

LAKE MANITOBA LAKE ST. MARTIN

OUTLET CHANNELS PROJECT

GEOLOGY AND SOILS

Includes regional and local bedrock geology, soils, and terrain

Environmental Impact Statement—Summary by Valued Component (VC)

Why is Geology and Soils a VC?

Geology and Soils is a VC because geology helps to shape the terrain and groundwater resources such as potable water and includes mineral resources that are used for economic and social development. Soils provide the foundation for natural vegetation and associated wildlife habitat, and soil type and quality influences agricultural productivity.

What is the current state of Geology and Soils?

The regional and local geology is composed of layers of carbonates and sandstone rock overlaying or overlapping granites. The carbonate bedrock in the area is overlain by layers of till material, left behind by retreating glaciers, as well as peat or organic deposits. Organic soils are more predominant in the northern portion of the region, extending from Lake St. Martin to Lake Winnipeg, and support mostly natural, vegetation and wetlands. The soil materials in the southern portion of the region, from Lake Manitoba to the south end of Lake St. Martin consist of extremely calcareous,

very stony, water-worked loamy textured glacial till, with marginal agricultural capability. The terrain surface is characterized as having nearly level to gently rolling topography.

What effects might the Project have on Geology and Soils?

Environmental effects to terrain conditions could result from alterations to drainage. Environmental effects on soils could result in changes to soil quantity and quality, and thus soil capability for supporting vegetation communities and agriculture.

Terrain conditions can be affected by the presence of the channels impacting the movement of surface and shallow groundwater flow, causing areas of inundation and flooding or drying.

Soil quality and quantity may be affected during construction from improper soil stripping, excavation and handling, admixing, compaction of topsoil and upper subsoil, and wind and/or water erosion of disturbed, exposed and stockpiled soils.

Soil capability and productivity around the Lake St. Martin shoreline may be increased during Project operation due to reduced flooding events.

Agricultural capability will be affected during construction and operation as areas are converted from agricultural to industrial land use.

Valued components (VCs) are components of the natural and human environment that are considered by the proponent, public, Indigenous Peoples, scientists and other technical specialists and government agencies involved in the assessment process to have scientific, ecological, economic, social, cultural, archaeological, historical, or other importance.



How will effects to Geology and Soils be addressed?

In addition to following standard and Project-specific mitigation to lessen residual effects, the following measures will address terrain conditions and soil quantity and quality issues:

Terrain Conditions

- Design Project infrastructure to reduce potential soil stability issues
- Stabilize channel banks, berms, dikes and ditches by revegetation or use of rip-rap
- Direct water downslope into the channels to minimize the risk of inundation and flooding

Soil Quantity and Quality

- Strip and stockpile mineral topsoil and organic material (peat, leaf litter, root mass) for later reuse in site restoration and reclamation efforts including natural re-establishment of vegetation
- Use at least 30 cm of impermeable soil, or approved equivalent, and lining with an impermeable ground sheet to contain spills and minimize cleanup costs where equipment, and/or hazardous material is stored
- Pile slash in a manner that allows for clean, efficient burning of all material. Avoid mixing soil into the slash
- Use erosion and sediment control measures to prevent undesirable soil movement

FOLLOW-UP AND MONITORING

Most follow-up and monitoring recommendations for geology are closely related to those on groundwater. Monitoring for soils will confirm the effectiveness of mitigations and maintenance of quality. Soil salvage during construction, including soil excavation, handling and stockpiling as well as periodic monitoring of soil stockpiles will confirm stabilization and control erosion.

CONCLUSIONS

Effects to geology relate more to terrain effects, which will be limited to alterations to drainage through the operation and maintenance phase in relation to the presence of the Lake Manitoba Outlet Channel and the Lake St. Martin Outlet Channel.

In terms of effects to soils, some of the Project will be located on land with agricultural capability and will be permanently lost; however, these changes represent less than 2% of the local area. Effects from nutrient runoff from cattle feedlot operations and the presence of manure stockpiles as a result of construction activities and operation of the Project will be managed through mitigation prior to construction. These potentially impacted soils will be identified, delineated, excavated and properly disposed of prior to the start of construction activities.

For more information or if you would like to share your concerns:

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