Appendix B: Geology of Swan Lake

The following section is extracted from a report by Peto MacCallum Ltd.,[2]

2.1.1 Site Settings and Land Use History

The site is located within a broad physiographic region known as the Peel Plain, a level-to-undulating tract of clay soils. Its principal physiographic feature is the Markham-Pickering till plain, a bevelled, partly drumlinized and fluted plain. The Pleistocene geology of the area has been shaped by glacial activity. The native soils consist of a sandy to clay bouldery till locally underlain by sand and gravel deposits. Historically, these deposits have been extracted as a source of road base granular out of the Groves gravel pit which formerly operated on the site.

Locally, the physiography of the site has been altered by relatively large volumes of fill materials stockpiled around the lake. Geodetic ground surface elevations range between approximately 205 and 221 m over the site.

Surface drainage in the area generally occurs through the Little Rouge Creek tributaries of the Rouge River which flow southeastwards. However, there are no obvious surface drainage outlets from the lake. Surface flows are generally directed southwestwards and away from the site. ***Hydrogeological records of water wells on the site indicate static groundwater table elevations ranging between 207 and 209 m. The elevation of the water level of the lake is approximately 208 m, confirming that the lake probably originated from groundwater within the kame aquifer.*** An analysis of static water level elevations indicates that the regional groundwater flow is directed southwestwards or southwards with an average hydraulic gradient of about 1%. ***[Emphasis added]***

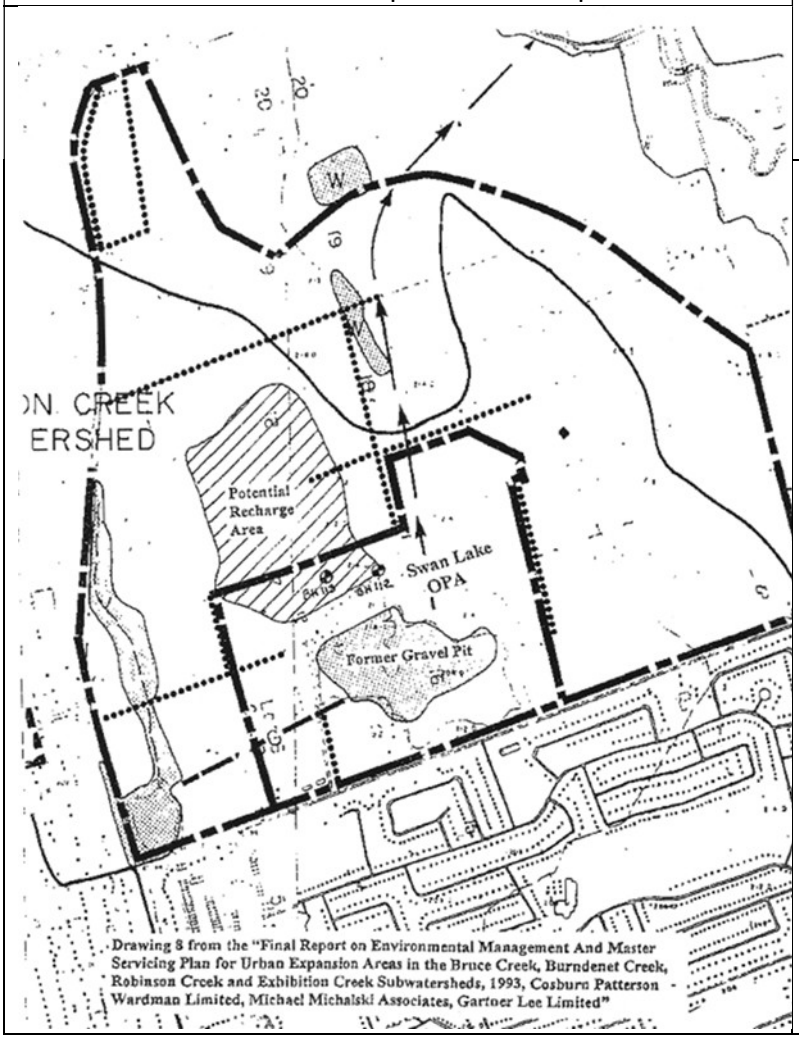
Historically, gravel extraction operations on the site began as early as the 1850s. However, the operations were phased out during the 1870s when the site was acquired by the Grove family. In 1962, the gravel operations resumed out of the Grove Pit under the ownership of Warnock and Johnson. Groundwater was struck around 1970 and the pit became a lake. Shortly thereafter the gravel pit operations discontinued.

2.2.2 Groundwater

Seepages of groundwater were observed in boreholes 3,4,5 and 6 during drilling. Groundwater, probably regional, was encountered in all of the boreholes with the exception of boreholes 7, 8, 9 and 13 and observation well 4. Groundwater water was encountered in test pits 5, 9,10, 11, 12, 17, 18, 33, 39, 40, 43 and 44. Depths to groundwater/wet cave ranged between 1.0 and 7.6 m below grade. ***By November 3, 1993, approximately five weeks after installation, the groundwater levels stabilized at 2.7 to 5.7 m below grade, elevation 208.0 +/- , in observation wells 2,3,4 and 5. In observation well 1, the water level was noted to be close to the ground surface on that date.*** An analysis of the static water level elevations indicated that in November, 1993, the regional groundwater flow was directed southwestwards with an average hydraulic gradient of about 1%. ***[Emphasis added]***

Potential Recharge Area

The following chart was included in the Peto MacCallum report identifying the "potential recharge area" which extends into the north-west portion of the park.



Ontario well records

The Ontario database for well records lists information on 27 different test wells from 1961 to 2022.

[Map: Well records | ontario.ca](#)

Well Locations In Swan Lake Park June 2025