

Project Description Summary

Lake Manitoba and Lake St. Martin Outlet Channels



Prepared for:

Canadian Environmental Assessment Agency

Submitted by:

Manitoba Infrastructure

January 2018



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1 General Information and Contacts

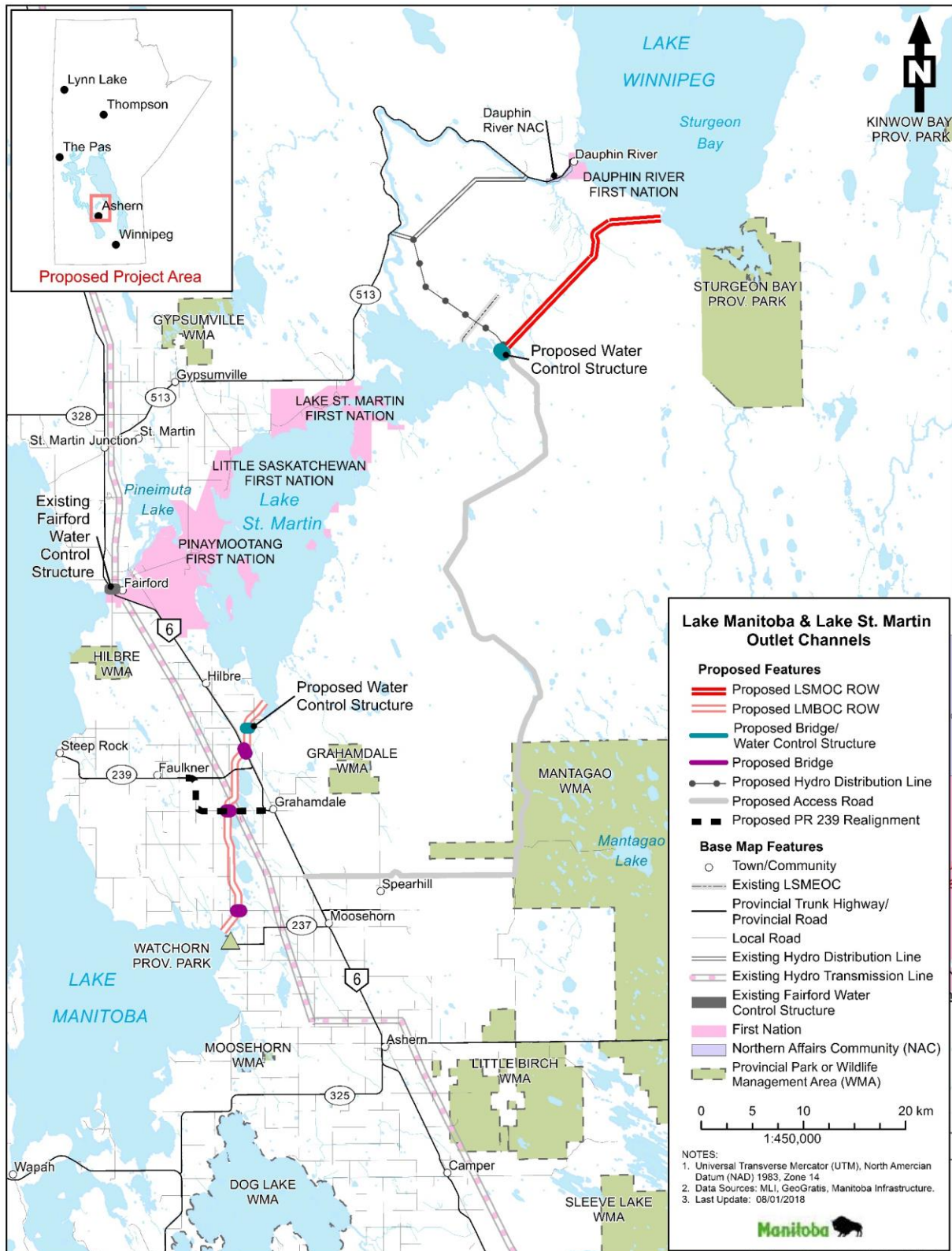
1.1 Project Name, Nature and Proposed Location

Manitoba Infrastructure (MI) is proposing the development of a permanent flood control management system for Lake Manitoba and Lake St. Martin, which will replace the existing Lake St. Martin Emergency Outlet Channel (LSMEOC) developed in 2011. Widespread flooding across much of southern Manitoba in 2011 resulted in unprecedented inflows into Lake Manitoba and Lake St. Martin, overwhelming the capacity of existing waterways. Subsequent flooding resulted in the long-term evacuation of communities surrounding Lake St. Martin and the Dauphin River, affected thousands of acres of farmland, bridges and highways, homes and cottages around Dauphin Lake, Lake Manitoba and Lake St. Martin – and led to the decision in 2011 to construct the LSMEOC on an emergency basis.

The proposed Lake Manitoba & Lake St. Martin Outlet Channel (LMBOC & LSMOC) Project is the final preferred recommendation as identified through several studies conducted after the 2011 flood (Flood Review Task Force 2013, LM & LSMRRC 2013, KGS 2016). To help reduce the effects of future flood events, two channels with one water control structure in each are required to direct flows from Lake Manitoba to Lake St. Martin and then to Lake Winnipeg (Map 1). During high water events, the proposed Lake Manitoba and Lake St. Martin Outlet channels will facilitate enhanced management and control of water levels on Lake Manitoba and Lake St. Martin by providing additional outlet capacity for Lake Manitoba to Lake St. Martin. This new development is supplemental to, but not an expansion of, existing flood infrastructure in Manitoba.

Construction of new channels in this area will also require re-alignment of existing roadways and construction of new bridge structures. The Lake Manitoba Outlet Channel's (LMBOC) design capacity will be 212 cubic metres per second (m^3/s) when operational and will be roughly 23 km long with an up to 100 m wide channel (Map 1). The LMBOC will be located in the center of a 400 m right-of-way that will also contain spoil berms and runoff collection ditches. The Lake St. Martin Outlet Channel's (LSMOC) capacity will be 326 m^3/s when operational and will be roughly 24 km long with an up to 120 m wide channel. The total footprint of the LSMOC, including containment berms and runoff collection ditches, will be located on Crown land and be contained within a 400 m ROW. If operated continually and at full capacity, the LMBOC and LSMOC could divert approximately 6.698 billion and 10.269 billion m^3 of water per year, respectively.

Manitoba Infrastructure (MI) has prepared a Project Description that complies with the *Prescribed Information for the Description of a Designated Project Regulations*, and the Guide to Preparing a Description of a Designated Project under the *Canadian Environmental Assessment Act, 2012*. This Project Description Summary is prepared to assist in the Canadian Environmental Assessment Agency's (the Agency's) determination on the need for a federal environmental assessment of the Project.



Map 1. Project Area

1.2 Proponent's Name and Contact Information

Project name: Lake Manitoba and Lake St. Martin Outlet Channels (LMB & LSM OC)

Proponent: Manitoba Infrastructure - 6th Floor - 215 Garry Street, Winnipeg MB R3C 3P3

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2.0 Federal and Provincial Involvement and Regulatory Requirements

2.1 Federal Involvement

The Project is being developed so as to reduce flooding on Lake Manitoba, Lake St. Martin and surrounding communities and will not directly affect any federal land, including granting of interest in federal land through easement, right of way, or transfer of ownership.

Manitoba is seeking to share costs for Project design and construction with Canada. The cost for the design and construction of the Project will be shared by the Province of Manitoba and Government of Canada. Canada committed to cost sharing 50% to a total of \$247.5 Million through the New Building Canada Fund – Provincial Territorial Infrastructure Component – National Regional Projects. An agreement in principle is anticipated in the future at which time provincial expenditures will become eligible for cost share.

2.2 Regulatory Requirements

The proposed LMB & LSM OC is a designated project under The *Canadian Environmental Assessment Act, 2012* (CEAA 2012, section 6), and therefore is expected to require an environmental assessment, subsequent to federal and public review of this Project Description under the provisions of CEAA 2012. Permits and approvals will be sought for construction activities such as vegetation removal, camp development, burning of cleared vegetation, and quarry development. Table 1 provides a listing of Project-pertinent legislation to the construction of the outlet channels and associated works. The Project requires an *Environment Act* Licence under *The Environment Act* of Manitoba. Being a flood control project protecting areas greater than 100 km², the Project will likely be classified as a Class 3 development and require an environmental assessment. An *Environment Act* proposal (EAP) form will be submitted to Manitoba Sustainable Development (MSD) to initiate the provincial environmental assessment process.

Table 1. Regulatory Requirements of the LMB & LSM OC Project

Act	Regulatory Objectives, Project Linkages and Permits
<i>Canadian Environmental Assessment Act, 2012</i>	Identifies and defines activities subject to and guidance for an environmental assessment.
<i>Canada Water Act 1985</i>	Protection of water resources, including water quality
<i>Fisheries Act 1985</i>	Protects fisheries from serious harm; requires Authorization under Paragraph 35(2)(b).
<i>Migratory Birds Convention Act 1994</i>	Protects designated migratory birds and their nests
<i>Navigation Protection Act 1985</i>	Protects rights on navigable and scheduled waterways. MI will opt-in and obtain Transport Canada Authorization.
<i>Species at Risk Act 2002</i>	Prevents extirpation or extinction of wildlife species, and protects endangered and threatened species.
<i>Transportation of Dangerous Goods Act 1992</i>	Methods for handling, containing and transporting substances that could cause damage to personal safety or the environment.
<i>Explosives Act 1985</i>	Manufacturing, testing, acquisition, possession, sale, storage, transportation, importation and exportation of explosives. Blasting activities and explosives storage and transport will be licenced.
<i>The Environment Act</i>	Identifies and defines activities subject to and guidance for an environmental assessment in Manitoba. Project requires environmental assessment and Environment Act Licence.
<i>The Crown Lands Act</i>	Requirement for and issuance of leases, permits, easements and rights-of-way for specified works on provincial Crown lands
<i>The Dangerous Goods Handling and Transportation Act</i>	Identifies requirements for handling, containment and transportation of dangerous substances
<i>The Mines and Minerals Act</i>	Requirements for sustainable development of mineral product exploration and production, including quarrying, in Manitoba. Quarry permits will be required.
<i>The Wildlife Act</i>	Designates provincial wildlife lands, regulates licenced harvest of wildlife, and identifies other protections in Manitoba.
<i>The Heritage Resources Act</i>	Designates heritage sites, protection for heritage resources, identifies when a heritage resource impact assessment needed
<i>The Workplace Safety and Health Act</i>	Outlines safety in the workplace, identifies requirements to meet safe work practices
<i>The Water Rights Act</i>	Identifies rights and use of water in Manitoba and prohibitions against diversion of water or operation of water works. Permits may be required for drainage works.
<i>The Endangered Species and Ecosystems Act</i>	Lists and assures protection of threatened and endangered species and ecosystems in Manitoba

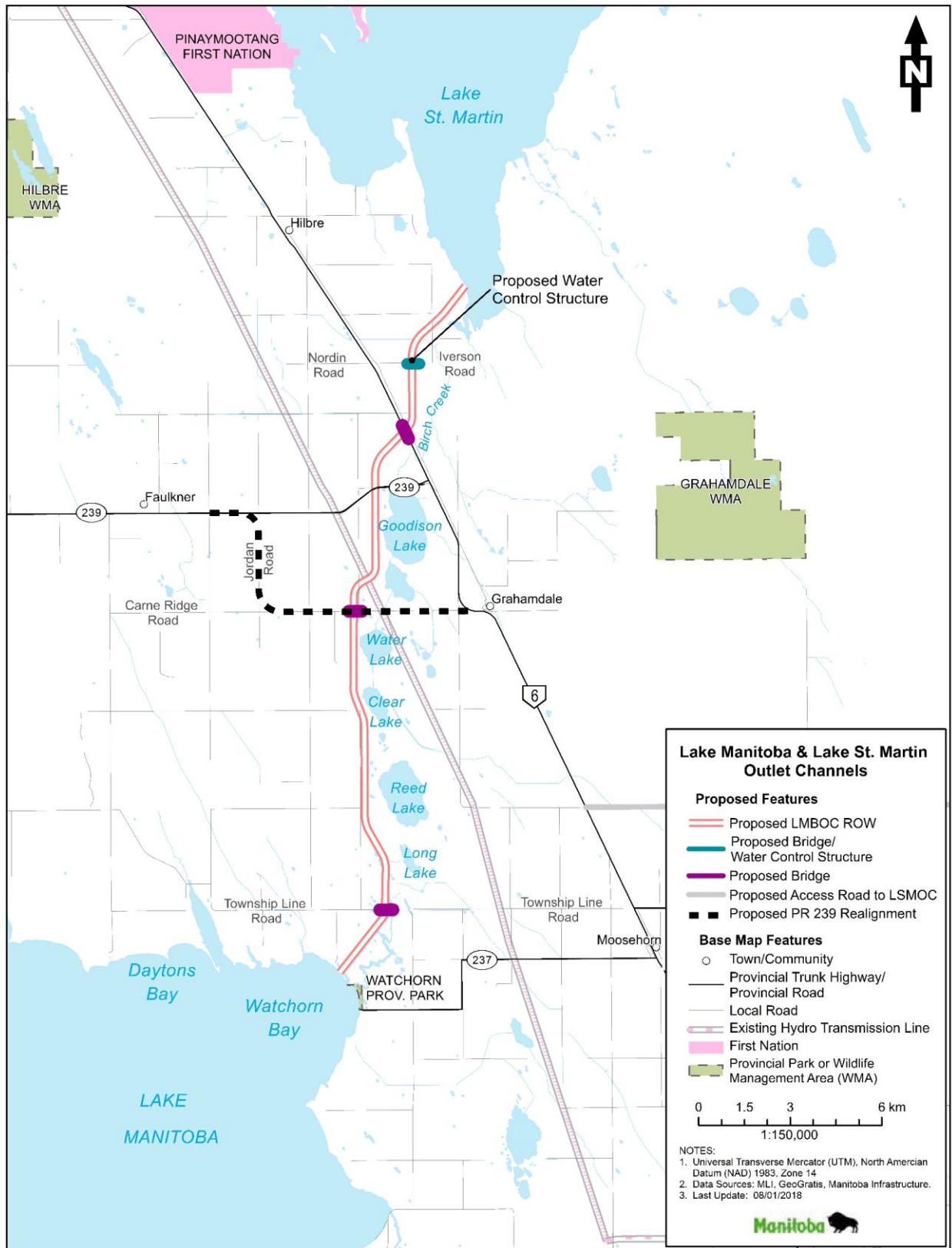
Act	Regulatory Objectives, Project Linkages and Permits
<i>The Noxious Weeds Act</i>	Identifies noxious weeds, outlines responsibilities to control or destroy such weeds and prohibits their spread
<i>The Water Resources Administration Act</i>	Framework for administration of water control works, including requirements and processes for approval of operating guidelines
<i>The Water Protection Act</i>	Protects Manitoba's water resources and aquatic ecosystems
<i>The Wildfires Act</i>	Outlines wildfire controls, duties and prohibitions.

The LMBOC and LSMOC are not located within a designated regional planning district where environmental or land use plans have been developed. After the 2011 provincial flood event, the Province of Manitoba initiated a study to identify and mitigate potential flood risk and assess potential options to reduce risk for communities and infrastructure to a number of major rivers and lakes within the Assiniboine River and Lake Manitoba watersheds. These studies include: The 2011 Manitoba Flood Review Task Force, The Lake Manitoba and Lake St. Martin Regulation Review, and The Assiniboine River and Lake Manitoba Basins Flood Mitigation Study (Flood Review Task Force 2013, Lake Manitoba and Lake St. Martin Regulation Review 2013, KGS 2016). Approximately five years of aquatic-based studies have occurred in Lake St. Martin and Lake Winnipeg (Sturgeon Bay) in response to the construction and operation of the LSMEOC.

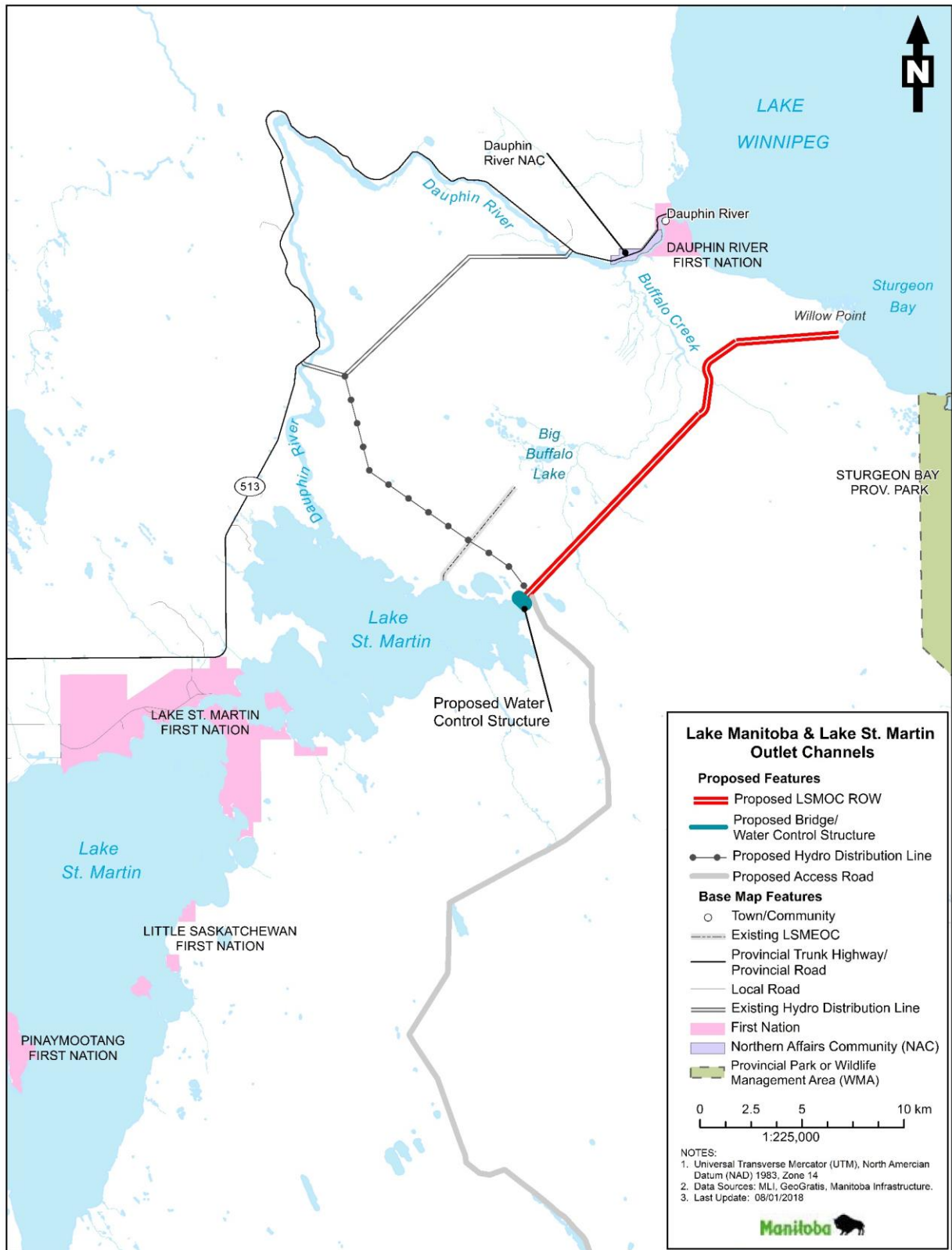
3.0 Project Information

3.1 Project Location

The Project is located in Manitoba's Interlake Region, in the lands of Treaty 2 (Map 1). The LMBOC would extend from Lake Manitoba north to Lake St. Martin (Map 2); this area is generally located north of the community of Ashern and south of Pinaymootang First Nation. The LSMOC is located between the northeastern most extent of Lake St. Martin and Sturgeon Bay on Lake Winnipeg (Map 3).



Map 2. Detailed Route – Proposed LMBOC



Map 3. Detailed Route – Proposed LSMOC

The UTM location for Project infrastructure illustrated in Maps 1, 2 and 3 is identified in Table 2.

Twelve Indigenous communities located on Lake Manitoba, Lake St. Martin and Lake Winnipeg have used or are currently using lands within and adjacent to the Project area to exercise Indigenous and Treaty Rights. There are two Provincial Parks and two Wildlife Management Areas (WMA) located in proximity to the proposed Project.

Table 2. Proposed Project Component Coordinates (NAD 83, UTM)

Project Component		Zone	Easting	Northing	
Lake Manitoba Outlet Channel	Inlet	14 U	529841	5681518	
	Outlet	14 U	534090	5703781	
	Water Control Structure	14 U	532294	5701501	
	Municipal Bridges	Iverson Road	14 U	532294	5701501
		Township Line Road	14 U	531408	5683613
		PTH 6	14 U	532037	5699259
		PR 239	14 U	530703	5694339
Lake St. Martin Outlet Channel	Inlet	14 U	557122	5738284	
	Outlet	14 U	572725	5751400	
	Water Control Structure	14 U	557122	5738284	
	Hydro Distribution Line (Start)	14 U	548483	5749379	
	Hydro Distribution Line (End)	14 U	557122	5738284	

3.2 Project Components and Activities

3.2.1 Physical Works and Structures

The LBMOC component of the Project is comprised of:

- Approximately 23 km long, excavated diversion channel from Watchorn Bay on Lake Manitoba to Birch Bay on Lake St. Martin (Map 2, Photos 1 and 2)
 - Channel invert elevation (EI) of about 242 m at Lake Manitoba and about 239 m at Lake St. Martin; depth from existing ground to vary from 6 m to 12 m
 - Average channel velocity of 1.3 m/s (in till) and an operational channel capacity of 212 m³/s
- A combined bridge and water control structure located at the channel intersection with Iverson Road
 - Conceptual design: three 9 m wide sluice bays, guides and sill beams for upstream stoplogs, vertical lift gates and downstream stoplogs

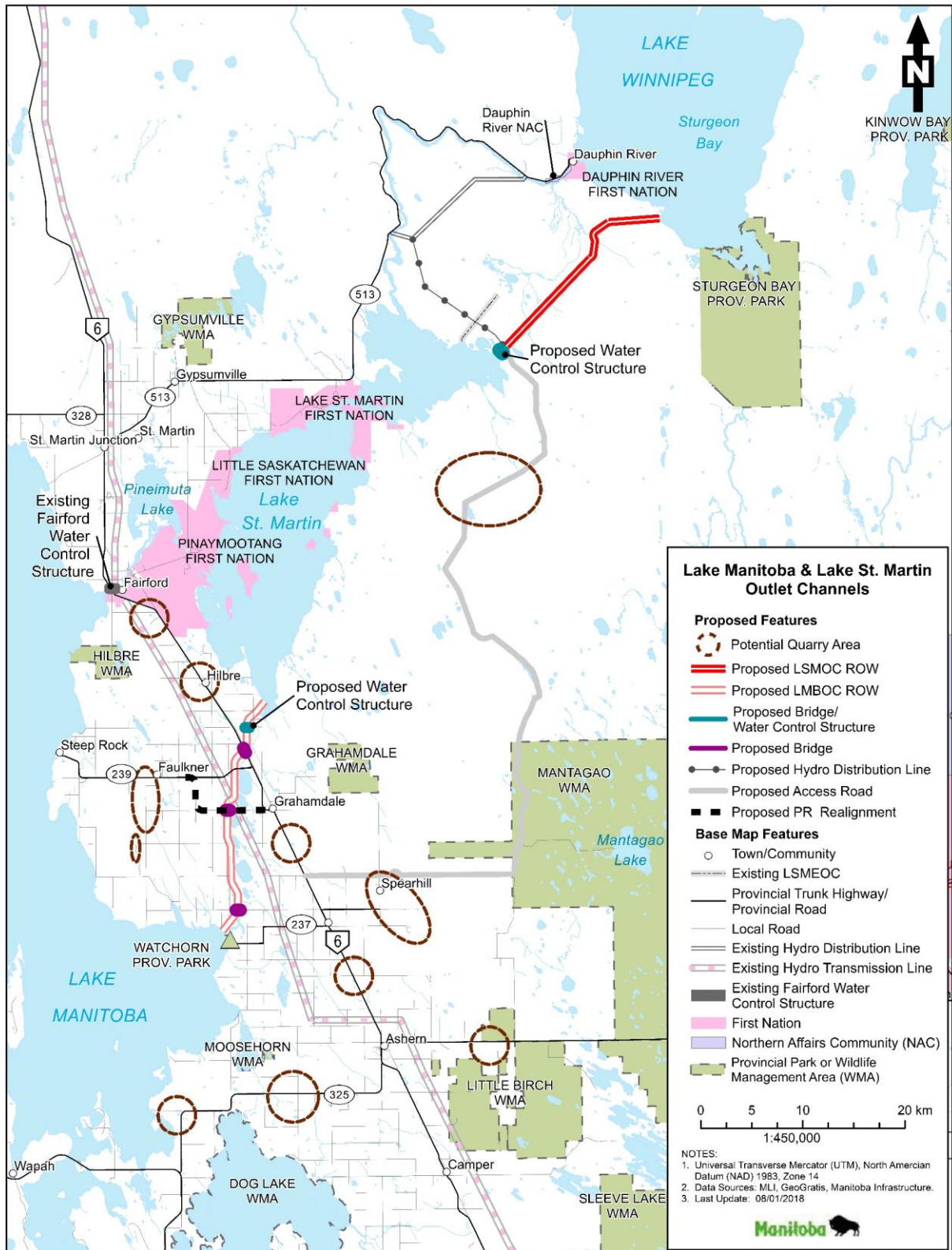


Photo 1. Inlet of the Lake Manitoba Outlet Channel on August 31, 2017, Looking Southwest from Approximately 14 U 5302187 E 5681941 N (Proposed Centreline in Yellow)

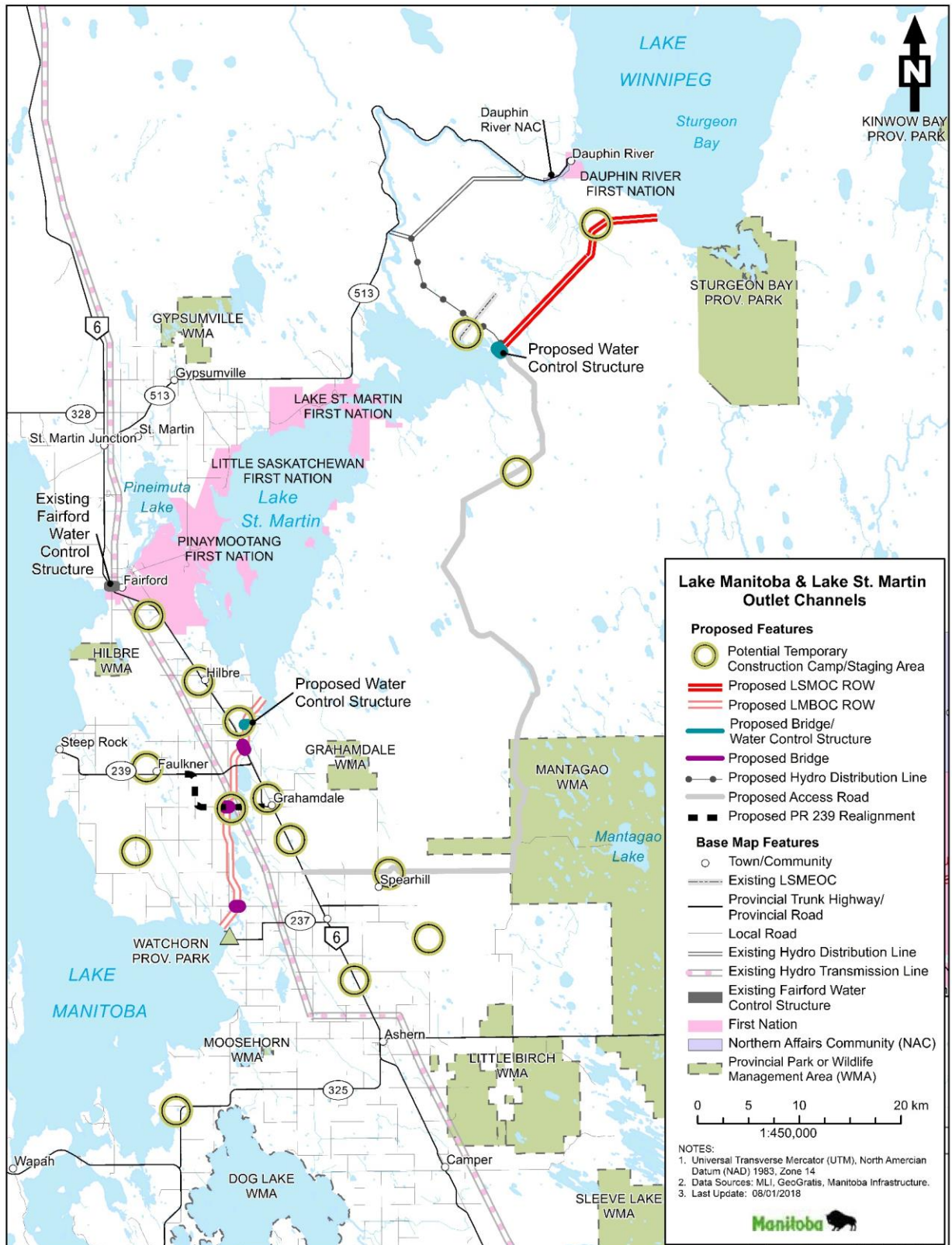


Photo 2. Approximate location of the Lake Manitoba Outlet Channel on August 31, 2017, Looking South from Approximately 14 U 530797 E 5687962 N (Proposed Centreline in Yellow)

- Re-alignment and/or construction of provincial highways, municipal roads and three bridge structures (additional to water control structure)
 - Bridges associated with Township Line Road, realigned Provincial Road (PR) 239 and Provincial Trunk Highway (PTH) 6 (Map 2)
- Rock quarries to produce riprap to control erosion along the channel and to realign PR 239 (Map 4) – some quarries may be retained for future maintenance
- Channel inlet and outlet at lakes
- Temporary construction camps and staging areas (Map 5)



Map 4. Potential Quarry Areas



Map 5. Potential Temporary Construction Camps/Staging Areas

The LSMOC component of the Project is comprised of:

- Approximately 23 km long, excavated diversion channel extending from Lake St. Martin to Lake Winnipeg south of Willow Point (Map 3; Photo 3)
 - A base width of about 44 m and an invert EI of about 241 m at LSM and an invert EI of about 213 m at Lake Winnipeg.
- The outlet channel will have a capacity of 326 m³/s and is currently designed to a velocity of approximately 1.0 m/s
- A combined bridge and water control structure at the inlet of the LSMOC
 - Conceptual design: six 9 m wide sluice bays, guides and sill beams for upstream stoplogs, vertical lift gates and downstream stoplogs



Photo 3. Approximate Location of the Lake St. Martin Outlet Channel on August 31, 2017, Looking South from Approximately 14 U 561910 E 5742837 N

- Drop structures (up to 12) to address channel velocity
- Rock quarries to produce riprap, at minimum, for drop structures and to control erosion along the channel
- Temporary construction camps and staging areas (Map 5)
 - Camps will accommodate over 100 workers
 - Staging areas to store materials, maintain and assemble equipment and administer work on the proposed Project.
- Channel inlet and outlet and lakes
- A 15 km long, 24 kilovolt (kV) distribution line to facilitate construction and operation of the LSMOC water control structure

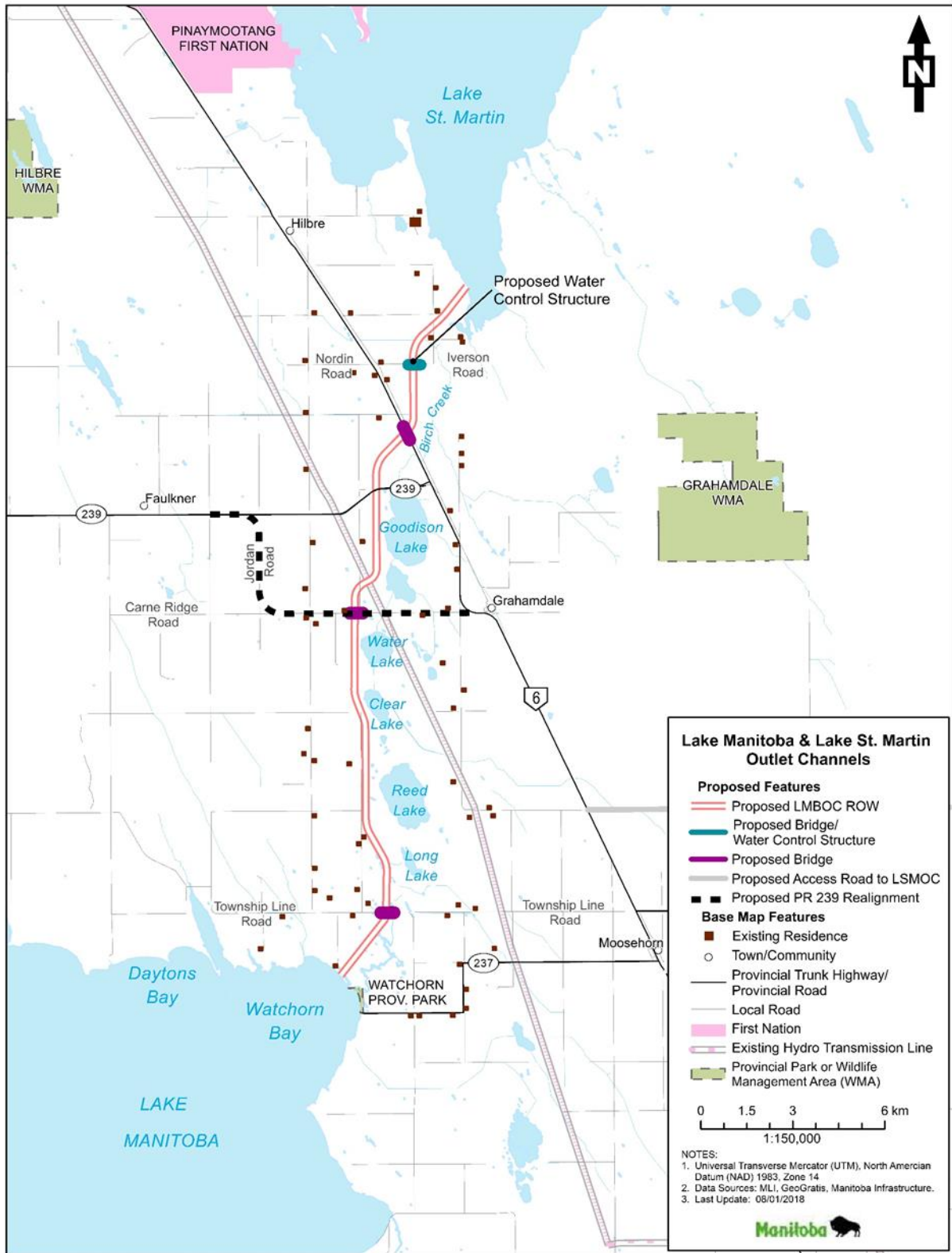
There are no federal lands intersected by the LMBOC or the LSMOC. The LMBOC is located within the RM of Grahamdale, predominantly on private agricultural land and will require land acquisition prior to construction. Some sites intersected by LMBOC are provincial Crown land. The nearest privately held residence is approximately 0.5 km from the LMBOC centreline, and there are approximately 66 residences within 3.0 km of the LMBOC. The communities of Moosehorn and Pinaymootang First Nation are located about 10.9 km and 9.3 km away from the outlet channel (Maps 6 and 7), respectively.

The LSMOC is located entirely on Provincial Crown land; this area is considered semi-remote as there is limited road access, with the nearest permanent residence located approximately 6.1 km away. The Regional Assessment Area (RAA) also includes Provincial Parks, established communities and mineral extraction areas (i.e. quarries and quarry withdrawals). Dauphin River First Nation and Lake St. Martin First Nation reserve boundaries are located approximately 4.6 km and 12.0 km (respectively) from the LSMOC.

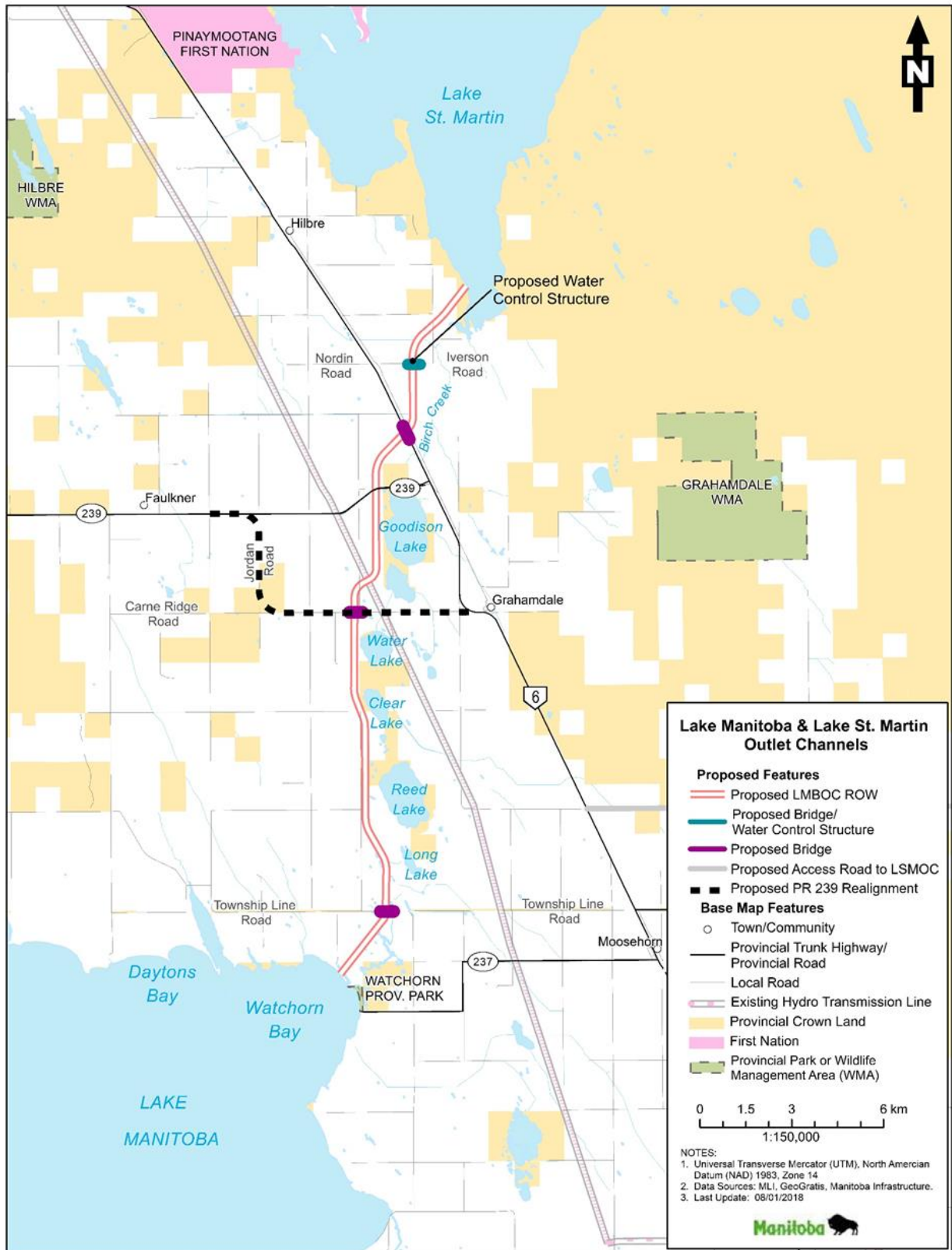
There are currently no anticipated measurable effects on other federal lands or any transboundary effects in adjacent jurisdictions.

3.3 Emissions, Discharges and Wastes

The emissions, discharges and waste that may be generated by the proposed Project along with proposed mitigation measures for each item are provided in Table 3.



Map 6. Residences in the Vicinity of the Proposed LMBOC



Map 7. Detailed Route – Proposed LMBOC – Provincial Crown Land

Table 3. Emissions, Discharges and Waste Generated by the Project

	Phase	Source	Mitigation Plan
Emission	Construction, Operation and Maintenance	Operation of motorized equipment along outlet channels	<ul style="list-style-type: none"> Minimize build-up of harmful airborne pollutants such as NO_x, SO₂, and greenhouse gases Inspect and maintain vehicles and equipment Dust abatement measures
	Construction & Maintenance	Increased noise levels	<ul style="list-style-type: none"> Air compressors will be housed in insulated enclosures to act as effective sound barriers
Discharge	Construction, Operation and Maintenance	Hazardous and non hazardous substances Spills	<ul style="list-style-type: none"> Fuel storage and re-fuelling at designated sites Appropriate secondary containment Non-petroleum based oils and greases used Spill protection, e.g., fuel tanks on concrete foundations equipped with catch sumps Spill response procedures to be utilized Decommission and remediate concrete washout areas
	Construction & Maintenance	Groundwater seepage in the outlet channels	<ul style="list-style-type: none"> Groundwater seepage water will be discharged into a sediment pond
	Construction	Site drainage/ surface runoff	<ul style="list-style-type: none"> Roads to incorporate erosion control methods Surface runoff directed into natural drainage
		Erosion and Sediment Control	<ul style="list-style-type: none"> Water flow volumes and velocities minimized Riprap energy dissipaters and ditch lining used Establishing vegetation over disturbed areas
Waste	Construction & Maintenance	Sanitary waste disposal - construction sites and camps	<ul style="list-style-type: none"> Portable toilet facilities and holding tanks will be used Sewage will be collected regularly and hauled to an sewage treatment facility
		Domestic waste disposal	<ul style="list-style-type: none"> Domestic waste will be collected and hauled to an existing permitted waste disposal site
	Construction & Maintenance	Industrial waste	<ul style="list-style-type: none"> Locations for disposal of waste rock and overburden are to be determined

3.4 Project Phases and Scheduling

The proposed Project schedule includes four major phases:

1. Planning and Design (2016 - 2019) - identifying preferred route alignments for outlet channel, preliminary and detailed engineering studies and analysis, environmental baseline data collection and environmental assessment.
2. Pre-construction (2018 - 2019) - detailed design and contract tendering, Environmental Protection Plans (EPPs), bridge and water control structure locations selected, construction planning (e.g., survey out selected quarry and camp locations), final project design.
3. Construction (2019 - 2023) - outlet channels, water control structures, bridges, rock quarries, and distribution line (with associated erosion and sediment control and revegetation measures); temporary staging areas and construction camp
4. Operation and Maintenance – Operation of the LMBOC and LSMOC will be tied to snowmelt, rain and/or surface water flows in the local area and region. The Province will operate the LMBOC and LSMOC through the use of hydraulically operated water control structures.

It is not anticipated that decommissioning of the LMBOC & LSMOC Project will be required. Additionally, MI is currently exploring options to repurpose the existing LSMEOC.

4.0 Consultation with Aboriginal Groups, Public & Stakeholders

4.1 Pre-Project Planning Engagement

Consultation with Aboriginal groups and other stakeholders began with a series of information sessions, including public open houses and stakeholder briefing sessions that were held in June 2013 and December 2014 in Dauphin River, Brandon, and Portage la Prairie to discuss past and potential future flood infrastructure. This public engagement was associated with the review of the Assiniboine River and Lake Manitoba Basin Flood Mitigation Study that introduced channel outlet options for Lake Manitoba and Lake St. Martin (KGS 2013). Invitations were mailed out to local, regional, and provincially identified stakeholders, including: municipal representatives; business owners; private citizens; conservation districts; and Indigenous peoples. The need for new flood protection infrastructure was a major outcome of these discussions.

An open house held in Ashern in September 2014, which focussed on the LMB & LSM OC options, was attended by over 250 people, representing homeowners, farmers/ranchers, and cottage owners, elected officials, business owners, and Indigenous community members. Among those that attended information sessions were:

- RM of Coldwell
- RM of Whitehead
- RM of Rockwood
- RM of West Interlake
- RM of Cartier
- RM of Ste. Rose
- RM of Glenwood
- RM of Dauphin
- RM of Archie-Ellice
- RM of Miniota
- RM of Sifton
- RM of Woodworth
- RM of Langford
- RM of Archie
- RM of St. Francois Xavier
- RM of Westbourne
- RM of Grassland
- RM of Alonsa
- RM of Ochre River
- RM of Cornwallis
- RM of Shellmouth- Boulton
- RM of Portage la Prairie
- RM of North Cypress-Langford
- RM of Lawrence-Lakeshore
- RM of Victoria
- Manitoba Trappers Association
- Town of Minnedosa
- Town of Russell
- Town of Virden
- Town of Carberry
- City of Portage la Prairie
- City of Dauphin
- City of Brandon
- Manitoba Beef Producers
- Assiniboine Basin Initiative
- Skownan First Nation
- Manitoba Metis Federation
- Tootinaowaziibeeng First Nation

4.2 Indigenous Engagement and Consultation

Initial engagement with Indigenous communities on the Project began after the 2011 flood. Project-related consultation includes the Indigenous and Public Engagement Program (IPEP) for the EIS and Crown consultation under Section 35 of the Constitution Act. Working with the Interlake Reserves Tribal Council (IRTC), MI and INR are finalizing consultation agreements, workplans and budgets for 6 First Nations (FN) communities within the Interlake Region, i.e., Dauphin River First Nation, Little Saskatchewan First Nation, Pinaymootang First Nation, Peguis First nation, Kinonjeoshtegon First Nation and Lake Manitoba First Nation. Other Indigenous communities who have an interest in the proposed Project are currently at various states of engagement and consultation processes.

Preliminary scoping completed by MI tentatively identified 12 communities that may be affected by the LMB & LSM OC Project. In addition to the Manitoba Metis Federation and Dauphin River Indigenous Relations Communities, Manitoba Infrastructure met with the 10 First Nations identified in Table 4 that had an interest in, and who may be directly affected by, the proposed Project. Introductory informational letters were sent to the identified communities in July and August of 2015.

Table 4. First Nations Engaged Through IPEP: 2014-2017

Directly Affected	Indirectly Affected
Pinaymootang First Nation	Fisher River Cree Nation
Dauphin River First Nation	O-Chi-Chak-Ko-Sipi First Nation
Little Saskatchewan First Nation	Ebb and Flow First Nation
Lake St. Martin First Nation	Kinonjeoshtegon First Nation
Peguis First Nation	Lake Manitoba First Nation

The Province of Manitoba began engagement with the Indigenous groups in 2011 and since have had individual meetings and/or correspondence, which are ongoing in 2017, with the following Indigenous communities or groups and Northern Affairs Communities (NAC) regarding the LMB & LSM OC Project:

- Assembly of Manitoba Chiefs
- Aghaming NAC
- Berens River First Nation
- Berens River NAC
- Bloodvein First Nation
- Brokenhead First Nation
- Dauphin River First Nation
- Dauphin River NAC
- Ebb and Flow First Nation
- Fisher Bay NAC
- Fisher River Cree Nation
- Hollow Water First Nation
- Interlake Regional Tribal Council
- Kinonjeoshetegon First Nation
- Lake Manitoba First Nation
- Lake St. Martin First Nation
- Little Saskatchewan First Nation
- Little Black River First Nation
- Loon Straits NAC
- Manigotagan NAC
- Manitoba Metis Federation
- Matheson Island NAC
- Misipawistik First Nation
- Norway House Cree Nation
- Norway House NAC
- O-Chi-Chak-Ko-Sipi First Nation
- Peguis First Nation
- Pinaymootang First Nation
- Pine Dock NAC
- Poplar River First Nation
- Princess Harbour NAC
- Sagkeeng First Nation
- Seymourville NAC

Since 2011, communities have identified the following key concerns related to effects of the existing LMBOC and proposed LMBOC & LSMOC Project:

- Project channel effects: increased sediments and silt into Lake St Martin and Lake Winnipeg and associated increased turbidity, blue green algae, and invasive species; increased levels of Lake Winnipeg and associated shoreline erosion, and transfer of water from Lake Manitoba into Lake Winnipeg; traditional fishing on Lake St. Martin and Dauphin River; Bear Creek spawning area, damage to traditional territories, affecting ability to use area; and access controls on new road
- Flooding effects: loss of wildlife; fish health, harvesting of medicinal plants and herbs; sustenance fishing; change in community's way of life affecting health
- Commercial fishing status and adequacy of compensation packages
- Loss of agricultural cattle operations due to the Fairford Water Control Structure
- Lack of First Nation participation and training in the work being conducted
- LSMEOC operation affected: hunting and trapping; increased debris in Lake Winnipeg causing damage to commercial fishing equipment; fishery effects on Dauphin River, as well as water quality and increased shoreline erosion, fish movement and fishing, silting and ice jamming

4.3 Public, Stakeholders and Other Parties

Since 2011, engagement and consultation with the public, stakeholders and other parties regarding the Project has involved individual meetings and information sessions with potentially affected landowners, RMs, other jurisdictions, and stakeholders. Additional steps include a Project-specific website where regularly updated information is available for review and comment (<https://www.gov.mb.ca/mit/wms/lmb/lsmtoutlets/index.html>). Information sessions were held with Moosehorn in May and June 2017, and in other communities since, to present preferred alignments and obtain additional input on the LMB & LSM OC Project. A public open house was also held in Winnipeg in July 2017. Key comments/questions received in 2017 during the May 29 landowner meeting, the June 29 information session and the July 13 public open house include:

- Environmental concerns including: fish, plants, wildlife, invasive species (carp and zebra mussels), losing existing beaches, traditional medicines, flooding, sedimentation, and ice conditions;
- Economic effects, including a reduced tax base, land values and capital gains from land sales;
- Effects to agriculture; and,
- Impacts to groundwater quantity and quality and surface water quantity, quality and drainage.

The June 29, 2017 information session and July 13, 2017 public open house were attended by a total of 217 people, with 49 filling out questionnaires. Of those who responded to the questionnaire: over 81% expressed support of the overall project concept, with 49% expressing support for the proposed operating guidelines, and 39% expressing support for the proposed relocation of PR 239. Most respondents (67%) identified one of their primary land uses as farming and/or residential, followed by recreational land use (31%). The key comments/questions raised by farming and residential land users as well as commercial and/or non applicable land users include:

- Possible loss or reduction of well water
- Concerns regarding well water quality and drainage
- Agriculture is not being adequately considered
- Concerns about losing existing beaches, medicines, fish, moose and other plants and animals and changes to the environment in small lakes east of the LMBOC
- Effects of operation of the Portage Diversion on Lake Manitoba
- Will water sent to Lake Manitoba via the Portage Diversion be monitored?

Public input has been documented and will continue to be considered as part of project planning, design, construction and operation. Regular, and transparent communication with

interested stakeholders will continue as the project progresses, e.g., open houses and ongoing monthly project meetings with affected Rural Municipalities.

4.4 Consultation with other jurisdictions

Individual meetings and general information sessions occurred with federal regulators from CEAA, Indigenous and Northern Affairs Canada (INAC) and Department of Fisheries and Oceans Canada (DFO), as well as provincial regulators from Manitoba Sustainable Development and Agriculture, and Interlake-Eastern Regional Health Authority.

Engagement and information sharing with the following jurisdictions has involved open discussions as part of the ongoing project planning, design and approvals processes:

- CEAA, e.g., Prairie and Northern Region
- Manitoba Region, Aboriginal Affairs and Northern Development Canada
- Fisheries Protection Program, Fisheries and Oceans Canada
- Canada-Manitoba Infrastructure Secretariat
- Transport Canada, Navigable Water Protection Program
- Fisheries Branch, MSD
- Biodiversity and Endangered Species Section, MSD
- Wildlife Branch, MSD
- Groundwater Section, MSD
- Water Science & Management Branch, MSD
- Parks and Regional Services, MSD
- Medical Officer of Health, Interlake-Eastern Regional Health Authority
- Manitoba Region, Aboriginal Affairs and Northern Development Canada
- Highway Planning and Design Branch, MI
- Manitoba Agriculture
- Manitoba Hydro
- RM of Coldwell
- RM of Grahamdale
- Bell MTS
- West Interlake Community Futures

5.0 Environmental Setting

The spatial boundaries used in describing and assessing the Project include a Project Footprint (PF), a Local Assessment Area (LAA) and a Regional Assessment Area (RAA). The Project Footprint is the physical space or directly affected area on which the Project components or activities are located. The LAA is the area beyond the Project Footprint in which direct and indirect Project effects are measurable; it will encompass an area extending on either side of the LMBOC & LSMOC as well as Lake St. Martin and a portion of Lake Manitoba near the inlet and Lake Winnipeg near the channel outlet. The RAA is the area beyond the LAA within which most indirect and cumulative effects would occur (CEAA 2015) and includes the approximate area illustrated on Map 1.

5.1 Climate, Noise and Air Quality

The 30 year climate normals report an average annual temperature of 1.9 degrees Celsius (°C), with a monthly maximum (average) of 18.3°C in July, and a minimum of -18.1°C in January (Government of Canada 2016a; data for 1981-2010 from the Lunder weather station). Mean annual precipitation is 480.2 millimetres (mm), of which 385.5 mm falls as rain with the remainder as snow (approximately 20%). Precipitation falls primarily as snow during the winter months, with the greatest snowfalls occurring in November, December and January. Precipitation occurs mainly as rain during the spring, summer and fall seasons, with overall levels of precipitation peaking in June, July and August. Average wind speeds recorded at Dauphin, Manitoba are fairly constant throughout the year, ranging from approximately 14 kilometres per hour (km/hr) to 17 km/hr.

Existing noise and vibration levels in the RAA are expected to be typical of an area characterized by forest, wetland and grassland areas with a transportation corridor and rural centers, cottage areas, and the presence of commercial, recreational and transportation activities. Sources of noise and vibration near the LMBOC primarily include road use, construction and maintenance activities by light and heavy vehicles and equipment; quarrying activities; farming activities; recreational vehicles and activities (e.g., fishing, boating, hunting, snowmobiling, use of ATVs); occasional air traffic; wind and wave action along shoreline areas; livestock; and wildlife. Sources of noise near the LSMOC are primarily limited to boat traffic, snowmobile and ATV use, occasional air traffic, wildlife, and wind or wave action.

In Manitoba, air quality issues are mostly local in nature and are primarily related to odour and other pollutants such as wind-blown dust released from specific local sources or activities. The population and amount of overall development and activity in the LAA is of very low density versus more populated urban areas. Existing effects on air quality in the LAA include emissions and dust due to traffic on local municipal, gravel and dirt roads and trails, including ATV and snowmobile activity; naturally occurring or human induced forest fires; emissions and dust from quarrying and quarried rock processing activities; odours, emissions and dust from farming activities; emissions from boating and other water-based activities; emissions from home heating, maintenance and other residential activities; and emissions from intermittent air traffic (Forster 2017). Smoke from forest fires and burning of agricultural crops may occur on occasion.

5.2 Terrain, Topography, Geology and Soils

The ground surface of the LMBOC upstream of PTH 6 is relatively flat with an elevation that ranges between 248 and 250 masl over a distance of about 16 km with occasional rises to 252 masl closer to PTH 6. For a distance of about 0.5 km leading towards and away (about 1 km total) from PTH 6 the ground surface elevation is also relatively flat and ranges between 251 and 252 masl. Beginning about 0.5 km downstream of PTH 6, the ground surface elevation drops sharply to 246 masl over a distance of 1 km (about 0.1% slope) and

then remains relatively flat between 246 and 248 masl for about 3.5 km before the channel enters Lake St. Martin.

The ground surface elevation of the LSMOC typically slopes downwards from Lake St. Martin at about 246 masl to Lake Winnipeg at about 218 masl. The average slope of the ground surface along the channel is about 0.12%; however, frequent deflections in ground surface topography vary the ground surface slope between 0.024% and 0.24%. The ground surface along the channel rises at two locations at an average slope of about 0.14% over a distance of about 1 km.

The geology of the RAA is composed of layers of carbonates and sandstone overlain with granites or gneisses (Leybourne et al. 2007). Large deposits of limestone, dolomite and gypsum that have formed karst topography, which produces features such as underground drainage systems, sinkholes and caves (Bilecki 2003, Government of Manitoba 2016). The underlying dolomitic limestone bedrock associated with the LMBOC occurred at depths between about 16 and 25 metres below ground level (mbgl). The surficial geology is very calcareous, stony (cobble or gravel), water-worked glacial till that is deep to shallow (20-30 m) over limestone bedrock (Smith et al. 1998).

Soils within the LAA are primarily chernozemic dark grey surface horizons result, as well as soils composed of luvisol, brunisol and organic matter (Mills 1984). Soils in the higher ridges are imperfectly-drained, dark chernozems developed on strongly calcareous, loamy to clay loam glacial till, while the low areas are dominated by poorly-drained gleysols to shallow, slightly decomposed organic soils (Smith et al. 1998). The LMBOC generally consists of a thin layer of organics (0.1 and 0.3 m thick) overlying till materials (16 to 25 m thick) over limestone bedrock (KGS Group 2016). The LSMOC generally consists of a thin to thick layer of organics (0.1 to 6.0 m thick) overlying till materials (3 and 13 m thick) over limestone bedrock.

5.3 Groundwater and Surface Water

The principal sources of water in the Ecodistrict are groundwater, and surface water from Lake St. Martin. Groundwater is from shallow sand and gravel aquifers associated with the glacial till deposits (Smith et al. 1998). Aquifers in the region range from less than 6 m where the sand and gravel deposits are at ground surface, to more than 60 m in low-lying areas where thick clay beds cover the aquifer (Rutulis 1973). Water quality in the sand and gravel aquifers ranges from fair to excellent (Betcher et al. 1995, Rutulis 1973); Groundwater testing indicated that the water parameters are typical of the Interlake bedrock limestone aquifer. Flowing artesian well conditions are common in the RAA, in particular along Birch Creek, and in the vicinity of Lake St. Martin (KGS Group 2016).

Major watercourses and waterbodies in the RAA include Lake Manitoba, Fairford River, Lake St. Martin, Dauphin River Lake Winnipeg and several creeks, ponds and lakes (Maps 1-3). Typical lake levels range from: a minimum of about 247 masl (810.3 feet) to 249.1 masl (817.1 feet) for Lake Manitoba; 242.3 masl (794.8 feet) to 245.5 masl (805.5 feet) for

Lake St. Martin. The Fairford River monthly mean flows for the period of record from 1912 to 2015 ranged from a minimum of 0 to 610 m³/s.

5.4 Fish and Fish Habitat

Fish communities in each waterbody are diverse and comprised of many species (e.g., at least 37 fish species occur in Lake Manitoba). The Dauphin River is used as a migratory route by spawning walleye (*Sander vitreus*) and lake whitefish (*Coregonus clupeaformis*) moving from feeding areas in Sturgeon Bay to spawning locations in upstream areas of the river and in Lake St. Martin. Commercial fisheries occurring in Lake Manitoba, Lake St. Martin and Sturgeon Bay target species such walleye, lake whitefish, common carp (*Cyprinus carpio*), suckers, and northern pike (*Esox lucius*).

5.5 Vegetation

The primary land cover type in the LMBOC LAA is grasslands, which covers almost half of the area. Other representative vegetation cover in the LMBOC LAA includes herb wetland, perennial crops and pasture, herb cover and dense broadleaf forests. Forest stand vegetation is dominated by trembling aspen (*Populus tremuloides*) in the ridge areas, but often associated with balsam poplar (*Populus balsamifera*) and white spruce (*Picea glauca*), whose distribution is affected greatly by forest fires (Smith et al. 1998). Willow (*Salix* spp.), sedge (e.g., *Carex* spp.), and meadow grass occur in the poorly-drained depressions.

Within the LSMOC LAA, the dominant land cover type is shrub wetland, comprising just over 50% of the LAA. Other representative vegetation cover in the LSMOC LAA includes herb wetland, dense coniferous forest, and dense mixedwood forest. Black spruce (*Picea mariana*) dominates forest stands due to extensive bogs/fens (peatlands) and poorly-drained mineral soils (transitional areas) (Smith et al. 1998). Associated vegetation varies from mosses (e.g., *Sphagnum* spp.), ericaceous shrubs (e.g., Labrador tea [*Rhododendron groenlandicum*]), swamp birch (*Betula pumila*), sedge, willow, and tamarack (*Larix laricina*), depending on whether the area is characterized as a peatland or transitional area.

No plants listed under MBESEA, SARA, or that having a special designation by COSEWIC are known or expected to occur in the RAA (MBSD 2016; SARA 2016). The small white lady's-slipper (*Cypripedium candidum*) and the rough agalinis (*Agalinis aspera*), are both listed federally and provincially as Endangered, and have known distributions 100 km south of the RAA, close to St. Laurent, MB (MBSD 2016; EC 2015). One species listed by the MBCDC as a species of conservation concern (S1 or S2 by the Manitoba Conservation Data Centre MBCDC) was identified at several locations along the LSMOC, the dragon's mouth orchid (*Arethusa bulbosa*), which is considered rare throughout its range or in the province (6 to 20 occurrences) and may be vulnerable to extirpation. This species was found at several locations along the Willow Point within open sphagnum bogs. The habitats in which the dragon's mouth orchids were found are common habitat types throughout the LAA for the LSMOC.

5.6 Wildlife

There are approximately 280 species of terrestrial animals that occur in the Project region – this includes 42 species of mammals. Aerial and ground surveys as well as habitat modelling indicated that mammal species typical in the area include: moose (*Alces alces*), elk (*Cervus canadensis*), white-tailed deer (*Odocoileus virginianus*), black bear (*Ursus americanus*), grey wolf (*Canis lupus*), coyote (*Canis latrans*), lynx (*Lynx canadensis*), mink (*Neovison vison*), muskrat (*Ondatra zibethicus*), otter (*Lutra canadensis*), American marten (*Martes americana*), beaver (*Castor canadensis*), ermine (*Mustela erminea*), fisher (*Mustela pennanti*), least chipmunk (*Eutamias minimus*), red squirrel (*Tamiasciurus hudsonicus*), and snowshoe hare (*Lepus americanus*). While moose and elk were observed in low numbers, white-tailed deer and most furbearer species were common in the Project region.

There are six species of bats that may occur within the RAA: big brown bat (*Eptesicus fuscus*), eastern-red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), little brown bat (or little brown myotis; *Myotis lucifugus*), northern myotis (or northern myotis; *Myotis septentrionalis*), and silver-haired bat (*Lasionycteris noctivagans*). The eastern-red, hoary and silver-haired bat species migrate south for the winter, while the big brown, little brown and northern myotis species overwinter in hibernacula such as caves – which were not detected in the RAA during focused field investigations. The little brown bat and northern myotis, which were detected in the RAA during audio recordings, are listed as Endangered on Schedule 1 of SARA and the *Manitoba Endangered Species and Ecosystem Act* (MBESEA) (Table 5, SARA 2016; MBSD 2016). SARA currently has a proposed Recovery Strategy for the little brown bat and northern myotis, with three Critical Habitat areas for these species identified in the Interlake area of Manitoba (Norquay et al. 2013).

The Manitoba Breeding Bird Atlas provides breeding bird survey results conducted within the Project region between 2010 and 2014. Of the approximately 230 species expected to occur in the Project region, 83 species were identified through the Manitoba Breeding Bird Atlas breeding bird survey. A total of 91 species were identified during field studies conducted within the Project RAA. Common to the RAA were: Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), double-crested cormorant (*Phalacrocorax auritus*), common tern (*Sterna hirundo*), American white pelican (*Pelecanus erythrorhynchos*), bald eagle (*Haliaeetus leucocephalus*), red-winged blackbird (*Agelaius phoeniceus*), common raven (*Corvus corax*), killdeer (*Charadrius vociferous*), and brown-headed cowbird (*Molothrus ater*).

Table 5. Species at Risk Observed in the Project Region

Common Name	Scientific Name	MBESEA Status	COSEWIC Status	SARA Schedule	SARA Status
Little Brown Bat	<i>Myotis lucifugus</i>	Endangered	Endangered	Schedule 1	Endangered
Northern Myotis	<i>Myotis septentionali</i>	Endangered	Endangered	Schedule 1	Endangered
Trumpeter Swan	<i>Cygnus buccinator</i>	Endangered	N/A	N/A	N/A
Bank Swallow	<i>Riparia riparia</i>	N/A	Threatened	Schedule 1	Threatened
Barn Swallow	<i>Hirundo rustica</i>	N/A	Threatened	Schedule 1	Threatened
Bobolink	<i>Dolichonyx oryzivorus</i>	N/A	Threatened	Schedule 1	Threatened
Common Nighthawk	<i>Chordeiles minor</i>	Threatened	Threatened	Schedule 2	Threatened
Red Headed Woodpecker	<i>Melanerpes erythrocephalus</i>	Threatened	Threatened	Schedule 1	Threatened
Short Eared Owl	<i>Asio flammeus</i>	Threatened	Special Concern	Schedule 1	Special Concern
Northern leopard frog	N/A	Special Concern	Schedule 1	Special Concern	Yes

The 7 bird species of conservation concern observed in the Project region are provided in Table 5. Some other species that may potentially occur in the region but which were not observed during field studies include the least bittern (*Ixobrychus exilis*) (endangered under MBESEA, threatened under SARA and COSEWIC, and S2B under MBCDC), the piping plover (*Charadrius melodus*), and great egret (*Ardea alba*) (S2S3B).

Of the 10 herptile (i.e., reptile and amphibian) species likely to occur in the RAA, the most common are the: red-sided garter snake (*Thamnophis sirtalis parietalis*), boreal chorus frog (*Pseudacris triseriata maculata*), Canadian toad (*Anaxyrus hemiophrys*), grey tree frog (*Hyla versicolor*), northern leopard frog (*Lithobates pipiens*), and wood frog (*Lithobates sylvatica*) (Cook 1984; Conant and Collins 1991; Nature North 2014; Preston 1982). The species most commonly observed during field investigations include the boreal chorus frog, northern leopard frog and wood frog and red-sided garter snake. The northern leopard frog is currently listed as a species of Special Concern on Schedule 1 of SARA (Table 5).

5.7 Socio-economic

Preliminary scoping completed by MI has tentatively identified 12 communities that may be affected by the LMB & LSM OC Project. First Nations with an interest in, and who may be directly affected by, the proposed Project are: Pinaymootang First Nation, Dauphin River

First Nation, Little Saskatchewan First Nation, Lake St. Martin First Nation, Peguis First Nation, Fisher River Cree Nation, O-Chi-Chak-Ko-Sipi First Na, Ebb and Flow First Nation, Kinonjeoshtegon First Nation, and Lake Manitoba First Nation.

Pinaymootang, Dauphin River, Little Saskatchewan, Lake St. Martin are all signatories to Treaty 2 and have the rights to hunt and trap and exercise their Indigenous and Treaty Rights throughout the RAA. Peguis FN is a signatory to Treaty 1 but its Community Interest Zone is located in in Treaty 2 territory.

The communities of Grahamdale, Hilbre, Moosehorn and Gypsumville are within the region near the LMBOC. There are numerous residences spread throughout that region (Map 6), but none within the LSMOC area. Commercial fishing and outfitting are among the resource uses in the region, particularly on Lake Winnipeg and Lake Manitoba. Agriculture commonly occurs between Lake Manitoba and Lake St. Martin.

5.8 Heritage Resources

Heritage resources are protected under The Manitoba Heritage Resources Act (Government of Manitoba 1986). Heritage resources include: i) a heritage site; ii) a heritage object, and 3) any work or assembly of works of nature or of human endeavour that is of value for its archaeological, palaeontological, pre-historic, historic, cultural, natural, scientific or aesthetic features, and may be in the form of sites or objects or a combination thereof. Found human remains are protected by Manitoba's Policy Concerning the Reporting, Exhumation and Reburial of Found Human Remains (Government of Manitoba 1987). A Heritage Resources Impact Assessment (HRIA) is required when heritage resources are suspected within a development area.

A heritage resources evaluation of the Project in 2017 revealed that the lands between Lake Manitoba and Lake St. Martin are low and wet and have been modified by agriculture, ranching, transmission lines and roads (Northern Lights Heritage Services 2017). The ground and aerial surveys did not indicate any areas that had potential for heritage resources. The lands nearest LMBOC have been subject to use by cattle and are extremely disturbed. Further, the land does not meet the criteria for high or medium potential for archaeological site. As such, the LMBOC area was considered to be of low potential for archaeological sites. The location of any potential heritage resources is very difficult to predict given the opportunistic nature of hunting; abandoned traps and satellite camps may be present. Fishing appears to have been mainly associated with the large lakes and main rivers; however, if inland spawning areas were known there is a potential for stone weirs to be present.

An uninterpreted site near the LMBOC was the only archaeological site identified within the LAA. The Bayton St. Thomas Lutheran Cemetery is also located near the LMBOC on Bayton Road about 1.3 km southwest of Reed Lake; this cemetery is located about 100 m from the west side of the proposed LMOC Route D RoW, and about 3 km south of the Uninterpreted archaeological site.

6.0 Potential Effects

6.1 Project Interactions

A preliminary evaluation of potential key direct interactions between the Project and various receptors of the biophysical environment and Indigenous peoples, including those identified in section 5 of CEAA 2012 are shown in Table 6 and 7. Interactions identified in these tables have a reasonable likelihood of occurrence and will undergo further assessment in the EIS. Interactions have been identified for the construction, operation, maintenance and non-operation (post-construction period when channels are not in use) phases of the Project.

6.2 Potential Project Effects

The effects of the Project on the environment and appropriate mitigation measures are being evaluated during the Environmental Impact Statement (EIS). Mitigation and restoration measures will be identified to offset or reduce the environmental effects of the Project.

The proposed Project is not located on federal lands, and any potential effects on federal lands will be indirect. The Project has the potential to affect fish and fish habitat, migratory birds and species of conservation concern – all environmental components that come under federal jurisdiction. There are large positive socio-economic benefits associated with reducing flood frequency and potential.

6.2.1 Physical Environment

Most potential effects on ambient air quality and noise, such as release of GHGs from equipment and increased noise and levels of airborne particulate (dust), are expected to be localized and occur during construction and would be much reduced during operation and maintenance phases.

Project-related activities that may effect or influence terrain or topography and topography during project construction, operation and maintenance include excavation, and quarrying and blasting. The geology and soils in the Project Footprint (PF) may also be effected by vegetation clearing, improper soil conservation methods, increased light vehicle and construction equipment traffic and accidental spills or malfunctions. These activities have potential to effect soil erosion, bank or slope stabilization, surficial geology, soil compaction, loss of soil resources, and soil contamination.

Table 6. Potential Key Direct Interactions between the Project and the Environment

Project Component	Project Phase	Receptor									
		Climate, Noise and Air Quality	Geology and Soils	Groundwater	Surface Water	Fish and Fish Habitat	Vegetation	Mammals	Birds (incl. Migratory Birds)	Amphibians and Reptiles	Species at Risk (incl. Aquatic species at Risk)
LMBOC Channel, Inlet and Outlet	Construction	+	+	+	+	+	+	+	+	+	+
	Operation		+	+	+	+	+	+	+	+	+
	Maintenance	+			+	+	+	+	+	+	+
	Non-Operation			+	+	+	+	+	+	+	+
LMBOC Water Control Structure	Construction	+					+	+	+	+	+
	Operation	+									
	Maintenance	+									
LSMOC Channel, Inlet, Outlet and Drop Structures	Construction	+	+	+	+	+	+	+	+	+	+
	Operation		+		+	+	+	+	+	+	+
	Maintenance	+			+	+	+	+	+	+	+
	Non-Operation				+	+	+	+	+	+	+
LSMOC Water Control Structure	Construction	+	+				+	+	+	+	+
	Operation	+									
	Maintenance	+									
Bridges and culverts	Construction	+			+	+	+	+	+	+	+
	Operation				+	+		+	+	+	+
	Maintenance	+			+	+		+	+	+	+
PR 239 and Municipal Road Re-Alignments	Construction	+	+	+	+	+	+	+	+	+	+
	Operation	+		+	+	+	+	+	+	+	+
	Maintenance	+	+		+	+	+	+	+	+	+

Project Component	Project Phase	Receptor									
		Climate, Noise and Air Quality	Geology and Soils	Groundwater	Surface Water	Fish and Fish Habitat	Vegetation	Mammals	Birds (incl. Migratory Birds)	Amphibians and Reptiles	Species at Risk (incl. Aquatic species at Risk)
Temporary Construction Camps, and Staging Areas	Construction*	+	+		+		+	+	+	+	
	Operation**										
	Maintenance**										
Quarries	Construction	+	+	+	+		+	+	+	+	
	Operation	+	+	+	+		+	+	+	+	
	Maintenance	+	+	+	+		+	+	+	+	
Distribution Line	Construction	+	+	+	+	+	+	+	+	+	+
	Operation						+	+	+	+	+
	Maintenance	+					+	+	+	+	+

†Potential interaction; Blank cell: No anticipated interaction
 *Includes mobilization, demobilization and rehabilitation of temporary sites that are only required during the Project’s construction phase
 **Temporary Construction Camps and Staging Areas will be decommissioned after construction and are therefore not required in the Maintenance and Operation phases
 The following terms are used in the table as defined in, and in accordance with section 5(1)(a) of CEAA 2012, as:
 - *Fish and Fish Habitat* as per the definition in section 2(1) of the Fisheries Act
 - *Species at Risk* as per the definition in section 2(1) of the Species at Risk Act, including *Aquatic Species* as defined in section 2(1) of the Species at Risk Act
 - *Birds* includes *Migratory Birds* as defined in section 2(1) of the Migratory Birds Convention Act, 1994

Table 7. Potential Key Direct interactions between the Project and Indigenous peoples.

Project Component	Project Phase	Health and Socio-Economic Conditions	Physical and Cultural Heritage	Current use of Lands and Resources for Traditional Purposes	Sites of Importance
LMBOC Channel, Inlet and Outlet	Construction	+	+	+	+
	Operation	+	+	+	+
	Maintenance	+		+	
	Non-Operation				
LMBOC Water Control Structure	Construction	+	+		
	Operation	+	+	+	+
	Maintenance	+			
LSMOC Channel, Inlet, Outlet and Drop Structures	Construction	+	+	+	+
	Operation	+	+	+	+
	Maintenance	+		+	
	Non-Operation				
LSMOC Water Control Structure	Construction	+	+		
	Operation	+	+	+	+
	Maintenance	+			
Bridges and culverts	Construction	+	+	+	
	Operation				
	Maintenance	+			
PR 239 and Municipal Road Re-Alignments	Construction	+	+	+	
	Operation				
	Maintenance	+			
Temporary Construction Camps, and Staging Areas	Construction*	+	+	+	+
	Operation**				
	Maintenance**				
Quarries	Construction	+	+	+	+
	Operation			+	
	Maintenance	+			
Distribution Line	Construction	+	+	+	
	Operation			+	
	Maintenance	+		+	

+ Potential interaction; Blank cell: No anticipated interaction
 *Includes mobilization, demobilization and rehabilitation of temporary sites that are only required during the Project's construction phase
 **Temporary Construction Camps and Staging Areas will be decommissioned after construction and are therefore not required in the Maintenance and Operation phases

Among the groundwater effects is the potential drawdown of the aquifer, mostly during construction: potential maximum of 2.5 m to 4.2 m of drawdown at a 1.0 km distance from the channel during construction, and as much as 6 m to 8 m in the immediate vicinity of the channel excavation. During normal channel operation, aquifer drawdown in the range of 1.5 m upstream of the Control Structure could be anticipated at 1 km from the channel, and in the range of 3 m downstream of the Control Structure at a distance of 1 km (KGS Group 2017).

Potential Project effects to surface water may include changes to water quality, groundwater input and flow regime. Changes in TSS levels, nutrients and metals, current flow regimes, and seepage of groundwater into surface water may occur during construction and operation.

6.2.2 Aquatic Environment

Project-related construction, operation and maintenance activities may affect fish and fish habitat through activities that result in erosion and sedimentation, reduced surface water quality, alteration of shoreline morphology, changes to drainage and surface water flows and the alteration of existing and creation of new aquatic habitat. Regulation of water levels may also affect fish and fish habitat through altering riparian vegetation and wetland systems.

6.2.3 Terrestrial Environment

Clearing and excavation activities during construction will result in the loss of terrestrial vegetation, but will be limited to the area comprising the channel footprint and other temporary work areas. Along the LMBOC, the loss of existing vegetation will largely be in previously effected (i.e. agricultural) habitats, whereas the LSMOC area is largely comprised of native vegetation communities, including some wetland habitats. Along with the loss and alteration of terrestrial vegetative communities during construction, there is potential for loss of rare plants and sensitive sites as well as for the introduction of invasive species.

Potential Project-related effects to wildlife and habitat include: habitat loss, alteration and fragmentation, sensory disturbance, increases in vehicular collisions, and increased predation pressure.

6.2.4 Species at Risk

Project-related activities that have the potential to affect species of conservation concern during Project construction, operation and maintenance include: quarrying, vegetation clearing, increased traffic, and accidental spills or malfunctions. These activities have potential to result in sensory disturbance, temporary or permanent displacement, loss or alteration of habitat and increased mortality.

Further assessment of potential direct and indirect effects on species at risk as well as other plant and animal species and appropriate mitigation strategies will be further evaluated and described in an environmental assessment for the proposed Project.

6.2.5 Socio-economic, Heritage and Indigenous Peoples

This Project is being developed in response to past flooding, including the 2011 flood event, and the effect that it has had on communities, farmland, businesses and personal properties. Several Indigenous communities on Lake St. Martin have been displaced due to past flooding events; reducing flood frequency and intensity through Project implementation, along with the resulting changes to the environment, is expected to benefit Indigenous communities on Lake St. Martin through reducing damages to housing, property and infrastructure. This Project will have a considerable socio-economic benefit associated with alleviating flooding in the region. There will also be positive spin-offs associated with job creation and local economy stimulation, particularly during the construction phase.

There may be some minor adverse effects associated with the Project. A preliminary assessment of potential socio-economic effects related to access interruption revealed that the establishment of detours will mitigate potential effects and maintain access to emergency medical services. There may also be small, short-term effects associated with ambient air quality and noise, particularly during construction. Potential effects of the Project to Indigenous peoples may include: changes to traditional use of lands and resources, changes to the biophysical environment, effects on fish and fish habitat, vegetation, and wildlife resources. A more detailed assessment of socio-economic effects related to the proposed Project will be provided in the EIS.

The Project area is considered to be of low potential for archaeological sites. Additional information will be gathered on the uninterrupted site near the LMBOC and a HRIA conducted prior to construction if the potential for heritage resources in the LAA increases above a “low” status. If any heritage resource material is uncovered during construction, a qualified specialist will be engaged to assess the material and surrounding area prior to the continuance of construction activities.

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