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LIST OF MAPS

Abbreviations and Acronyms

EIS	environmental impact statement
EOC	emergency outlet channel
LAA	local assessment area
LMOC	Lake Manitoba outlet channel
LSMOC	Lake St. Martin outlet channel
RAA	regional assessment area

QUESTION IAAC-22

EIS Guideline Reference: 7.1.4 Groundwater and Surface Water

EIS Reference: 6.4.2. Project Interactions with Groundwater; 6.4.5 Existing Conditions for Surface Water

Context and Rationale

The EIS Guidelines require the proponent to identify and explain the selection of spatial boundaries.

The EIS identifies different areas for the RAA for the soils, groundwater/geology, and surface water VCs. It is not clear how the Buffalo Lake watershed overlaps with the selected RAAs. In the EIS, the proponent refers to Appendix 6B, Figure 6.4B-8 to describe the Buffalo Lake watershed. However, this figure does not define the Buffalo Lake watershed boundaries. The EIS notes that defining the watershed boundary of a wetland is difficult and generally describes the Buffalo Creek watershed as consisting of Big Buffalo Lake, Little Buffalo Lake, Buffalo Creek and several small unnamed lakes, ponds and creeks as having a very complex hydrology. Understanding the rationale for the selected RAA is necessary to support the assessment of changes from the Project to water and associated effects, including effects to fish and fish habitat.

Information Requests

a) Discuss applicability of the RAA for surface water and given Buffalo Lake watershed boundaries. If warranted, presented revised figures to demonstrate consideration of the Buffalo Lake watershed boundaries in the selection of the RAA for surface water.

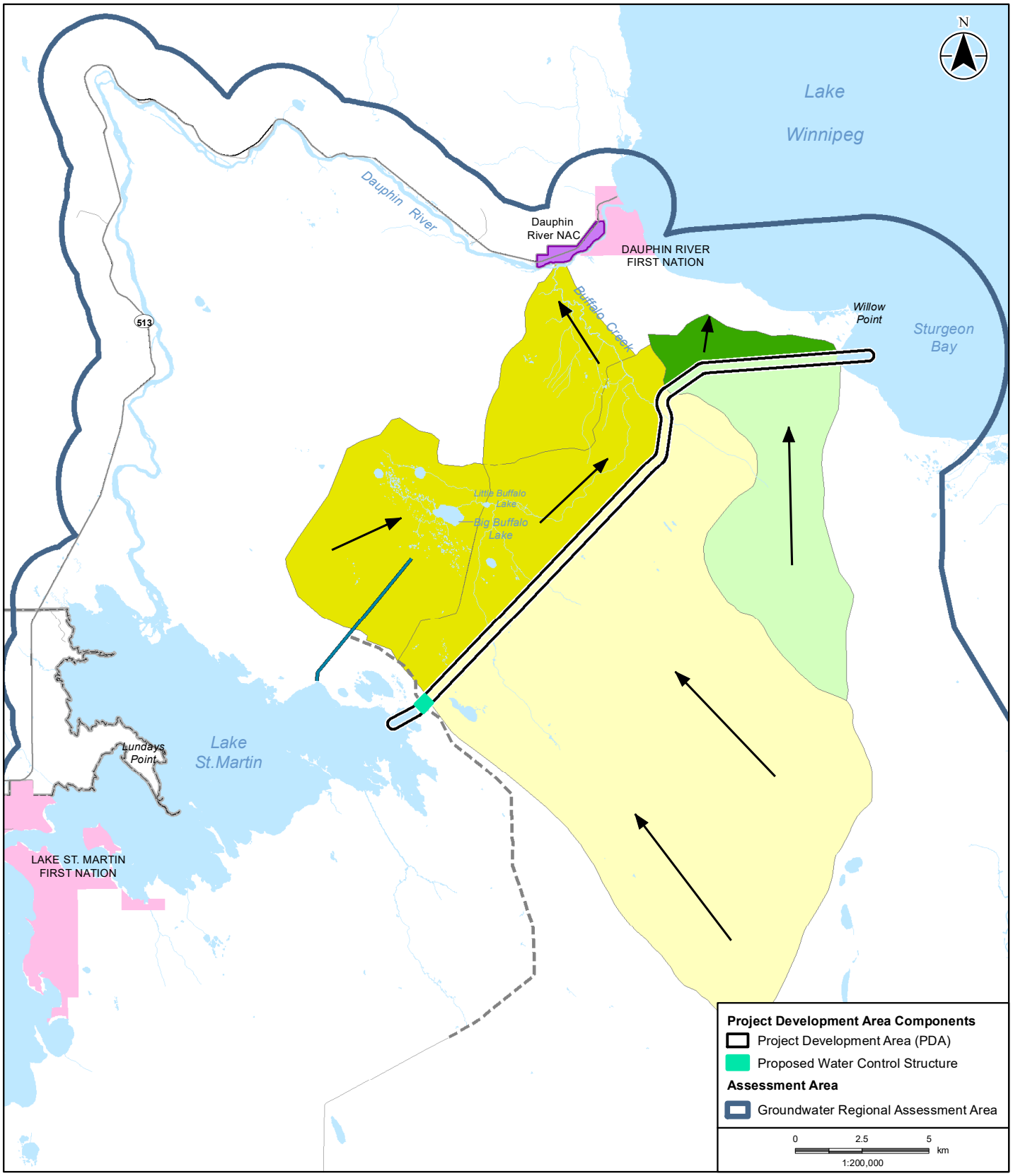
    i. Provide baseline data of the Buffalo Lake watershed including but not limited to drainage areas, flow paths, and seepage of groundwater into surface water (and erosion and sedimentation) to inform understanding of the watershed boundaries and to support understanding of changes in flows. Present an updated figure to define the likely Buffalo Lake watershed boundaries.

    ii. Provide field assessment data of the surface and shallow subsurface drainage flow in the LSMOC LAA considering the Buffalo Lake watershed.

Response IAAC-22

a) Big Buffalo Lake and Little Buffalo Lakes are also commonly referred to as Buffalo Lakes and are drained by Buffalo Creek; thus, are all part of the Buffalo Creek watershed. The drainage patterns and watershed boundaries are provided in the environmental impact statement (EIS) in Volume 2, Figure 6.4B-10 “Location of the LSMOC and Existing Drainage Patterns”. The regional assessment area (RAA) encompasses the interpreted extent of the Buffalo Creek watershed.

    i. Based on a topographical interpretation of a digital elevation model of the region the extent of the Buffalo Creek watershed (the groundwater RAA) is provided in Map 22-1, attached.



Legend

- Lake St.Martin Emergency Outlet Channel (Reach 1)
- Reach 1 Access Road
- Provincial Highway (PTH/PR)
- Municipal Road
- Rural Municipality
- Northern Affairs Community (NAC)
- First Nation
- Surface Water Flow Direction
- Buffalo Creek drainage area intercepted by LSMOC
- Buffalo Creek drainage area not affected by LSMOC
- Lake Winnipeg drainage area intercepted by LSMOC
- Lake Winnipeg drainage area not affected by LSMOC

Notes

1. Coordinate System: NAD 1983 UTM Zone 14N
2. Data Sources: Governments of Manitoba and Canada, Manitoba Infrastructure, RM of Grahamdale
3. Last Update: 5/7/2020 9:31:48 PM

Manitoba

MANITOBA INFRASTRUCTURE
Lake Manitoba & Lake St.Martin Outlet Channels Project
Environmental Impact Statement

Location of the LSMOC and Existing Drainage Patterns

IR Map 22-1

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Question IAAC-22

Volume 2, Figure 6.4B-2 in the EIS shows the RAA for surface water. However, the Buffalo Creek system is complex as it encompasses wetlands. Surface water runoff in a wetland does not flow uniformly; therefore, effects cannot be predicted using typical approaches of measurement of drainage area and flow analysis, as was done with the Birch Creek and Watchorn Creek drainage areas to examine the effects of the Lake Manitoba Outlet Channel (LMOC). In addition, Big Buffalo Lake may be supplied by groundwater upwelling from the carbonate aquifer; thereby, supplying Buffalo Creek with additional water, which is difficult to measure and quantify.

ii. There is no field assessment data of the surface and shallow subsurface drainage flow in the Lake St. Martin Outlet Channel (LSMOC) local assessment area (LAA) considering the Buffalo Lake watershed. The construction and operation of the LSMOC will likely cause a reduction in flows as the LSMOC will intercept water flowing through the wetlands from south-east to north-west (see Map 22-1). The reduction could be mitigated as discussed below and then the magnitude of the effect may be similar to the reduction in flows at Birch Creek in the LMOC (i.e., moderate). Quantification of effects to flows in the Buffalo Creek system cannot be predicted with a high degree of confidence before construction is complete. This interpretation of flow rate reduction was considered within the assessment of impacts on fish habitat (EIS Volume 3, Section 7.2.4.2 Permanent Alteration or Destruction of Fish Habitat, page 7.55).

In order to mitigate this effect, an adaptive management strategy is proposed as discussed in response to IR-21. The strategy would involve monitoring levels in wells in proximity to the wetlands and flows in Buffalo Creek to determine if mitigation is required. There is an option to repurpose the emergency outlet channel (EOC) to mitigate changes to flows in Buffalo Creek. However, at this time Manitoba Infrastructure has no plans to implement this option.