

3 Surficial Geology and Vegetation

Table 3-1 provides a summary of the reviewer comments and the location of the response.

Table 3-1 Surficial Geology and Vegetation Table of Conformance

Reviewer	EAR Section	Reviewer Comment	Response Report Section Where Addressed
3 Surficial Geology and Vegetation			
Natural Resources Canada	Section 7.3	References References fail to cite two regional Quaternary studies completed by the Geological Survey of Canada in the region of the project: Dyke (1990) and Jackson (1994).	Section 3.1.3; Reference
Natural Resources Canada	Section 7.3.2.2; Figure 7.3-2	Glaciolacustrine Materials Discrepancy between the amount of glaciolacustrine materials depicted on the map in Figure 7.3-2 and that described in the text.	Section 3.1.2; Figure 3-1
Natural Resources Canada	Section 7.3.4.1	Borrow Site Location of the borrow site is required and consideration of site location on environmental impact. No indication of materials testing was provided in the EAR.	Section 3.1.2; Section 7.4.1; Appendix F1
Natural Resources Canada	Section 7.3.2.2	Permafrost & Slope Stability Investigation Proponent needs to obtain information of how and when the permafrost conditions and slope stability conditions will be properly evaluated. Little permafrost data was captured in the geotechnical investigation and little information is known about the site that will underlie the dam.	Sections 3.2; Sections 7.2, 7.3 and 7.5
Natural Resources Canada	Section 2.8.10	Tailings Facility Foundation More specific details are required of the drainage blanket construction and monitoring to ensure contaminants do not leak.	Section 7.6
Natural Resources Canada	Appendix II	Test Pit Data The test pitting data in Appendix II is missing.	Appendix F1
Environment Canada	Section 7.3.2.2	Slope Stability Assessment near Tailings Facility The proposed tailings facility location is within and/or adjacent to an area considered to be at a medium level of risk for terrain instability (eg. erosional instability, slope failures). A more detailed geotechnical assessment of the tailings area is suggested. Geotechnical test pitting -results from that program should be included.	Sections 3.2; Sections 7.2, 7.3 and 7.5; Appendix F1

3.1 Surficial Geology

3.1.1 Terrain/Surficial Materials Study Area Definition

The LSA for terrain and surficial materials is defined as the potential project disturbance footprint (conservatively defined as the total of YZCs claim areas potentially affected by industrial complex facilities) buffered by 100 m to account for potential edge effects such as changes in drainage or induced localized instabilities.

Terrain and surficial materials have also been mapped within the wildlife LSA, as a foundation for the ecosystem mapping in this area.

The effects on terrain from the Wolverine Project are not expected to overlap with effects of other projects or activities; therefore no RSA for cumulative effects assessment was defined.

As noted in EAR Section 7.3.1, the terrain/surficial LSA includes all YZC claim areas potentially affected by ground disturbance for project facilities (including industrial complex and road), buffered by 100 m for potential edge effects.

3.1.2 Glaciolacustrine and Borrow Pit Materials

EAR Figure 7.3-2 has been corrected to differentiate between the glaciolacustrine and lacustrine areas (Figure 3-1). Glaciolacustrine materials occur in approximate 3.7% of the LSA. The area of glaciolacustrine materials that could potentially be directly disturbed by project construction will be less than 3.7%, since project facilities will occupy only a limited area within the LSA.

EAR Section 2.10.12 and EAR Figure 2.1-1 describe the industrial complex borrow pit located next to the existing airstrip. The area designated for the industrial complex borrow pit has sufficient material to supply onsite development; see Figure 7.1-1 for the borrow pit location and Section 7.4 for geochemical information. A test pitting program, undertaken by YZC in conjunction with Klohn Crippen, tested numerous samples of borrow pit materials (see Section 7.3 and Appendix F1).

As indicated, runoff from the borrow area will be directed to a settling pond and which will be pumped to the tailings pond. Tailings pond water will be recycled for use as process water and/or treated prior to any release to receiving waters. An updated description of water management and treatment is provided in Section 9.

The tailings dam borrow material will be obtained from within the tailings impoundment area (see Sections 7.3 and 7.8).

Figure 3-1 Surficial Materials Distribution in the Wolverine Project Area (Figures Section)

3.1.3 Additional References

In addition to the list of references cited in the EAR, the additional sources suggested by Natural Resources Canada (NRCan) have been reviewed. The information provided in these papers was cited in other references consulted in preparation of the EAR. This

information was reflected in the baseline description and mapping for the project area. Materials and conditions found within the Wolverine area are similar to those found in the Frances Lake (Dyke 1990) and Pelly (Jackson 1994) areas. In addition, Brown's Permafrost Map of Canada (1967) was also reviewed. The references are as follows:

- Dyke, A.S. 1990. Quaternary geology of the Frances Lake map area, Yukon and Northwest Territories. Geological Survey of Canada, Memoir 426, 39 pages.
- Jackson, L.E. Jr. 1994. Terrain inventory and Quaternary history of the Pelly River area, Yukon Territory. Geological Survey of Canada, Memoir 437, 41 pages.
- Brown, R.J.E. 1967. Permafrost map of Canada. Geological Survey of Canada, Map 1246A

3.2 Permafrost

In 2005, various excavation activities in a range of locations provided an indirect assessment of permafrost. Permafrost was not intersected in the areas of the exploration camp, industrial complex or tailings area; however, it was noted that seasonal variation affected the results of many of the excavations

Outhouse construction at the exploration campsite entailed digging five 3 to 5 m deep holes. Of the five outhouse holes, only one intersected a frost zone at a depth of 0.5-1 m and was subsequently determined to be temporary ground frost (seasonal).

The baseline geotechnical study that took place in May and later in August involved a geotechnical drill and test pitting program. The tested area spanned from the west end of the industrial complex to the south-eastern reaches of both of the assessed tailings facilities locations. In the May program, frozen ground was found in several test pits particularly on north slopes and areas protected by trees; however, test pits in the same general vicinity that were dug in August did not encounter ground frost. Section 7.3 further discusses the results of this program and test pit logs are found in Appendix F1.

The possibility of encountering permafrost during the construction of the permanent road route exists. It is understood there are potential hazards for infrastructure and slope failure and hence YZC has cited the road route primarily on south facing slopes. YZC will ensure that when permafrost is encountered appropriate mitigation practices will be employed and where applicable the industry standards will be followed. YZC is aware of the EBA, 2004 report on permafrost and the case histories will be noted along with the practices followed in the potentially hazardous conditions. It is anticipated that during construction of the haul road permafrost may be encountered on the north facing slope near the Robert Campbell Highway. Upon completion of road engineering YZC will further investigate the potential for permafrost along the road route and establish procedures to prevent road instability and permafrost disturbance.

3.3 Vegetation

3.3.1 Vegetation Study Area Definition

The vegetation LSA is defined as the potential project disturbance footprint (conservatively defined as the total of YZCs claim areas potentially affected by industrial complex facilities) buffered by 100 m to account for project-specific effects on vegetation VECCs associated with dustfall/emissions, edge effects (windthrow, drying), changes in

drainage, invasive species establishment/dispersal and road salt. The vegetation LSA falls entirely within the area of detailed ecosystem mapping developed for the project

The RSA includes the LSA and is defined to include an area that provides for adequate representation of the four biozones affected by the project. These biozones with associated representation in the RSA are as follows:

- Alpine (6.5%)
- Subalpine (32.8%)
- Boreal High (45.9%)
- Boreal low (14.9%)

The RSA is centered on the project area and delineated by geographic boundaries (waterbodies and heights of land) that encompass representative areas of the biozones affected by the project disturbance footprint. The RSA falls within the regional vegetation mapping area (derived from remotely sensed data) developed for the Project.