

Appendix B

Water Budget Maps

Not all maps recommended in MNR guidance were required as explained on next page.

MOE Suggested WB Maps	North Bay-Mattawa WB Maps	Comments
1- Climate Stations	Map 1 Climate	Combined with WB Map 1 and WB Map 2
2- Precipitation Distribution		
3 – Representative Areas for Climate Station (e.g. Theissen Polygons)	- Not required	Ordinary Kriging Interpolation Technique Used
4 – Meteorological Zones	- Not required	Only 1 Meteorological zone exists
5 - Evapotranspiration	Map 2 Actual Evapotranspiration	Actual ET was determined from Thornthwaite and Mather method
6 – Bedrock Geology	Map 3 Bedrock Geology	
7 – Sediment Thickness	Map 4 Overburden Thickness	
8 – Geologic Unit Thickness	- Not required	- Shallow Overburden - No discrete aquifer/aquitards,
9 – Bedrock Topography (elevation)	Map 5 Bedrock Topography	
10 – Surficial Geology	Map 6 Surficial Geology	
11 - Hummocky Topography		Included in Map 6
12 – Physiographic Regions	Map 7 Physiography	
13 – Ground Surface Topography	Map 7a Topography	
14 – Soils Map	- Not required	No full coverage. Used Surficial Geology data and GIS Approach
15 – Land Cover Map	Map 8 Land Cover	
16 – Streamflow Gauging Stations	Map 9 Streamflow Characteristics	Combined with WB Map 16, 18 and 21
17 – Flow Distribution	Map 10 Flow Distribution	
18 – Dams, Channel diversions etc.		Included in Map 9
19 – Fisheries	Map 11 Fisheries	Very few portions of the watershed covered under this category
20 – Surface Water Takings	Map 12 Surface –and GW takings	Combined with WB Map 25 and WB Map 26
21 – Surface Water Nodes		Included in WB Map 9
22 – Aquifer Extents, GW Flow Directions	Map 13 Water Table Surface	Combined with WB map 24
23 – Recharge and Discharge Zone	Map 14a Recharge Distribution	
24 – Depth to Water Table		Included in Map 13
25 – GW Monitoring Network Locations		Included in Map 12
26 – Groundwater Takings		Included in Map 12
27 - Stress Assessment Sub-watersheds	Map 15 Stress Assessment Sub-watersheds	

Note: * “WB Map” # refers to the suggested mapping from the MOE Interim Water Budget Technical Direction Document (Version 3.0, December 21, 2005)

Some of the suggested maps have not been used in this report. WB Map 3 for the Theissen polygons was not included because these were not used in the analysis. Rather an Ordinary Kriging interpolation technique was used to avoid the “steps” that cross the watershed when using the Theissen technique. This was particularly important as there were only two useable meteorological stations within the SP Area. WB Map 4 on meteorological zones was also not included because the whole watershed lies in one zone due to the similar physiography. WB Map 8 was intended to identify the unit thicknesses. However, given the shallow overburden there are no major aquifer/aquitards or other formations that can be discretely identified.

WB Map 14 was intended to be the pedological soils mapping. Such mapping exists only for a part of the SP Area, however much is based on interpretation of high level aerial photography. Since soil properties (from a groundwater recharge perspective) have been obtained from the surficial quaternary mapping, the soils map was deemed redundant. Two maps which are not specified by MOE were prepared for the quantification of run-off (Map 14b) and surplus (Map 14c) distribution.

Table B1. Soil Infiltration Factors

Map Unit	Geologic Description	Factor
2a	Bedrock-drift complex in Precambrian terrane: Primarily till cover	0.10
1	Precambrian Bedrock	0.10
2	Bedrock-drift complex in Precambrian terrane:	0.10
2b	Bedrock-drift complex in Precambrian terrane: Primarily stratified drift cove	0.10
3	Paleozoic bedrock:	0.20
4	Bedrock-drift complex in Paleozoic terrane:	0.25
4a	Bedrock-drift complex in Paleozoic terrane: Primarily till cover	0.20
4b	Bedrock-drift complex in Paleozoic terrane: Primarily stratified drift cover	0.30
5	Till:	-99.00
5a	Till: Silty sand to sand-textured till on Precambrian terrain	0.30
5b	Till: Stone-poor, sandy silt to silty sand-textured till on Paleozoic terrain	0.20
5c	Till: Stony, sandy silt to silty sand-textured till on Paleozoic terrain	0.20
5d	Till: Clay to silt-textured till (derived from glaciolacustrine deposits or s	0.10
5e	Till: Undifferentiated older tills, may include stratified deposits	0.40
6	Ice-contact stratified deposits: sand and gravel, minor silt, clay and	0.40
6a	Ice-contact stratified deposits: In moraines, eskers, kames and crevasse fill	0.40
6b	Ice-contact stratified deposits:In subaquatic fans	0.40
7	Glaciofluvial deposits: braided river deposits and delta topset facies	0.40
7a	Glaciofluvial deposits: Sandy deposits	0.40
7b	Glaciofluvial deposits:Gravelly deposits	0.40

Table B1. Soil Infiltration Factors

Map Unit	Geologic Description	Factor
8	Fine-textured glaciolacustrine deposits: silt and clay, minor sand and gravel	0.10
8a	Fine-textured glaciolacustrine deposits:Massive to well laminated	0.10
8b	Fine-textured glaciolacustrine deposits:Interbedded silt and clay and gritty,	0.10
9	Coarse-textured glaciolacustrine deposits: sand, gravel, minor silt and	0.30
9a	Coarse-textured glaciolacustrine deposits: Deltaic deposits	0.40
9b	Coarse-textured glaciolacustrine deposits:Littoral deposits	0.30
9c	Coarse-textured glaciolacustrine deposits:Foreshore and basinal deposits	0.25
10	Fine-textured glaciomarine deposits: silt and clay, minor sand and gravel	0.10
10a	Fine-textured glaciomarine deposits: Massive to well laminated	0.10
10b	Fine-textured glaciomarine deposits: Interbedded silt and clay and gritty, pe	0.10
11	Coarse-textured glaciomarine deposits: sand, gravel, minor silt and cla	-99.00
11a	Coarse-textured glaciomarine deposits:Deltaic deposits	0.40
11b	Coarse-textured glaciomarine deposits: Littoral deposits	0.30
11c	Coarse-textured glaciomarine deposits: Foreshore and basinal deposits	0.20
12	Older alluvial deposits: clay, silt, sand, gravel, may contain organic	0.20
13	Fine-textured lacustrine deposits: silt and clay, minor sand and gravel	0.10
14	Coarse-textured lacustrine deposits: sand, gravel, minor silt and clay	-99.00
14a	Coarse-textured lacustrine deposits: Deltaic deposits	0.40
14b	Coarse-textured lacustrine deposits: Littoral deposits	0.30
14c	Coarse-textured lacustrine deposits: Foreshore and basinal deposits	0.20
15	Fine-textured marine deposits: silt and clay, minor sand and gravel	0.10
16	Coarse-textured marine deposits: sand, gravel, minor silt and clay	-99.00
16a	Coarse-textured marine deposits:Deltaic deposits	0.40
16b	Coarse-textured marine deposits:Littoral deposits	0.30
16c	Coarse-textured marine deposits:Foreshore and basinal deposits	0.20
17	Eolian deposits: fine to very fine sand and silt (loess)	0.20
18	Colluvial deposits: boulders, scree, talus, undifferentiated landslide	0.40
19	Modern alluvial deposits: clay, silt, sand, gravel, may contain organic	0.40
20	Organic deposits: peat, muck, marl	0.40
21	Man-made deposits: fill, sewage lagoon, landfill, urban development	0.30

