documented record of the site conditions. A copy of the environmental inspection form template is included in Appendix D. MI inspectors will bring environmental concerns to the attention of MI's project manager or contract administrator. The Project Manager or Contract Administrator will have the authority to issue a stop work order and/or to

order additional environmental protection measures deemed necessary to ensure environmental protection.

2.5.4.2 Contract Administrator

If a contract administrator is employed, a Contract Administration Agreement will be created to identify the contract administrator's inspection responsibilities. The contract administrator will ensure that the environmental protection measures are constructed, implemented and maintained (ex: silt fences and sediment barriers are maintained and cleaned) in accordance with the contract documents. The contract administrator will have the authority to issue a stop work order and to order additional environmental protection measures deemed necessary to ensure environmental protection.

2.5.4.3 Contractor

The contractor's inspection responsibilities are prescribed by the contract documents (Environmental Protection Specifications, EPs) and outlined in the CPEMP and OPEMP. Inspections will include fuel storage containers, tank vehicles, dangerous goods and hazardous waste storage facilities / sites for releases of fuel, dangerous goods or hazardous waste, sediment and erosion controls, clearing and grubbing debris, clean-up and litter controls. The contractor will be required to submit monthly environmental report and incident reports. Copies of the contractor's monthly environmental form template and incident form template are included in Appendix D.

2.5.5 When

Construction inspections will commence with the start of construction and be conducted as described in the CPEMP. Post-construction monitoring will continue for various durations appropriate to the condition being monitored.

2.6 Monitoring and Follow-up Plans

2.6.1 Objectives

Monitoring activities are designed to:

- Verify environmental effects predictions made during the engineering design and environmental assessment of the Project.
- Provide data with which to evaluate the effectiveness of mitigation measures undertaken.
- Provide data with which to implement adaptive management measures for improving future environmental protection activities.
- Document additional measures of adaptive measures to improve future environmental protection activities.
- Document compliance with required conditions as stipulated in regulator permits, authorization and MI guidance documents.

2.6.2 How

Monitoring components are included in MI contracts through Environmental Protection Specifications (Appendix C – Part B) and the Environmental Protection Procedures (EPs) (Appendix C – Part A).

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 and reporting on applicable monitoring programs.

MI will engage in-house environmental staff and specialized environmental consultants to draft specific environmental monitoring plans (ex: aquatic environment, wildlife) and conduct monitoring of specific components of the environment as required with assistance from local indigenous people. These plans will be developed to meet regulatory obligations and shared with community liaison committees and appropriate federal and provincial authorities for their review and comment. Additional monitoring or adjustments to the plans will be made in consideration of the responses received.

Results from the monitoring and follow-up programs will be provided as appropriate to community liaison and advisory committees, stakeholders, Indigenous communities, and federal and provincial authorities. MI and its consultants will consider the results from the monitoring and follow-up programs and input received from community liaison committees, regulators and others in its review of the status of the environmental protection activities on an on-going basis, and amend programs as necessary. If the monitoring programs identify any unforeseen environmental effects or the environmental protection measures are not performing as intended, the Manager of Environmental Services will bring such occurrences to the attention of the MI senior leadership and recommend amendments. As the proponent/owner of the Project, MI will make final decisions on adjustments to environmental activities.

The adaptive management approach will be followed whereby lessons learned and improvements identified during the inspection, monitoring and follow-up programs will be applied to continually improve subsequent environmental protection activities. MI will also monitor the application of action plans and emergency response procedures for environmental protection and human health and safety.

2.6.3 Who

Contractors will be responsible for completion and reporting of applicable construction contract related monitoring programs.

MI staff will administer specific environmental monitoring plan activities including arranging and managing contracts with specialized environmental consultants. MI will also manage the IPEP through which interested parties will be provided the information and opportunities to comment on the data. As the Project proponent, MI will be responsible for implementing and reporting on this program throughout the construction and operation and maintenance phases of the Project and MI will make final decisions on adjustments to environmental activities. Monitoring reports will be submitted to appropriate federal and provincial departments to meet regulatory obligations.

The specialized environmental consultants will undertake monitoring and follow-up programs in their respective fields of expertise.

On a selective basis, MI will solicit input and feedback from local liaison committees, stakeholders and regulators on its environmental protection measures and monitoring programs.

2.6.4 What

MI is committed to implementing a broad suite of project mitigation measures and monitoring activities as identified in the EIS. The broad project component or environment component monitoring programs that have been or will be developed and associated plans, protection procedures and general contract requirements are identified in **Table 1**.

Table 2: Environmental Components for Project 6

Component	Monitoring Plan, Environmental Protection Procedures and General Contract Requirements
Wildlife	Appendix C (Part A and B): • *EP 14 - Wildlife* • *Environmental Protection Specification 130.19* Appendix E: Wildlife Monitoring Plan *May include moose, caribou, migratory bird and furbearers*
Aquatic Environment	Appendix C (Part A and B): • *EP 6 - Working Within or Near Fish Bearing Waters* • *EP 7 - Stream Crossings* • *EP 8 - Temporary Stream Diversions* • *EP 9 - Fish Passage* • *EP 10 - Fish Salvage* • *EP 11 - Culvert Maintenance and Replacement* • *EP 12 - Blasting Near a Watercourse* • *EP 16 - Erosion and Sediment Control* • *EP 23 - Mussel Salvage* • *EP 24 - Water Quality Monitoring* • *EP 25 - Prevention of the Transfer of Invasive Species* • *Environmental Protection Specification 130.15* Appendix E: Aquatic Environment Monitoring Plan *May include water quality, fish passage, fish habitat compensation, bank stabilization*
Erosion and Sediment Control	Appendix C (Part A and B): • *EP 16 - Erosion and Sediment Control* *Environmental Specification 130.16*
Dust Control	Appendix C (Part A and B): • *EP 18 - Dust Suppression Procedures* *Environmental Protection Specification* 130.11
Waste Management	Appendix C (Part A and B): • *EP 5 - Material Handling and Storage* *Environmental Protection Specification* 130.9
Hazardous Materials Management	Appendix C (Part A and B): • *EP 2 – Petroleum Handling and Storage* • *EP 3 - Spill Response* • *EP 5 - Material Handling and Storage* *Environmental Protection Specification* 130.9
Decommissioning of Temporary Construction Facilities and Borrow Pits	Appendix C (Part A and B): • *EP 17 – Temporary Site Decommissioning* • *EP 19 - Borrow Pit Decommissioning* • *Environmental Protection Specification 130.8* Decommissioning Plans to be provided in OPEMP

Emergency Response for Accidents and Spills	Appendix C (Part A and B): • *EP 3 - Spill Response* • *Environmental Protection Specification 130.10* Emergency Response Plan for environmental accidents and spill to be developed by Contractor
Vegetation Restoration	Appendix C (Part A) • *EP22 – Temporary Site Decommissioning* Winter Road Reclamation Plans to be incorporated into OPEMP measures

Site-specific monitoring will be done in conjunction with the overall monitoring programs where appropriate. Procedures for identifying and tracking issues are discussed in Section 2.1 of this Environmental Management Plan. MI is the project proponent and is responsible for managing the Project.

2.6.5 When

Baseline monitoring began during the EA phase of the Project. Construction monitoring will be conducted routinely to determine the success of the mitigation measures implemented and to identify any unpredictable effects. Post-construction monitoring will continue for various durations appropriate to the condition being monitored.

2.7 Reporting

2.7.1 Objective

The objective is to provide regulatory authorities, local Indigenous communities, stakeholders and the general public with timely and accurate information.

The objective is also to provide regulatory authorities, local Indigenous communities, stakeholders, and general public with opportunities to provide comments, suggestions, and opinions on the Project, the environment protection measures and the monitoring programs.

2.7.2 How

A component is to report to the interested parties and to consider feedback in the on-going implementation of the environmental protection measures including the monitoring and adaptive management to continuously improve the environmental protection provided.

2.7.2.1 Indigenous and Public Engagement Program

ESRA developed an IPEP to provide opportunities for on-going involvement of and dialogue with Indigenous communities and local governments on the Project that MI will continue to manage. The IPEP consists of the following principal elements:

- **Meetings with Chiefs and Councils and Mayor and Councils** – MI will continue to meet with Chiefs and Councils from the east side First Nation communities and Northern Affairs Communities to update them on the status of the all-season road project;
- **East Side Community Meetings** – MI will continue to host community meetings, in collaboration with local Chiefs and Councils, to update local residents in all east side communities on the progress of the all-season road project;

- **Local Liaison Committees** – MI is committed to communicating with Manto Sipi Cree Nation, Bunibonibee Cree Nation, and God's Lake First Nation and God's Lake Northern Affairs Community on the progress of the Project;
- **Meeting with Resource Users and Elders and other Stakeholders**– MI is committed to working with community members and other stakeholders as requested or required concerning issues of cultural and socio-economic significance; and
- **On-going Communications –** MI will continue to maintain and update Manitoba Infrastructure's website (http://www.gov.mb.ca/mit/hpd/environment/index.html) to ensure that local residents and others have access to information on the all-season road projects. MI will also utilize community radio, newspapers, public presentations and other media to communicate with residents on the east side of Lake Winnipeg. MI also maintains a telephone line (204-945-3660) for public inquiries related to Project 6 environmental licencing.

2.7.2.2 Regulatory Involvement

Regulatory involvement will occur through reporting requirements of the Environment Act Licence and CEAA 2012 Decision Statement Conditions that are received for the Project as well as those identified in other permits, authorizations, approvals. Regular contact will be made with the local Conservation Officer in Thompson and with the MSD's North-Eastern Region Integrated Resource Management Team to keep them informed of MI activities as it pertains to the Project.

2.7.3 Who

MI will ensure reporting and communication activities are conducted in accordance with requirements in the Licence, Decision Statement, other permits, authorizations and approvals, and through the established communication channels formed as a part of the delivery of the IPEP.

2.7.4 What

The major elements of the IPEP are to exchange information and provide opportunities for interested parties to voice their opinions, comments and suggestions. Information will include:

- progress of the Project
- up-coming construction activities in local areas
- opportunities for community involvement and dates of community information meetings
- environmental monitoring plans
- wildlife monitoring activities
- measures to protect heritage and archaeological resources
- records of actions taken to address environmental incidents such as accidents, spills, leaks, and releases, the reporting and clean-up procedures used
- other items of interest

2.7.5 When

The requirements for reporting to the communities and public will vary with the program and regulatory requirements.

Reporting to regulatory authorities will occur as required by permit, authorization or approvals or as otherwise requested.

2.8 Management Review

2.8.1 Objective

To maintain continuous improvement by reviewing the adequacy, suitability and effectiveness of the environmental management practices associated with the Project.

2.8.2 How

As described above, the monitoring and follow-up programs will report results to the MI's project managers, senior environmental coordinator and environmental services manager who can implement corrective action as necessary be shared with local liaison committees for review and comments and reported to the regulators as appropriate.

MI management will also periodically review the environmental management system at a strategic level to ensure its continuing suitability, adequacy and effectiveness. The review includes assessment of opportunities for improvement and the need for changes, including to overall environmental policy and objectives.

2.8.3 Who

MI management review will occur on two levels. On an on-going basis, the division managers, project managers, and the senior environmental coordinator will have the detailed information with which to make recommendations as the Project proceeds. The senior environmental coordinator and project managers, with input from division managers, will action measures to enact environment protection as outlined in this plan.

On a strategic level, the MI management has the authority to make decisions about the environmental protection practices and to take action, including through allocation of resources.

2.8.4 What

The senior environmental coordinator will review detailed reported results of the monitoring and follow-up activities. The review will include consideration of effectiveness of mitigation measures and accuracy of prediction of environmental effects as the construction activities proceed, with a view to adapting mitigation to further minimize adverse effects, or to improving prediction of effects, as the all-season road network on the east side proceeds. Results will be shared with MI management, division managers and staff.

Management review will consider needs for changes to policy, objectives and other elements of the Environmental Management Plan, in the light of reported results and recommendations arising from the monitoring and follow-up activities, and considering any changing circumstances and opportunities for continual improvement. Management will review the various elements of the Environmental Management Plan, the strategic approaches and resource allocations, and the environmental practices undertaken. Changes to elements of the Environmental Management Plan will be communicated to MSD and the Agency as an amendment to this document or its appendices.

2.8.5 When

MI management meets regularly to monitor on-going progress as the Project proceeds. Systems are in place to record decisions.

3 REFERENCES

AASHTO Centre for Environmental Excellence. 2003. Ensuing an Environmental Management System to Meet Transportation Challenges and Opportunities an Implementation Guide. AASHTO Centre for Environmental Excellence.

Canada. Department of Environment. 2014. *Species at Risk Public Registry.* Web.

Canada and Manitoba. *Canada-Manitoba Agreement on Environmental Assessment Cooperation*. May 2000.

Canada and Manitoba. *Canada-Manitoba Agreement on Environmental Assessment Cooperation (2007)*. March 2007.

Commission for Environmental Cooperation. 2000. Guidance Document Improving Environmental Performance and Compliance: 10 Elements of Effective Environmental Management Systems.

East Side Planning Initiative. 2004. *Promises to Keep: Towards a Broad Area Plan for the East Side of Lake Winnipeg*. Report prepared by the East Side Planning Initiative for Manitoba Conservation. Winnipeg.

Global Environmental Management Initiative. 2000. *ISO 14001 Environmental Management System Self-Assessment Checklist.*

International Organization for Standardization. 1996. ISO 14001 Environmental Management Systems - Specifications with Guidance for Use. International Organization for Standardization.

International Organization for Standardization. 2008. ISO 14001:2004 Environmental Management Systems – Requirements with guidance for use.

International Organization for Standardization. 1996. ISO 14004 Environmental Management Systems – General Guidelines on Principles, Systems and Supporting Techniques. International Organization for Standardization.

International Organization for Standardization. 2008. ISO 14004:2004 Environmental Management Systems – General Guidelines on principles, systems and support Techniques.

Manitoba. Department of Conservation. 2001. Environment Act Licence No. 2534.

Manitoba. Department of Conservation. 2010. Environment Act Licence No. 2929.

Manitoba. Department of Conservation. 2008. *Forest Management Guidelines for Riparian Management Areas.*

Manitoba. Department of Conservation and Water Stewardship. 2010. *Forest Practices Guidebook, Forest Management Guidelines for Terrestrial Buffers.*

Manitoba. Department of Conservation and Water Stewardship. 2013. 2013-2014 Trapping Guide.

Manitoba. Department of Conservation and Water Stewardship. 2014a. *Wabanong Nakaygum Okimawin (WNO).* Web.

Manitoba. Department of Conservation and Water Stewardship. 2014b. *Species at Risk*. Wildlife Branch. Web.

NCS International. 2006. *ISO 14001:2004 Self Assessment Checklist* EMS- E008, Issue 2.

Queensland Government, Environmental Protection Agency. 2003. Preparing an Environmental Management Plan (EM Plan) for a Non-standard Exploration Permit or Mineral Development Licence. Available at http://www.epa.qld.gov.au.

Stapleton, P. J., Glover, M. A., and Davis, S. P. 2001. Environmental Management Systems: An Implementation Guide for Small Medium-sized Organizations 2nd Edition. NSF International.

Starkey, R. et al. 1998. Environmental Management Tools for SMEs: A Handbook. Available at http://www.eea.eu.int

Sturm, A., Upasena, S. 1998. ISO 14001 Implementing an Environmental Management System. Available at http://www.ellipson.com.

University of Vermont. ND. Environmental Management Plan Overview. Available at http://esf.uvm.edu/uvmemp.

Wright, D.G. and G.E. Hopky. 1998. Guidelines for the use of explosives in or near Canadian fisheries waters. Canadian Technical Report of Fisheries and Aquatic Sciences. 2107: iv + 34 p.

Appendix 8-2:
Environmental Protection Procedures

Environmental Protection Procedures

Table of Contents

ENVIRONMENTAL PROTECTION PROCEDURES 1

CLEARING AND GRUBBING

March 2018 Revision

1.0 Description

.1 The clearing and grubbing of vegetation shall be undertaken as instructed by the Manitoba Infrastructure – Remote Road Operations to accommodate for various activities, including geotechnical investigation, construction camp preparation and quarry site development. The Contractor is responsible for ensuring compliance with contract specifications, environmental legislation, permits and authorizations.

2.0 Purpose

.1 The purpose of this procedure is to ensure that clearing and grubbing operations are conducted in accordance with applicable environmental legislation, regulations, guidelines, permits and contracts.

3.0 Legislation and Supporting Documents

- Manitoba Infrastructure – Remote Road Operation (MI-RRO) Contracts and Associated Documents
- Previous East Side Road Authority (ESRA) Contracts and Associated Documents
- Applicable Provincial Licences and Permits
- The Manitoba Conservation Brush Disposal Guidebook – March 2005
- The Manitoba Stream Crossing Guidelines for the Protection of Fish Habitat – May 1996
- Environmental Protection Procedures – Appendix 8-2: of P6 – All-Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation, and God's Lake First Nation Environmental Impact Statement – April 2018
- Environmental Protection Specifications – Appendix 8-3: of P6 – All- Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation, and God's Lake First Nation Environmental Impact Statement – April 2018
- Fisheries Act (R.S., 1985, c. F-14)
- The Manitoba Sustainable Development Forest Practices Guidebook: Forest Management Guidelines for Terrestrial Buffers – 2010-2022

4.0 Procedures

.1 Clearing and grubbing shall be limited to the site and associated access routes.

.2 Clearing and grubbing shall only be undertaken between September, 1 of any year and April, 1 of the following year.

.3 Within the limits as directed and staked out by the Contract Administrator, all brush and trees, except those designated by the Contract Administrator to be saved, is to be cut level with the ground, and all surface debris, excluding merchantable timber but including fallen timber, slash limbs, brush, grass and weeds, is to be disposed as directed or permitted by the Contract Administrator. Disposal may involve:

- Burning
- Spreading and compacting
- Limbing/chipping

.4 All clearing and grubbing operations shall be clearly marked and completed to the approval of the Contract Administrator. The Contract Administrator will take into account required buffers, and sensitive areas.

.5 Where possible, grubbing shall not occur within 2 m (2.5 yards) of standing timber in order to prevent damage to root systems of adjacent standing trees and reduce the occurrence of blow down.

.6 Clearing activities shall be limited to removing vegetation to ground level without disturbing root mass. Height of stumps shall not exceed 15 centimetres.

.7 Trees shall be felled towards the centre of the area to be cleared. Any brush falling outside the area to be cleared shall be moved back to the work area and disposed as directed by the Contract Administrator. The Contractor shall take all precautions against the damage to other trees, traffic structures, pole lines or property in the felling of trees. The Contractor is liable for any damages occurring in the performance of this work.

.8 Timber from which forest products can be manufactured (merchantable) shall be cleared of limbs and stockpiled on the worksite in consolidated piles more than 1 metre from standing timber or as directed or permitted by the Contract Administrator. Merchatable timber shall be made available for community use free of charge upon request from community member or organizations. Removal and or disposal of any unused merchantable timber remains the responsibility of the contractor.

.9 There shall be no bulldozing of woody debris into standing timber.

.10 Existing trails, trap lines, portages and other travelways shall not be altered so as to interfere with other users.

.11 No clearing shall be permitted from April 1 to September 1 to avoid disturbance to nesting birds and other wildlife species.

.12 Clearing within 30 metres of a watercourse shall be by hand.

.13 Cleared trees and vegetation shall not obstruct waterways during any season, and shall be stored above the ordinary high water mark (1 in2 year high water mark). Stockpiles of any material are to be stored a minimum of 100 m from any water body or watercourse.

4.1 Brush Disposal

.1 Disposal of cleared trees and brush must be done as directed or approved by the Contract Administrator. Disposal may involve burning, compacting, piling, burying, windrowing and compacting, limbing and chipping.

.2 All cleared vegetation, grubbed material, and debris that is to be left in place shall be piled and compacted in windrows. Windrows shall be compacted to lie as close to the ground as possible (maximum height of 0.6 of a metre) and shall be no closer than 1 metre to the bush line. Windrows are required to have a 15 metre break every 100m in length.

.3 Cleared and grubbed material that is to be burned shall be piled for burning. Burn piles shall be located a minimum of 15 metres from other wood and brush piles and standing timber.

.4 Merchantable timber that is identified by the Contract Administrator shall be stockpiled within existing clearings and at least 1 metre from standing timber. Stockpile sites shall not be located within 100 metres of a waterbody. Unless otherwise specified, all stockpiled material shall be removed from Crown land by April 30 following the date of issuance.

.5 The burning of debris piles shall not permitted in the spring or early summer to avoid disturbing small wildlife species which may have young in the piles or may have prepared nesting sites. The best and preferred option for wildlife is burning in the fall or winter.

.6 No burning of debris piles shall occur on deep organic soils. Piles shall be a minimum of 15 metres away from standing timber and the high water mark of any waterbody.

.7 Slash shall be piled in a manner that allows for clean, efficient burning of all material. Avoid mixing soil into the slash.

.8 The Contractor shall obtain a burning permit for open fires between April 1 and November 15. Burning between November 16 and March 31 does not require a burning permit; however, the supervising

officer shall be advised prior to any burning. All fires shall be completely extinguished by March 31.

.9 Ensure safety precautions are taken to keep the fire under control. Burn piles shall be monitored, to ensure that subsequent fire hazards are not present. Upon completion of the burn, burn piles shall be completely extinguished.

.10 All occurrences of fire spreading beyond the debris piles shall be reported to the Contract Administrator and the Natural Resources District Supervisor

ENVIRONMENTAL PROTECTION PROCEDURES 2

PETROLEUM STORAGE

March 2018 Revision

1.0 Description

.1 The storage and handling of petroleum and allied products shall be undertaken in accordance with contract specifications, environmental legislation, permits and authorizations as approved by the Manitoba Infrastructure – Remote Road Operations.

.2 Fuel spills, leaks and releases present a hazard to human health and safety, and can be a threat to wildlife habitats, vegetation, soil, surface water and wetlands, groundwater and aquifers, and structures such as wells, drains and ditches. Besides the potential impacts on health and the environment, there may be significant costs associated with wasted fuel, treatment of oily wastewater, and remediation of fuel-impacted sites. The Contractor is responsible for complying with all contract specifications, environmental legislation, permits and authorizations.

2.0 Purpose

.1 The purpose of this procedure is to ensure that all petroleum storage is carried out in accordance with applicable legislation, regulations, guidelines, permits and contracts.

3.0 Legislation and Supporting Documents

- Manitoba Infrastructure – Remote Road Operation (MI-RRO) Contracts and Associated Documents
- Previous East Side Road Authority (ESRA) Contracts and Associated Documents
- The Manitoba Environment Act - C.C.S.M. c. E125
- The Workplace Safety and Health Act - C.C.S.M. c. W210
- Applicable Provincial Licences and Permits
- The Dangerous Goods Handling and Transportation Act, C.C.S.M. c. D12
- Storage and Handling of Petroleum Products and Allied Products Regulation – 188/2001
- Technical Bulletin PSF-004, March 2015: Impact Protection Requirements for Above Ground Storage Tanks Systems
- National Fire Code of Canada. Canadian Commission on Building and Fire Codes, National Research Council of Canada, 2005
- Environmental Protection Procedures – Appendix 8-2: of P6 – All- Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation, and God's Lake First Nation Environmental Impact

Statement – April 2018

- Environmental Protection Specifications – Appendix 8-3: of P6 – All- Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation, and God's Lake First Nation Environmental Impact Statement – April 2018

4.0 Procedures

4.1 Petroleum Storage and Handling

.1 All petroleum handling and storage shall comply with Manitoba *Regulation 188/2001* respecting *"Storage and Handling of Petroleum Products and Allied Products".*

.2 Petroleum products shall be transported in accordance with the Manitoba Provincial "*Dangerous Goods Handling and Transportation Act"*.

.3 All reasonable precautions shall be taken to ensure that refuelling only takes place within a Designated Area used for fuel storage or handling.

.4 In the event that a piece of equipment must be refuelled outside a Designated Area, the fuel shall be transported in Approved containers.

.5 Absorbent pads, or other precautions, such as a high density polyethylene (HDPE) groundsheet, shall be used to contain the fuel and prevent fuel from being spilled onto the ground surface.

.6 Equipment shall not be refueled from a watercraft.

.7 All reasonable precautions shall be taken to ensure that cleaning, washing, and servicing of equipment only takes place within a Designated Area.

.8 All mobile equipment that is not in use shall be parked within a Designated Area.

.9 All Designated Areas used for petroleum product storage shall be a minimum distance of 100 metres from any water body and shall have the top soil stripped and be underlain with at least 30 cm of impermeable soil or approved alternate and dyked in such a manner as to contain any leakage or spillage. The dykes shall be designed, constructed and maintained to retain not less than 100% of the capacity of the total number containers or 110% of the largest container, whichever is greatest. The top soil shall be stored and used in the restoration of the site.

.10 Tank vehicles used to deliver fuel to the worksite and/or used to move fuel around the worksite shall meet the requirements for highway tanks

for the shipment of dangerous goods by road set out in CSA Preliminary Standard B620-98, *Highway Tanks and Portable Tanks for the "Transportation of Dangerous Goods"*.

.11 All Designated Areas used for petroleum storage shall be a minimum distance of 3 metres from a property line or building and 15 metres horizontally from hydroelectric poles and lines.

.12 Construction, installation and removal of petroleum storage tank systems shall occur under the supervision of a registered licenced petroleum technician.

.13 Petroleum storage tanks shall be grounded and the dispensing tank shall be attached with a bonding cable to an appropriate location on the receiving tank prior to commencing fueling.

.14 Petroleum products shall be labeled as to their contents and stored and handled within designated areas.

.15 Dedicated petroleum storage areas shall provide spill containment and facilitate clean up through measures such as:

- Maximum separation from environmentally sensitive features;
- Clear identification of the materials present;
- Access restricted to authorized vehicles and employees;
- Impervious bermed storage areas; and
- Dedicated spill response equipment.

.16 Storage sites for petroleum products shall be secured and signs including hazard warnings, who to contact in case of a spill, access restrictions and under whose authority the access is restricted shall be posted.

.17 All employees involved in the handling and storage of fuels shall have WHMIS and spill response training.

.18 All combustible engines shall be shutdown during fueling.

.19 There shall be no smoking and no open flames at the petroleum storage area at any time.

.20 Only above ground storage tanks shall be used for the storage of bulk petroleum products. The tanks shall be equipped with overfill protection and spill containment consisting of perimeter dykes or secondary containment in the tank design. If dykes are used, the containment areas shall be dewatered after a rainfall event and the containment water disposed of as approved by the Contract Administrator. Product inventory shall be taken weekly by the owner/operator of all aboveground storage tanks with a capacity of 5000 litres or greater and retained for inspection upon request.

.21 All petroleum storage tanks with a capacity of 5000 litres or greater shall be registered with Manitoba Sustainable Development. New tanks shall be registered before installation. Tanks shall be designed, installed, and operated in accordance with the Manitoba Provincial *"Dangerous Goods Handling and Transportation Act"* and the Federal *"Transportation of Dangerous Goods Act"*. Smaller stationary tanks shall adhere to requirements of the Manitoba Fire Code. A copy of the petroleum license shall be posted at the fuelling site.

.22 Fueling from unregistered tanks shall not be permitted.

.23 Concrete barriers shall be installed around all petroleum storage tanks to prevent collisions (as per Technical Bulletin PSF-004, March 2015: Impact Protection Requirements for Above Ground Storage Tanks Systems).

.24 Bulk waste oil shall be stored in aboveground oil tanks, which shall have secondary containment and a weatherproof cover. Waste oil shall be recycled by a reputable recycling agency. Waste oil shall never be used as a dust suppressant.

.25 All petroleum storage containers and tank vehicles shall be inspected daily for leaks and spillage. Damaged or leaking fuel storage containers shall be promptly removed from site.

.26 All petroleum handling and storage areas shall be kept clear of snow and materials so as to allow clear access and routine inspection and leak detection.

.27 In the event that there is a spill onto the ground surface from any piece of equipment, such as a broken hydraulic hose, the entire affected area shall be cleaned up and all contaminated soil shall be appropriately disposed of at a licenced soil recycling facility. If contaminated soil is to be stored on site for any time a designated storage area is to be identified and prepared to prevent secondary contamination. Contaminated soil is segregated.

.28 As petroleum storage and equipment servicing areas are taken out of service any remediation shall be conducted, including the appropriate disposal of the contaminated material to the satisfaction of the Contract Administrator.

.29 The Contractor shall designate on-site Emergency Spill Response Coordinators.

.30 The Contractor shall prevent fuel, lubricants or compounds from being released. All empty containers from equipment refueling and servicing shall be removed to a licenced disposal site. The Contractor shall be

thoroughly familiar with provincial/federal spill response compliance procedures.

.31 Materials required for spill containment and clean up shall be available at all sites where construction related activities occur. All vehicles hauling fuel shall carry materials and equipment for emergency spill containment.

.32 At locations where stationary filled oil equipment is used, oil containment measures such as secondary containment shall be incorporated (i.e., berms).

.33 Contaminated soils resulting from releases shall be remediated or disposed of in a manner approved by the Contract Administrator.

.34 Fuel barrels shall be securely fastened to the vehicle during transport and if possible during refueling operations.

.35 All petroleum product storage sites and mobile transportation units shall, at all times, be equipped with appropriate categories of equipment and volumes of fire suppression products.

.36 Fueling procedures shall be posted where fueling occurs.

4.2 Fueling Procedures

.1 Fueling equipment from a fixed fuel tank of sliptank

- Ensure the slip tank is clear of snow and debris
- Ensure the pump is turned off
- Connect the pump to the battery
- Use a piece of rag or absorbent pad to cover the tip of the nozzle
- Place the nozzle in equipment tank– be careful of splash back
- Turn on the pump
- Fill the tank – ensure you do not overfill the tank
- Turn off the pump
- After fuelling – catch all drips on an absorbent pad, use a rag or absorbent pad to wipe off the nozzle.
- Once the nozzle has stopped dripping, use the rag to cover the end of nozzle and return the nozzle to the slip tank
- Disconnect the pump from the battery
- Accidental spills must be cleaned up immediately using the Spill Response Procedures
- Used absorbent pads must be discarded in a designated Spill Disposal Container

.2 Fuelling equipment using a jerry can

- Ensure the slip tank is clear of snow and debris
- Place jerry can on an absorbent pad in a spill tray
- Ensure the pump is turned off
- Connect the pump to the battery
- Use a piece of rag of absorbent pad to cover the tip of the nozzle
- Place the nozzle in the jerry can – be careful of splash back
- Turn on the pump
- Fill the can to the fill line
- Turn off the pump
- After fuelling – catch all drips on the absorbent pad, and use a rag or absorbent pad to wipe off the nozzle.
- Once the nozzle has stopped dripping, use the rag to cover the end of nozzle and return the nozzle to the slip tank
- Disconnect the pump from the battery
- Fuel the chainsaw/ATV/snowmobile using the jerry can – be careful of splash back
- All fuel transfers must occur with an absorbent pad and/or oil catcher placed underneath to catch spills
- Wipe down the jerry can with a rag before removing from the absorbent pad
- Accidental spills must be cleaned up immediately using the Spill Response Procedures
- Used absorbent pads must be discarded in a designated Spill Disposal Container

4.3 Emergency Response Plan For Spills

.1 It is the responsibility of the Contractor to conduct appropriate soil testing on Designated Area(s) and contract work sites prior to the mobilization of equipment to the site to establish baseline conditions. The Contractor will be held responsible for any contamination unless evidence to the contrary can be provided by the contractor.

.2 The contractor will maintain an emergency response plan in accordance with EP3, the Environmental Protection Specifications and applicable legislations

ENVIRONMENTAL PROTECTION PROCEDURES 3

SPILL RESPONSE

March 2018 Revision

1.0 Description

.1 The Contractor shall develop and submit to the Manitoba Infrastructure – Remote Road Operations a spill response plan in accordance with all applicable contract specifications, environmental legislation, permits and authorizations.

.2 Fuel spills, leaks and releases present a hazard to human health and safety, and can be a threat to wildlife habitats, vegetation, soil, surface water and wetlands, groundwater and aquifers, and structures such as wells, drains and ditches. Besides the potential impacts on health and the environment, there may be significant costs associated with wasted fuel, treatment of oily wastewater, and remediation of fuel-impacted sites. The Contractor is responsible for complying with all contract specifications, environmental legislation, permits and authorizations.

2.0 Purpose

.1 The purpose of this procedure is to ensure that all necessary precautions are taken to prevent spills, leaks or releases, in accordance with applicable legislation, regulations, guidelines, permits and contracts.

3.0 Legislation and Supporting Documents

- Manitoba Infrastructure – Remote Road Operation (MI-RRO) Contracts and Associated Documents
- Previous East Side Road Authority (ESRA) Contracts and Associated Documents
- The Manitoba Environment Act - C.C.S.M. c. E125
- The Workplace Safety and Health Act - C.C.S.M. c. W210
- Applicable Provincial Licences and Permits Permits
- The Dangerous Goods Handling and Transportation Act, C.C.S.M. c. D12 - 2010
- Storage and Handling of Petroleum Products and Allied Products Regulation – 188/2001
- National Fire Code of Canada. Canadian Commission on Building and Fire Codes, National Research Council of Canada, 2005
- Environmental Protection Procedures – Appendix 8-2: of P6 – All- Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation, and God's Lake First Nation Environmental Impact Statement – April 2018
- Environmental Protection Specifications – Appendix 8-3: of P6 –

All- Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation, and God's Lake First Nation Environmental Impact Statement – April 2018

4.0 Procedures

4.1 General

.1 All petroleum handling and storage shall comply with Manitoba Regulation 188/2001 respecting *"Storage and Handling of Petroleum Products and Allied Products".*

.2 Petroleum products shall be transported in accordance with the Manitoba Provincial *"Dangerous Goods Handling and Transportation Act"* and the federal "*Transportation of Dangerous Goods Act"*.

.3 Tank vehicles used to deliver fuel to the worksite and/or used to move fuel around the worksite must meet the requirements for highway tanks for the shipment of dangerous goods by road set out in CSA Preliminary Standard B620-98, *Highway Tanks and Portable Tanks for the "Transportation of Dangerous Goods"*.

.4 Dedicated petroleum storage areas shall provide spill containment and facilitate clean up through measures such as:

- Maximum separation from environmentally sensitive features,
- Clear identification of the materials present,
- Access restricted to authorized vehicles and employees,
- Impervious bermed storage areas, and
- Dedicated spill response equipment.

.5 All employees involved in the handling and storage of fuels and hazardous materials shall have WHMIS training.

.6 The Contractor shall designate on-site Emergency Spill Response Coordinators.

.7 It is the responsibility of the Contractor to conduct appropriate soil testing on Designated Area(s) and contract work sites prior to the mobilization of equipment to the site to establish baseline conditions. The Contractor will be held responsible for any contamination unless evidence to the contrary can be provided by the contractor.

4.2 Emergency Response Plan For Spills

.1 The Contractor shall ensure that due care and caution is taken to prevent spills, at all times.

.2 An updated list of key contacts and telephone numbers for reporting spills, problems, etc., shall be kept on-site at all times.

.3 A Workplace Hazardous Materials Information System (WHMIS) file shall be maintained on-site for all hazardous materials at the work area. Prior to commencement of the Work, Material Safety Data Sheets (MSDS) shall be submitted to Manitoba Infrastructure – Remote Road Operations for all hazardous materials to be used on-site. No material shall be brought to the site without prior submission of a MSDS.

.4 All major spills of petroleum products or other hazardous substances with significant impact on the environment and threat to human health and safety (as defined in Table 1) shall be reported to Manitoba Sustainable Development, immediately after occurrence of the environmental accident, by calling the 24-hour emergency number (204) 945-4888 (Toll Free: 1-855-944-4888). The contractor will follow any instructions given by Manitoba sustainable development regarding spill response.

.5 All spills shall be reported to Manitoba Infrastructure – Remote Road Operations within 24 hours whether it was necessary to report the spill to Manitoba Sustainable Development or not. The spill report shall include the following:

- Personnel responding to the spill,
- Material spilled,
- Cause of spill,
- Estimated amount of material spilled,
- Estimated area and volume of soil affected by the spill,
- Cleanup action undertaken, and
- Means used to contain, transport and dispose of the materials involved.

.6 The Contractor shall designate a qualified supervisor(s) as the on-site emergency response coordinator(s). The emergency response coordinator(s) shall have the authority to redirect manpower and equipment in order to respond in the event of a spill.

.7 An updated on-site spill response and containment plan for each dangerous good/hazardous waste shall be maintained in the work area at all times.

.8 The designated emergency response coordinator shall periodically review and if necessary revise the on-site response plan.

.9 Appropriate materials for containment and cleanup of any spill of dangerous goods or hazardous wastes shall be available on-site when such materials are present in the work area. Also designated personnel and first responders shall be familiar with the storage

location and proper application of such containment and cleanup materials.

.10 All spills of quantities less than those set out in Table 1 and without a potential impact to the environment shall be contained and cleaned up immediately by on-site personnel in accordance with the on-site emergency response and containment plan.

.11 All personnel responsible for the handling of dangerous goods and hazardous wastes shall be familiar with the on-site response and containment plan.

.12 The following actions shall be taken by the person in charge of the spilled material or by first person(s) arriving at the scene of a hazardous material accident or by the on-site emergency-response coordinator:

.1 **Notification and Spill Assessment**

.1 Notify the emergency-response coordinator,

.2 Identify exact location and time of accident,

.3 Request assistance as required by magnitude of accident from Manitoba Sustainable Development (24-hour Spill Response Line (204) 945-4888), Police, Fire Department, or Ambulance and Company backup, and

.4 Notify the Manager of Environmental Services for Manitoba Infrastructure.

.2 **Attend to Public Safety**

.1 Secure the area from public access,

.2 Eliminate ignition sources, and

.3 Initiate evacuation of immediate area, if necessary.

.3 **Gather and Assess Information on Status of Situation, noting:**

.1 Personnel on-site,

.2 Cause and effect of spill,

.3 Estimated extent of damage,

.4 Amount and type of material involved, and

.5 Proximity to waterways.

.4 **If safe to do so, and in Accordance with the On-Site Response and Containment Plan Try to Stop the Dispersion or Flow of Spill Material by:**

.1 Approach from upwind,

.2 Stop or reduce leak if safe to do so,

.3 Dyke spilled material with dry, inert sorbet material or dry clay, and

.4 Prevent spill material from entering waterways, utilities or other openings by dyking proximity to waterways.

Table 1

Spills that must be reported to Manitoba Sustainable Development as Environmental Accidents

Column I **Classification**	Column II **Hazard**	Column III **Reportable Quantity Or Level**
1	Explosives	All
2.1	Compressed Gas (Flammable)	100 L*
2.2	Compressed Gas	100 L*
2.3	Compressed Gas (Toxic)	All
2.4	Compressed Gas (corrosive)	All
3	Flammable liquids	100 L
4	Flammable Solids	1 Kg
5.1 PG** I & II	Oxidizer	1 Kb or 1 L
PG III	Oxidizer	50 Kg or 50 L
5.2	Organic Peroxide	1 Kg or 1 L
6.1 PG I	Acute Toxic	1 Kg or 1L
PG II & III	Acute Toxic	5 Kg or 5 L
6.2	Infectious	All
7	Radioactive	Any discharge or radiation level exceeding 10 m Sv/h at the package surface and 200 uSv/h at 1m from the package
8	Corrosive	5 Kg or 5 L
9.1	Miscellaneous (Except PCB mixtures)	50 Kg 0
9.1	PCB mixtures	500 grams
9.2	Aquatic Toxic	1 Kg or 1 L
9.3	Wastes (Chronic Toxic)	5 Kg or 5 L

ENVIRONMENTAL PROTECTION PROCEDURES 4

NOISE CONTROL

March 2018 Revision

Procedure name: Noise Control

Reference number EP4

1.0 Description

.1 All construction activities shall be undertaken by means that do not result in violation of the noise by-laws of adjacent municipal authorities. The Contractor is responsible for ensuring compliance with contract specifications, environmental legislation, permits and authorizations.

2.0 Purpose

.1 The purpose of this procedure is to ensure that the Contractor complies with noise by-laws of the adjacent municipal authorities.

3.0 Legislation and Supporting Documents

- Manitoba Infrastructure – Remote Road Operation (MI-RRO) Contracts and Associated Documents
- Previous East Side Road Authority (ESRA) Contracts and Associated Documents
- Applicable Provincial Licences and Permits
- Environmental Protection Procedures – Appendix 8-2: of P6 – All- Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation, and God's Lake First Nation Environmental Impact Statement – April 2018
- Environmental Protection Specifications – Appendix 8-3: of P6 – All- Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation, and God's Lake First Nation Environmental Impact Statement – April 2018

4.0 Procedures

.1 All plant and equipment supplied by the Contractor for use on the Project shall be effectively "sound-reduced" by means of proper silencers, mufflers, acoustic linings, acoustic shields or acoustic sheds.

.2 The Contractor shall comply with the noise By-laws of the adjacent First Nations, communities and municipal authorities and any noise related clauses incorporated in the project's Environment Act License.

.3 Any operation of plant or equipment outside the hours as regulated by the adjacent First Nations, communities or municipal authorities shall require an exemption in writing. The Contractor shall provide a copy of such an exemption to the Contract Administrator.

ENVIRONMENTAL PROTECTION PROCEDURES 5

MATERIALS HANDLING AND STORAGE

March 2018 Revision

1.0 Description

.1 This procedure specifies materials handling and storage requirements during all phases of construction.

2.0 Purpose

.1 The purpose of this procedure is to ensure that construction sites are kept clean and orderly at all times in accordance with applicable contract specifications, legislation, permits and authorizations.

3.0 Legislation and Supporting Documents

- Manitoba Infrastructure – Remote Road Operation (MI-RRO) Contracts and Associated Documents
- Previous East Side Road Authority (ESRA) Contracts and Associated Documents
- The Dangerous Goods Handling and Transportation Act, CCSM c D12
- Workplace Safety and Health Act, CCSM c W210
- The Environment Act, CCSM c E125
- Waste Management Facilities Regulation, CCSM c E125
- Onsite Wastewater Management Systems Regulation No. 83/2003
- Applicable Provincial Licences and Permits
- Environmental Protection Procedures – Appendix 8-2: of P6 – All- Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation, and God's Lake First Nation Environmental Impact Statement – April 2018
- Environmental Protection Specifications – Appendix 8-3: of P6 – All- Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation, and God's Lake First Nation Environmental Impact Statement – April 2018

4.0 Procedures

4.1 General

.1 All construction areas shall be kept clean and orderly at all times during and at completion of construction.

.2 Waste material shall be recycled to a degree that is economically and practically feasible.

.3 There shall be no indiscriminate dumping of waste and litter on or off the construction site.

.4 Different waste streams shall not be mixed.

.5 All waste materials shall be collected and contained in a designated waste storage area and in containers appropriate to the waste classification until removed from the site for recycling or disposal at an approved facility.

.6 Waste storage sites shall be designated for each worksite and camp as approved by the Contract Administrator.

.7 Waste material (i.e. food and food containers) that is likely to attract nuisance wildlife shall be stored in wildlife proof storage bins and hauled off site at regular intervals for disposal at an approved disposal facility.

.8 Contaminated runoff or water shall be contained and prevented from entering any watercourse. The collected contaminated runoff or water shall be hauled off site for disposal at an approved disposal facility.

4.2 Domestic Solid Wastes, Demolition and Construction Waste

.1 At no time during construction shall domestic solid, demolition, or construction waste be permitted to accumulate at any location on the work site, other than at a dedicated waste storage site, unless approved by the Contract Administrator.

.2 All domestic solid waste containers shall be clearly marked to identify the nature and type of material to be deposited (e.g. containers for recyclable material and containers for disposal).

.3 No on-site burning of waste or any other material is allowed unless approved by the Contract Administrator. The Contractor shall be responsible for obtaining a burning permit from Manitoba Sustainable Development for burning between April 1 and November 15.

.4 All domestic solid waste storage shall be confined to Designated Areas.

.5 Waste concrete from concrete pumps and concrete trucks, cleanout materials from concrete trucks, concrete pumps and other equipment shall be deposited only in the concrete washout Designated Area. All of this material shall be hauled off site, for disposal at an approved landfill or to a recycling facility, not later than at the closure of the Designated Area.

4.3 Domestic Sewage

.1 All sewage shall be collected through the provision of an outside toilet facility in compliance with the *Onsite Wastewater Management Systems Regulation No. 83/2003.*

.2 All collected sewage shall be removed from the site at least once every seven (7) days by a registered sewage hauler, as defined in section 21(1) of the *Onsite Wastewater Management Systems Regulation No. 83/2003* and disposed of at a wastewater treatment facility licenced under The Environment Act or otherwise federally regulated.

4.4 Dangerous Goods/Hazardous Waste Handling and Disposal

.1 Dangerous goods/hazardous wastes shall be identified and shall be handled in accordance with The Dangerous Goods Handling and Transportation Act and Regulations and Health Canada's Workplace Hazardous Materials Information System (WHMIS).

.2 The Contractor shall have staff, trained and certified in the handling of dangerous goods, present on-site whenever said dangerous goods are being utilized for the performance of the work.

.3 All dangerous goods/hazardous waste shall be confined to Designated Areas and stored in a secure manner to prevent access by non-designated employees.

.4 Designated dangerous goods/hazardous waste storage areas shall have the top soil stripped and be lined with at least 30 cm of impermeable material or approved equal and dyked in such a manner as to contain any leakage or spillage. The dykes shall be designed, constructed and maintained to retain not less than 100% of the capacity of the total number of containers or 110% of the largest container, whichever is greatest. The top soil shall be stored and used in the restoration of the site.

.5 Disposal of hazardous waste shall only be at hazardous waste facilities licensed under The Dangerous Goods Handling and Transportation Act.

.6 All waste stored at designated hazardous waste storage areas shall be removed from the site at least once every seven (7) days.

.7 Hydrocarbons shall not be stored or disposed of in earthen pits on-site.

.8 All used oils shall be stored in appropriate drums or tanks until removed to a registered waste oil recycling centre or hazardous waste disposal facility.

.9 Used oil filters shall be drained, placed into suitable storage containers and disposed of at approved facilities. The oil drained out of the used filters shall be collected and handled in the same manner as used oil.

.10 A pesticide use permit shall be obtained prior to the application of pesticides. The Contractor shall ensure that all pesticides are applied by a licenced commercial applicator and adhere to all conditions specified in this permit. These conditions include submitting a properly completed post seasonal form to the Contract Administrator at the completion of the Contract or at the end of each calendar year confirming that any terms and conditions of the permit have been satisfied. The Contractor shall supply the following information to the Contract Administrator:

.1 The name of each pesticide used,

.2 The Pest Control Product number of each pesticide,

.3 Quantity in litres of each pesticide used,

.4 Total area treated in hectares,

.5 A map of the treated areas,

.6 Legal description of the land where practical, and

.7 Color coded map to indicate where each type of pesticide was used.

.11 All pesticides shall be handled and applied by or under the direct supervision of a licensed commercial applicator, as defined in section 4.1 of the *Pesticides Regulation 94/88*, and further all pesticides shall be used in accordance with any terms and conditions of the permit.

.12 As dangerous goods/hazardous waste storage areas are taken out of service any remediation shall be conducted, including the appropriate disposal of the contaminated material to the satisfaction of the Contract Administrator.

ENVIRONMENTAL PROTECTION PROCEDURES 6

WORKING WITHIN OR NEAR FISH BEARING WATERS

March 2018 Revision

Procedure name:
Working Within or Near Fish Bearing Waters

Reference number
EP6

1.0 Description

.1 This procedure specifies requirements for working within or near fish bearing waters during all phases of construction.

2.0 Purpose

.1 To ensure that any works occurring within a watercourse is conducted according to applicable guidelines and permit requirements.

.2 To ensure the implementation of appropriate mitigation measures and Best Management Practices to protect aquatic habitats.

.3 To ensure that water quality standards are met throughout the course of instream construction activities.

3.0 Legislation and Supporting Documents

- Manitoba Infrastructure – Remote Road Operation (MI-RRO) Contracts and Associated Documents
- Previous East Side Road Authority (ESRA) Contracts and Associated Documents
- Applicable Provincial Licences and Permits
- Applicable Fisheries and Oceans Canada (DFO) Authorizations
- Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat (www.gov.mb.ca/waterstewardship/fisheries/habitat/sguide.pdf)
- Freshwater Intake End-of-Pipe Fish Screen Guidelines – Department of Fisheries and Oceans 1995 (www.dfo-mpo.gc.ca/Library/223669.pdf)
- Environmental Protection Procedures – Appendix 8-2: of P6 – All- Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation, and God's Lake First Nation Environmental Impact Statement – April 2018
- Environmental Protection Specifications – Appendix 8-3: of P6 – All- Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation, and God's Lake First Nation Environmental Impact Statement – April 2018

4.0 Procedures

.1 The Contractor shall schedule and plan the Work so that the amount of in-water work is kept to a minimum. Construction activities shall not occur within 100 metres of a watercourse with the exception of construction of a watercourse crossing.

.2 In-water work shall be restricted to low flow periods where possible. Whenever possible, in-water works shall be scheduled during a period when the watercourse is seasonally dry or frozen to the bottom.

.3 The Contractor shall not undertake construction activities in fish bearing waters or potentially fish bearing waters between April 15 and July 15 of any year, or during periods of high stream flow or identified spawning periods. In watercourses determined to contain fall spawning fish species, the contractor shall not undertake “in water” construction activities before July 15 or after September 15.

.4 Material, cleared vegetation, stockpiles and/or waste shall not be deposited or stored within 100 metres of a watercourse, unless approved by the Contract Administrator. No borrow shall be removed from within 100 metres of water body.

.5 The disturbance to the stream bed and banks shall be minimized. Use existing trails, roads or cut lines to access the site where possible to avoid disturbance to riparian vegetation.

.6 All construction activities shall be suspended during adverse weather conditions (i.e., heavy rains).

.7 As a general rule, keep roads a minimum of 100 metres away from a watercourse except when crossing the watercourse. This often forces the alignment onto drier sites. If a 100 metre distance is not possible, allow a buffer zone of undisturbed vegetation between the road and the waterway, using a buffer zone width of approximately 10 m plus 1.5 times the slope gradient or 30 m, whichever is greater.

.8 Backfill (i.e. rip rap and other rock materials) installed adjacent to a fish bearing water body shall be clean and well graded granular material that is free of fines.

.9 Where possible, in-water work shall be staged to occur as a single event and machinery access shall be limited to a single point on the shoreline.

.10 The distance between the machinery access point and the worksite shall be minimized.

.11 The Contractor shall use an in-stream pad built of washed gravel where in-water equipment activity would generate excess sediment.

.12 If work is being conducted under a Fisheries and Oceans Canada (DFO) Authorization, adhere to all conditions outlined within the Authorization.

.13 Equipment shall arrive on site in a clean, washed condition, and free of fluid leaks.

.14 Equipment shall be kept in good repair to prevent leakage of fuel oil etc. Avoid fuelling, changing oil, repairing or washing any equipment within 100 metres of the normal high water mark. Ensure runoff and water used for equipment cleaning does not enter any water body.

.15 Spill containment and cleanup supplies shall be stored and accessible on site at all times.

.16 Vehicles and other equipment shall be kept away from and out of the water unless instructed otherwise by the Contract Administrator.

.17 If there is no existing crossing and the watercourse must be crossed, a temporary crossing shall be constructed to keep all vehicles and equipment out of the watercourse.

.18 Concrete works shall be conducted in a manner that does not allow direct or indirect entry of concrete, concrete fines or concrete wastewater into the watercourse.

.19 Natural debris removal shall be limited to that which is necessary to protect bridge piers or abutments or to that which is blocking culverts.

.20 Debris and other objects shall be lifted out of the water whenever possible. Items shall not be dragged across the stream bed/lake bottom and banks/shoreline.

.21 All banks/shoreline areas that are disturbed shall be restored to their original conditions as soon as practicable, including re-vegetation if necessary. Erosion and sediment control measures shall be implemented, inspected and maintained until vegetation is established.

.22 Work plans for beaver dam removal shall be provided to the Contract Administrator 5 business days prior to the start of dam removal.

ENVIRONMENTAL PROTECTION PROCEDURES 7

STREAM CROSSINGS

March 2018 Revision

Procedure name:
Stream Crossings

Reference number:
EP7

1.0 Description

.1 The installation of stream crossings will be required to facilitate various activities. The Contractor is responsible for ensuring compliance with contract specifications, environmental legislation, permits and authorizations.

2.0 Purpose

.1 The purpose of this procedure is to ensure that stream crossings are installed in accordance with applicable environmental legislation, regulations, guidelines, permits and contracts.

3.0 Legislation and Supporting Documents

- Manitoba Infrastructure – Remote Road Operation (MI-RRO) Contracts and Associated Documents
- Previous East Side Road Authority (ESRA) Contracts and Associated Documents
- Applicable Provincial Licences and Permits
- Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat –May 1996 (www.gov.mb.ca/waterstewardship/fisheries/habitat/sguide.pdf)
- Freshwater Intake End-of-Pipe Fish Screen Guidelines – Department of Fisheries and Oceans 1995 (www.dfo-mpo.gc.ca/Library/223669.pdf)
- Environmental Protection Procedures – Appendix 8-2: of P6 – All- Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation, and God's Lake First Nation Environmental Impact Statement – April 2018
- Environmental Protection Specifications – Appendix 8-3: of P6 – All- Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation, and God's Lake First Nation Environmental Impact Statement – April 2018

4.0 Procedures

.1 All stream crossings shall be constructed in accordance with *The Manitoba Stream Crossing Guidelines for the Protection of Fish Habitat – May 1996*.

.2 A minimum vegetated buffer strip of 30 metres shall be maintained between the worksite and watercourse except at the actual crossing location.

.3 Where possible, existing stream crossings shall be utilized to traverse watercourses.

.4 Temporary stream crossings shall be located at straight stream sections, perpendicular to the bank. In particular, meandering bends, braided streams, alluvial fans and other unstable areas shall be avoided.

.5 Temporary stream crossings shall be designed for their intended construction loading and to accommodate anticipated water flows.

.6 The number of temporary stream crossings constructed shall be minimized.

.7 When feasible, the construction of stream crossings shall be scheduled for the period of lowest stream flow and should be a single event.

.8 Streams shall be crossed at right angles to minimize shoreline disturbance to the extent possible.

.9 The natural alignment of the stream shall be maintained.

.10 Where possible, there shall be no dredging, infilling, grading or excavating of the channel bed or banks.

.11 Temporary stream crossings shall be removed as soon as possible following completion of the work or when it is no longer required.

.12 Following the removal of a temporary stream crossing, the site shall be restored to its original state. The restoration shall include appropriate erosion and sediment control measures and re-vegetation of disturbed areas as required.

ENVIRONMENTAL PROTECTION PROCEDURES 8

TEMPORARY STREAM DIVERSIONS

March 2018 Revision

Procedure name: Temporary Stream Diversions

Reference number: EP8

1.0 Description

.1 Worksite isolation shall be undertaken as instructed by the Manitoba Infrastructure – Remote Road Operations to accommodate any in water works that must be conducted "in the dry" within fish bearing waters to minimize erosion and sedimentation and maintain downstream flows. The Contractor is responsible for ensuring compliance with contract specifications, environmental legislation, permits and authorizations.

.2 Suspended sediment presents a hazard to fish and fish habitat as it can clog and abrade gills, smother eggs, change habitat structure and cover food supply. Maintaining downstream flows is critical to the survival of many aquatic species.

2.0 Purpose

.1 The purpose of this procedure is to ensure that temporary stream diversions are installed in accordance with applicable environmental legislation, regulations, guidelines, permits and contracts.

3.0 Legislation and Supporting Documents

- Manitoba Infrastructure – Remote Road Operation (MI-RRO) Contracts and Associated Documents
- Previous East Side Road Authority (ESRA) Contracts and Associated Documents
- The Environment Act - C.C.S.M. c. E125
- The Workplace Safety and Health Act - C.C.S.M. c. W210
- Applicable Provincial Licences and Permits
- Department of Fisheries and Oceans' *"Freshwater Intake End-of-Pipe Fish Screen Guideline" (1995).*
- The Manitoba Stream Crossing Guidelines for the Protection of Fish Habitat – May 1996
- Fisheries Act – RSC, 1985, c. F-14
- Environmental Protection Procedures – Appendix 8-2: of P6 – All- Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation, and God's Lake First Nation Environmental Impact Statement – April 2018
- Environmental Protection Specifications – Appendix 8-3: of P6 – All- Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation, and God's Lake First Nation Environmental Impact Statement – April 2018

4.0 Procedures

4.1 General

.1 Temporary stream diversions shall be constructed under low flow conditions and shall be designed to accommodate flows that may occur during storm events.

.2 Instream diversion structures (i.e., sheet piling, sandbags, etc.) shall be constructed using erosion resistant materials.

.3 Temporary stream diversions shall be designed to provide fish passage, even during low flow conditions. If elevated pipes are used, remove diversion during fish migration periods.

.4 Stream diversion channels shall be constructed in the dry, excavating from downstream to upstream. Diversion channels shall have gentle curves and similar gradient to the natural watercourse.

.5 To help prevent potential erosion, the diversion channel shall be lined with erosion resistant materials (i.e., plastic, rock) where practicable.

.6 While the worksite is isolated, flow shall be maintained downstream at all times.

.7 A fish salvage operation shall be conducted by a qualified biologist with a "live fish handling permit" prior to dewatering of the isolated work area.

.8 The site shall be restored as soon as possible following completion of the Work. The restoration work shall include re-vegetation of disturbed areas (i.e. channel banks), infilling any temporary channels, removing all construction materials and debris and installation and maintenance of required erosion and sediment control measures.

4.2 Temporary Diversion Channels

.1 Temporary diversion channels shall be designed to accommodate expected watercourse flow from storm events.

.2 Temporary diversion channels shall be constructed "in the dry" by not excavating upstream and downstream ends of the diversion channel.

.3 Existing watercourses shall not be disturbed until temporary diversion channels have been constructed.

.4 Diversion channels shall be opened from the downstream end first. Stabilize the connection of the diversion channel to the main watercourse. Pump flows around work site, if possible during construction of the channel connection.

.5 The upstream connection to the main watercourse shall be constructed and stabilized while pumping flows, if possible, around the work area.

.6 Gradient controls shall be used to ensure that diversion channel slopes correspond to the existing channel gradients.

.7 Erosion control measures shall be installed to protect any unstable channel beds and banks.

.8 The diversion channel shall be inspected following a severe rainstorm or at the end of the spring freshet to identify areas of incipient erosion. Eroded areas shall be repaired promptly.

4.3 Pumped Diversions

.1 Pumped diversions shall be used wherever a channel must be completely blocked to allow work 'in the dry'.

.2 Intakes shall be sized and screened to prevent debris blockage and fish mortality in accordance with DFO's *Freshwater Intake End-of-Pipe Fish Screen Guideline.*

.3 The Pumping system shall be sized to accommodate expected watercourse flow from storm events (generally 1 in 5 year event, although the 1 in 2 year event may be used for non-critical situations).

.4 Pumps shall be discharged onto geofabric, gravel, straw bales or an alternate approved by the Contract Administrator to dissipate the energy of discharge and mitigate scouring of channel banks and/or streambed.

ENVIRONMENTAL PROTECTION PROCEDURES 9

FISH PASSAGE

March 2018 Revision

Procedure name:
Fish Passage

Reference number:
EP9

1.0 Description

.1 Providing fish passage shall be undertaken as instructed by the Manitoba Infrastructure – Remote Road Operations (MI-RRO) to accommodate for in-water construction activities. The Contractor is responsible for ensuring compliance with contract specifications, environmental legislation, permits and authorizations.

2.0 Purpose

.1 The purpose of this procedure is to ensure that fish passage is maintained in accordance with applicable environmental legislation, regulations, guidelines, permits and contracts.

3.0 Legislation and Supporting Documents

- Manitoba Infrastructure – Remote Road Operation (MI-RRO) Contracts and Associated Documents
- Previous East Side Road Authority (ESRA) Contracts and Associated Documents
- The Environment Act - C.C.S.M. c. E125
- Applicable Provincial Licences and Permits
- Fisheries Act – RSC, 1985, c. F-14
- Environmental Protection Procedures – Appendix 8-2: of P6 – All- Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation, and God's Lake First Nation Environmental Impact Statement – April 2018
- Environmental Protection Specifications – Appendix 8-3: of P6 – All- Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation, and God's Lake First Nation Environmental Impact Statement – April 2018

4.0 Procedures

.1 Flow shall not be constricted by more than two thirds (66.6%) of the original stream width.

.2 Flow shall be maintained at all times to permit the safe and unimpeded passage of fish.

.3 A temporary diversion channel to direct flows around the work site shall be constructed if flows are to be constricted by more than two thirds of the original stream width in fish bearing waters.

.4 In non fish bearing waters a pumped diversion may be used instead to maintain flows downstream.

.5 Cleared trees, vegetation or construction materials shall not obstruct waterways during any season, and shall be stored above the ordinary high water mark (1 in 2 year high water mark).

ENVIRONMENTAL PROTECTION PROCEDURES 10

FISH SALVAGE

March 2018 Revision

Procedure name: Fish Salvage

Reference number: EP10

1.0 Description

.1 Fish salvage operations shall be undertaken as instructed by the Manitoba Infrastructure – Remote Road Operations to accommodate for in-water construction activities. The Contractor is responsible for ensuring compliance with contract specifications, environmental legislation, permits and authorizations.

2.0 Purpose

.1 To ensure that fish salvages are conducted in accordance with applicable environmental permits, guidelines and legislation.

.2 To ensure that best management practices and guidelines are implemented for the protection of aquatic species.

3.0 Legislation and Supporting Documents

- Manitoba Infrastructure – Remote Road Operation (MI-RRO) Contracts and Associated Documents
- Previous East Side Road Authority (ESRA) Contracts and Associated Documents
- Applicable Provincial Licences and Permits
- Applicable Fisheries and Oceans Canada Authorizations
- Environmental Protection Procedures – Appendix 8-2: of P6 – All- Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation, and God's Lake First Nation Environmental Impact Statement – April 2018
- Environmental Protection Specifications – Appendix 8-3: of P6 – All- Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation, and God's Lake First Nation Environmental Impact Statement – April 2018

4.0 Procedures

.1 A fish salvage operation shall be conducted where site isolation and/or dewatering is required.

.2 Fish salvages shall be conducted by qualified Professional Biologist possessing the necessary Manitoba Sustainable Development Permits for fish handling.

.3 Fish salvages shall be conducted following the isolation of the worksite and prior to the completion of dewatering and/or commencement of construction works.

.4 Partial dewatering is permissible to decrease wetted area and increase efficiency of capture, provided that pump intakes are adequately screened (See DFO *Freshwater Intake End-of-Pipe Fish Screen Guideline*). However, the fish salvage shall be completed prior to dewatering the entire area.

.5 If necessary, captured fish shall be placed in a holding tank with adequate water until released.

.6 Captured fish shall be cataloged by species. The length and weight of a representative proportion of captured fish species shall be recorded.

.7 The following information shall be collected and recorded:

- .1 Date,
- .2 Location (watercourse name and geographic coordinates),
- .3 Description of project/construction works,
- .4 Physical habitat parameters – channel width, wetted width, size (area) and depth of salvage area, water temperature,
- .5 Fish capture method (e.g. Seine net, dip net, gill net, backpack electrofishing) ,
- .6 Effort (e.g. two passes with a seine net; two people dip netting for 0.5 hours; backpack electrofishing for 350 seconds),
- .7 Number of fish collected, by species, and
- .8 Length and weight of a representative proportion of captured fish species.

.8 All captured fish shall be released downstream of the worksite.

ENVIRONMENTAL PROTECTION PROCEDURES 11

CULVERT MAINTENANCE AND REPLACEMENT

March 2018 Revision

Procedure name:
Culvert Maintenance and Replacement

Reference number:
EP11

1.0 Description

.1 Culvert maintenance and replacement shall be undertaken as instructed by the Manitoba Infrastructure – Remote Road Operations to accommodate for in-water construction activities. The Contractor is responsible for ensuring compliance with contract specifications, environmental legislation, permits and authorizations.

2.0 Purpose

.1 To ensure that culvert maintenance and replacement is conducted in accordance with applicable environmental permits, guidelines and legislation.

3.0 Legislation and Supporting Documents

- Manitoba Infrastructure – Remote Road Operation (MI-RRO) Contracts and Associated Documents
- Previous East Side Road Authority (ESRA) Contracts and Associated Documents
- Applicable Provincial Licences and Permits
- Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat (www.gov.mb.ca/waterstewardship/fisheries/habitat/sguide.pdf)
- Freshwater Intake End-of-Pipe Fish Screen Guidelines – Department of Fisheries and Oceans 1995 (www.dfo-mpo.gc.ca/Library/223669.pdf)
- Applicable Fisheries and Oceans Canada (DFO) Authorizations or Letters of Advice
- Fisheries Act, RSC.,1985, c-F14
- The Environment Act - C.C.S.M. c. E125
- The Workplace Safety and Health Act - CCSM. c. W210
- Environmental Protection Procedures – Appendix 8-2: of P6 – All- Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation, and God's Lake First Nation Environmental Impact Statement – April 2018
- Environmental Protection Specifications – Appendix 8-3: of P6 – All- Season Road Linking Manto Sipi Cree Nation, Bunibonibee Cree Nation, and God's Lake First Nation Environmental Impact Statement – April 2018

4.0 Procedures

.1 Material and debris removal shall be timed to prevent disruption to sensitive fish life stages by adhering to DFO's restricted activity timing windows unless accumulated material is preventing the passage of water and/or fish through the structure. The Contractor shall not undertake construction activities in fish bearing waters or potentially fish bearing waters between April 15 and July 15 of any year, or during periods of high stream flow.

.2 Emergency debris removal using hand tools or machinery (e.g. backhoe) may be carried out at any time of year. Emergencies include situations where carrying out the project immediately is in the interest of preventing damage to property or the environment, or is in the interest of public health or safety. DFO is to be notified immediately.

.3 Effective erosion and sediment control measures shall be installed prior to starting work. These measures shall be inspected regularly during the course of construction. The contractor shall make all necessary repairs if any damage occurs.

.4 The contractor shall limit the removal of accumulated material (i.e., branches, stumps, other woody materials, garbage, etc.) to the area within the culvert, immediately upstream of the culvert and to that which is necessary to maintain culvert function and fish passage.

.5 Accumulated material and debris shall be removed slowly to allow clean water to pass, to prevent downstream flooding and reduce the amount of sediment-laden water going downstream.

.6 When removing beaver dams and associated debris for culvert maintenance, the Contractor shall:

- .1 Time work to avoid harm to spawning fish, eggs, and larval fish.
- .2 Install effective sediment and erosion control measures before starting work. Erosion and sediment control is to be inspected regularly to ensure proper function and repaired immediately if found damaged.
- .3 Operate machinery from outside from outside the water that minimizes the disturbance to the banks and bed of the watercourse.
- .4 Remove dam gradually to allow water to release slowly and prevent sediment at the bottom of the pond from being released downstream.
- .5 Not create a breach in the dam exceeding the width of the original stream.
- .6 Not use explosives without MI and DFO approval.