

LAKE MANITOBA LAKE ST. MARTIN

OUTLET CHANNELS PROJECT

MANITOBA TRANSPORTATION AND
INFRASTRUCTURE

Wetland Compensation Plan

June 30, 2022

TABLE OF CONTENTS

- DISCLAIMER I**
- PREFACE..... II**
- LIST OF ACRONYMS AND GLOSSARY OF TERMS V**
 - Acronyms v
 - Glossary of Terms vi
- 1.0 INTRODUCTION 1**
 - 1.1 Purpose and Objectives 1
 - 1.2 Background 2
 - 1.3 Regulatory Requirements 6
 - 1.4 Roles and Responsibilities..... 7
 - 1.5 Indigenous Engagement 8
 - 1.6 Related Documents..... 8
- 2.0 WETLAND DELINEATION 9**
 - 2.1 Methodology..... 9
 - 2.1.1 Information Sources and Mapping..... 9
 - 2.1.2 Field Verification..... 10
 - 2.1.3 Wetland Classification System 10
 - 2.2 Results..... 11
- 3.0 WETLAND COMPENSATION 12**
 - 3.1 Process..... 12
 - 3.2 Wetlands Requiring Compensation 16
- 4.0 FOLLOW-UP AND MONITORING..... 17**
- 5.0 REFERENCES 19**
- APPENDIX 1 21**

List of Tables

Table 1: Key Roles Associated with Implementation of Wetland Compensation

Table 2: Class III, IV and V Wetlands Intersected by Project Components

Table 3: Wetland Compensation Ratios for Restoration and Enhancement

Table 1-1: Project Merged Land Cover Classification System and Habitat Descriptions for Class III, IV and V Wetlands

Table 1-2: Wetland Classification within the LMOC PDA

Table 1-3: Wetland Classification within the PR 239 Re-route PDA

Table 1-4: Wetland Classification within the LSMOC PDA

Table 1-5: Wetland Classification in the Power Distribution Line PDA

List of Figures

Figure A: EMP Process

Figure 1: Project Area

Figure 2: Wetlands in the LMOC Area

Figure 3: Wetlands in the LSMOC Area

DISCLAIMER

This document was developed to support the Environmental Management Program (EMP) for the Lake Manitoba and Lake St. Martin Outlet Channels Project (the Project). It has been prepared by Manitoba Transportation and Infrastructure as a way to share information and facilitate discussions with Indigenous rights-holders, stakeholders and the public. It has been prepared using existing environmental and engineering information and professional judgement, as well as information from previous and ongoing public and Indigenous engagement and consultation. The contents of this document are based on conditions and information existing at the time the document was prepared and do not take into account any subsequent changes. The information, data, recommendations, and conclusions in this report are subject to change as the information has been presented as draft. This draft plan should be read as a whole, in consideration of the entire EMP, and sections or parts should not be read out of context.

Revisions to draft plans have been informed by and will be based on information received from the engagement and consultation process, the Environmental Assessment process, Project planning activities, and on conditions of provincial and federal environmental regulatory approvals received for the Project. As these will be living documents, any changes to the plans that occur after Project approvals are received will be shared with regulators, Indigenous rights-holders and stakeholders prior to implementation of the change. Either a revision number or subsequent amendment would be added to the specific environmental management plan to communicate the revision or change.

PREFACE

The Lake Manitoba and Lake St. Martin Permanent Outlet Channels Project (the Project) is proposed as a permanent flood control mitigation for Lake Manitoba and Lake St. Martin to alleviate flooding in the Lake St. Martin region of Manitoba. It will involve the construction and operation of two new diversion channels: the Lake Manitoba Outlet Channel (LMOC) will connect Lake Manitoba to Lake St. Martin and the Lake St. Martin Outlet Channel (LSMOC) will connect Lake St. Martin to Lake Winnipeg. Associated with these outlet channels are the development of bridges, control structures with power connections, a new realignment of Provincial Road (PR) 239, and other ancillary infrastructure.

Manitoba Transportation and Infrastructure is the proponent for the proposed Project. After receipt of the required regulatory approvals, Manitoba Transportation and Infrastructure will develop, manage and operate the Project. This Wetland Compensation Plan (WCP) is one component of the overall Environmental Management Program (EMP) framework, which describes the environmental management processes that will be followed during the construction and operation phases of the Project. The intent of the EMP is to facilitate the timely and effective implementation of the environmental protection measures committed to in the Environmental Impact Statement (EIS), the requirements and conditions of the provincial licence issued under *The Environment Act*, the federal Decision Statement issued under *The Canadian Environmental Act 2012*, and other approvals received for the Project. This includes the verification that environmental commitments are implemented, monitored, evaluated for effectiveness, and adjustments made if/as required. It includes a commitment that information is reported back in a timely manner for adjustment, if required.

A key component for the success of the EMP is environmental monitoring, such that environmental management measures are inspected and modified for compliance with environmental and regulatory requirements, including those set out in provincial and federal approvals received for the Project. As indicated, monitoring results will be reviewed and used to verify predicted environmental assessment conclusions and effectiveness of mitigation measures. If unanticipated effects occur, or if mitigation measures are inadequate, adaptive management measures and subsequent monitoring will be applied as described further in individual environmental management and monitoring plans.

Monitoring results and application of adaptive management measures will inform follow-up reporting to regulators and any required revisions to environmental management plans. Manitoba Transportation and Infrastructure has initiated discussions with Indigenous rights-holders and the Rural Municipality (RM) of Grahamdale in the Project area on the establishment of an Environmental Advisory Committee (EAC). The EAC would be a platform for sharing monitoring results and discussing issues of concern. In addition, Manitoba Transportation and Infrastructure anticipates that the EAC will coordinate Indigenous Environmental Monitors and communications during the construction period and will be working with Indigenous rights-holders and stakeholders on its structure and purpose.

Manitoba Transportation and Infrastructure remains committed to consultation and ongoing engagement with Indigenous rights-holders and stakeholders that are potentially impacted by the Project. Detailed EMP review discussions were incorporated into Indigenous group-specific consultation work plans. Engagement opportunities included virtual open house events, sharing draft environmental management and monitoring

plans, sharing plan-specific questionnaires, and meetings to discuss related questions and recommendations. The intent has been to offer multiple avenues to share information about the Project so that rights-holders and stakeholders would be informed and could provide meaningful input into Project planning. The original draft EMP plans and questionnaires that were posted on the Project website for public review and comment are being replaced by the second draft of each plan as it becomes available. Feedback and recommendations received were used to update the current version of the draft plans, which are posted to the Project website at: <https://www.gov.mb.ca/mit/wms/lmblsmoutlets/environmental/index.html>.

Figure A displays a summary of the EMP process. The EMP provides the overarching framework for the Project Construction Environmental Management Program (CEMP) and the Operation Environmental Management Program (OEMP). These will be updated prior to Project construction and operation, respectively, and will consider applicable conditions of *The Environmental Act* provincial licence, *Canadian Environmental Assessment Act 2012* federal Decision Statement conditions and other approvals, any other pertinent findings through the design and regulatory review processes, and key relevant outcomes of the ongoing Indigenous consultation and public engagement processes. Until such time, these plans will remain in draft form.

The purpose of the CEMP and OEMP is to guide how environmental issues will be addressed during construction and operation, respectively, and how adverse effects of activities will be mitigated. The CEMP is supported by several specific or targeted management plans that will guide Manitoba Transportation and Infrastructure's development of the Project's contract documents and subsequently, the Contractor(s) activities, in an environmentally responsible manner and to meet regulatory compliance in constructing the Project. The OEMP will include some of the same targeted plans developed to manage issues during construction, but prior to construction completion, they would be revised and adapted to suit the specific needs during the operation phase.

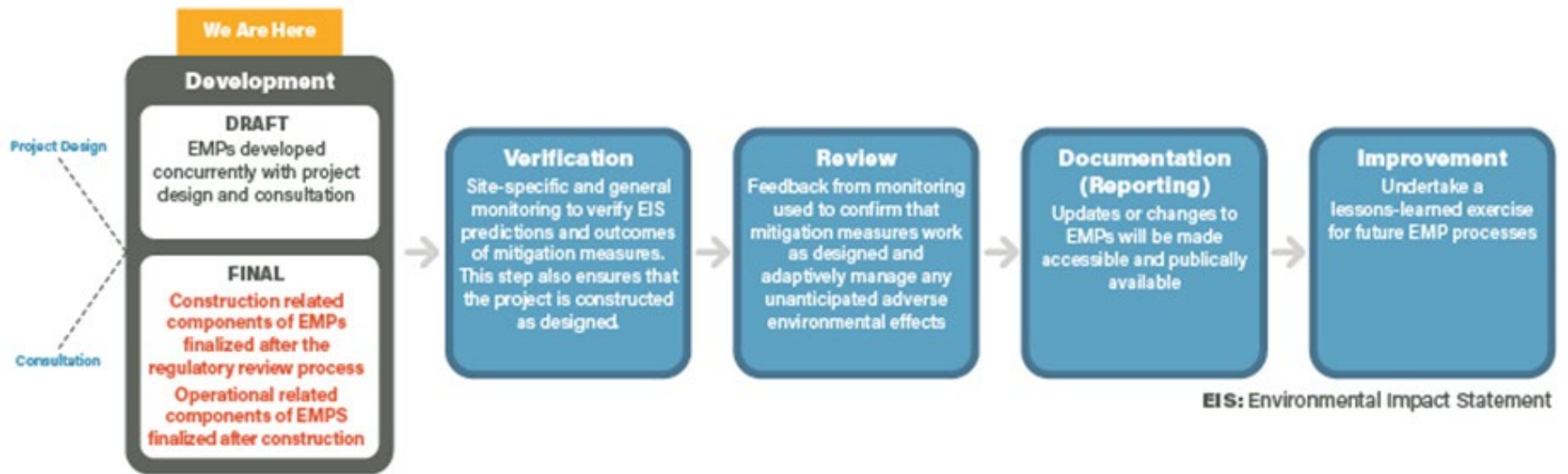


Figure A: EMP Process

LIST OF ACRONYMS AND GLOSSARY OF TERMS

Acronyms

%	percent
CEAA	<i>Canadian Environmental Assessment Act</i>
CEMP	Construction Environmental Management Program
EAC	Environmental Advisory Committee
EIS	Environmental Impact Statement
EMP	Environmental Management Program
EOSD	Earth Observation for Sustainable Development
GWMP	Groundwater Management Plan
ha	hectares
km	kilometre
LCC	Land Cover Classification
LAA	local assessment area
LiDAR	Light Detection and Ranging
LMOC	Lake Manitoba Outlet Channel
LSMOC	Lake St. Martin Outlet Channel
m	metre
MHHC	Manitoba Habitat Heritage Corporation
NDVI	Normalized Difference Vegetation Index
NDWI	Normalized Difference Water Index
OEMP	Operation Environmental Management Program
PDA	Project development area
PR	Provincial Road
the Project	Lake Manitoba and Lake St. Martin Outlet Channel Project
RAA	regional assessment area
RM	Rural Municipality
RVMP	Revegetation Management Plan

SWMP	Surface Water Management Plan
WCP	Wetland Compensation Plan
WetMP	Wetland Monitoring Plan
WMP	Wildlife Monitoring Plan
WRA	<i>Water Rights Act</i>
WRAA	<i>Water Resources Administration Act</i>

Glossary of Terms

Aquatic vegetation: Submerged, floating-leaved and floating plants that only grow on or beneath the water surface. Submerged plants may be rooted in soils or free-floating.

Baseline: Initial environmental conditions, prior to construction or anthropogenic actions.

Contractor: Refers to the individuals, entities or groups contracted by Manitoba Transportation and Infrastructure to undertake specific Project construction, operation or maintenance activities, and includes all subcontractors and affiliates.

Discharge: Rate of outflow; volume of water flowing down a river, from a lake outlet, or man-made structure.

Environmental Monitor: Refers to the individuals, groups or designated representatives engaged by Manitoba Transportation and Infrastructure to monitor, inspect, and document compliance with contractual and regulatory requirements associated with the construction activities and associated works for the Project. The monitor may also be an active member (or representative) of the Project’s Environmental Advisory Committee.

Groundwater: Water that occurs beneath the land surface and fills the pore spaces of soil or rock below saturated zone.

The Owner: refers to Manitoba Transportation and Infrastructure or a designated representative delegated by Manitoba Transportation and Infrastructure with overall responsibility for, and oversight of, Project design, construction and operation.

Peatland: Refers to:

- (a) a bog, fen or swamp, and
- (b) has waterlogged conditions that prevent plant material from fully decomposing, resulting in the production of organic matter exceeding its decomposition causing in a net accumulation of peat.

Runoff: Surface water that flows overland and into streams, wetlands or waterbodies, or into drainage systems.

Rights-holders: include First Nations, Metis Communities and other Indigenous communities who hold Aboriginal or Treaty rights that are protected under section 35 of *The Constitution Act 1982*. Commonly, these include hunting, trapping, fishing or gathering rights.

Stewart and Kantrud system: A wetland classification system that identifies 5 classes of prairie wetlands (Manitoba Sustainable Development, 2020). The class is determined by the length of time that the wetland holds surface water in a year of average moisture conditions and the associated vegetation and soils.

- Class I: short-lived wetlands (retains water for one week or less), mainly existing in spring after winter snow melts or big rains, typically supporting vegetation such as Kentucky bluegrass, goldenrod, forbes.
- Class II: short-lived wetlands (retains water for one week to one month), mainly existing in spring after winter snow melts or big rains, typically supporting vegetation such as fine stemmed grasses, sedges and forbs.
- Class III: semi-permanent or seasonal, meaning that it retains water for one month to three months, often dry by mid-June but may hold water for the entire year, often lasting fewer than five months; typically supporting shallow marsh vegetation such as emergent wetland grasses, sedges and rushes on gleysolic soils.
- Class IV: semi-permanent, meaning that it retains water for more than three months, holds some water year-round under wetter conditions but go dry in below average years, often lasting more than five months; typically supporting marsh vegetation and submerged aquatic vegetation such as cattails, bulrushes and pond weeds in the central area of the wetland as on gleysolic soils.
- Class V: permanent, meaning that it retains water year-round in average years with permanent open water in the central areas, but may go dry in years with well below average moisture conditions; typically having a central area that is open water free of vegetation surrounded by a zone of submerged aquatic vegetation such as cattails, bulrushes and pond weeds on gleysolic soils.

Surface water: Water that is on the Earth's surface, such as in a stream, river, lake, or reservoir.

Wetland: Refers to:

- (a) a marsh, bog, fen, swamp or ponded shallow water, and
- (b) low areas of wet or water-logged soils that are periodically inundated by standing water and that are able to support aquatic vegetation and biological activities adapted to the wet environment in normal conditions.

Wetland restoration: The practice of restoring water levels and/or the function of a wetland that has been altered, degraded, impaired, or lost.

1.0 INTRODUCTION

Wetlands are recognized by the Province of Manitoba as integral components of a watersheds, providing numerous flood control and ecological benefits. Manitoba's Water Strategy (Manitoba, 2003) outlines how wetland enhancement and restoration are important conservation goals. The objective of Manitoba's water conservation planning is to conserve and manage the lakes, rivers, groundwater and wetlands of Manitoba so as to protect the ability of the environment to sustain life and provide environmental and economic benefits, along with other values to existing and future generations. The Made-in-Manitoba Climate and Green Plan (Manitoba Sustainable Development, 2017) identifies wetlands and watersheds as a keystone to Manitoba's plan; it emphasizes the importance of protecting wetlands and watersheds to preserve habitat and wildlife and to provide natural drainage features in a time of climate change and flooding. Wetland enhancement and restoration are among the measures being adopted as a component of natural and green infrastructure and the potential carbon offset programs (Manitoba Sustainable Development, 2017). The steps being taken by the Province, and more specifically by Manitoba Transportation and Infrastructure with respect to the Lake Manitoba and Lake St. Martin Outlet Channel Project (the Project), are consistent with to *The Water Rights Act* C.C.S.M. c. W80 (WRA) and provide formalized protection for wetlands in Manitoba.

1.1 Purpose and Objectives

The purpose and objectives of this Wetland Compensation Plan (WCP) was outlined in the Lake Manitoba and Lake St. Martin Outlet Channels Project Environmental Impact Statement (EIS; MI, 2020) submitted by Manitoba Transportation and Infrastructure in March 2020. This plan describes the process by which wetlands that will be affected by Project construction and operation will qualify for mitigation, monitoring and/or compensation. Section 4.0 of this plan also provides an overview with respect to the follow-up and monitoring of wetlands that are planned to occur along and adjacent to the Project development area (PDA).

The overall objectives of the WCP are to:

- Outline Manitoba Transportation and Infrastructure's approach for wetland compensation as it pertains to this Project.
- Summarize the key findings of the wetland mapping and field investigations (WSP, 2020a) as they pertain to the determination of wetlands that qualify for compensation.
- Describe legislated approach to wetland compensation in Manitoba.
- Outline follow-up and monitoring measures to be adopted for other wetlands that do not meet the criteria as requiring wetland compensation.

1.2 Background

The Project is a flood mitigation project located approximately 220 kilometres (km) northwest of the City of Winnipeg (Figure 1) and consists of two new diversion channels: the Lake Manitoba Outlet Channel (LMOC) and the Lake St. Martin Outlet Channel (LSMOC). Associated with these outlet channels are the development of bridges, control structures with power connections, a new realignment of Provincial Road (PR) 239 that follows an existing municipal road for much of its length and is bordered by agricultural lands (primarily cropland or pasture uses), and other ancillary infrastructure. The Project is located within and extends northeast of the Rural Municipality (RM) of Grahamdale in Manitoba's Interlake region, an area within the Boreal Plains Ecozone.

The LMOC will extend approximately 24 km from Watchorn Bay on Lake Manitoba northeast to Birch Bay on Lake St. Martin in an area characterized by agricultural lands. The terrain is generally flat, with a distinct north to south trending drumlinoid or ridged and swale topography formed from subglacial deposition, with slopes of 1 percent (%) to 3% (WSP, 2020a). Ridges are generally well drained with upland forest vegetation, while the swales are poorly drained and support wetland communities (Figure 2).

The LSMOC extends about 24 km between the northeastern most extent of Lake St. Martin and Sturgeon Bay on Lake Winnipeg (Figure 3). There is currently all-season road access from Provincial Trunk Highway 6 to the Project site. The LSMOC and the proposed distribution line are on Crown lands (within Treaty 2 lands) in the southern part of the Mid-Boreal Lowland Ecoregion, an area smoothed by clay, silt and sand glacial deposits that support poorly drained flat bogs and horizontal fens (WSP, 2020a).

The Project EIS indicated that no wetland class will be lost from the region and made the following key statements regarding wetlands pertinent to this WCP:

- The effects from the LMOC and PR 239 realignment will be offset by wetland compensation (as per Manitoba legislation).
- Wetlands south of Lake St. Martin will undergo further wetland mapping – this occurred in 2020 and was extended to include all PDAs (WSP, 2020a).
- Monitoring of the effectiveness of wetland-related mitigation measures will occur.

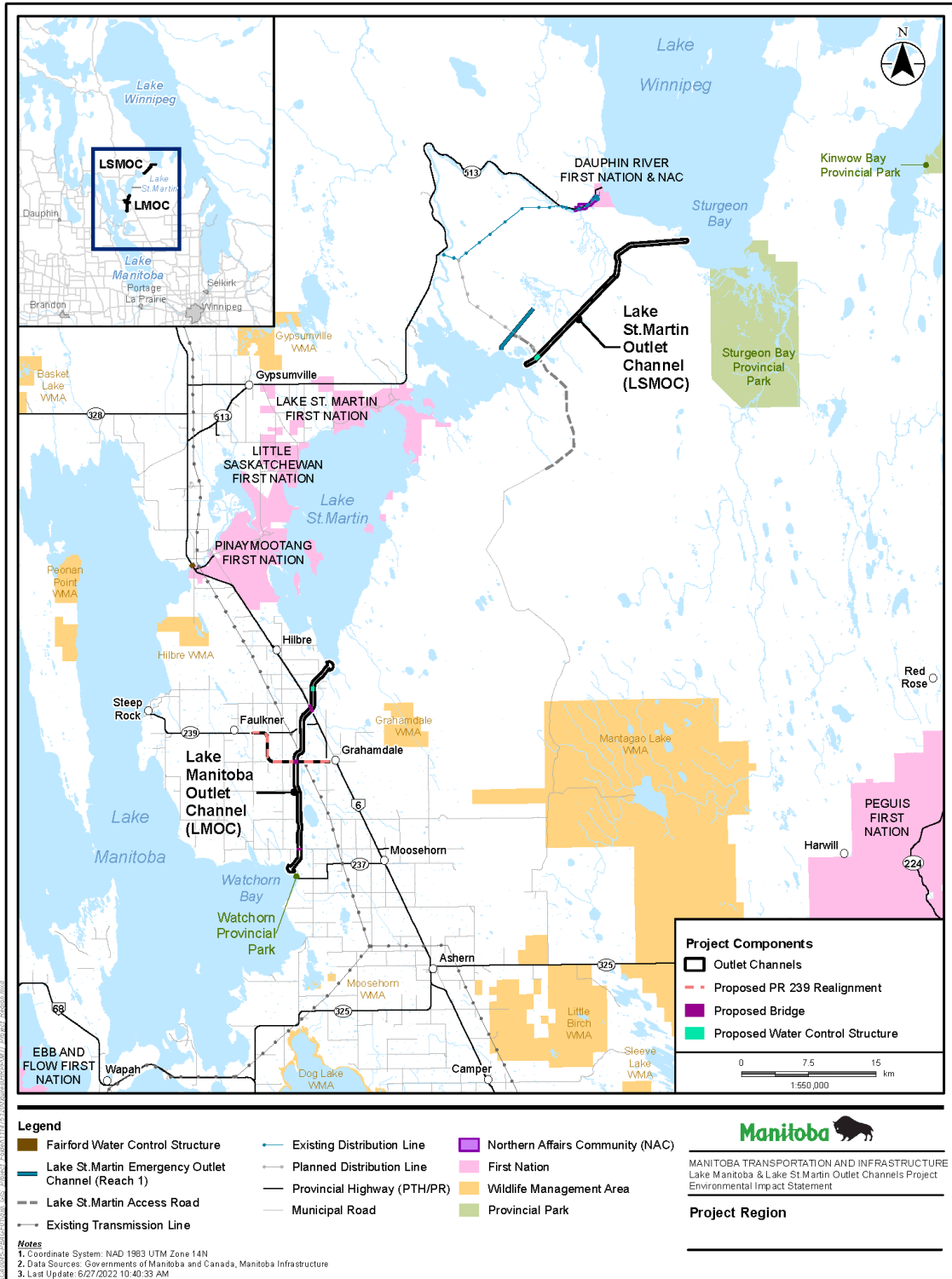


Figure 1: Project Area

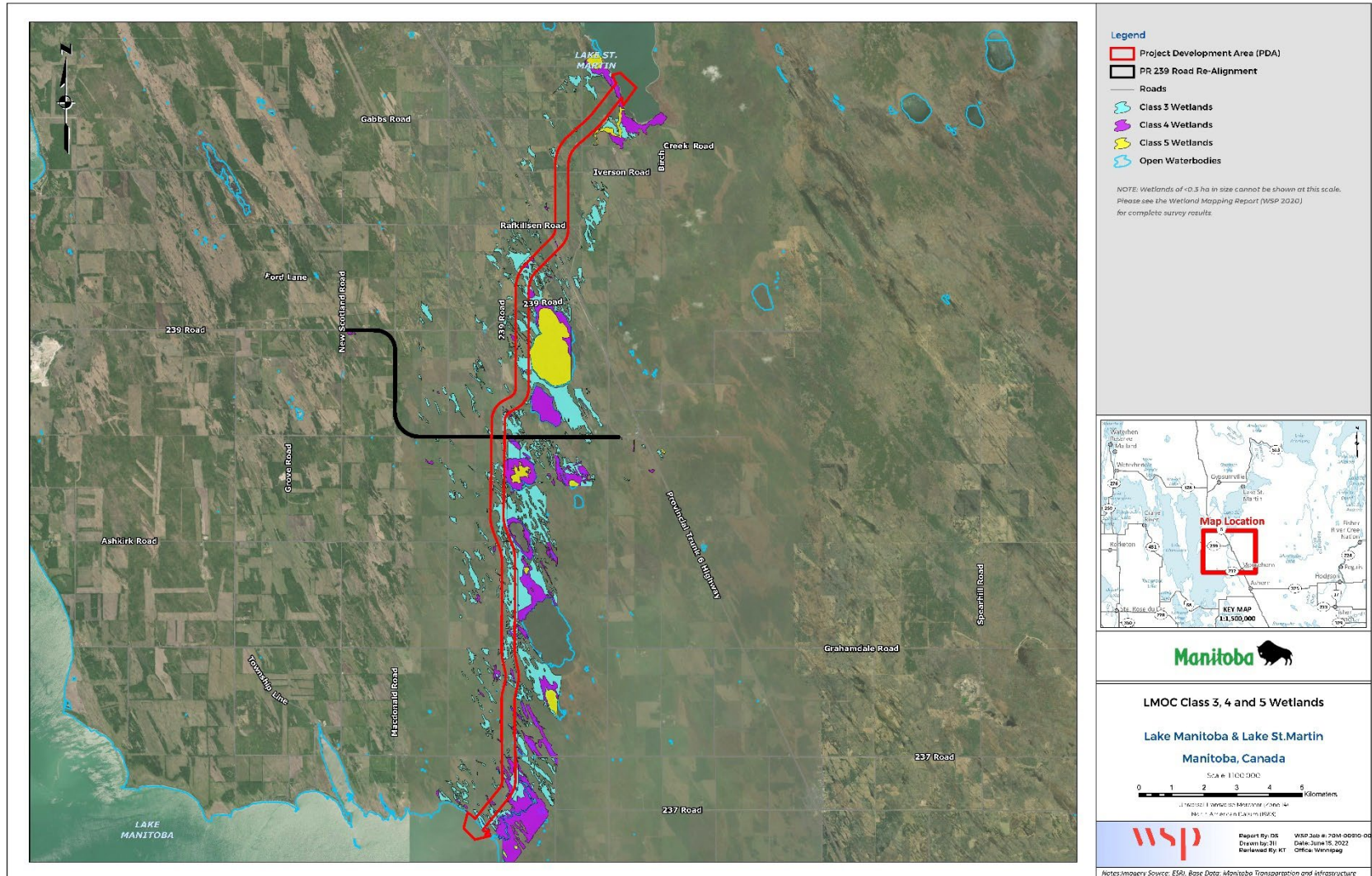


Figure 2: Wetlands in the LMOCA Area

INTRODUCTION

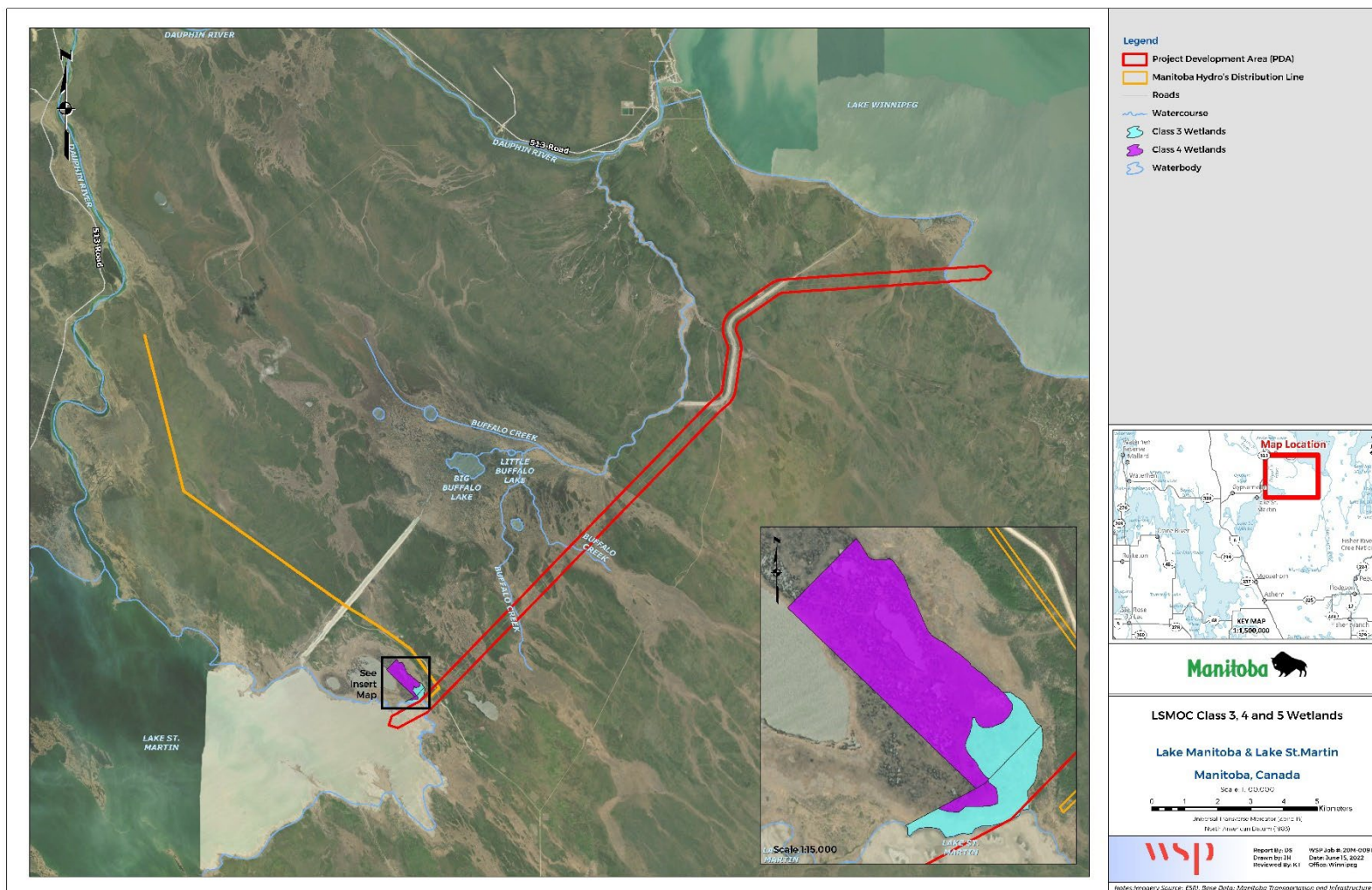


Figure 3: Wetlands in the LSMOC Area

1.3 Regulatory Requirements

The proposed Project is a designated project under the *Canadian Environmental Assessment Act, 2012* (CEAA, 2012), and therefore requires an Environmental Assessment. Pursuant to section 15(d) of the CEAA, 2012, the Impact Assessment Agency of Canada is the authority responsible for federal review of the proposed Project and they issued Guidelines for the Preparation of an EIS for the Project. Other key federal legislation, under which approvals may be required, includes the Fisheries Act, *Canadian Navigable Waters Act* (formerly the *Navigation Protection Act*), *Migratory Birds Convention Act* and *Species at Risk Act*.

The proposed Project is considered a 'Class III' development under the Classes of Development Regulation (164/88) of *The Environment Act* (Manitoba) and therefore requires an *Environment Act* Licence. The Environmental Approvals Branch of Manitoba Environment, Climate and Parks, Environmental (MECP, formerly Manitoba Sustainable Development) is the authority responsible for provincial review of the proposed Project and they provided EIS Guidelines for the Project. In addition to addressing the EIS Guidelines, provincial permits will be required under several acts to address various Project activities, such as *The Crown Lands Act* (camp development on provincial Crown lands), *The Mines and Minerals Act* (quarry development), *The Wildfires Act* (burning) and *The Dangerous Goods Handling and Transportation Act* (petroleum storage tanks). Additional information is available in the Construction Environmental Management Program (CEMP, Appendix 1).

Under *The Transportation Infrastructure Act* (TIA) and *The Water Resources Administration Act* (WRAA), Manitoba Transportation and Infrastructure is responsible for the construction and operation of water control, drainage, and transportation infrastructure. The delivery of some of these projects occur in areas where wetland habitat is present and wetland impacts are unavoidable (Manitoba Natural Resources and Manitoba Highways and Transportation, 1998).

In 2019, *The Water Rights Act* (WRA) was amended to streamline drainage and water resource management and includes a goal of no net loss of wetlands. The Act describes the measures associated with licensing system to water use and allocation primarily for agricultural, industry, and municipal users. For water control works that require licensing under the *Water Rights Act*, the Act indicates that "prescribed" classes of wetlands require specific actions to ensure no net loss of wetland benefits. Prescribed classes of wetlands requiring specific actions are established in the Water Rights Regulation (section 4.1(1)) as Class III wetlands (Manitoba, 2018). Water control works outside of the agricultural region of Manitoba that require authorization under WRA are assessed on a case-by-case basis to determine whether or not Class III wetlands will be altered by the proposed works. If Class III wetlands will be altered by a water control work that requires licencing then the requirements of section 5.1 of the Act must be met.

Under *The Water Rights Act*, Manitoba Transportation and Infrastructure is not required to seek approval for works related to water rights, diverting water or diversions. However, the wetland compensation guidance in the Act will be used by the Project as instruction regarding wetland compensation. The Act sets out requirements for restoration, enhancement, and/or compensation of prescribed wetlands that are lost or altered by the construction, operation and maintenance of a project. Potential wetland impacts could also include reduction in the physical size or a change that would affect the wetland classification (e.g., a change

to hydrology that would alter duration of inundation). In general, provincial wetland compensation can be accomplished in two ways:

- Financial compensation to an approved service provider as designated in the *Water Rights Act*, such as the Manitoba Habitat Heritage Corporation (MHHC) for the purposes of restoring or enhancing wetlands.
- Implementation of wetland restoration or enhancement projects in a location specified or approved by the Minister of Conservation & Climate.

1.4 Roles and Responsibilities

Table 1 identifies key roles and responsibilities associated with planning, development and implementation of the WCP. Manitoba Transportation and Infrastructure hired Independent consultants to conduct an assessment of wetlands. That information was integrated into the Project EIS and more recently associated with follow-up wetland assessment and documentation in support of the WCP.

Currently, Manitoba Transportation and Infrastructure is evaluating options to satisfy the objectives for provincial no-net loss of wetlands. Potential projects may include protection, enhancement, restoration, and/or compensation for prescribed wetlands (Class III, IV and/or V wetlands). Roles and responsibilities for each project will be identified when projects are formalized.

Table 1: Key Roles Associated with Implementation of Wetland Compensation

Role	Organization	Responsibility
Project Owner / Proponent	Manitoba Transportation and Infrastructure	Assure provincial wetland policies and legislative objectives are met Assure completion of identified protection, restoration, and/or enhancement projects Complete payment for identified compensation projects
Wetland Investigation and Assessment	Independent Consultant(s)	Wetland quantification and categorization
Approved Wetland Service Provider	MHHC	Approved by Minister to perform wetland restoration or enhancement projects under the <i>Water Rights Act</i> .
<i>Water Rights Act</i> Review	Manitoba Environment, Climate and Parks (MECP)	Review WCP prior to implementation

1.5 Indigenous Engagement

Manitoba Transportation and Infrastructure is committed to and in the process of ongoing engagement and consultation with Indigenous rights-holders and other stakeholders that are potentially affected by the Project. Detailed Environmental Management Program (EMP) review discussions that include this WCP will, through such measures as virtual open house events and EMP-specific questionnaires, provide ongoing engagement opportunities that facilitate EMP finalization.

1.6 Related Documents

The following project documents, additional to the Project EIS, also contain wetland-related topics and details, but not necessarily included in this WCP:

- Surface Water Management Plan (SWMP) and associated monitoring;
- Groundwater Management Plan (GWMP) and associated monitoring;
- Vegetation Monitoring as outlined in the Revegetation Management Plan (RVMP);
- Wildlife Monitoring Plan (WMP); and
- Wetland Monitoring Plan (WetMP).

2.0 WETLAND DELINEATION

This section outlines how wetlands were assessed and identifies key characteristics of those that move forward for compensation. The process of compensation associated with those wetlands is described in Section 3.0. Wetland delineation involves determining and defining the wetlands that would be directly affected by the construction and operation of the Project. Manitoba Transportation and Infrastructure engaged an independent consultant to delineate and quantify the loss of these wetlands that are intersected by the PDA. The wetland delineation information developed from mapping and field investigations in 2020 provides a refinement of earlier work (WSP 2020a; MI 2020). This information was subsequently interpreted with consideration of *The Water Rights Act* in developing the best approach to compensate for wetlands potentially affected by the Project (Section 3.0).

2.1 Methodology

This section summarizes the methods used in wetland delineation described more fully in the Wetland Field Report developed on the basis of fieldwork and mapping conducted in 2020 (WSP 2020a).

2.1.1 Information Sources and Mapping

The delineation of wetland types that initially occurred in support of the Project EIS included vegetation mapping for the PDA, the vegetation and wetland local assessment area (LAA) (1 km beyond the Project footprint) and regional assessment area (RAA, 5 km beyond the Project footprint). Mapping used two publicly available data sources:

- The Enhanced Wetland Mapping, produced by Ducks Unlimited Canada (DUC, c. 2018)
- The Earth Observation for Sustainable Development (EOSD) Land Cover Classification (LCC) (Wulder and Nelson, 2003)

Both data sets offered continuous mapping of the LMOC and LSMOC study areas, which were derived from relatively coarse scale satellite data (about 1:50,000 scale). Final mapping was at a similarly coarse scale (about 1:50,000). While satisfactory for the purposes of the Project EIS, more detailed delineation of wetlands at a higher resolution was obtained in 2020 on the PDA and adjacent lands to refine the wetland impact analysis and facilitate compensation planning for wetland loss.

Mapping incorporated orthoimagery and available light-detection and ranging (LIDAR) data within a 1.5 km area extending from the PDA centreline. The fine resolution of this data facilitated the mapping of wetland and upland areas at 1:5,000 scale, leading to improved accuracy and increased confidence in wetland and upland community delineation and characterization (WSP 2020a). Wetland mapping was initially completed using automated GIS classification techniques that combined Sentinel 2, orthoimagery, Manitoba Transportation and Infrastructure LIDAR (1 metre [m] resolution) and national digital elevation model terrain data to delineate and classify wetlands and upland land cover. The assessment of wetlands included drainage

systems and depressions that may collect surface water; these depressions were then classified using the imagery sources (Sentinel 2 and orthoimagery) to identify wetland classes.

Wetland identification and mapping was performed using a hierarchical approach, based on analysis of satellite imagery, topographic indices generated from terrain data, and field observations. As a first step, probable wetland areas were identified from a pixel-based classification of multispectral Sentinel 2 data (10 m resolution). Spectral data was used to calculate the Normalized Difference Vegetation Index (NDVI) and Normalized Difference Water Index (NDWI), two key indicators of wetland vegetation and soil moisture. Classification was then performed using a Random Forest algorithm with the following input variables: red, green, and blue bands, infrared band, NDVI and NDWI. In addition to the spectral band indices, indices from the terrain LIDAR dataset were extracted. Two indices were included in the classification: Topographic Wetness Index and the Depth to Water Index.

Wetland delineation was extracted from select areas that were then assessed during the late summer vegetation surveys conducted in August 2020. This data allowed assessment of the accuracy of the delineations and to confirm wetland classes along the survey area. A second object-based classification was performed to evaluate wetland classes, using a series of descriptive statistics extracted from previous satellite and topographic layers. A final verification was performed using visual interpretation of the orthoimagery and field ground truthing data to ensure accuracy of wetland classification and delineation.

2.1.2 Field Verification

Field confirmation of wetland mapping included both ground truthing surveys and visual checks (WSP 2020a). Ground truthing surveys were completed during the early (July 6-12, 2020) and late summer (August 6- 12, 2020) to determine wetland and terrestrial plant community composition. Early summer data provided initial training points for wetland classification and both early and late data were used to confirm initial and final stages of wetland and upland classifications. An aerial check of the initial mapping by helicopter survey (visual checks) along the PDA during late summer plant surveys also helped to confirm mapped (spatial) delineations. During aerial surveys, broad zones of habitats were checked, as well as specific wetland sites. Specific wetlands were also checked in more detail during the aerial surveys (visual and ground check surveys), to confirm differentiations among forested and marsh wetland classes. In total, ground truthing checked 120 sites, representing each mapped wetland and upland type within each of the Project components (i.e., LSMOC, LMOC, Manitoba Hydro's distribution line, and PR 239 re-route).

2.1.3 Wetland Classification System

The Stewart and Kantrud (1971) system and the Canadian Wetland Classification System (National Wetlands Working Group, 1997) were both used to develop a merged classification system (Appendix 1, Table 1-1). The combination allowed identification of the marshes in the southern Project areas (LMOC and PR239) and the organic and swamp peatland types in the northern areas (LSMOC and the power distribution line). As the Stewart and Kantrud system is currently used in Manitoba's wetland compensation process, this approach facilitates analyses and discussions regarding offsets for wetland impacts.

The five classes of wetlands in Schedule C of the WRA are based on definitions provided in Stewart and Kantrud (1971) and are intended for the glaciated prairie region. A document on the MECP website helps to further explain the classification system and its application to the agricultural region of Manitoba (https://www.manitoba.ca/sd/pubs/water/water_rights/mb_wetlands_classification_key.pdf). For upland habitats, forests were classified using the Manitoba Forest Ecosystem Classification system (Zoladeski, et al., 1995). Waterbodies and anthropogenic land cover types followed the LCC for Manitoba (Wulder and Nelson, 2003).

2.2 Results

Appendix 1 (Table 1-2 to Table 1-5) provides an evaluation of wetland habitat maps, as verified through field investigations. Table 2 provides a summary of the results with respect to the Class III, IV and V wetland types that are being considered for compensation under the WRA. Table 2 indicate that the most common wetland habitat types intersected by the LMOC are Class III marshes (197.9 hectares [ha], or 19.2% of habitat types intersected by the LMOC PDA when considering terrestrial and wetland habitat types; WSP, 2020a). A small amount (1.1 ha) of Class III wetlands is intersected by the PR 239 realignment.

Peatlands and swamp predominate in the LSMOC area, where horizontal fens and stream fens represent collectively represent 63% of habitat types intersected (37% and 26%, respectively; WSP, 2020a). Peatlands and swamps represent 31% of habitat types intersected by the proposed distribution power line to extend from PR 513 to the LSMOC water control structure. By definition, peatlands are not Class III, IV or V wetlands. Schedule C of *The Water Rights Act* defines Class III wetlands as those holding surface water for a period between one month and three months (in average years). Although peatlands have high water tables, this is not in the form of surface water and they do not have high water tables for only 3 months. Peatlands are typically not dry at any time of the year. Class III wetlands are also defined as those wetlands with gleysolic soils. Peatlands do not have gleysolic soils. Finally, Class III wetlands frequently have shallow marsh vegetation, such as emergent wetland grasses, sedges and rushes. Peatlands do not have shallow marsh vegetation; they have black spruce, tamarack, shrubs, sphagnum moss – vegetation typical of bogs or fens.

Table 2: Class III, IV and V Wetlands Intersected by Project Components

Project Component	Class III	Class IV	Class V	Total Area (ha)
LMOC	197.9	38.4	0.8	237.1
PR 239	1.1	0.7	0.0	1.8
LSMOC	0.1	0.0	0.0	0.1
Distribution Power Line	0.0	0.0	0.0	0.0
Total Area (ha)	199.1	39.1	0.8	239.0

3.0 WETLAND COMPENSATION

This section outlines the process involved in developing a WCP, and considers wetland classification described in Section 2.0 (Table 2). As with many jurisdictions, Manitoba's Wetland Policy framework requires avoidance, minimization, and compensation. To the extent possible, avoidance and minimization of effects to wetlands have been considered during earlier stages of Project planning (e.g. location of Project components). As required by the *Water Rights Act*, compensation described in this section will focus on prescribed wetlands, i.e., wetlands defined as Class III, IV, or V according to the Stewart and Kantrud (1971). These are wetland classes that have been particularly threatened in agricultural areas across Manitoba.

3.1 Process

The overall process that will be used to develop the specific wetland compensation projects can be generally described in 5 steps outlined below and describe in the text that follows:

1. Wetland mapping, classification and assessment for appropriate project areas.
2. Information sharing and discussions with Indigenous rights-holders, and the public.
3. Development of enhancement and restoration projects and the determination of compensation.
4. Continued discussions and information sharing.
5. Implementation of wetland compensation project plans.

Step 1 – Wetland Delineation and Investigation

Wetland delineation investigation and evaluation as described further in Section 2.0 involves:

- Identify, map and conduct field investigations of wetlands that are intersected by or otherwise adjacent to the Project PDA
 - Occurred initially through baseline surveys and mapping for the Project to support the Project EIS and followed up with more detailed mapping and site investigations to characterize wetlands (MI 2020, WSP 2020a).
- Classify wetland using both the Stewart & Kantrud Wetland Classification System and the Manitoba Wetland Assessment Method
 - Conducted by WSP (2020a) for the Project.

Step 2 – Information Sharing

Initial information sharing will be accomplished by:

- Posting and sharing the draft WCP with Indigenous rights-holders, and public stakeholders:
 - The WCP includes Manitoba Transportation and Infrastructure’s current understanding of current and available information.
 - Providing resources and opportunity for virtual meetings to present and discuss the plan.
 - Facilitate public access to related supporting documents including field investigation reports.
 - The WCP was posted to the Manitoba Transportation and Infrastructure website in December 2020 and discussion with Indigenous rights-holders, other stakeholders and the public occurred prior to and, particularly, after the posting of this information.

Step 3 – Wetland Compensation Approach

This section outlines the steps that will be taken by Manitoba Transportation and Infrastructure with respect to Class III, IV and V wetlands that may be impacted by the Project. Manitoba Transportation and Infrastructure will be considering restoration, enhancement and financial compensation projects to meet its wetland compensation obligations.

- Wetland compensation ratios - Compensation ratios will be applied to Class III, IV, and V wetlands.
 - *The Water Rights Act* indicates that “prescribed” classes of wetlands require specific actions to address no net loss of wetland benefits. The wetland compensation ratios are identified in the Water Rights Regulation (C.C.S.M.c. W80) (Manitoba, 2018) and are conditional on the wetland classification and the applied compensation method.

The compensation ratios for prescribed wetlands are listed in Table 3.

Table 3: Wetland Compensation Ratios for Restoration and Enhancement

Action	Ratio
Restore or enlarge an existing wetland	2:1
Enhance or permanent legal protect	3:1

- Restoration and enhancement projects will be the preferred approach over financial compensation, although it should be understood that objectives of restoration and/or enhancement projects may also include:
 - Increase the size of the existing wetland
 - Improve hydric soil functions, hydrology and vegetation of a wetland and the uplands surrounding the wetland
 - Provide permanent legal protection to wetland or wetland enhancements
 - Through enhancement and/or restoration projects to reduce financial compensation

- Since the completion of wetland field investigations in 2020, Manitoba Transportation and Infrastructure has begun the process of identifying potential enhancement and restoration projects.
 - In the WCP questionnaire and within consultation and engagement meetings, Manitoba Transportation and Infrastructure requested feedback from rights-holders and Project stakeholders on suitable wetland enhancement, restoration and/or protection project ideas outside the PDA, and in the LAA and RAA. The following feedback that has been received to date pertains to suggested locations for compensation projects:
 - Local regions, including the entire area extending from LSMOC north to the Saskatchewan and McBeth Points, east to Fisher Bay and further east to include the entire Washow-Fisher Peninsula, south to PR 325, and the LMOC area
 - Large areas of Manitoba
 - Riparian wetlands (Lake Winnipeg wetlands and downstream in the Nelson River).
 - Upper Assiniboine River and Lake Manitoba watersheds
 - The determination of compensation projects will consider input from Indigenous rights-holders, regulators and other stakeholders through the EAC. Manitoba Transportation and Infrastructure began a study that evaluates local and regional crown land that may also include potential for enhancement, restoration and/or protection. The criteria to assess potential parcels for eligibility as a suitable compensation project will at minimum include:
 - Topography
 - Existing Habitat/hydrological connectivity
 - Wetland Size
 - Known Species at Risk use
 - Vegetation zone distribution
 - Duration of surface water in more than 10% of the wetland
 - Disturbance in or immediately adjacent the wetland
 - Wildlife habitat quality and associated potential for wildlife use
 - Connectivity to fish habitat/fish-bearing waters
 - Water quality improvement
 - Groundwater discharge/recharge
 - Wetland uniqueness
 - Culturally important species and areas
 - Recreation/Education potential
 - When enhancement and restoration projects have been identified, Manitoba Transportation and Infrastructure will determine if additional financial compensation is also required.
 - Compensation funds are to be provided to an approved service provider. Manitoba Environment Climate and Parks are responsible to determine what organization qualify as service providers under the WRA.

- Using the compensation ratios in Table 3, funds may be transferred to an approved service provider that can effectively perform wetland restoration or enhancement projects.
- Manitoba Transportation and Infrastructure will endeavor to support approved service provider(s) by assuring wetland-relevant information is submitted with the compensation transfer.

Step 4 - Information Sharing Continued

Continue to share updated and current information in the following manner:

- As a way to finalize the WCP, continue to post and share the updated plan with Indigenous rights-holders, and public stakeholders
 - Providing resources and opportunity for virtual meetings to present and discuss the new compensation plans
 - Facilitate public access to related supporting documents including field investigation reports
- Manitoba Transportation and Infrastructure has initiated discussions with Indigenous rights-holders in the Project area and the RM of Grahamdale with respect to the establishment of an Environmental Advisory Committee (EAC). Manitoba Transportation and Infrastructure will utilize this platform to identify potential wetland creation, restoration or enhancement projects; this will include information on the location of sites and the process for delivering the compensation project.

Step 5 – Wetland Compensation Plan Implementation

Depending on the nature and need of each wetland compensation project, individual implementation plans will likely be required.

- As wetland compensation projects are formalized, develop implementation plans that identify appropriate project phases including: planning, construction/activities, and monitoring.
- Individual project schedules will be developed which when compiled will demonstrate the length of time it will take to complete the Projects overall wetland compensation requirements.

Manitoba Infrastructure and Transportation will continue to engage and consult with Indigenous rights-holders and the RM of Grahamdale and work with the EAC towards development of an effective process for wetland compensation. These compensation projects are anticipated to occur over several years, some of which may be initiated during the construction phase.

3.2 Wetlands Requiring Compensation

Based on recent field investigations and the current environmental assessment, this section describes the types and area of wetland that are currently included for consideration in the WCP. Manitoba Transportation and Infrastructure is committed to applying the mitigations to minimize Project-related wetland impacts as identified in the Project EIS.

Table 2 provides a summary of the evaluation of wetland habitat maps, as verified through field investigations (Section 2.1). Table 2 illustrates that Class III wetlands represent 83.3% of all wetlands identified, followed by 16.4% for Class IV and 0.2% for Class V. Of the Class III wetlands, 99.4% are located on the LMOC, 0.5% on PR239, and 0.1% on LSMOC. This includes areas of 197.9 ha, 1.1 ha, and 0.1 ha in each of the respective project components. Of the Class IV wetlands identified, 98.2% was located on LMOC and 0.8% on PR239. This includes 38.4 ha and 0.7ha in each of the respective project components. Class V wetlands were only identified in the LMOC, including 0.8ha. Class IV and V wetlands have not been identified along the PDA for the LSMOC. Prescribed wetlands were not identified along the distribution power line (Figure 1 and Figure 3).

4.0 FOLLOW-UP AND MONITORING

Follow-up and monitoring is a key component of the ongoing environmental assessment of wetlands potentially affected by the Project. The WetMP provides details with regard to follow-up and monitoring. The WetMP includes an integrated sampling design for several environmental parameters (e.g., surface water, ground water, vegetation and wildlife) to determine whether and how wetlands are being affected by the Project. The WetMP is designed and will be implemented in a manner that is consistent with section 9 of the Impact Assessment Agency of Canada's (formerly Canadian Environmental Assessment Agency) EIS Guidelines for the Project (CEAA 2018), which states: the purpose of the program is to verify the accuracy of predictions and the effectiveness of mitigation measures, and to assure that proper measures and controls are in place in order to decrease the potential for environmental degradation during all phases of Project development. Additionally, monitoring associated with the SWMP, GWMP, RVMP, and WMP will provide results that inform or otherwise bolster the information base developed on wetlands through the WetMP. The results of that monitoring will inform the need for additional or refinements to mitigation measures with respect to wetlands.

Verification of wetland-related predictions identified in the Project EIS will primarily involve testing key predictions to verify that mitigation measures implemented as part of Project construction and operation are functioning as intended. Regular reporting and review of results from environmental assessment verification monitoring can be used to determine whether further review or adaptive modification to measures specified in the CEMP, Operation Environmental Management Program (OEMP), and associated environmental management plans are required.

Compliance-related monitoring (Project EIS Volume 1, Chapter 3, Appendix 3F; MI, 2020) will involve inspecting construction sites to assure that mitigation measures identified in the CEMP, OEMP and associated environmental plans are being implemented and are functioning as intended on a site-specific scale (e.g. surface water management and the potential influence on adjacent wetlands). Environmental compliance monitoring, and regular site inspection will also help to identify unanticipated adverse environmental effects resulting from Project activities, and will enable timely proactive or reactive response in order to avoid, minimize or mitigate these potential effects at a site-specific scale.

The results from environmental compliance monitoring and environmental assessment verification monitoring may provide information that identifies the need for and means of adaptively managing unanticipated environmental effects related to the Project. The general approach for development of the Project's EMP, and the specific management and monitoring plans that comprise it, provides a proactive means of adaptively managing unanticipated adverse environmental Project effects. Draft environmental management and monitoring plans are being revised and updated in conjunction with ongoing engineering design, and ongoing input received from potentially affected Indigenous rights-holders and other stakeholders.

FOLLOW-UP AND MONITORING

Overall, Manitoba Transportation and Infrastructure's proposed approach to environmental management, environmental monitoring, reporting, review, and ongoing engagement is meant to further assist in identifying and addressing potential information gaps, uncertainties related to potential effects, implementation of mitigation, and continual review and improvement on environmental performance.

Environmental management and monitoring plans have been shared with Indigenous rights-holders and public stakeholders that may potentially be affected by the Project. The results of ongoing engagement with will inform the further development of the plans. The WCP and other plans will be finalized after the receipt of required Provincial and Federal regulatory approvals.

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APPENDIX 1

Wetland Types and Area Potentially Affected by the Project (WSP 2020a)

Table 1-1: Project Merged Land Cover Classification System and Habitat Descriptions for Class III, IV and V Wetlands

Classification	Description
Marsh¹	
Class II	Temporary graminoid/forb mineral wetland with wet meadow plant community; surface water is present for a short period of time after snowmelt or a heavy rainfall.
Class III	Seasonal graminoid/forb mineral wetland with shallow wetland plant community; surface water is present throughout the majority of the growing season, but is typically dry by the end of summer.
Class IV	Semi-permanent graminoid/forb mineral wetland with deep wetland community; surface water is present for most or all of the year, except in periods of drought.
Class V	Permanent graminoid/forb mineral wetland with open water community; surface water is present throughout the year.
Peatland	
Bog²	
Basin Bog	Topographically confined peatland with poor nutrients and level surface; water input limited to snowmelt, rain and local surface run-off.
Fen²	
Basin Fen	Topographically confined peatland; water inputs consisting of snowmelt, rain, surface runoff, and groundwater.
Horizontal Fen	Uniformly vegetated peatland on broad depressions or plains; water inputs consisting of snowmelt, rain, surface runoff, and groundwater.
Shore Fen	Peatland situated adjacent to lakes or ponds with firmly anchored surface peat; water inputs consisting of snowmelt, rain, surface runoff, groundwater and surface flow.
Stream Fen	Peatland located in main channel or along banks of permanent or semi-permanent streams; water inputs consisting of snowmelt, rain, surface runoff, groundwater and surface flow.

Classification	Description
Swamp²	
Basin Swamp	Topographically confined shrubby or treed wetland with less than 40 cm of organic soil.
Lacustrine Swamp	Shrubby or treed wetland with less than 40 cm of organic soil occurring along the shores of permanent ponds or lakes; water level affected by lake during high water periods.
Lagg Swamp	Sloping shrubby or treed wetland with less than 40 cm of organic soil occurring between upland mineral terrain and peatlands.
Riverine Swamp	Shrubby or treed wetland with less than 40 cm of organic soil occurring along banks of rivers and permanent and intermittent streams; subject to flooding when stream or river waters are high.
Unconfined Flat Swamp	Broad shrubby or treed wetland with less than 40 cm of organic soil among other kinds of wetlands with poorly defined edges.
Water Bodies³	
Water Bodies	Consists of all open water including lakes, rivers, streams, ponds and lagoons.

Notes:

- ¹ Prairie Pothole Wetland Classification System, Stewart and Kantrud (1971)
- ² Canadian Wetland Classification System (National Wetlands Working Group, 1997)
- ³ Manitoba LLCC is based on the EOSDLCC system (Wulder and Nelson, 2003)

Table 1-2: Wetland Classification within the LMOC PDA

Broad Land Cover Category	Land Cover Class	Total Area In the PDA (ha)	Compensation Area (ha)
Marsh	Class II	68.0	N/A
	Class III	197.9	197.9
	Class IV	38.4	38.4
	Class V	0.8	0.8
Swamp	Basin Swamp	47.8	N/A
	Lacustrine Swamp	0.8	N/A
Total Wetlands		353.7	237.1

Table 1-3: Wetland Classification within the PR 239 Re-route PDA

Broad Land Cover Category	Land Cover Class	Total Area In the PDA (ha)	Compensation Area (ha)
Marsh	Class II	4.1	N/A
	Class III	1.1	1.1
	Class IV	0.7	0.7
Swamp	Basin Swamp	3.2	N/A
Total Wetlands		9.1	1.8

Table 1-4: Wetland Classification within the LSMOC PDA

Broad Land Cover Category	Land Cover Class	Total Area In the PDA (ha)	Compensation Area (ha)
Marsh	Class III	0.1	0.11
Peatland	Basin Bog	114.1	N/A
	Basin Fen	40.9	N/A
	Horizontal Fen	333.3	N/A
	Shore Fen	4.8	N/A
	Stream Fen	232.5	N/A
Swamp	Basin Swamp	3.8	N/A
	Lacustrine Swamp	10.7	N/A
	Lagg Swamp	11.5	N/A
	Unconfined Flat Swamp	18.1	N/A
Total Wetlands		769.7	0.1

Table 1-5: Wetland Classification in the Power Distribution Line PDA

Broad Land Cover Category	Wetland Class	Total Area In the PDA (ha)	Compensation Area (ha)
Peatland	Basin Bog	0.2	N/A
	Basin Fen	2.2	N/A
	Horizontal Fen	1.8	N/A
	Stream Fen	0.2	N/A
Swamp	Lacustrine Swamp	0.1	N/A
	Lagg Swamp	4.1	N/A
	Riverine Swamp	0.9	N/A
	Unconfined Flat Swamp	4.6	N/A
Total Wetlands		14.2	0