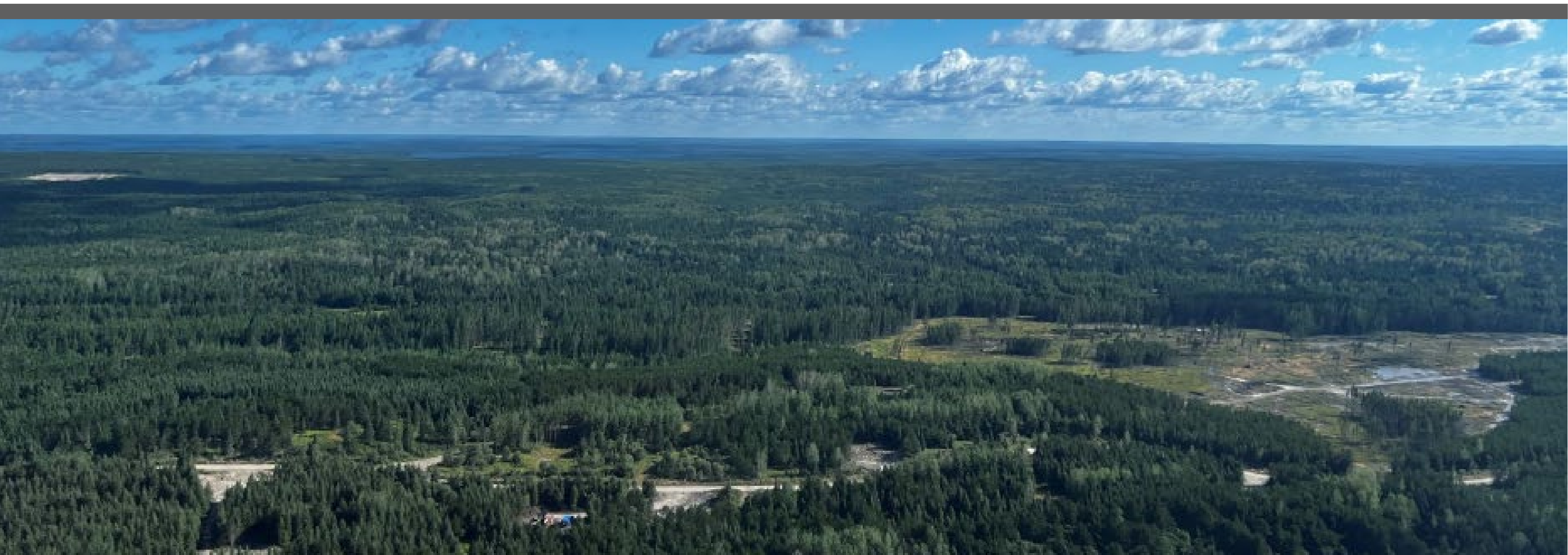
KINROSS Great Bear

Great Bear Gold Project
Impact Statement

Appendix H-1:

Hydrogeology Baseline Report



GREAT BEAR RESOURCES LTD.

GREAT BEAR PROJECT

HYDROGEOLOGY BASELINE REPORT

AUGUST 2025

GREAT BEAR PROJECT

HYDROGEOLOGY BASELINE REPORT

GREAT BEAR RESOURCES LTD.

PROJECT NO.: OMEMA2303
AUGUST 2025

WSP CANADA INC.
6925 CENTURY AVENUE, SUITE 600
MISSISSAUGA, ON, CANADA L5N 7K2

T: +1 905-567-4444
WSP.COM

SIGNATURES

PREPARED BY:

Original Signed

Brad Markham, M.Sc., P.Geo. (Limited)
Principal Hydrogeologist

REVIEWED BY:

Original Signed

Simon Gautrey, MSc., MBA, P.Geo.
Senior Technical Director, Hydrogeology

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1 INTRODUCTION

1.1 PROJECT BACKGROUND

Great Bear Resources Ltd. (Great Bear Resources) is a wholly (100%) owned subsidiary of Kinross Gold Corp., a Canadian-based gold and silver mining company founded in 1993 and headquartered in Toronto, Ontario, Canada. The Great Bear Property (Property) is located in the Red Lake mining district, approximately 25 kilometres (km) southeast of the Municipality of Red Lake in northwestern Ontario (Figure 1-1).

1.2 EXISTING SITE CONDITIONS

The Property is currently in early exploration with up to 16 drills operating on site. All existing facilities and equipment present on the Property are associated with the early exploration. The first exploration work completed within the Property area dates back to 1944. A search of the Abandoned Mines Information System did not identify any mining hazards within the Property.

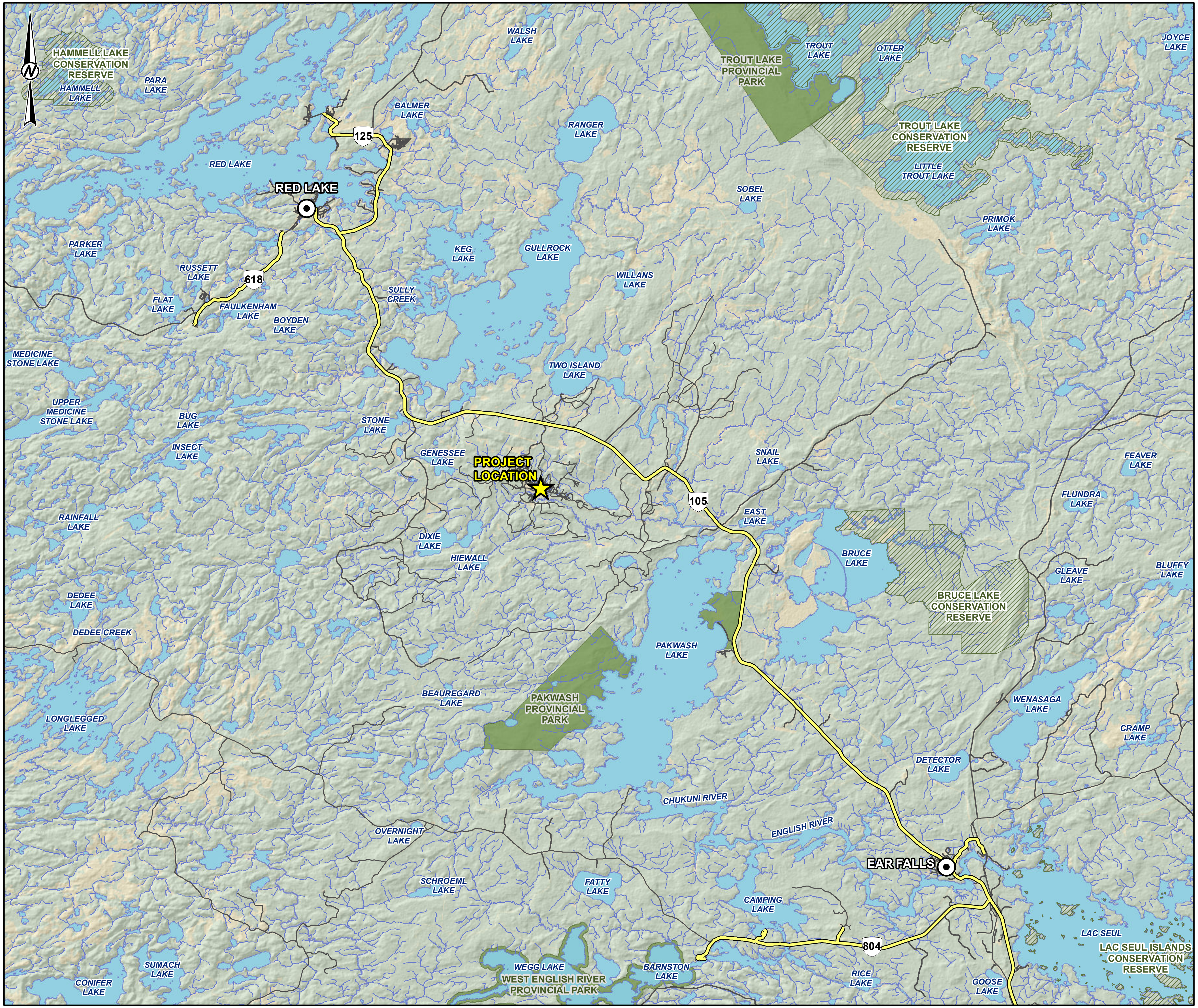
There have been no prior mining operations completed on the Property and no historical facilities or buildings within the Property. Some of the land within the Property boundary is occupied by historical and active gravel pits held by others.

1.3 DATA SOURCES

This report relies upon information collected during previous investigations at the Property or within the region. These reports include hydrogeological field investigation reports, as well as information from exploration drilling programs and government report.

Key reporting used in the preparation of this report include:

- Hydrogeological field programs conducted by WSP during the 2022, 2023, and 2024 field seasons. Hydrogeological field programs are ongoing at the time of preparation of this report with the most up-to-date available description of the available hydrogeological field data being the 2025 Hydrogeology Field Data Report (WSP, 2025a), which incorporates field completed previously (WSP 2024a).
- 2024 cumulative water quality baseline report for the Great Bear Project (WSP 2024b).
- Great Bear Project Detailed Climate Change Dataset Report (WSP 2024c).
- 2024 Hydrometric Baseline Report for the Great Bear Project (WSP 2024d).
- 2022 – 2023 Fisheries Resources Baseline Report (WSP 2024e).
- Local geological interpretation from Great Bear Resources (2024).
- Publicly available geological information including Quaternary (Prest 1982 and Sharpe and Russel 1996) and bedrock geological mapping (Sanborn-Barrie and Skulski 2004).



KEY MAP

SCALE 1:30,000,000

LEGEND

- ★ PROJECT LOCATION
- ⊙ TOWN
- CONSERVATION RESERVE
- PROVINCIAL PARK
- HIGHWAY
- LOCAL ROAD
- RESOURCE/ RECREATION ROAD
- WATERCOURSE
- WATERBODY

0 2.5 5 10

1:250,000 KILOMETRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. WATERCOURSES AND WATERBODY ACQUIRED FROM LAND INFORMATION ONTARIO (MNRF) AND MODIFIED TO MATCH AERIAL IMAGERY AND LIDAR.
3. ROADS INFORMATION PROVIDED BY KINROSS, AUGUST 2022.
4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

TITLE
PROJECT LOCATION

CONSULTANT

wsp

YYYY-MM-DD	2024-11-21
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
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2 ENVIRONMENTAL SETTING

2.1 EXISTING SITE CONDITIONS

The Property consists of mining lands (leases and claims) located in the unorganized townships of Faulkenham Lake, South of Byshe, Dixie Lake and Bruce Lake.

The first exploration work completed within the Property dates back to 1944. Exploration drillhole records indicate sporadic drilling at the Property from the 1950's through the early 2000's with a total of 181 exploration drillholes advanced during this time frame. Exploration drilling began in earnest around 2018 with almost 2,500 exploration drillholes being advanced since then. A search of the Abandoned Mines Information System did not identify any mining hazards within the Property.

There have been no prior mining operations completed on the Property and no historical facilities or buildings within the Property although some of the land within the Property boundary is occupied by historical and active gravel pits held by others. The locations of the historical and active gravel pits are shown on Figure 2-1.

2.2 GROUNDWATER USERS

The Project site is located in an unorganized township and is a part of the Kenora district in northwestern Ontario. The only nearby industrial developments to the Project Site are the active and inactive aggregate (sand and gravel) operations along Tuzyk's Road.

A search of available water well records from the MECP online Water Well Information System indicates that there are 12 monitoring or test wells, 7 existing or former water supply wells, and 3 wells of unknown use located within the 3 km buffer of the Property boundary. Well details for 10 potential water supply wells, including those of unknown use, are provided in Table 2-1 and well locations are shown on Figure 2-1. Based on their recorded locations, these wells were assumed to be active if located adjacent to buildings, indicating there are 8 active water supply wells in the area. All these potentially active wells are located adjacent to large water bodies at significant distances from the Property.

Of the remaining 12 wells, all but 2 are described as test wells that were drilled in the 1960's, whose location information is very poor and reported as non-productive and are assumed to be abandoned. One monitoring well, WWR7133399, was located and confirmed to the be existence at the site at the gravel pit off Tuzyk's Road. A second likely monitoring well is reportedly located near to the gravel pit at the intersection of Tuzyk's Road and Highway 105, but no construction details are available.

There are no water supply wells within the Property boundary. All of the water supply wells are north of the Property, to the northwest, close to Boyden Creek, or north and northeast close to Gullrock Lake. There are a number of small buildings, which are likely cottages, located along the shores of lakes without wells in the MECP Water Well Information System, which are assumed to have lake based water supplies.

There are no active Permit to Take Water approvals within the surveyed area not held by Great Bear Resources.

2.3 CLIMATE

Climate data for the Project area has been developed as part of a detailed climate change dataset which has been prepared by WSP (2024c). These climate data are based on observations made at the Red Lake A climate stations (Stations 6016970, 60116971 and 60116975) which are located about 24 km from the site, and at a similar elevation. A summary of the pertinent climate data from WSP (2024c), is provided below:

- The average annual temperature is 1.1 deg Celsius (°C). The warmest month on average is the month of July with a mean temperature of 18.3°C, and the coldest is the month of January with a mean temperature of -19.2°C.
- Daily average temperatures typically drop below 0 °C in November and typically remain below °C until April.
- The site experiences frequent sub-freezing temperatures with both frost and ice days making up a considerable portion of the year at 200 and 127 days respectively. Summers can be relatively short with summer days (daily maximum temperature greater than 25°C) ranging from 10 to 63 days and average of 33 days.
- Average annual total precipitation for the site was calculated to be 633.0 millimetres (mm) with July being the wettest month (90.4 mm) and February being the driest (20.1 mm) on average.
- Annual rainfall, not including snowfall, under normal conditions, is 516 mm with rainfall being highest in June and July.
- Snowfall typically starts in late September and ends in early June with an annual average snowfall of 214 centimetres (cm).
- Potential evapotranspiration rates for the Project site were estimated using the Hargreaves equation (Hargreaves and Samani 1985) to be 684.6 mm.
- Lake evaporation for the Project site has been calculated using daily pan evaporation data available from nearby Environment and Climate Change Canada (ECCC) climate stations. The average annual lake evaporation is expected to be 557 mm. Monthly average lake evaporation is shown on Figure 2-2 which indicates that evaporation peaks beginning in July and does not occur during the winter months.
- WSP (2024d) reported the mean annual Lake evaporation for site as 557.2 mm, which is lower than the mean annual potential evapotranspiration of 684.6 mm presented above. The difference in values could be attributed to lake evaporation estimates being inherently lower, as this refers to the evaporation from the surface of a lake, but potential evapotranspiration accounts for not only the water bodies but also transpiration from vegetation and soil surfaces.

Monthly average values for temperature and precipitation and lake evaporation, taken from WSP (2024c), are shown in Table 2-2 and a plot of the daily high, low and mean temperatures, along with monthly total precipitation is shown on Figure 2-2.

Climate data are also available at the site from meteorological station which has been installed at the mid 2022 (WSP, 2024d). As of the time of this report preparation temperature and precipitation data are available for 2022, 2023, and 2024 and are presented in Table 2-3 and Table 2-4. The climate station is located in the northern part of the project site (Figure 2-3).

Total precipitation measured at the climate station located on the Property during 2023 was 528.3 mm which is considerably lower than the mean annual values based on long term records, while the average annual temperature measured at the site weather station for 2023 was 2.6 °C which is higher than the mean normal of 1.1 °C that is based on the climate normal values. Precipitation amount of 528.3 mm is lower than the normal summer lake evaporation rate, with lake evaporation exceeding precipitation from May to September 2023. This will result in lower stream flow and baseflow contributions to surface water features than is observed in typical years, especially for those watersheds with a relatively high proportion of the area occupied by watersheds on relatively flat terrain with poor drainage, i.e., such as the several unnamed watercourses across the Project site, which have a smaller catchment area and less capacity to attenuate changes in precipitation than a larger catchment may have, and large parts of Dixie Creek around Dixie Lake and in the wetlands upstream of Tote Road.

The 2022 precipitation total as measured at the Ear Falls Environment Canada Flow station was 680.6 mm was above the climate normal annual precipitation rate of 633 mm/year.

2.4 TOPOGRAPHY

The site topography is shown on Figure 2-3. Overall topographic relief across the Property ranges from about 455 to 350 metres above sea level (masl), where the topographic highs typically correspond to bedrock hills / knolls and lows being at watercourse and waterbody locations. Terrain can be characterized as rugged and is typical of northern Ontario. The topography reflects the glacial history of the area which has left exposed bedrock and deposited sand eskers and outwash deposits (typically sand / gravel) across some of the higher elevation northern portions of the site and lacustrine deposits in the lower elevation areas.

Site topography is dominated by a local high ridge which runs roughly northwest to southeast and is parallel to Highway 105, which is just to the north of it. This topographic high ground area shows bedrock outcrops and forms the southern extent of an extensive esker feature which runs in a roughly southwest direction parallel to the eastern shore of Gullrock Lake about 15 km to the north. This topographic high ground is inferred to form the major recharge area for the Project site and it also represents the surface water catchment divide between Dixie Creek to the south and Gullrock Lake and Two Island Lake to the north of the divide. A local groundwater flow divide between Dixie Creek and Gullrock Lake / Two Island Lake is also inferred to coincide with this drainage divide.

Dixie Creek is situated in the most significant of these low lying areas as it meanders through a large relatively flat swampy area as it flows toward its confluence with the Chukuni River several kilometres downstream of the proposed development area. The elevation of Dixie Creek as it crosses the Property, is only a few metres above the elevation of its confluence with the Chukuni River which is roughly 16 km downstream of Dixie Lake, reflecting the low drainage potential of the lower portion of the Dixie Creek watershed.

Figure 2-4 shows the topographic gradient profile of Dixie Creek from the Chukuni River. The profile indicates that Dixie Creek can be divided into several flat areas, which coincide with wetlands and marshes, separated by two small cascades. The cascade areas are associated with boulders in the streambed. Aquatic surveys (WSP, 2024e) report the creek bed sediments in the flat lying area are fine grained, consistent with the low gradients in these sections. At the downstream end of Dixie Creek, the change in elevation from Tote Road to the Chukuni River is sufficiently low for backflow effects from the Chukuni River to be noticeably at Tote Road at certain times of the year (WSP, 2024d).

Table 2-1: Water Supply Well Details from MECP water well record database

Well ID	UTM 15N		Depth (m)	Primary Use	Possible Status [1]
	Easting (m)	Northing (m)			
3101086	446778	5641227	33.5	Commercial	Not in use
3101844	467178	5631027	83.8	Commercial	Likely active
7116965	458771	5640111	16.8	Domestic	Likely active
7147767	458696	5640168	16.8	Domestic	Likely active
7151030	458643	5640092	74.7	Domestic	Likely active
7123705	467434	5631411	25.9	Public	Likely active
3100355	467433	5631328	9.4	Water Supply	Not in use/ Poor location information
7163282	458402	5640232	19.8	Water Supply	Likely active
7163285	458402	5640232	50.3	Water Supply	Likely active
7223326	446424	5641875	86.9	Water Supply	Likely active

Note:

1 Possible status was determined according to whether the well is associated with a building, if yes, the well is assumed to be active, if no building was present the well was assumed to be inactive.

Table 2-2: Monthly Average Climate Data Based on Climate Normal Data

Climate Parameter [1]	Month												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Precipitation (mm)	29.1	20.1	27.1	34.3	62.8	89.2	90.4	81.8	75.1	53.8	38.7	30.4	633
Temperature (ºC)	-19.2	-15.9	-7.9	1.5	9.3	15.2	18.3	16.9	11.0	4.1	-5.8	-15.5	1.1
Lake Evaporation (mm)	0.0	0.0	0.9	12.7	96.9	122.0	131.5	108.7	63.6	20.7	0.0	0.0	557.0

Note:

1 Development of monthly average data for the Project is described in detail in WSP (2024c).

Table 2-3: Monthly Onsite Temperature Data Based Site Weather Station for 2022 to 2024

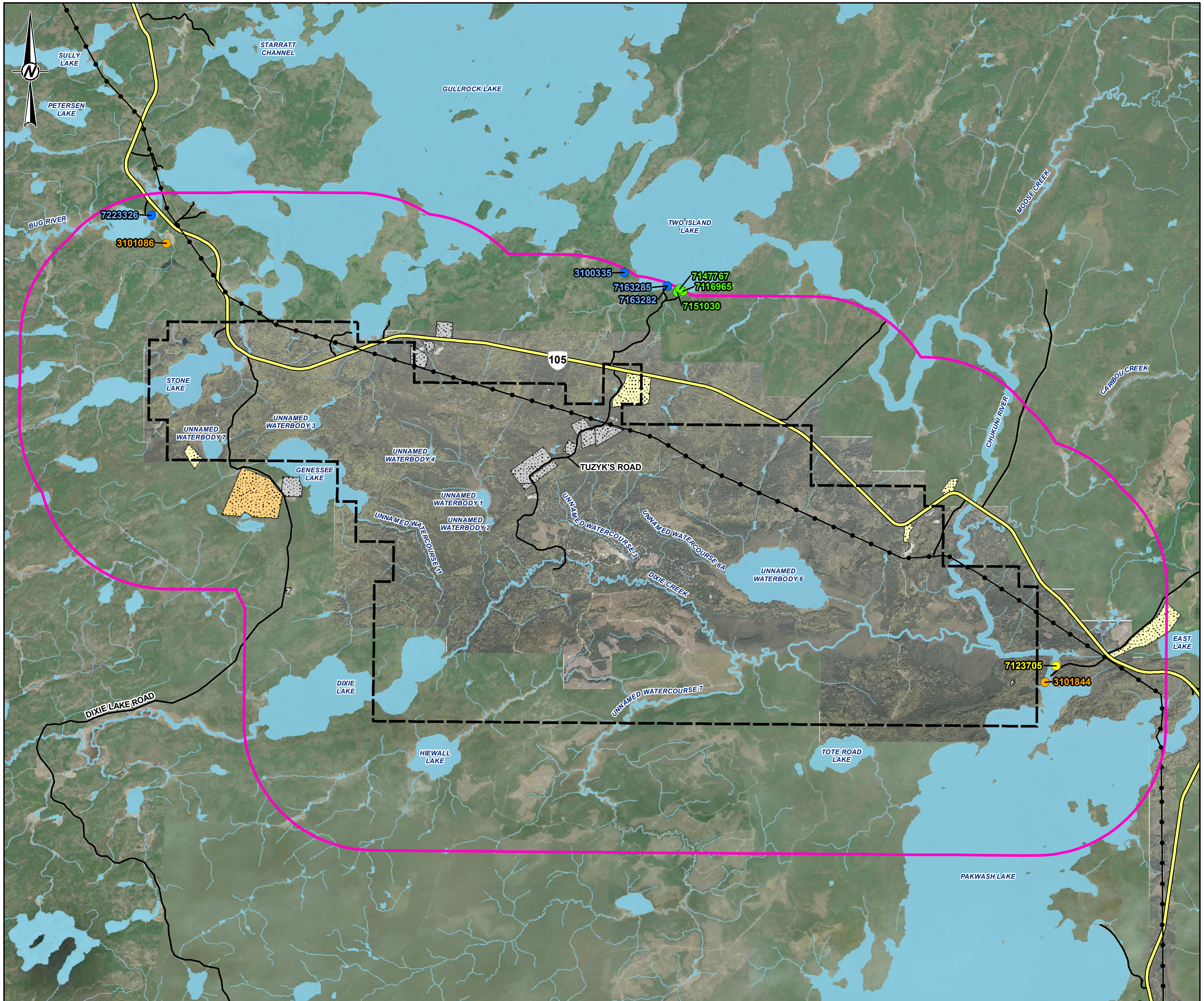
Parameter	Year	Month												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average Temperature or Precipitation for Period of Record
Onsite Mean Temperature (°C)	2022	n/a[1]	n/a[1]	n/a[1]	n/a[1]	n/a[1]	n/a[1]	n/a[1]	n/a[1]	9.2	4.1	-4.9	-15.0	-1.7
	2023	-12.6	-15.0	-9.4	-0.6	13.1	17.8	16.1	15.9	13	4.4	-5.3	-6.4	2.6
	2024	-13.7	-9.6	-8.4	2.7	9.1	14.2	18.7	17.1	14.7	5.0	-1.2	-11.6	3.1

Table 2-4: Monthly Onsite Precipitation Data Based Site Weather Station for 2022 to 2024

Parameter	Year	Month												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average Temperature or Precipitation for Period of Record
On site Total Precipitation (mm)	2022	n/a[1]	n/a[1]	n/a[1]	n/a[1]	n/a[1]	n/a[1]	n/a[1]	n/a[1]	29	27	23	27	106
	2023	4	7	8	39	21	96	98	54	62	73	48	18	528
	2024	5	35	34	48	116	n/a[2]	n/a[2]	n/a[2]	n/a[2]	n/a[2]	n/a[2]	n/a[2]	867

Note:

1 Development of monthly average data for the Project is described in detail in WSP (2024c).
2 Onsite climate data not available.



LEGEND

- PROPERTY BOUNDARY
- 3 KM BUFFER ZONE
- HIGHWAY
- LOCAL ROAD
- EXISTING TRANSMISSION LINE
- WATERCOURSE
- WATERBODY

AGGREGATE PERMITS

- AGGREGATE PIT
- MTO AGGREGATE PIT
- MTO AGGREGATE PIT/QUARRY

WATER SUPPLY WELL

- COMMERCIAL
- DOMESTIC
- PUBLIC
- UNKNOWN

0 1 2 4
1:90,000 KILOMETRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. AERIAL IMAGERY PROVIDED BY KINROSS (SCENE DATE: SEPTEMBER 2022).
3. PROPERTY BOUNDARY PROVIDED BY KINROSS, AUGUST 2024.
4. ROADS INFORMATION PROVIDED BY KINROSS, AUGUST 2022.
5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

TITLE
WATER SUPPLY WELL RECORDS

CONSULTANT

wsp

YYYY-MM-DD	2024-11-21
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
OMEMA2303	0001	A	2-1

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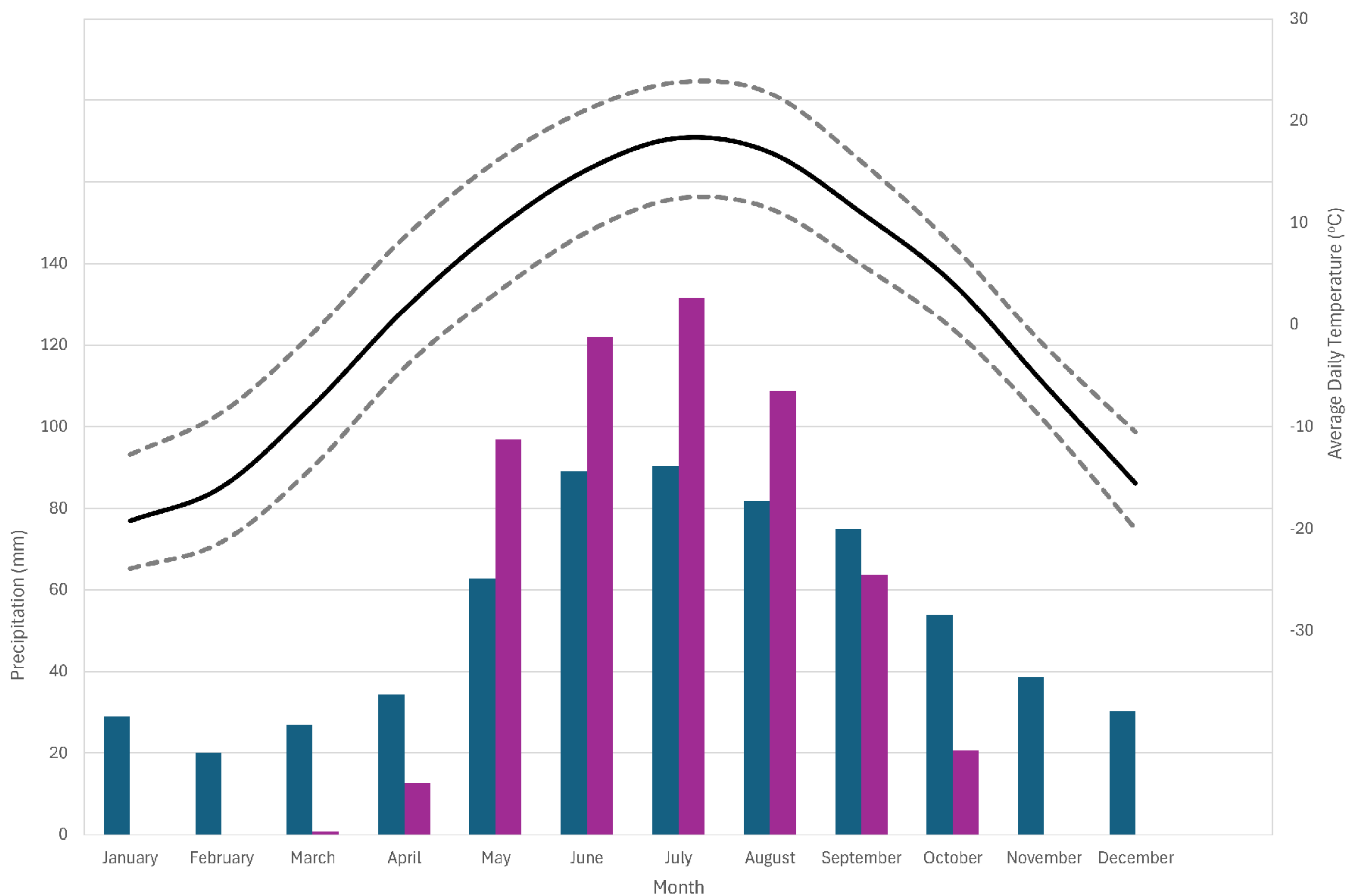
25mm

LEGEND

- AVERAGE MONTHLY PRECIPITATION
- MONTHLY LAKE EVAPORATION
- MONTHLY MEAN TEMPERATURE
- MEAN MONTHLY MINIMUM TEMPERATURE
- MEAN MONTHLY MAXIMUM TEMPERATURE



NOTE(S)

REFERENCE(S)

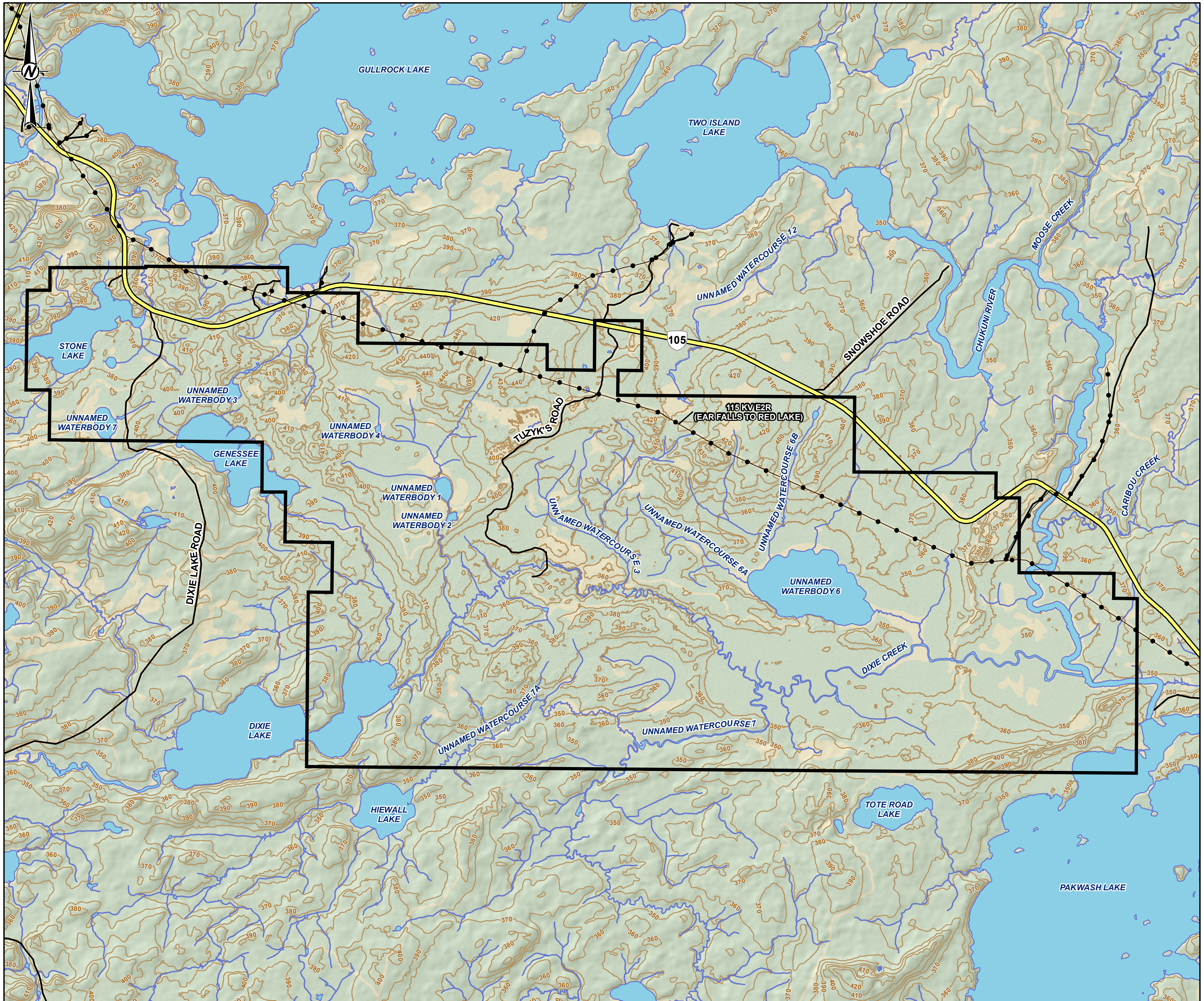
CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

TITLE
PROJECT SITE CLIMATE DATA

CONSULTANT		
wsp	YYYY-MM-DD	2024-11-21
	DESIGNED	----
	PREPARED	MD
	REVIEWED	----
	APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
OMEMA2303	0001	A	2-2



LEGEND

- PROPERTY BOUNDARY
- HIGHWAY
- LOCAL ROAD
- POWER LINE
- CONTOURS (10 M INTERVAL)
- WATERCOURSE
- WATERBODY

0 1 2 4
1:72,000 KILOMETRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. PROPERTY BOUNDARY PROVIDED BY KINROSS, AUGUST 2024.
3. CONTOURS ACQUIRED FROM LAND INFORMATION ONTARIO (MNRF), 2022 AND DERIVED FROM 2022 LIDAR PROVIDED BY KINROSS
4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

TITLE
GREAT BEAR PROPERTY TOPOGRAPHY

CONSULTANT
wsp

YYYY-MM-DD	2024-11-21
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
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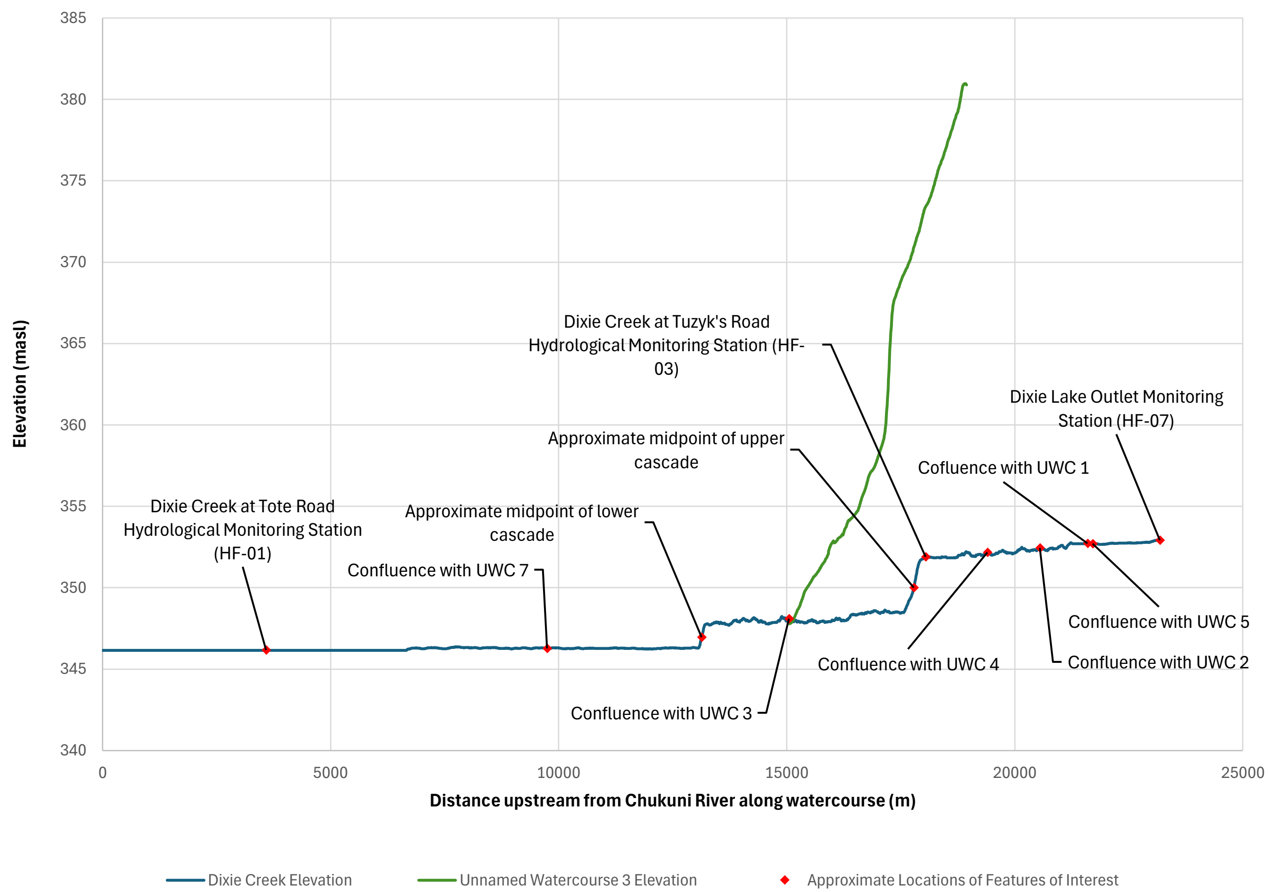


Notes

Topographic profile of Dixie Creek from Tote Road to Dixie Lake			
Great Bear Resources			
Hydrogeology Baseline			
Figure Number	2-4		
Project Number	OMEMA2303		
Date	Nov-24		
Drawn	MR	Reviewed	SG

3 GEOLOGIC SETTING

Site geological conditions have been established based on the following information which was available at the time of preparation of this report. These data include:

- Site drillhole drilling.
- Publicly available information including Quaternary (Prest 1982 and Sharpe and Russel 1996) and bedrock geological mapping (Sanborn-Barrie and Skulski 2004).
- Preliminary faults investigation (WSP 2023a).
- Results of geophysical mapping investigations carried out at the Property by Simcoe Geoscience Limited (2023, 2024).

Details of the overburden and bedrock geology at the Property are discussed in the sections below.

3.1 OVERBURDEN GEOLOGY

Quaternary geology (overburden) mapping is shown on Figures 3-1A (as mapped by WSP for the site area) and 3-1B (Ontario Geological Survey mapping at 1:1,000,000 for larger area; NDMNRF, 1997) and indicates that, at the Property, local overburden is composed primarily of four units. These are:

- Organic deposits (peat and muck; generally, 1 to 4 m thick).
- Glaciolacustrine deposits differentiated into:
- Shallow water and shoreline deposits (sand, gravel, silt; generally, 1 to 3 m thick)
    - Deep water deposits (clay, silt, and fine sand; varved clay below 380 masl elevation; generally 1 to 13 m thick)
    - Glaciofluvial outwash deposits (esker sands with minor gravel; generally 1m to greater than 40 m thick).
- Glacial till deposits (gravelly to bouldery, sand to sandy silt till; generally 1 to 6 m thick).

At the higher elevations across the Property, typically above about 380 to 390 masl elevation, the general sequence of overburden material is sand (glaciofluvial esker and glaciolacustrine near shore deposits) followed by glacial till which overlies the bedrock. Sands associated with esker deposits can be quite thick, as noted above, but much of this is often present above the water table (Section 5.4.1) and as such, does not represent a significant aquifer (see Section 5.2). At the lower elevation portions of the site (i.e., below about 380 to 390 masl elevation), the general sequence is glaciolacustrine deposits (mostly silts and clays) followed by glacial till which overlies bedrock. The glaciolacustrine sediments show a progression from relatively shallow water deposits closer to the contact with the older till and eskers deposits near the 380 to 390 masl contact to deeper water deposits below approximately 370 masl. Organic deposits (peat) are also found at the lower elevation portions of the site, such as around Unnamed Waterbody 6 and along Dixie Creek as well, and other flat lying areas with poor drainage. Total overburden thickness is shown on Figure 3-2 and shows that overburden thickness ranges from absent, in the areas of bedrock outcropping, to greater than 50 m locally. Details of the overburden stratigraphy are presented in detail below in Section 5.2.

Overburden deposits at the Property are reflective of the glaciated history of the area where inferred ice flow direction was generally from the northeast to the southwest, based on glacial striations present on exposed bedrock outcropping (Sharpe and Russell 1996). The glaciofluvial and glaciolacustrine deposits are associated with the glacial Lake Agassiz.

Prest (1982) indicates that the gravelly to boulder, sand to sandy silt till are the oldest Quaternary sediments in the area and were deposited by a late Wisconsinan glacier moving in a south to southwest direction. Where present at surface, the till is often characterised by a cover of boulder lag. On the

Property, most of the till is present as ground moraine, with a few short, low lying moraine ridges present on the south side of Dixie Creek, to the southeast of the proposed underground development. Bedrock outcrops are much more frequent in mapped areas of till cover compared to other overburden materials, reflecting the relatively thin overburden cover in these areas. Thicker tills are present but are largely buried by younger sediments and located filling buried bedrock depressions.

Prest (1982) notes that retreat of the glacier was accompanied by esker disposition and associated outwash sediment deposition into glacial Lake Agassiz. Glacial Lake Agassiz is reported to have flooded the local area to elevations of at least 435 masl. The entire property was once submerged except for a few areas of higher ground. From its maximum extent, the level of glacial Lake Agassiz dropped in stages, creating a series of shoreline features, some of which have been mapped in the northwest portion of the Property. In the process of the retreat of glacial Lake Agassiz, wave action re-worked both the esker and till sediments, removing fines, while leaving a boulder lag cover over the till areas and reworking the upper 1 to 3 m of esker sediments into shoreline deposits. The former esker deposits are expected to overlie both till and bedrock units, but where reworked as shoreline sediments, sand sediments can also be expected to overlie Lake Agassiz clay and silts where shoreline and post deposition wind action have transported the sands over the fine-grained sediments.

Away and offshore from the former shoreline sediments, finer grained sediments were deposited in the deeper parts of Lake Agassiz, forming a continuous silt or clay cover over the older till and esker sediments in lower elevation areas. These silt and clay sediments would largely post date the esker deposits but be of similar age to reworked lake shore sediments. Prest (1982) notes that varved clays, are more frequently found at elevations below 380 masl, with some locations exhibiting 600 to 1,000 varve cycles. Prest (1982) speculated that the area of mapped glaciolacustrine sediments would include areas of higher silt content near former shoreline sediments and points of former surface water discharge into Lake Agassiz, and areas of higher clay content and varved clay clays away from the shoreline areas, such as within the large, flat floodplains of Dixie Creek and Chukuni River.

After the retreat of Lake Agassiz, organic silts reportedly developed in local ponds, with peat development in low-lying poorly drained areas, except in low-lying areas around Unnamed Waterbody 6 and the lower floodplain of Dixie Creek, where Prest (1982) notes that creeks meander directly over clay deposits and the organic silts.

3.2 BEDROCK GEOLOGY

In the regional bedrock context, shown on Figure 3-3, the Project site lies within the Red Lake greenstone belt of the Uchi Subprovince of the Archean Superior Province of the Canadian Shield. As described in Great Bear Resources (2021), the rocks of Red Lake greenstone belt (east trending) and Birch-Confederation greenstone belt (north trending) of the Uchi Subprovince are interpreted to have evolved by eruption and deposition of volcanic sedimentary sequences on the active continental margin, followed by subduction related arc volcanism. Continental collision led to subsequent crust thickening and metamorphism. Both greenstone belts in the Red Lake District are dominated by the Balmer and Confederation Lake assemblages:

- Balmer assemblage (2,989 to 2,964 million years): tholeiitic and komatiitic basalt, with minor felsic volcanic rocks, iron formation and fine-grained clastic meta-sediments, which hosts the majority of the known Red Lake lode gold deposits.
- Confederation assemblage (2,750 to 2,735 million years): represented with three sequences, McNeely calc-alkaline sequence (central Red Lake) consisting of intermediate to mafic volcanic rocks, Heyson tholeiitic sequence (southeastern Red Lake) composed of felsic volcanics and interlayered with mafic flows, dacitic tuff and plagioclase-phyric basaltic andesites, and Graves sequence (northern Red Lake) consisting of basal polymictic conglomerate, intermediate pyroclastic rocks, syn-volcanic diorite and tonalite.

Local geological interpretation for the site area, which is based on property scale mapping, extensive diamond drilling, lithogeochemistry, petrography and geophysics, is shown on Figure 3-4.

The southwestern portion of the Property is underlain by a folded sequence of mafic volcanic flows intercalated with argillite and siltstone, iron formation, minor local felsic volcanics and minor ultramafic rocks. The association of this rocks is interpreted to be the sequence formed in a marine setting, in proximity to active venting in pre-existing anoxic basins. Felsic to intermediate rocks dominates the central portion of the property. The mafic rocks are in contact with a largely felsic / sedimentary rocks in the northeast portion of the property. Mafic volcanic dykes and sills are common throughout the Property. They range from lamprophyre to gabbro / diorite.

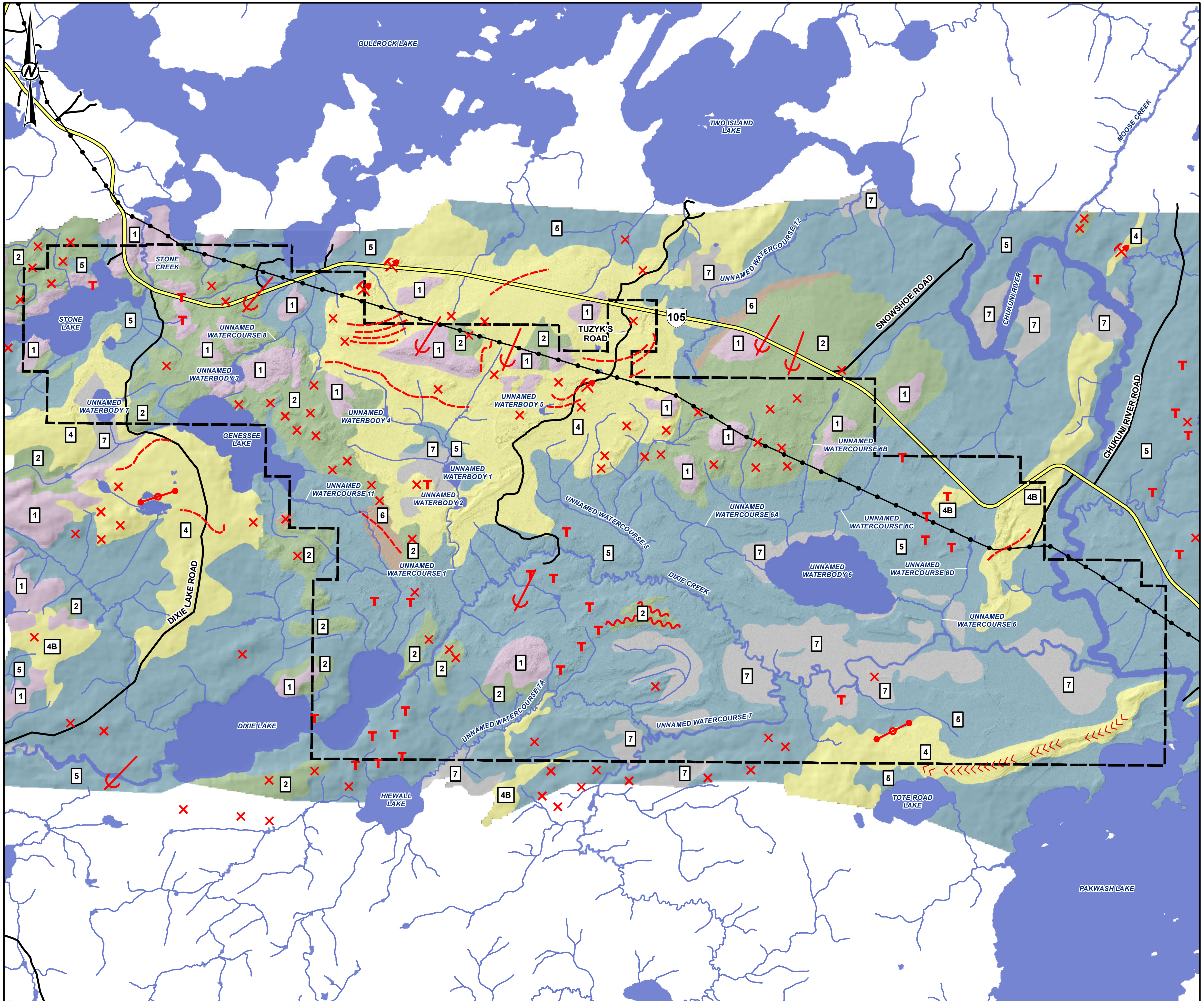
3.2.1 BEDROCK STRUCTUAL FEATURES

Three main bedrock structural features have been identified near the project site, two shear zones and one fault zone. The location of these structural features, overlain on the lithology model that has been developed for the site, are shown on Figure 3-4, with views of the faults from multiple perspectives provided in Figure 3-5. The two shear zones are the LP Shear Zone and the Yauro Shear Zone, lie approximately parallel to one another, and are both northwest-southeast trending features that are steeply dipping to the north.

A RQD block model was prepared by WSP (2023b) to evaluate the RQD trends in bedrock as well as the large-scale geologic structures like the LP, Yauro and Auro Faults. The developed RQD model showed that a trace of lower RQD values (<80) can be seen consistently along the Auro fault, but not along the LP shear zone or Yauro structure, where only localized zones of lower RQD were observed.

According to the site structural geologic information, the shear zone features are associated with D2 and D3 deformation events and are characterized as high strain zones with gradational contacts. Brecciation may be present, however, the intervals are commonly associated with healed breccias and are interpreted to represent ductile deformation characterized by mineral elongation and recrystallization (WSP, 2023b). Both the LP and Yauro Shear Zones intercept the underground workings however, the Yauro Shear Zone only does at high elevation near entrance of the ramp, and only the LP Shear Zone passes near Dixie Creek. The LP Shear Zone also intersects the underground workings, but at the depth of the intermediate and deep bedrock. Boreholes that intersect the LP fault, are generally characterized by localized isolated broken core zones, and mineralization and infilling of joints with chlorite, sericite, and some talc and muscovite where they intersect the fault (WSP 2023b).

Review of core photos and rock quality designation (RQD) logs from exploration drillholes shows that the northwest-southeast trending Auro Fault is characterized by the presence of gouge and breccia, and unlike the Yauro and LP zones, is associated with brittle deformation (WSP 2023b). The Auro Fault trends roughly north-south and dips to the east.



LEGEND

- PROPERTY BOUNDARY
- HIGHWAY
- LOCAL ROAD
- EXISTING TRANSMISSION LINE
- WATERCOURSE
- WATERBODY
- SAND AND OR GRAVEL PIT
- SMALL BEDROCK OUTCROP (NOT SHOWN FOR UNIT 1)
- SMALL OUTCROPS OF TILL
- ABANDONED SHORELINE FEATURES
- GLACIAL STRIATION (ICE FLOW DIRECTION INFERRED)
- TRANSVERSE MORAINE RIDGE
- ESKER (DIRECTION OF FLOW INFERRED)
- MORAINE RIDGE

QUATERNARY GEOLOGY

HOLOCENE **NONGLACIAL**

7 **ORGANIC DEPOSITS:** PEAT AND MUCK; 1-4 M THICK; MUSKEGS, FENS STRING BOGS; COMMONLY OVERLIES GLACIOLACUSTRINE MUD

LATE WISCONSINAN **PROGLACIAL AND GLACIAL**

GLACIOLACUSTRINE DESPOSITS: SEDIMENTS DEPOSITED INTO GLACIAL LAKE AGASSIZ PREDOMINANTLY AS UNDERFLOW AND AS LITTORAL DEPOSITS

6 **SHORELINE AND SHALLOW WATER DEPOSITS:** SAND, GRAVEL, SILT; 1-3 M THICK; SMALL BEACH RIDGES OVER OUTWASH DEPOSITS; MAINLY REWORKED MORAINIC DEPOSITS. 6A, GRAVEL AND GRAVELLY SAND; 6B, SAND WITH SILTY FINE SAND; 6C, THIN SAND OVER CLAY OR TILL

5 **DEEP WATER DEPOSITS:** LAMINATED TO VARVED CLAY, SILT AND FINE SAND; 1-50 M THICK; MAINLY OCCUPIES DEPRESSIONS

GLACIOFLUVIAL DEPOSITS: SEDIMENTS DEPOSITED PREDOMINANTLY INTO GALCIAL LAKE AGASSIZ AS SUBAQUEOUS FANS

4 **OUTWASH DEPOSITS:** SAND AND GRAVEL; 1-5 M THICK; MAINLY SUB-AQUEOUS FAN SEDIMENT, INCLUDES SOME ESKERS; 4A, GRAVELLY SAND; 4B, SAND WITH MINOR GRAVEL

GLACIAL

GLACIAL DESPOSITS: SEDIMENT DEPOSITED DIRECTLY FROM GLACIAL ICE

2 **TILL:** GRAVELLY TO BOULDERY, SAND TO SANDY-SILT TILL; NONCALCAREOUS; 1-6 M THICK; BLANKETS MOST BEDROCK; MINOR BEDROCK INCLUDED; 2A, TILL LESS THAN 1 M THICK; 2B, TILL WITH THIN COVER OF SAND, CLAY, OR MODIFIED SEDIMENT

1 **DRIFT AND BEDROCK:** ROCK DOMINATED TERRAIN (25-100% OUTCROP); ICE AND WATER ERODED ARCHEAN GRANATIC, METAVOLCANIC, AND METASEDIMENTARY ROCKS; THIN TILL AND STRATIFIED DEPOSITS, 1-3 M THICK IN DEPRESSIONS

0 1 2 4
1:70,000 KILOMETRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. QUATERNARY GEOLOGY BASE MAPPING IS EXTRACTED FROM QUATERNARY GEOLOGY OF RED LAKE-CONFEDERATION LAKE AREA; SHARPE, D R; RUSSELL, H A J. GEOLOGY SURVEYS OF CANADA, OPEN FILE 2876, 1996.
3. PROPERTY BOUNDARY PROVIDED BY KINROSS, AUGUST 2024.
4. ROADS INFORMATION PROVIDED BY KINROSS, AUGUST 2022.
5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

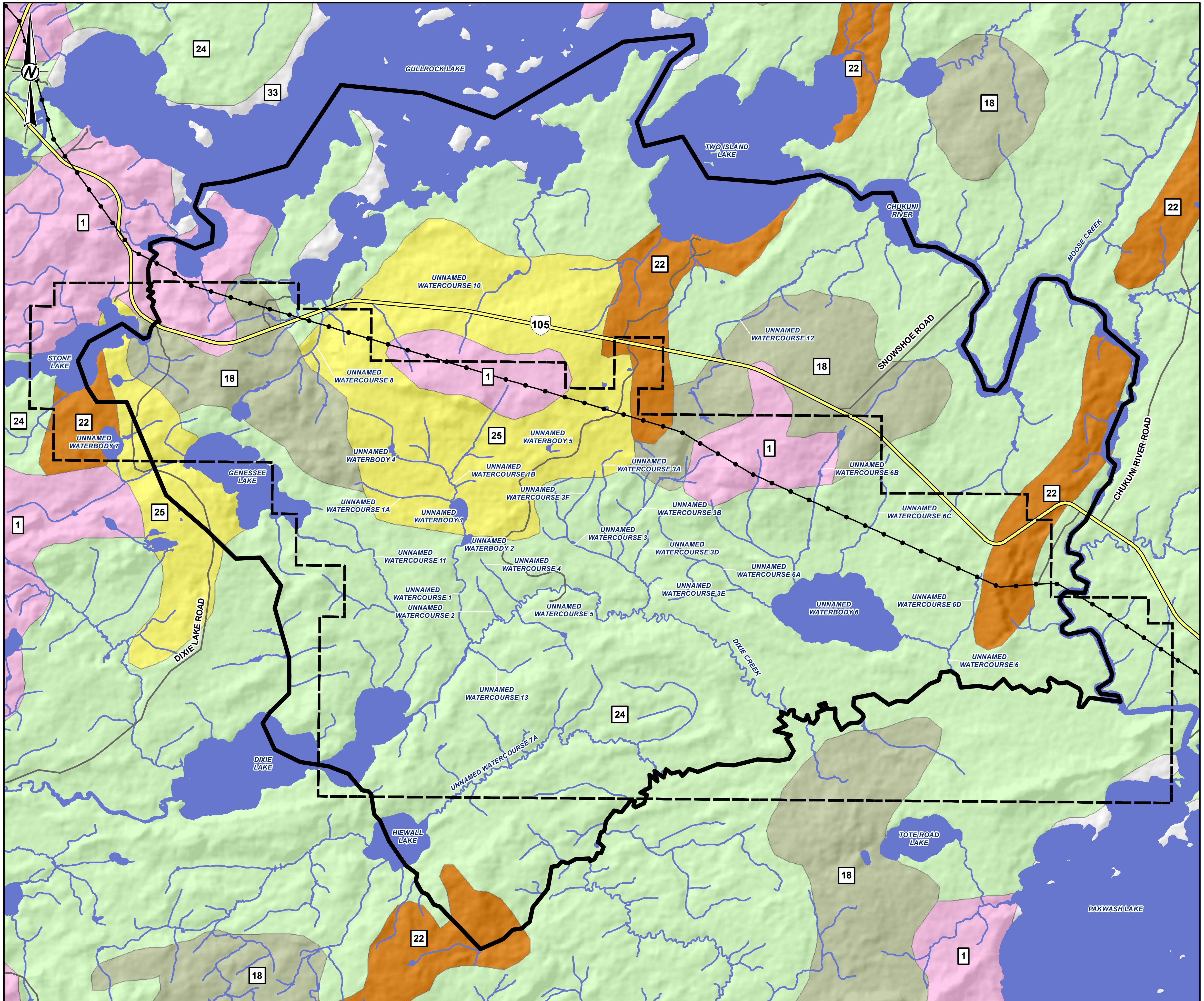
PROJECT
GREAT BEAR PROJECT

TITLE
QUATERNARY GEOLOGY

CONSULTANT

YYYY-MM-DD	2024-11-21
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
OMEMA2303	0001	A	3-1A



LEGEND

- DOMAIN OF CONCEPTUAL HYDROLOGICAL MODEL
- PROPERTY BOUNDARY
- HIGHWAY
- LOCAL ROAD
- EXISTING TRANSMISSION LINE
- WATERCOURSE
- WATERBODY

QUATERNARY GEOLOGY

- 33 LAKES
- 25 GLACIOMARINE DEPOSITS: SAND, GRAVELLY SAND AND GRAVEL NEARSHORE AND BEACH DEPOSITS
- 24 GLACIOMARINE DEPOSITS: SILT AND CLAY, MINOR SAND BASIN AND QUIET WATER DEPOSITS
- 22 GLACIOFLUVIAL ICE-CONTACT DEPOSITS: GRAVEL AND SAND MINOR TILL INCLUDES ESKER, KAME, END MORAINE, ICE-MARGINAL DELTA AND SUBAQUEOUS FAN DEPOSITS
- 18 TILL: UNDIFFERENTIATED, PREDOMINANTLY SAND TO SILTY TO SILT MATRIX, COMMONLY RICH IN CLASTS, OFTEN LOW IN MATRIX CARBONATE CONTENT
- 1 BEDROCK: UNDIFFERENTIATED IGNEOUS AND METAMORPHIC ROCK, EXPOSED AT SURFACE OR COVERED BY A DISCONTINUOUS, THIN LAYER OF DRIFT

0 1 2 4

1:70,000 KILOMETRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. QUATERNARY GEOLOGY ACQUIRED FROM THE ONTARIO GEOLOGICAL SURVEY DATA SET 14 (NDMNRF), 1997.
3. PROPERTY BOUNDARY PROVIDED BY KINROSS, AUGUST 2024.
4. ROADS INFORMATION PROVIDED BY KINROSS, AUGUST 2022.
5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

TITLE
QUATERNARY GEOLOGY (ONTARIO GEOLOGICAL SURVEY)

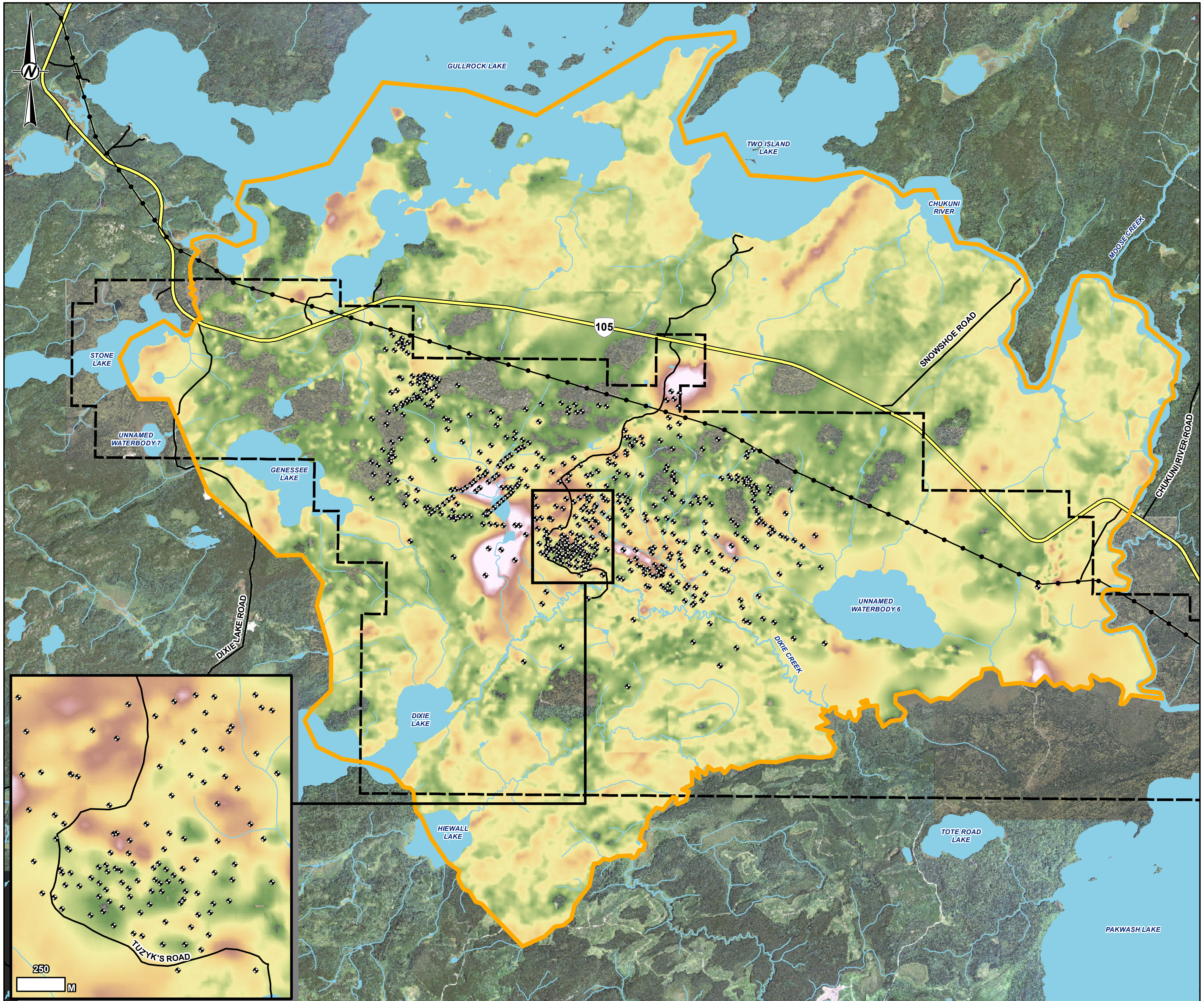
CONSULTANT

wsp

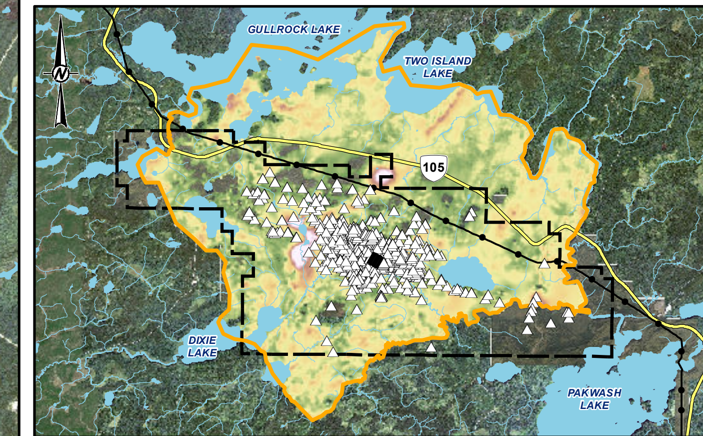
YYYY-MM-DD	2024-11-21
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
OMEMA2303	0001	A	3-1B

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B



KEY MAP



SCALE 1:315,000

LEGEND

- DOMAIN OF CONCEPTUAL HYDROGEOLOGICAL MODEL
- PROPERTY BOUNDARY
- HIGHWAY
- LOCAL ROAD
- EXISTING TRANSMISSION LINE
- WATERCOURSE
- WATERBODY
- RESOURCE EXPLORATION HOLE (SHOWN IN KEY MAP)
- BOREHOLE

OVERBURDEN LAYER THICKNESS

THICKNESS UNIT: METRES

60

0

0 1 2 4

1:70,000 KILOMETRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. AERIAL IMAGERY PROVIDED BY GREAT BEAR RESOURCES (SCENE DATE: SEPTEMBER 2022).
3. PROPERTY BOUNDARY PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2024.
4. ROADS INFORMATION PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2022.
5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

TITLE
OVERBURDEN THICKNESS

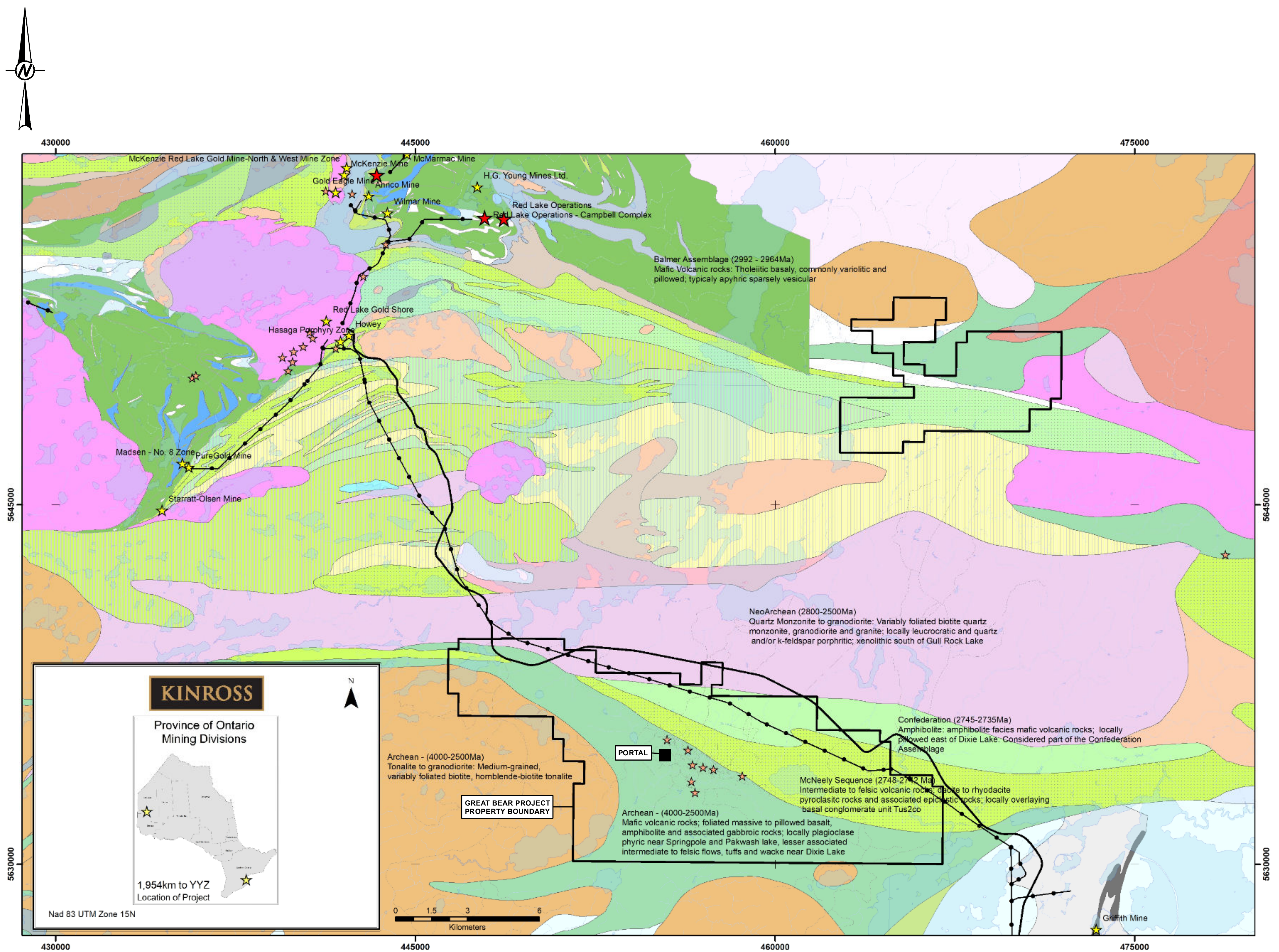
CONSULTANT

YYYY-MM-DD	2025-06-05
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
CA0031272	0001	A	3-2

25mm
0
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

PATH: X:\CA\CAOAK300-OAK\MIS-FS1-ProjectF\2023\Projects\OMEMA2303_Kinross_Great_Bear_Envt\7_GIS\HydroGeo\Baseline_2024\MXD\Overburden_Thickness_5.mxd PRINTED ON: 2025-06-05 AT: 9:50:01 AM



LEGEND

- PORTAL
- GREAT BEAR PROJECT OUTLINE
- TRANSMISSION LINE
- HIGHWAY 105
- PRODUCING MINE
- PAST PRODUCER
- PROSPECT WITH RESOURCE
- RIVER
- WATERBODY

0 2.5 5 10

1:175,000 KILOMETRES

NOTE(S)

REFERENCE(S)

1. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT

GREAT BEAR RESOURCES

PROJECT

GREAT BEAR PROJECT

TITLE

REGIONAL BEDROCK GEOLOGY

CONSULTANT

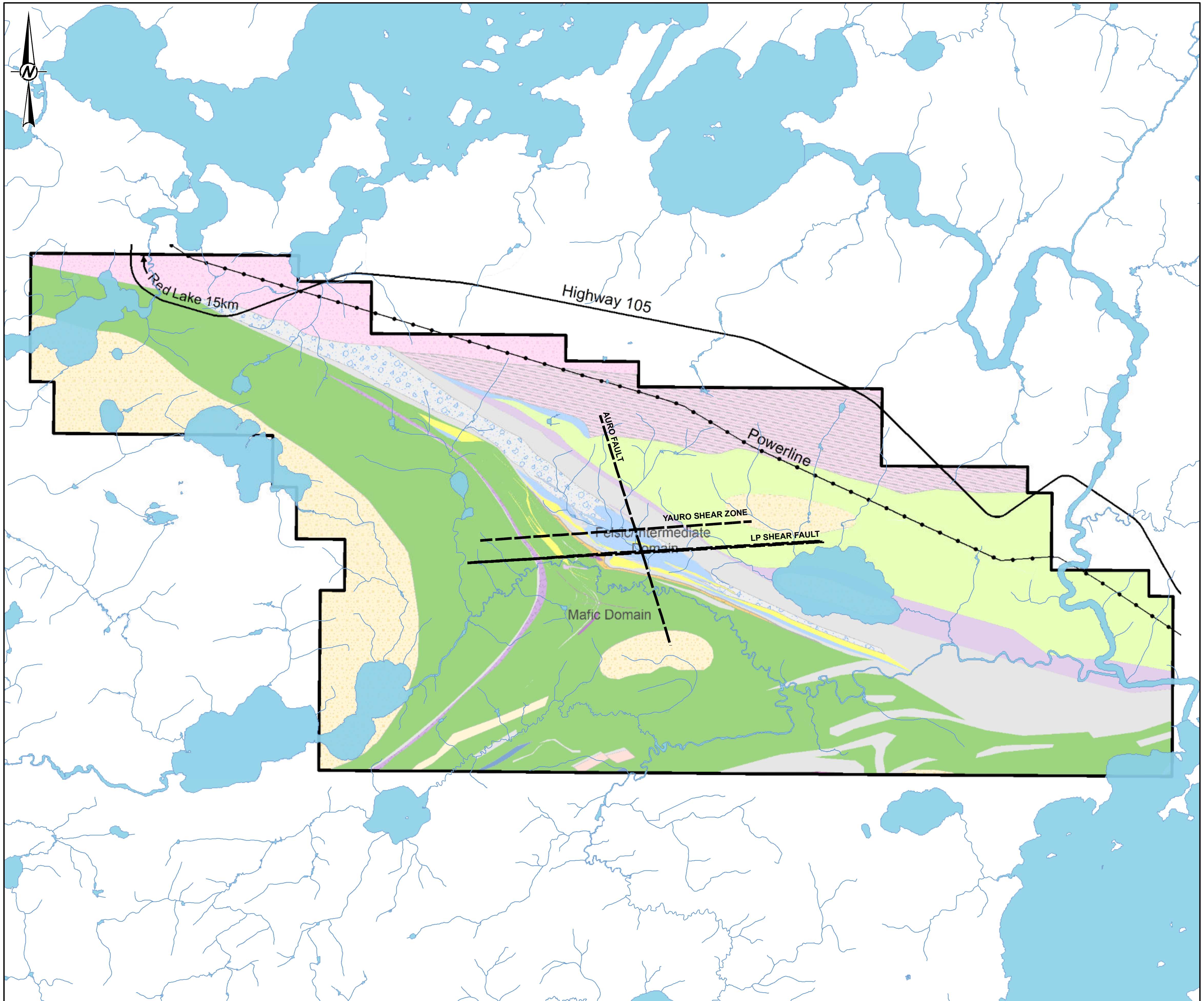
wsp

YYYY-MM-DD	2024-11-21
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
OMEMA2303	0001	A	3-3

25mm

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B



LEGEND

- FAULT
- MAFIC VOLCANIC
- UTLRAMAFIC VOLCANIC
- METASEDIMENT
- FELSIC VOLCANIC
- FELSIC-INTERMEDIATE VOLCANIC
- FRAGMENTAL 1
- FRAGMENTAL 2
- INTERMEDIATE VOLCANIC
- FELSIC VOLCANIC 2
- UTLRAMAFIC VOLCANIC 2
- UTLRAMAFIC INTRUSIVE
- TONALITE - GRANODIORITE
- GRANODIORITE - QTZ MONZONITE
- GRANODIORITE TRANSITION (+SEDS + MAFIC VOLCANIC)

0 1 2 4

1:70,000 KILOMETRES

NOTE(S)

REFERENCE(S)

1. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT

GREAT BEAR RESOURCES

PROJECT

GREAT BEAR PROJECT

TITLE

INTERPRETED LOCAL GEOLOGY

CONSULTANT

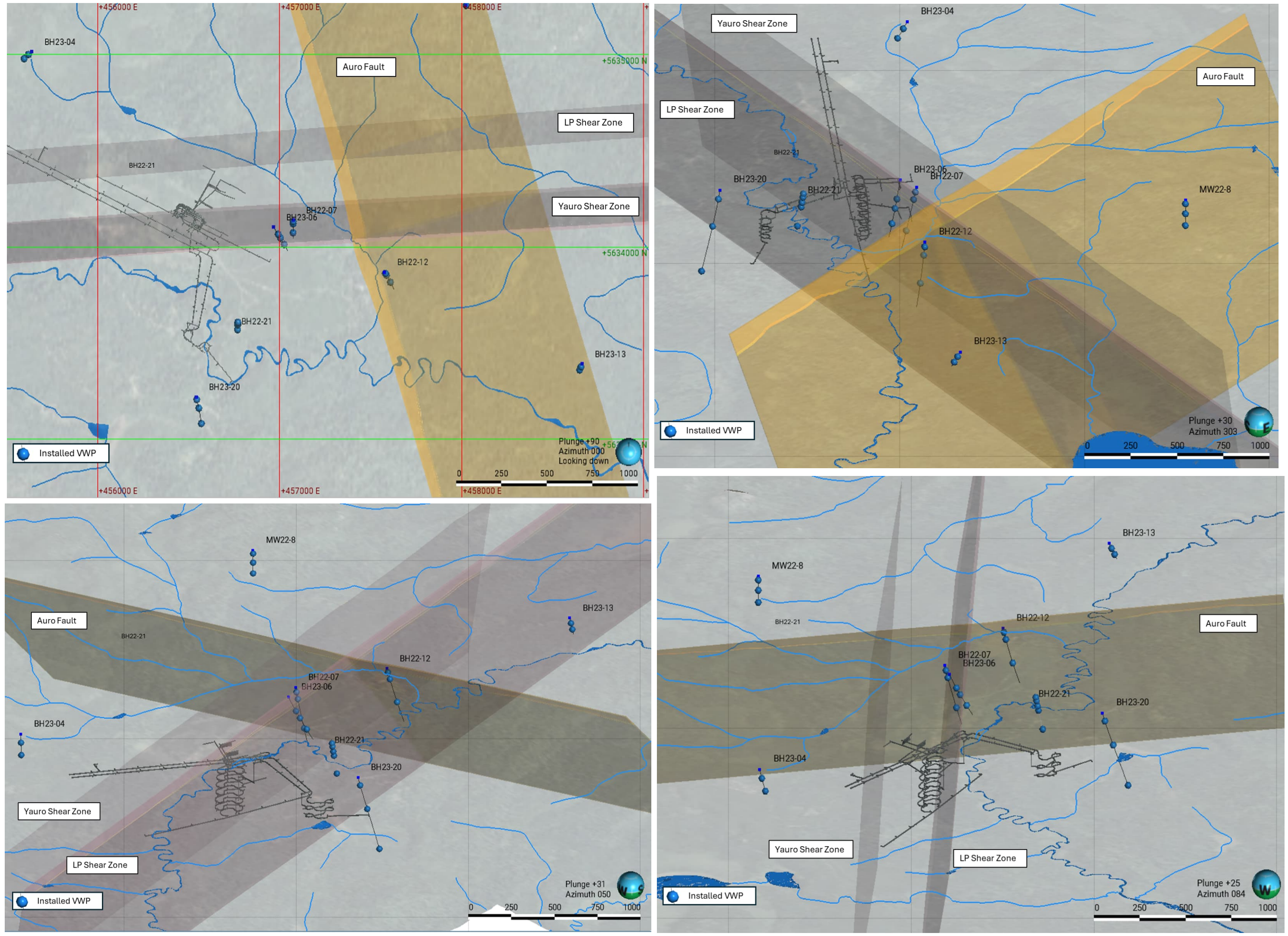
wsp

YYYY-MM-DD	2024-11-21
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
OMEMA2303	0001	A	3-4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm



Notes

3-D Visualization of Shear and Fault Zones with VWP locations			
Great Bear Resources			
Hydrogeology Baseline			
Figure Number		3-5	
Project Number		OMEMA2303	
Date		Nov-24	
Drawn	IL	Reviewed	SG

4 SURFACE WATER FEATURES

Surface water hydrology has been assessed by WSP as part of ongoing environmental assessment work. An overview of the Project surface water hydrology is presented here as it provides semi-quantitative information on the groundwater discharge, which is derived from low-flow creek gauging that is relevant to estimating the recharge to the groundwater system. Additional detail is provided in the comprehensive hydrology baseline report being issued separately (WSP 2024d), which has been supplemented with observations related to groundwater from studies of the aquatic environment (WSP, 2024e) and terrestrial environment (Northern Bioscience 2024), as well as observations from site personnel.

4.1 REGIONAL AND LOCAL WATERSHEDS

Regional and local watershed areas and boundaries are presented on Figure 4-1 and Figure 4-2, respectively. The Property is located primarily within the watershed of the Dixie Creek and associated tributaries. Dixie Creek crosses the southern portion of the Property and flows into the Chukuni River to the east. The Chukuni River is a large regulated system, with flow controlled by the Snowshoe Rapids Dam. Water levels and flow releases at the dam are managed by the Ministry of Natural Resources (MNR), with a single concrete structure consisting of four stop log bays and a sheet pile weir.

The Chukuni River discharges into Pakwash Lake, which also receives inflows from the Trout Lake River, Lac Seul and Cedar River (Figure 4-1). Pakwash Lake discharges into the English River system through the Manitou Falls generating station. The major watershed divide within the Property is approximate to the existing power line corridor and Highway 105, where watercourses north of the powerline corridor flow northwards beyond the Property boundary, towards Gullrock and Two Island Lake (Figure 4-2).

A northern portion of the Property drains towards Gullrock Lake. Gullrock Lake is part of the five lakes system which includes Red Lake, Keg Lake, Ranger Lake, and Two Island Lake which drains to the Chukuni River. Water levels in the five lakes system are controlled by Snowshoe Rapids Dam which is located on the Chukuni River, upstream of the confluence of Dixie Creek.

4.2 HYDROLOGIC MONITORING SUMMARY

A series of hydrologic baseline monitoring stations were installed on the Property at locations shown on Figure 4-3 to continuously monitor the local flow conditions. Further detail is provided in WSP (2024d).

Catchment areas for each of the monitoring stations listed above are shown in Table 4-1. Based on the watershed areas shown in Table 4-1 it is apparent that the watersheds for the individual tributaries that contribute to Dixie Creek are generally small in relation the total watershed area of the creek. Watersheds for HF-04, HF-02, HF-06 represent roughly 2.5%, 4.1% and 2.2% of the entire Dixie Creek watershed, for example, while the watershed for Genessee Lake (HF-08) which falls within the Dixie Creek watershed represents about 3% of the total creek watershed.

Continuous water level data has been collected at the baseline hydrometric stations using pressure transducers equipped with data loggers. As of the time of this report preparation preliminary rating curves for these flow monitoring stations have been developed. Stream discharge hydrographs for these monitoring stations for the currently available data are shown in Appendix B.

Monitoring surface water flows at the site to characterize the baseflow conditions has been complicated by beaver activity. Many of the factors that are known to affect the accuracy of rating curves (as described in Terzi 1981) are magnified in smaller watersheds as the relationship between stage and discharge is more sensitive than larger systems. Beaver activity, debris accumulation, sedimentation / erosion, and aquatic growth effects are the major issues that have hindered the development of accurate rating curves on the project. In 2023, major beaver dams were noted approximately 2 km downstream of the Dixie Lake outlet and also at approximately 0.5 km upstream of HF-08 (the Genessee Lake flow station). For this reason and also the because the 2023 field season saw low water levels and flow rates, spot flow measurements were taken at additional locations to bolster the low flow monitoring data along Dixie Creek. These additional station locations are also shown on Figure 4-3.

Great Bear Resources has also collected periodic low-flow streamflow spot measurements at several of the smaller tributaries within the Property. The purpose of this program is to characterize baseflow conditions, under the low flow conditions, within the smaller headwater sub-catchments of a number of the tributaries to Dixie Creek, Gullrock Lake, Unnamed Waterbody 6 and the Chukuni River. The location of these supplemental flow monitoring stations are shown on Figure 4-3.

Spot flow measurements from these monitoring locations were taken from 2022 to early 2025 by Great Bear Resources and WSP staff and are provided in Table 4-2 and Table 4-3. The smaller tributaries tend to be intermittent and more difficult to measure accurately; however, they provide an understanding of the base flow during drier periods which can be linked back to an understanding of the groundwater hydrology.

4.3 PHOTOGRAPHIC LOG

A photographic log of select surface water features, taken during the June 2023 and September 2023 hydrology site visits are provided in Appendix C to highlight the influence of beaver dams on surface water levels and show the ephemeral nature of several of the head water features of the smaller unnamed watercourses. Photographs also illustrate the general size and scale of some of the surface water features that are present at the site.

4.4 INFRARED DRONE IMAGERY

Infrared drone imagery has been collected from creeks at the project site in two campaigns, one in September 2023 which covered a portion of Dixie Creek from close to Dixie Lake to downstream of Tuzyk's bridge, and one in September 2024 which extended the area of the first survey further upstream towards Dixie Lake and further downstream along Dixie Creek to the confluence with Unnamed Watercourse 7, and also added the sections of Unnamed Watercourse 6A and Unnamed Watercourse 7A. The September 2023 survey was done under very dry conditions, (September 11 to September 18, 2023), while conditions for the September 2024 survey were wet to normal (September 17 to September 20, 2024). For reference, the average flows at estimated from water level by rating curve at the HF-03 flow station during the periods of the two surveys were 1,230 m^3/day for the 2023 survey and 56,460 m^3/day for the 2024 survey.

The purpose for collecting the infrared drone imagery was to undertake a qualitative survey for groundwater discharge features, which were expected to appear as sources of relatively cool water at the time the two surveys were completed. A summary of the main observations from the drone imagery are provided in Figure 4-4 and Figure 4-5. In addition to collecting information on the relative temperature of the creek, the drone survey also helped examine the nature of the creek bed and obstacles to flow within the creeks. In Dixie Creek alone, 11 beaver dams were identified in the surveyed area between Dixie Lake and Unnamed Watercourse 3, indicating that beaver dams may represent a significant hinderance to regular flow within the creek. Beaver dams were also present in Unnamed Tributary 7A, however Unnamed Tributary 6A appears to be too small to attract beaver activity. Where the beaver dams were intact and functioning, it is expected that they also have a thermal impact on the creek, causing water above the dams to equilibrate with atmospheric temperatures, mixing and warming the creek water in the summer.

The discharge of cool water relative to that of Dixie Creek was readily identifiable in the drone imagery for water discharging from several of the unnamed watercourses. For the upstream portion of the Dixie Creek survey, these included discharge from Unnamed Watercourses 1, 13, 2, 5 and 4 during wet conditions in the September 2024 drone survey. However, where these watercourses were also surveyed in dry conditions in 2023, which included the confluence of Dixie Creek with Unnamed Watercourse 2, 5, 4, only inflow from Unnamed Watercourses 2 and 4, on the north side of Dixie Creek was notable, indicating that they are sources of cooler water for Dixie Creek, while inflow from Unnamed Watercourse 5 was minor under dry conditions, indicating it contributes little water to Dixie Creek.

The confluence of Dixie Creek with Unnamed Watercourse 3 was only surveyed under dry conditions in September 2023. That survey indicated that waters in the lower reaches of Unnamed Watercourse 3 appeared equally warm to that in Dixie Creek, which does not suggest discharge from Unnamed Watercourse 3 was a source of cool water to Dixie Creek.

One small area of cool water was observed in Dixie Creek itself, just downstream of the upper cascade, which impacted temperatures in the creek in one small part of the creek for several metres downstream. At the time of the survey, there was insufficient flow in the creek for the creek to form a continuous water cover over the boulders and stones of the cascade, and water appears to have been flowing through the boulders and stones from water pooled on the upstream side of the cascade to the lower side of the cascade, as such the cool water maybe a result of cooling as former surface water from the upstream pool passes into the ground, rather than a pure groundwater source. Stream flow measurements collected close to the time of the drone survey in this section of the creek (September 12, 2023), are provided in Table 4-4, and were very flow, and indicate any gain in water over this section of the creek was likely quite small, possibly as low as 50 m^3/day or less. No other potential groundwater discharge sources were identified.

The 2023 survey also identified three small areas on the creek bank with clusters of small dark patches. The patches are unlike other cool features and are possibly an artifact of spectrum used by the thermal camera; however, if they are cool features, they could indicate areas of groundwater discharge. All three were located on the north bank of Dixie Creek, in the area between the confluence with Unnamed Watercourse 3 and the upper cascade. The three areas appear as small clusters of dark patches in areas of shrubbery. None of the patches included continuous traces of cool material to the creek, indicating that if they are areas of groundwater upwelling, the upwelling is insufficient to create a continuous flow of water to the creek. Each of the three areas was visited on November 3, 2024, under dry, cool (low evaporation) conditions and examined for evidence of groundwater discharge. All three areas were dry, indicating that they are not groundwater discharge features.

Figures 4-4 and 4-5 also indicate the location of the faults and shear zones that cross Dixie Creek. Groundwater levels measured in monitoring wells near to where the structures cross or approach Dixie Creek are approximately ten meters above the creek level near the LP Shear Zone and two meters above Dixie Creek near the Aura Fault (Section 5.4), indicating that groundwater could discharge to the creek and creek banks and could be observable should the discharge be large enough. For both structures, the infrared imagery does not show areas or features of cool water discharge to the creek or creek banks, indicating that if groundwater is flowing through these structures to the creek, it is not doing so at a rate detectable in the drone infrared imagery under dry conditions in September 2023.

It is worth noting that, while cool water is often associated with groundwater contributions to surface water in the summer months, there maybe other reasons for water to appear cool, including the source of the water coming from an area cooled by the shading of trees. The time of day of the survey and the position of the sun can also impact the appearance of warm and cool features. Receiving waters may also be warmed by their retention in lakes or above beaver dams.

4.5 WATERCOURSE SUMMARY

4.5.1 DIXIE CREEK

Near the Project site, Dixie Creek is characterized as generally meandering and having a flat slope although there are two short cascading sections located downstream of HF-03, one approximately 300 m to 400 m downstream of the bridge at HF-03 of approximately 3.3 m, and one approximately 2.1 km further downstream of approximately 1.5 m (Figure 2-4). Both these cascading areas are characterized by coarse stones in the stream bed, suggesting bedrock outcrops at or near the creek bed, which have possibly limited downcutting of the streambed. Below the lower cascade, Dixie Creek is essentially flat until the HF-01 bridge, consistent with the meandering nature of the creek in the section and flows across a wide flat plain of wetlands. From upstream of the HF-03 cascade, the creek exhibits an approximate 1 m drop to Dixie Lake. There creek cuts through an esker at the HF-01 bridge to the Chukuni River. The low gradient of Dixie Creek across the floodplain combined with the limited elevation differential with the Chukuni River, indicates that flooding of the Chukuni River can cause backflow effects and flooding in of the lower reaches of Dixie Creek, including Unnamed Waterbody 6 and a significant section of Unnamed Watercourse 7.

Outside of the two stoney cascades mentioned above, the stream bed of Dixie Creek is characterized by clay with wetlands occupying the surrounding floodplains found upon organic sediments (muck), which is consistent with the Quaternary Geologic mapping (Figure 3-1A). The overburden thickness as determined from exploration drill data between the two cascade areas, with considerable thicknesses of overburden estimated to be present from extrapolation of drill data for the portions of the creek upstream and downstream of the cascades (Figure 3-2, with cross section view in Appendix E).

The narrow wetlands on either side of Dixie Creek upstream of the second cascade to Dixie Lake are described as swamp in the Terrestrial Baseline Report (Northern Bioscience, 2024). These swamps are described as largely meadow marshes where beaver dams have resulted in flooding during the spring, with little standing water later in the growing season. This is consistent with the large number of beaver dams observed along this section of the creek. They are not identified as groundwater dependent. Northern Bioscience (2024) indicate that localised flooding created by beaver dams is the dominant factor controlling the supply and distribution nutrients in the aquatic systems, and that groundwater dependent terrestrial ecosystems and wetlands are not observed. This is expected to be true for all the upper reaches of Dixie Creek where beaver dams are present and all of the smaller minor unnamed watercourses.

The swamps, bog and marsh identified in the wide floodplain downstream of the second cascade occur due to poor drainage in flat lying areas (Northern Bioscience 2024). Fens and open / shore fens are associated with nutrient rich waters and are only mapped in a narrow band on either side of Dixie Creek, in the area where the clays are most likely thickest, indicating a poor connection with local aquifers and the nutrients that supply these fens likely come from seasonal flooding. Other fens in the flood plain are mapped as nutrient poor treed fens. None of the above wetlands were identified as groundwater dependent. None of the wetlands along Dixie Creek are identified as provincially significant (Northern Bioscience 2024).

The boundaries of the watershed for Dixie Creek near the Project site are largely bedrock highs, with the exception of the downstream portion of the watershed where an esker forms the boundary between the Dixie Creek and Chukuni River watersheds. There are generally sandy materials, either glaciofluvial sand or till in the higher elevation sections of the watershed below the bedrock highs that form the watershed boundaries, with the lower elevation areas, and any area where water is unable to drain due to flat topography or topographic constraints underlain by clay rich glaciolacustrine sediments.

Hydrometric stations HF-07, HF-04 and HF-01 are located on the main branch of Dixie Creek and have been monitored since mid-2022. Most stations are monitored by transducer to measure water levels, however, in 2024, an IQ Acoustic Doppler flow monitoring system was added to the HF-01 flow monitoring station, to assist with the interpretation of backflow effects from the Chukuni River.

There are a number of smaller tributaries of Dixie Creek which are relevant to the Project, these are described below.

4.5.1.1 UNNAMED WATERCOURSE 1 AND UNNAMED WATERBODIES 1 AND 2

Unnamed Watercourse 1 is located approximately central to the Project site, with the majority of the headwaters of this tributary being in the area consisting of glacial outwash / esker sands. The boundaries of the catchment area of the watercourse are largely defined with bedrock highs. The upper portion of the watershed is thought to have relatively thin overburden, while a deep, overburden filled depression appears to be present under Unnamed Waterbodies 1 and 2, extending several hundred metres north and downstream more than 1 km.

Hydrometric station HF-06S and HL-06N are located at the outflow of Unnamed Waterbody 2 and at Unnamed Waterbody 1 respectively. Figure B-4b in Appendix B which shows the same hydrograph data for HF-06 as is presented in Figure B-4a, but zoomed in to highlight the low flow periods, indicates that the low flow discharge rate is on the order of roughly 100 to 200 cubic metres per day (m^3/day) to as low as 11 m^3/day in 2023 under the dry conditions recorded that summer and several hundred cubic metres per day in 2024 during more normal conditions. When normalized over the watershed area for HF-06 this is equivalent to 4.6 to 15.9 millimetres per year (mm/yr) which is considered quite low for a watershed composed largely of surficial sand (Table 4-5). The low baseflow is partially attributable to 2023 being drier than a typical year, but also due to the flow station being located partway up the watershed, at a relatively high elevation of approximately 378 masl in a sandy aquifer plain, where groundwater flow maybe passing through the sand under the section of the creek with the flow station to discharge to the lower portion of the creek, which drops to elevation 355 masl a further 2 km downstream. This would be consistent with the perched nature of Unnamed Waterbody 1, which has a surface water elevation approximately 10 m above that of the water table measured in a nearby monitoring well (MW22/04), at least along the downstream side of the pond.

The upper portions of the minor tributaries north of Unnamed Waterbody 1 appear to be intermittent, based on observations from supplemental spot flow monitoring station 5, located on tributary 1B-03 within this watershed, which was noted to be dry in September 2023. There is, however, a small portion of the western tributary (1A) to the pond where minor groundwater upwelling has been observed. Further upstream, flows in all the minor tributaries of the pond are expected to be interrupted by beaver dams.

Unnamed Waterbody 1 is roughly 10 ha in area and is a shallow pond, that is generally less than 0.5 m deep. Water levels are monitored via hydrometric station HL-06N. The average water level in Unnamed Waterbody 1 for the monitoring period from September 2023 to October 2023 is 28.65 m with a maximum recorded elevation of 28.71 m and minimum recorded elevation of 28.58 m. These water levels are relative to local benchmark that has not been tied into a geodetic survey elevation however the elevation must be above that of Unnamed Waterbody 2, which is downstream.

Unnamed Waterbody 2, located downstream of Unnamed Waterbody 1 is much smaller than Unnamed Waterbody 1, but is much deeper, up to 8 m deep. Water levels in Unnamed Waterbody 2 are monitored via hydrometric station HF-06S and have a typical elevation of approximately 379.1 masl as measured from a surveyed benchmark. This elevation is approximately ten meters above the groundwater level measured in MW4/22 in the aquifer beneath the surficial clay, indicating this pond and likely Unnamed Waterbody 2, are perched above the potentiometric surface of that aquifer.

Both waterbodies are noted as having a bottom of soft fine-grained sediments (WSP 2024e). Fish species present in Unnamed Waterbody 1 and Unnamed Waterbody 2 indicate that the fish habitat of these two ponds is cool to warm water for Unnamed Waterbody 1 and cold to warmwater for Unnamed Waterbody 2 (WSP 2024e). Cold water habitat in northern Ontario is associated with summer temperatures of less than 19°C, while cool water is greater than 19°C and warmwater greater than 25°C (Coker et al. 2001). Downward gradients or perched conditions have been identified around these two waterbodies, indicating that they are not groundwater fed, however Great Bear Resources staff have reported evidence of groundwater discharge in the western most tributary of Unnamed Watercourse 1 (1A), upstream of Unnamed Waterbody 1. It is also expected that based on the sandy local sediments and relative elevation to the water table, Unnamed Watercourse 1 receives additional groundwater inputs downstream of Waterbody 2.

The watershed of Unnamed Watercourse 1 includes a notable wetland area around and upstream of Unnamed Waterbody 1. The wetland area is a flat area that correlates with an area of mapped silty clay sediments in the Quaternary geology mapping, upstream of a notable esker ridge which bisects the watershed downstream of Unnamed Waterbody 2 (Figure 3-1A). The total pond and wetland area in the watershed is 2.3 km^2. The terrestrial baseline report (Northern Bioscience, 2024) maps shore fens along the margins of Unnamed Waterbody 1, with treed fens beyond the shoreline. Given the downward gradient observed near the wetland (see Section 5.4.3), this wetland is not thought to be sustained by groundwater inputs.

4.5.1.2 UNNAMED WATERCOURSE 2

Unnamed Watercourse 2 at its confluence with Dixie Creek is about 0.7 km downstream of Unnamed Watercourse 1. Flow along this watercourse is not monitored as part of the regular hydrometric program but spot flow measurements made by Great Bear Resources in 2023 and 2024, assumed to represent the low flow conditions, were 148 m^3/day and 295 m^3/day respectively (Sta 17, Table 4-5). When normalized over the watershed area this is equivalent to 67.1 mm/yr to 134.6 mm/yr which is considered high given that the watershed is within an area of predominantly glaciolacustrine deposits. Most likely this can be best explained by the watercourse receiving groundwater inputs in its upper reaches, where the tributary originates from the base of an esker.

4.5.1.3 UNNAMED WATERCOURSE 3

Compared to Dixie Creek, Unnamed Watercourse 3 has a relatively steep topographic gradient, although overall the gradient is low, with two relatively flat portions separated by steeper section where the watercourse bed may flow across bedrock or the slope of till materials. Marsh type wetlands have formed in the relatively flat areas, separated by steeper, channelized sections.

The uppermost reaches of Unnamed Watercourse 3 flow across primarily sandy materials (glaciofluvial and till deposits), while the bulk of the tributary watershed footprint flows across the glaciolacustrine deposits. The glaciolacustrine section of the watercourse is flat enough that large portions of the it, and a second smaller, relatively flat upstream section can readily flood in response to beaver activity. In both areas, beaver dam development can result in meadow marsh development, particularly in the lower reaches of the watercourse, which are frequently reported to be flooded as a result of beaver dams. Evaporation from surface water accumulated above beaver dams in the warm summer months, may be a significant drain on water that is flowing from the creek, before reaching the downstream flow station.

Spot flow monitoring stations 12 and 14, located on tributaries 3A and 3D were observed to be dry in September 2023, indicating that these may be ephemeral in nature. The spot flow measurements also suggest that most of the flow in Unnamed Watercourse 3 appears to originate from central tributary with spot flowing monitoring station 13 (Unnamed Watercourse 3B).

A hydrograph for HF-04 as is presented in Appendix A. When zoomed in to highlight the low flow periods, the hydrograph indicates that the low flow discharge rate is on the order of roughly 300 m^3/day, however spot flow measurements record almost zero flow at times of the year (Tables 4-4 and 4-5). The difference between the computed and spot flow measurements in parts reflects the difficulties in collecting stream flow measurements in very small watercourses. When normalized over the watershed area for HF-04 the 300 m^3/day is equivalent to 11.6 mm/yr. Considering that the bulk of Unnamed Watercourse 3 watershed is glaciolacustrine deposits and the tributary appears to receive little input from the upstream reaches underlain by till and some water can be expected to have been retained above beaver dams or evaporated from wetlands, this appears to be a reasonable value.

The glaciolacustrine sediments beneath the lower portion of the watershed cap till deposits which form a poor aquifer, that is fed by recharge to the higher ground to the north and northwest. This results in artesian conditions in some parts of the lower watershed. There are a large number of exploration drill holes within the lower part of the watershed, that could leak some water to the lower portion of watercourse. Data from the drillholes in the lower portion of the watercourse indicate the overburden is also generally greater than 20 m thick under the creek (Figure 3-2, with cross section view in Appendix E).

4.5.1.4 UNNAMED WATERCOURSE 4

Approximately 60% of the Unnamed Watercourse 4 watershed area, corresponding to the upper reaches of this tributary, lay the within the glacial outwash deposits while the remaining 40% is located in areas of glaciolacustrine clays.

Three of the spot flow measurements made by Great Bear Resources in 2023 and 2024, assumed to represent the low flow conditions, were between 148 m^3/day and 295 m^3/day respectively (Sta 17, Table 4-5). When normalized over the watershed area this is equivalent to 67.5 mm/yr to 134.6 mm/yr. Given the limited measurements available and that 2023 was an abnormally dry year, it is difficult to say with confidence if the 2023 values are within typical ranges for this watershed. Singer and Chen (2002) report that values of between 5 mm/yr and 10 mm/yr are reasonable estimates for silt and clay and that values of between 300 mm/yr to 350 mm/yr are reasonable recharge estimates for sands and gravels in northern Ontario. Given this, an estimate of 67.5 mm/yr is considered low given that much of the watershed is in glacial outwash sands. The value of 134.6 mm/yr seems more reasonable based on limited field data. Similar to Unnamed Watercourse 2, it is probable that this watercourse is receiving groundwater inputs in its upper reaches, where the tributary originates from the base of an esker, and not from its lower reaches.

4.5.1.5 UNNAMED WATERCOURSE 5

Unnamed Watercourse 5 is located on the south side of Dixie Creek. Spot flow measurements routinely indicate that flows are too low to measure indicating that groundwater contributions to flow are minor and flow within this watercourse may be ephemeral in nature, although it may not go dry.

Drilling data and bedrock outcrop mapping indicates that the ridge to the south of the watercourse, which divides the catchment area of this watercourse from Dixie Creek is a bedrock ridge with a thin overburden cover. There is a beaver pond in the central portion of the watershed, which exploration drilling data indicates sits above a bedrock low. The Quaternary geology deposits filling the bedrock low are mapped as glaciolacustrine sediments, with exploration drilling data indicating that the overburden is more than 20 m thick in places. The log of one geotechnical borehole drilled near the tributary (BH22-122) indicates that the overburden cover can have more than 6 m of clay sediments. The presence of clay sediments would be consistent with the ephemeral nature of flow within this tributary.

4.5.1.6 UNNAMED WATERCOURSE 6 AND UNNAMED WATERBODY 6

The catchment area for Unnamed Watercourse 6 includes Unnamed Waterbody 6. This watershed is immediately east of the watershed for Unnamed Watercourse 3 and contains several smaller sub-catchments to creeks which drain to Waterbody 6 (i.e., watercourses 6A, 6B and 6C). Hydrometric station HF-02, located at the outflow of Unnamed Waterbody 6, monitors surface water discharge from this watershed. The uppermost portions of this watershed, about 30% of the total catchment area, are located on areas of glacial till while the remained of the catchment area falls within the glaciolacustrine deposits. There is a small cascade near to where watercourse 6B exits the area of glacial till and flows onto the area underlain by glaciolacustrine sediments.

Unnamed Watercourse 6A is located on the southwest side of Unnamed Waterbody 6 and has a catchment which is mainly on glaciolacustrine sediments. Supplemental spot flow stations 8, 9 and 10 (Table 4-2), located on Unnamed Watercourse 6A and Unnamed Watercourse 6B of this watercourse was observed to have no flow during parts of 2023 and 2024 indicating that this tributary may be ephemeral in nature. No beaver dams have been noted on Unnamed Watercourse 6A, which flows largely over flat terrain, however, beaver dams were noted on Unnamed Watercourse 6B, which were sufficient to restrict flow in the watercourse.

A large portion of the Unnamed Watercourse 6 is mapped as wetlands (Northern Bioscience 2024). Most of the wetlands are classified as swamp, with some wetland along the northeastern margin of Unnamed Waterbody 6 classified a shore fen. Like the wetlands of the power reaches of Dixie Creek, the wetlands here have likely formed due to frequent flooding and poor drainage across a flat clay plain with limited drainage potential. Neither the swamp nor the shore fen are expected to be dependent on groundwater discharge.

Unnamed Waterbody 6 is comprised of a shallow water littoral zone in the east and west and a large uniform middle basin. Maximum recorded water depth was 1.78 m, with an average of 1.26 m throughout the lake. Water levels and discharge from Unnamed Waterbody 6 are monitored via hydrometric station HF-02. The water level range for the monitoring period from August 2022 to October 2023 indicates a maximum recorded elevation of 347.41 masl and minimum recorded elevation of 347.02 masl.

Unnamed Waterbody 6 has wide riparian habitat comprised of grasses, sedges and shrubs along its west, north, and southern margins. A portion of the southern shoreline of the lake is characterized by small boulders which likely reflect contact with till sediments and possibly bedrock. The boulders are part are the northern edge of a ridge of land that divides catchment of Unnamed Waterbody 6 from Dixie

Creek and rises 10 to 20 m above the lake level. Bedrock outcrop mapping and drill data indicate that the ridge contains bedrock highs which are an eastward extension of a bedrock ridge that extends eastward into the lower Dixie Creek watershed floodplain, with areas of thicker overburden cover. Drill from two exploration drillholes in the southern portion of the waterbody itself, report depths to bedrock of 10.0 and 21.8 m indicating the water body is underlain by a considerable thickness of the overburden materials (Figure 3-2).

4.5.1.7 UNNAMED WATERCOURSE 7

Unnamed Watercourse 7 is located on the south side of Dixie Creek and has a watershed area of 113 km^2. A flow station was established on one of the tributaries of Watercourse 7, Watercourse 7A, in June of 2024 (HF-11, with a corresponding watershed area of 41 km^2). Spot flow measurements at this station in June and August of 2024 recorded flows of 22.1 and 5,270 m^3/day respectively, indicating the high variability of this flow system. Spot flow measurements taken by Great Bear Resources staff at one of the sub tributaries of this watercourse (Tributary 7A-07 - Station 21, Table 4-2) often record no flow, indicating that some of the smaller sub-tributaries within this watercourse, such as Unnamed Watercourse 7A-07, may be ephemeral in nature or at least experience periods of no flow as a result of beaver dam activity.

Based on the available information, this watercourse is largely underlain by glaciolacustrine clays and silts. Wetlands in this watershed are mapped as swamp or treed fen (Northern Bioscience 2024), which do not indicate significant groundwater contributions.

Drilling data and outcrop mapping indicate that the drainage divide between Unnamed Watercourse 7 and Dixie Creek is a bedrock ridge with frequent bedrock exposure. Part of the bedrock on this ridge is mapped as Tonalite (Figure 3-4). The ridge is sufficiently high to largely sit above the area of glaciolacustrine deposition and has a till cover in places.

4.5.1.8 UNNAMED WATERCOURSE 13

Unnamed Watercourse 13 is also located on the south side of Dixie Creek. about 1.6 km downstream from the outflow of Dixie Lake. A single spot flow of 144 m^3/day was observed in June 2023 (Sta 19) while water levels were too low to measure any meaningful flow in September 2023 indicating that this watercourse may be ephemeral in nature.

4.5.1.9 UNNAMED WATERBODY 5

Unnamed Waterbody 5 is a small, isolated pond located within the Dixie Creek watershed to the west of Tuzyk's Road. The pond is located on the northwest side of the main esker that crosses the Property from northeast to southwest and has formed in a topographic low between the esker to the southeast and the bedrock ridges to the northeast. There is no permanent outlet to the pond, although flow has been observed flowing during wet conditions from the pond to the adjacent gravel pit to the northwest, where it soaked into the ground.

4.5.2 TRIBUTARIES OF GULLROCK LAKE

4.5.2.1 STONE CREEK

This watercourse is located at the northwest corner of the Project site and conveys surface water discharge from Stone Lake to Gullrock Lake. Outflow form Stone Lake is monitored via hydrometric station HF-10. The hydrograph for this station, zoomed in to highlight the low-flow periods is shown on Figure B7b. Low flows in this creek appear to be on the order of about 400 m^3/day, which when normalized over the catchment area equates to a recharge rate of about 3.6 mm/yr. Quaternary geology, shown on Figure 3-1A indicates that most of the catchment area of HF-10 is composed of exposed bedrock, so a low recharge estimate is anticipated for this watershed. A value of 3.6 mm/yr is outside the range of 5 to 10 mm/yr given by Singer and Chen (2002) as a reasonable range for recharge into Precambrian bedrock in northern Ontario and is likely attributable to the lower than normal precipitation observed during 2023.

4.5.2.2 UNNAMED WATERCOURSE 8 AND UNNAMED WATERBODY 3

This unnamed watercourse is located in the northern portion of the Project site and flows into Gullrock Lake where it crosses Highway 105. Surficial drainage within this watershed is primarily to the north, toward Gullrock Lake and includes the outflow from Unnamed Waterbody 3 as part of its headwaters. Surficial deposits within this watershed are comprised of a mix of glaciofluvial sands, glacial till and glaciolacustrine deposits. There are three flow monitoring stations on this watercourse, hydrometric station HF-09, located where the creek crosses the highway, monitors surface water discharge from this watershed (Figure 4-3), Station 1 of the Great Bear Resources supplemental flow monitoring program, located on the southern branch of this tributary, where the tributary crosses the hydro corridor, and Station 2 on the northeast branch of this tributary. Standing water with no flow was observed at Station 1 in June and September 2023, although this may not be indicative of typical conditions given the abnormally dry summer. Great Bear Resources supplemental Station 2 is regularly dry indicating that this part of the tributary is ephemeral in nature. The lowest measurable flow in 2024 at Sta 1 was 165 m^3/day. When normalized over the watershed area for HF-09 the 2024 low flow measurement is equivalent to 16.3 mm/yr which could be considered low to reasonable for a watershed with a large component of clay cover (Table 4-5).

The surficial geology of this watershed is similar to that of most of the north flowing watercourses that flow to Gullrock Lake or the Chukuni River. Most of the watershed is underlain by Lake Agassiz glaciolacustrine silts and clays which were deposited in shallow valleys that were extensions of the former glacial lake basin that occupies the low-lying areas to the north. Only the upper reaches of the watershed, along the drainage divide with the Dixie Creek watershed are glaciofluvial or outwash sediments exposed till deposited on areas of bedrock highs. A portion of the watercourse (Unnamed Watercourse 8B), drops over a cascade on bedrock near the transition from glaciofluvial to glaciolacustrine sands and may only flow during wet conditions, leaving the small beaver pond isolated from the rest of the watercourse through much of the year.

The main branch of the Unnamed Watercourse 8 originates in a small pond, Unnamed Waterbody 3, located in an area of coarse glacial deposits, separated from the Genesse Lake watershed by a shallow bedrock high.

4.5.2.3 UNNAMED WATERCOURSE 10

This watercourse is located just outside the Property north of the topographic high ridge that runs in an east-west direction, roughly parallel with Highway 105. Surface drainage in this watershed is to the north, toward Gullrock Lake. The catchment area is comprised of primarily glacial outwash sand deposits in the upper reaches, and Lake Agassiz glaciolacustrine silts and clays in the lower portion of the watershed. Spot flow measurements made by Great Bear Resources staff on three occasions in late spring / early summer and late summer of 2023 (Station 3, Table 4-2), indicated no flow / dry conditions, suggesting that parts of this watercourse may be ephemeral in nature in the upper reaches.

4.5.3 TRIBUTARIES OF THE CHUKUNI RIVER

4.5.3.1 UNNAMED WATERCOURSE 12

Unnamed Watercourse 12 is located outside the Property boundary. Surface drainage in this watershed is to the north toward the Chukuni River, just downstream of the outlet of Two Island Lake. There are numerous active and former beaver dams along this watercourse.

A supplementary monitoring location, Station 4 (Table 4-2), located at the headwaters of this tributary was visited in 2023 and 2024. The creek was frequently observed to be dry at this flow station, indicating that flow in this upper portion of Unnamed Watercourse 12 is ephemeral in nature.

The watercourse occupies a generally flat, low-lying area which is composed of Lake Agassiz glaciolacustrine sediments, although there are areas of exposed bedrock and till, and bedrock glaciofluvial sediments along the catchment boundaries to the east and west respectively. The headwaters of this watercourse have an elevation which is considerably below that of the drainage divide between the Chukuni River and Dixie Creek watersheds in this area to the southwest, reflecting the low gradient of the watercourse itself, and a steep climb to the bedrock-controlled ridge of the watershed divide to the southeast. The drainage divide between this watershed and that of Unnamed Watercourse 6 is much shallower, where there is a gap in bedrock highs.

Within the area of glaciofluvial sediments in the western part of the catchment area, there are several gravel pits off the main access road to the site, along with several small, isolated ponds on the western side of the access road. Similar to Unnamed Waterbody 5, which is another isolated waterbody, these ponds form between a bedrock high to the west and the main esker to the east and have no outlet. The southern most of these ponds, located within the existing transmission line (Hydro One) corridor has formed in a depression, which suggests it is a kettle lake. The approximate elevations of these ponds, from south to north are 398.5 m, 405 m, and 403 m, which like the head waters of Unnamed Watercourse 12, are considerably below the topographic divide between the Chukuni River and Dixie Creek watersheds in this area.

4.5.4 TRIBUTARIES TO DIXIE LAKE

4.5.4.1 UNNAMED WATERCOURSE 11

Unnamed Watercourse 11 is located upstream of Dixie Lake. This watershed h includes the catchments for Unnamed Waterbody 7 as well as Genessee Lake. Hydrometric stations HL-01, located at the inlet to Genessee Lake, and HF-08, located at the outflow of Genessee Lake, are located within the surface watershed of this tributary.

Hydrograph data and figures are provided in Appendix B. Figure B6b, from Appendix B shows the same hydrograph data for HF-08 as is presented in Appendix A, but zoomed in to highlight the low flow periods, indicate that flows observed during the summer months can be quite variable, often dropping to near zero values in 2023. This variability may be related to the drier than normal conditions observed in 2023, or to beaver dams which are present and have allowed the lake level to rise above what it would otherwise be, or to the preliminary nature of the rating curves used to generate the hydrographs. If an average value of the late summer / early fall flow monitoring round from 2023 is assumed to represent the very low flow conditions and is normalized over the watershed area for HF-08 (removing the area of Genessee Lake), this is equivalent to 7.4 mm/yr which is considered low for this watershed.

The watershed divide of this watercourse with Unnamed Watercourse 1 is characterized by a bedrock controlled ridge. Most of the low lying areas downstream of Genesse Lake are underlain by glaciolacustrine sediments, which are an extension of the Lake Agassiz clays found throughout the lower watershed of Dixie Creek, however, the shorelines of Genesse Lake itself are mapped as dominated by glaciofluvial sediments to the south and till to the north.

4.6 SPOT FLOW MEASUREMENT DISCUSSION

Spot flow measurements were used to help quantify groundwater contributions to local surface water features, primarily along the reaches of Dixie Creek close to the site, Unnamed Watercourse 3 and other smaller watercourses at and near the site.

An assessment of relative contributions to flow within Dixie Creek from Dixie Lake to the Tote Road bridge using spot flow measurements taken in a short period of time under low flow conditions during September 2023 (Table 4-4A). During the September 2023 spot flow measurement program, water levels in local surface water features were near to their annual low flow condition (Appendix B) while groundwater levels were close to their annual lows, although in both cases (Appendix D). Flow conditions in Dixie Creek downstream of Dixie Lake during this period were also heavily influenced by a beaver dam located at the outlet of the lake, resulting in an accumulation of water above the dam (Figure B5a), but very limited flow passing through the dam. The area of Dixie Lake and adjacent wetland immediately above the dam is approximately 5.3 km^2, which means for every centimeter increase in the lake level above the beaver dam, 53,000 m^3 of water storage is created. This amount of stored water is equivalent to approximately five days' worth of flow under the 7Q20 condition. Furthermore, this storage effect does not consider that evaporation rate in the summer from a lake (1.75 cm per 5 days in August, from Table 2-2) would exceed the rate of accumulation due to inflows at the 7Q20 rate, meaning the stable water level reported in the lake above the beaver dam would be indicative of a no flow condition for water leaving the lake. Similar effects are expected as a result of smaller beaver dams on smaller watercourses, such as Unnamed Watercourses 3 and 7a, where beaver dams have the potential to store a significant period of low flow of the tributary.

An accurate assessment of gaining and losing conditions along the entire reach could not be made due to the inherent limitations of flow measurement accuracy at low flow conditions, significant interference in flow conditions due to beaver dam activity, and there was also an event on the evening of September 19, 2023 which resulted in a 23 centimeter increase in water levels at the Tote Road station (HF-03) as recorded in the permanent transducer there, which influenced water levels and flows until the afternoon of September 21, including that at DC-2. However, despite these limitations, some broad observations can be made from the results, which are presented graphically in Figure 4-4.

From upstream to downstream the above referenced flow measurements show that overall, flows with Dixie Creek during the monitoring period were very low and measured at 750 m^3/day at the HF-03 flow station. For comparison, the expected flows for the climate conditions experienced in late 2023 from larger reference watersheds using this year's flows would be close to the 7Q20 for the HF-03 station of 10,368 m^3/day. The discrepancy is best explained by the presence of multiple beaver dams along the creek upstream of the is station, and high evapotranspiration rates in the summer. One beaver dam, located downstream of the outlet of Dixie Lake (Photo 2 from the Photolog in Appendix C) likely contributed to most of the flow loss, by causing back up of water levels into Dixie Lake and the surrounding wetlands, where high water losses due to evapotranspiration occurred, accounting for a more than 90% flow loss in the creek. It is very likely that similar flow loss mechanisms were also in effect in the other watercourses with significant beaver activity and wetland flooding such as Unnamed Watercourses 3 and 7A.

One upside of the effective damming of Dixie Creek, is that flows measured downstream of the dam, were low enough to make groundwater inputs more apparent both in flow measurements and in the infrared drone survey conducted in September 2023. Stream flow measurements taken during this period are illustrated in Figure 4-4 for Dixie Creek. During this monitoring event, gains within the creek from the beaver dam to the Tuzyk's Road bridge (HF-03) appear to be largely attributable to flows from unnamed watercourses 2 and 4 (approximately 600 m^3/day) with the difference of 50 m^3/day potentially attributable to groundwater inputs from Dixie Lake to the Tuzyk's Road bridge station (HF-03).

Downstream of the Tote Road bridge, the rocky substrate of the creek prevented accurate measurements at HF-03B and HF-03C, however, flows were measurable at DC-2 on September 20, 2023. The transducer at the HF-03 station records a short-lived water level event at this time, possibly related to a short rain event or beaver dam damage, which would have temporarily increased discharge (Figure 4-4 insert). Using the flow from the rating curve to estimate flows at HF-03 for September 20, 2023 generates a flow estimate of 3,735 m^3/day, which is very similar to the flow measured downstream at DC-2 (Table 4-4A) and indicating that there is no gain or minimal gain in flows between these two stations.

Further downstream, there is a very large increase in flow between DC-2 and the Tote Road bridge of approximately 23,000 m^3/day. An increase between these two locations is largely attributed to a combination of; surface water inflows from Unnamed Watercourse 7, which has a significant catchment area of 113 km^2, surface water inflows from the direction of Unnamed Waterbody 6, and groundwater contributions most likely from the esker at Tote Road itself. The timing of the measurement at HF-01 also indicates that this measurement may have been impacted by the water level increase event on the evening of September 19, however, this is not apparent from the hydrograph for the HF-01 station.

A similar assessment of groundwater contributions to Unnamed Watercourse 3 was made during the same period in 2023 (Table 4-4B) and is presented graphically in Figure 4-5. This analysis indicates that baseflows in Unnamed Watercourse 3, reflective of groundwater inputs are overall low, although how low cannot be determined due to the role of beaver dams blocking flow and pushing water into wetlands where it can evaporate or be captured as ice in winter storage (Table 4-2).

Spot flow measurements, taken as part of the supplemental flow monitoring program, provided in Table 4-2 also indicate that flows observed in Unnamed Watercourses 5, 6A, 6B and 7A-2, and the upper reaches of Unnamed Watercourses 1, 10 and 12 appear to be ephemeral in nature. When comparing the locations of these spot flow measurement locations indicating ephemeral flow conditions to the Quaternary mapping shown on Figure 3-1A, it can be seen that these stations either drain watersheds with a high proportion of glaciolacustrine cover (Unnamed Watercourses 6A, 13 and 5), or are located in the upper, higher elevation reaches of the watercourse where they flow over sandy or till material, suggesting that these reaches seasonally disconnect from the water table during dry or late winter conditions (upper portions of Unnamed Watercourses 1, 3, 6A and 6B, 10, 12, 19 and 20).

Conversely, year-round flowing conditions observed in spot flow measurements in Unnamed Watercourse 2 and Unnamed Watercourse 4 indicate groundwater inputs. These two watercourses originate from the toe of an esker, in a portion of the esker which sits is a relative topographic low, indicating that they receive groundwater inputs from the esker. It is also assumed that the lower reaches of Unnamed Watercourse 1, which is in a similar position also receive significant groundwater inputs (cool water conditions in Unnamed Waterbody 2 are likely also attributable to groundwater inputs).

Recharge estimates made from low flow observations of the smaller unnamed watercourses found at the property are quite variable between watersheds which is partly due the variable conditions between small catchment areas of some of the flow stations, both in terms of geology, presence and number of beaver ponds, and position of the flow station relative to recharge and discharge areas.

4.7 NAMED LAKES

There are a number of lakes that are found within or near the Property. The main lakes of interest are shown on Figure 4-2 and are listed below:

- Gullrock Lake
- Genessee Lake
- Stone Lake
- Dixie Lake
- Hiewall Lake
- Pakwash Lake.

4.7.1 GULLROCK LAKE

Gullrock Lake has a surface area of approximately 6,280 hectares (ha) with a watershed area of approximately 405,000 ha at the lake outlet (HL-02). Gullrock Lake drains to the Chukuni River and water level is controlled by Snowshoe Rapids Dam on the Chukuni River. The average annual water levels from measurements collected between June 2022 to October 2023 from is 355.7 masl.

4.7.2 GENESSEE LAKE

Genessee Lake has a surface area of roughly 181 ha and surface water catchment area of 1,110 ha at the lake outlet. The maximum recorded depth was 11 m and average depth was 4 m. Beaver activity has been observed at the lake outlet with the lake level being approximately 2 m higher than the downstream wetland area and creek due to the presence of a large beaver dam. Lake levels could drop should the beaver dam experience a breach. The average water level for the monitoring period from June 2022 to October 2023 is 379.32 masl with a maximum recorded elevation of 379.42 masl and minimum recorded elevation of 379.23 masl. Genessee Lake drains to Dixie Lake via Unnamed Watercourse 11.

4.7.3 DIXIE LAKE

Dixie Lake has a surface area of approximately 345 ha with a watershed area of approximately 18,677 ha at the lake outlet (HF-07). Beaver activity at the lake outlet and downstream of it influences the water level within the lake, and from May 2023, through late 2023, water levels in the lake rose by approximately 0.8 m in response to the development of a beaver dam at the lake outlet (see Dixie Lake hydrograph, Appendix C). The average water level for the monitoring period from June 2022 to October 2023 is 26.55 m with a maximum recorded elevation of 26.88 m (0.33 m above the average water level and 0.69 m the minimum) and minimum recorded elevation of 26.19 m (0.36 m below the average). Lake levels are relative to a local datum. One elevation has been surveyed at the lake on July 18, 2023, which placed the lake level at 351.96 masl.

4.7.4 STONE LAKE

Stone Lake has a surface area of approximately 225 hectares (ha) with a watershed area of approximately 4,098 ha at the lake outlet (HF-10). The flow from Stone Lake feeds into Gullrock Lake via Stone Creek. The average water level of Stone Lake for the monitoring period from June 2022 to October 2023 is 367.81 masl with a maximum recorded elevation of 368.19 masl and minimum recorded elevation of 367.70 masl.

4.7.5 PAKWASH LAKE

Pakwash Lake has a watershed area 8,020 km^2 and receives flow from the Chukuni River (watershed area 4,801 km^2; including Dixie Creek), Trout Lake River (watershed area 3,021 km^2), Lac Seul (watershed area 38,969 km^2) and Cedar River (1,743 km^2). Pakwash Lake discharges into the English River system. Pakwash Lake water levels are controlled by the Lake of the Woods Control Board.

4.7.6 HIEWALL LAKE

Hiewall lake is located at the headwaters of Unnamed Watercourse 7a, approximately 800 m south of Dixie Lake, at an elevation of about 348 masl, which is about 3 m lower than the elevation of Dixie Lake based on LiDAR data. The lake, along with most of the Unnamed Watercourse 7A catchment is mapped as underlain by glacial Lake Agassiz silts and clays, and what is likely a bedrock ridge between the two watersheds.

4.8 GROUNDWATER RECHARGE

Groundwater recharge for the area is generally highest during the spring freshest and late fall, when rainfall / snowmelt peak and evapotranspiration is reduced, and is typically focused on locations where the landscape is favourable (i.e., flat to gently sloping, minimal interception / transpiration yet shaded from evaporation, permeable soil with a deep water table).

A common approximation of groundwater recharge for a given watershed equates the baseflow to groundwater recharge (Jassas and Merkel 2014). On the regional scale of the Chukuni River watershed, recharge can be estimated from the long term baseflow data which has been complied for the Chukuni River near Ears Falls hydrometric station (station ID: 05QC001). Historical daily data from 1990 to 2020 are shown on Appendix B. It should be noted that a flow-regulated dam is located approximately 9 km upstream of the Ear Falls station and, as such, the timing / magnitude of flows is affected by dam operation.

Average calculated baseflow for the Chukuni River based on the historical data ranges from 7.4 to 14.4 m^3/s (depending on the separation method). Normalizing this to the gross drainage area of 4,360 km^2 yields a long-term average groundwater recharge values ranging from 54 to 107 mm/year, with seasonal values spanning a much broader range. These range agrees with the recharge estimate of

51 mm/yr which is obtained by normalizing the average minimum annual 7-day average low flow for station 05QC001 over the period of 1964 to 2021 (i.e. average of values of Chukuni River near Ear Falls (05CQC001) minimum annual 7-day average flow values shown in WSP 2024d).

At the scale of the Dixie Creek watershed, recharge can be estimated from the flow data collected at the HF-01 hydrometric station located on the Dixie Creek at Tote Road. HF-01 hydrograph, provided in Appendix B, zoomed in to illustrate the low-flow conditions, as is shown on Figure B1a and Figure B1b of Appendix B. The lowest observed flows at this monitoring station occur during the late summer, early fall period and are roughly 26,000 m^3/day from 2023 (Table 4-3). When normalized over the catchment area of 357 km^2 for this watershed this represents a low recharge of about 27.1 mm/yr which is inconsistent with the estimates obtained for the complete Chukuni River watershed, and likely due to the difference in seasonal conditions between the two datasets. This value represents an average recharge rate across the entire Dixie Creek watershed which has several different types of surficial deposits, and it is anticipated that some of these, such as the glaciofluvial sands will have a higher recharge rate, while others, such as the glaciolacustrine clays will be lower.

Recharge estimates can be obtained from low flow data collected over watersheds that are composed of primarily glaciolacustrine clays or bedrock, such as that of Dixie Lake (HF-07). The watershed area of Dixie Lake at its outflow is approximately 187 km^2 and is largely made up of glaciolacustrine deposits, Hydrograph for HF-07, zoomed in to show low flows, is shown on Figure B5b (provided in Appendix B) and indicates a low flow rate of about 6,000 m^3/day in 2023 (preceding the spring freshet and before significant beaver activity was noted) translates to an annual recharge rate of 11.8 mm/yr when normalized over the watershed area. This value is exceeds to that calculated for Unnamed Watercourse 3 (HF-04).

While base flow measurements theoretically provide an indication of groundwater recharge, as suggested, that estimates from this method may be affected by evapotranspiration at the discharge location. This is likely particularly the case at locations affected by beaver activity with upstream shallow and dispersed pools, wetlands, or larger lakes. As such, groundwater recharge estimates from base flow measurements acquired during the peak of the dry season likely represent lower-bound estimates of the average groundwater recharge rate.

Table 4-1: Continuously Monitored Hydrometric stations

Station ID	Description	Station Parameters	Watershed Area (km^2)	Surveyed water level summer 2023 (masl)
HF-01	Dixie Creek at Tote Road	Level, Flow	357	346.3
HF-02	Unnamed Waterbody 6 Outflow above Dixie Creek	Level, Flow	15	348.3
HF-03	Dixie Creek Upstream of Unnamed Watercourse 3	Level, Flow	201	351.8
HF-04	Unnamed Watercourse 3	Level, Flow	9	351.7
HF-06	Unnamed Waterbody 2 Outflow	Level, Flow	8	≈378
HF-07	Dixie Lake Outflow	Level, Flow	186	351.5
HF-08	Genessee Lake Outflow	Level, Flow	11	379.3
HF-09	Unnamed Watercourse 8	Level, Flow	5.3	-
HF-10	Stone Lake Outflow	Level, Flow	41	367.8
HL-01	Genessee Lake	Level	10	379.3
HL-02	Gullrock Lake	Level	4,049	355.7
HL-03	Chukuni River Upstream of Dixie Creek	Level	4,396	-
HL-06N	Unnamed Waterbody 1	Level	8	379.1

Table 4-2: Supplemental Flow Measurements from Great Bear Resources Field Program[1]

Station ID	Flow monitoring station[1]	Spot flow measurement (m^3/day) or observation and date/week observations taken[2]													
		17-May-23	01-Jun-23	08-Jun-23	17-Jun-23	23-Jun-23	02-Jul-23	08-Jul-23	15-Jul-23	21-Jul-23	29-Jul-23	11-Aug-23	18-Aug-23	13-Sep-23	24-Sep-23
1	Hwy 105 at Unnamed Watercourse 8	-	No Flow	-	-	-	-	-	-	-	-	-	-	No to minimal Flow	-
2	Hwy 105 at Unnamed Watercourse 8[3]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Hwy 105 at Unnamed Watercourse 10	-	No Flow	-	-	-	-	-	-	-	-	-	-	DRY	-
4	Hwy 105 at Unnamed Watercourse 12	-	754	-	-	-	-	-	-	-	-	-	-	DRY	-
5	Unnamed Watercourse 1 1B-03	-	-	-	8	-	-	-	-	-	-	-	-	DRY (downstream of beaver pond)	-
6	Coincident with HF-06	2,678	1,469	864	766	2,610	173	49	28	28	605	247	221	Standing water	69
7	Unnamed Watercourse 3B	-	-	401	-	-	-	-	-	-	-	-	-	-	-
8	Unnamed Watercourse 6B	-	-	No Flow	-	-	-	-	-	-	-	-	-	Minimal flow, swampy	-
9	Unnamed Watercourse 6A	-	-	409	-	-	-	-	-	-	-	-	-	Light flow	147
10	Unnamed Watercourse 6A, upstream of 6A-01	-	-	No Flow	-	-	-	-	-	-	-	-	-	DRY	-
11	Unnamed Watercourse 3A	-	-	162	-	-	-	-	-	-	-	-	-	n/a	9
12	Unnamed Watercourse 3A branch b	-	-	96	-	-	-	-	-	-	-	-	-	DRY (puddles only)	-
13	Unnamed Watercourse 3B	-	-	1,164	-	-	-	-	-	-	-	-	-	Light flow	60
14	Unnamed Watercourse 3D	-	-	221	-	-	-	-	-	-	-	-	-	DRY (muddy)	-
15	Unnamed Watercourse 3 (downstream of HF-04)	5,270	-	n/a	354	489	303	14	29	13	3	111	5	n/a	726
16	Intermittent stream valley between Unnamed Watercourses 3 and 2 3	-	-	DRY	-	-	-	-	-	-	-	-	-	DRY	-
17	Unnamed Watercourse 4	-	259	-	-	-	-	-	-	-	-	-	-	18	397
18	Unnamed Watercourse 2	-	-	106	-	-	-	-	-	-	-	-	-	148	181
19	Unnamed Watercourse 13	-	-	144	-	-	-	-	-	-	-	-	-	Standing water only	-
20	Unnamed Watercourse 5	-	253	-	-	-	-	-	-	-	-	-	-	Low water, backflow	-
21	Unnamed Watercourse 7A-07	-	-	241	-	-	-	-	-	-	-	-	-	Standing water	-

Notes:

1 Station locations shown on Figure 4-3. Includes some measurements by WSP staff, where taken at the same flow station.
2 "-" indicates station not visited. Date taken from near mid program.
3 Culvert at this location no longer exists, and station is not monitored.
4 No flow due to beaver dam.
5 Flow observed to be influenced by beaver dam, impacting accuracy of flow estimate.
Rain Indicates measurement noted as taken after rainfall
A indicates significant algae growth on stagnant water
WL Water level height observed at staff gauge

Table 4-2, continued: Supplemental Flow Measurements from Great Bear Resources Field Program

Station ID	Flow monitoring station[1]	Spot flow measurement (m^3/day) or observation and date/week observations taken[2]																
		24-Feb-24	10-June-24	17-June - 24	1-July-24	8-July-24	16-July-24	20-July-24	26-July-24	2-Aug-24	13-Aug-24	30-Aug-24	7-Sept-24	14-Sept-24	22-Sept-24	28-Sept-24	5-Oct-24	11-Oct-24
1	Hwy 105 at Unnamed Watercourse 8	-	339	1504	7788	1082	1357	2004	-	-	-	462.6	1171	165.1	1653	655.3	538.8	218.5
3	Hwy 105 at Unnamed Watercourse 10	-	-	224	148	6.6	33.8	11.3	-	-	-	-	0 DRY	0 DRY	-	37.8	0	0 Dry sections
4	Hwy 105 at Unnamed Watercourse 12	Frozen to bottom	-	555	574	547	354	391[Rain]	-	-	0	73.96	0	0 DRY	43.2	0 DRY	0 DRY	0 DRY
5	Unnamed Watercourse 1 1B-03	-	-	3297	1184	216	42.3	368	-	-	-	-	136.9	43.3	-	506.1	-	-
6	Coincident with HF-06	-	36926	7396	6750	5317	2473	2010	1653	-	-	-	352	-	8176	-	-	-
7	Unnamed Watercourse 3B	-	-	2698	1213	265	359	175	-	-	-	-	30.5	29.4	2168	-	-	-
8	Unnamed Watercourse 6B	-	578	1114	no flow[4]	115[5]	85	164	-	-	-	-	0[A]	-	62.6	-	-	-
9	Unnamed Watercourse 6A	-	856	1970	422.6	95.3	60	0	-	-	-	-	30.9	-	844	-	-	-
10	Unnamed Watercourse 6A, upstream of 6A-01	-	-	1511	258.6	1020	100	16.5	-	-	-	-	18.5	7.7	969	-	74.1	-
11	Unnamed Watercourse 3A	-	-	2464	3451	711	244	121.3	-	-	-	-	100.4	0	2336	-	-	-
12	Unnamed Watercourse 3A branch b	-	-	198	306.8	121	14.9	0	0	-	-	-	0	0	1205	-	-	-
13	Unnamed Watercourse 3B	-	-	1418	1329	785	284.1	187.5		-	-	-	28.9	38.1	1137	-	-	-
14	Unnamed Watercourse 3D	-	-	51	21.2	14	14.5	0	0[A]	-	-	-	0[A]	0	66.4	-	-	-
15	Unnamed Watercourse 3 (downstream of HF-04)	-	41000	26,174	4904	5951	482.9	282.4	-	-	-	-	109.7	58.6	4953	-	-	-
16	Intermittent stream valley between Unnamed Watercourses 3 and 2 3	-	-	29	40.2	13.1	16.8	36.5	-	-	-	-	0 Dry sections	0 Dry sections	267	-	-	-
17	Unnamed Watercourse 4	-	449	520	558.7	642	240.6	1046	-	-	-	-	229.4	295.2	967	-	-	-
18	Unnamed Watercourse 2	-	281	210	208.3	354	165.6	755.5	-	194.2	-	-	237.8	141.6	77.5	-	-	-
19	Unnamed Watercourse 13	-	-	220	531.4	608	40.1	No flow	0.17	53.7	38.0	0	11.0	0	609	-	0	0
20	Unnamed Watercourse 5	-	-	820	813.7	1526	360.8	108.8	1.4	-	310	40.0	45.7	0	2286	142.3	0	49.9
21	Unnamed Watercourse 7A-07	-	-	133	97.3	322	0	35.1	0	-	80.5	61.5	0	0 Dry sections	519	-	0	0[4]
17SG	Staff gauge WL at Station 17 (cm)	-		-	-	-	21 cm	28 cm	-	-	-	-	-	165.1	-	-	-	-
18SG	Staff gauge WL at Station 18 (cm)	-		-	-	-	-	18 ca	-	-	-	-	-	-	-	-	-	-
19SG	Staff gauge WL at Station 19 (cm)	-		-	-	-	16 cm	9 cm	-	-	-	-	-	-	-	-	-	-
20SG	Staff gauge WL at Station 20 (cm)	-		-	-	-	16 cm	13 cm	-	-	-	-	-	8 cm	-	-	-	-
21SG	Staff gauge WL at Station 20 (cm)	-		-	-	-	-	46 cm	-	-	-	-	-	46 cm	-	-	-	-

Table 4-3: Spot Flow Measurements by WSP staff for Hydrometric Stations near the Project

Flow Station	Date and Time	Surveyed water level (masl)	Calculated discharge (m^3/day)	Notes
HF-01 Tote Road Bridge	6/1/22 11:13	348.42	636,371	
	7/13/22 17:15	347.32	326,428	
	9/20/22 11:50	346.51	114,100	
	2/9/23 13:00	346.49	48,108	Under Ice
	3/14/23 11:40	346.37	29,100	Under Ice
	6/14/23 18:18	346.34	50,570	
	7/28/23 18:35	346.33	70,969	
	9/20/23 18:00	346.27	26,473	
	10/20/23 12:45	346.34	33,057	
	3/11/24 15:55	346.23	39,813	Under Ice
	6/5/24 10:45	346.92	1,018,431	
	6/12/24 12:30	346.76	621,121	
	8/13/24 10:40	346.43	139,800	
	10/7/24 10:52	346.40	103,000	
	2/16/25 12:30	346.50	60,800	
	5/13/25 9:51	346.49	n/a	
HF-02A	6/9/24 16:20	n/a	855	
	8/12/24 14:20	n/a	155	
	10/7/24 12:45	n/a	8.6	
	5/16/25 13:12	n/a	166	
HF-02B	6/10/24 11:36	n/a	579	
	10/7/24 13:25	n/a	26	
HF-03 Tuzyk's Road Bridge	5/31/22 15:00	352.48	461,454	
	7/12/22 12:00	352.05	103,965	
	8/17/22 16:00	352.24	232,701	
	9/20/22 14:05	352.02	65,128	
	2/8/23 17:15	352.04	34,232	Under Ice
	3/12/23 11:45	351.95	18,987	Under Ice
	6/17/23 12:00	351.73	2,402	
	7/25/23 15:25	351.87	2,065	
	9/25/23 11:00	351.71	726	
	10/20/23 10:02	351.91	2,497	
	3/9/24 14:00	352.00	33,532	Under Ice
	6/5/24 13:20	352.48	497,362	
	8/13/24 16:08	352.00	71,600	
	10/9/24 13:07	351.94	49,000	
	2/17/25 12:30	352.08	45,600	
	5/13/25 11:15	352.23	n/a	

Flow Station	Date and Time	Surveyed water level (masl)	Calculated discharge (m^3/day)	Notes
HF-04 Unnamed Watercourse 3	6/4/22 14:00	351.93	7,655	
	7/16/22 10:30	351.71	847	
	8/16/22 15:00	351.74	1,123	
	9/19/22 17:00	351.71	225	
	2/9/23 15:00	351.77	69	
	3/11/23 10:00	n/a	0	No flow, frozen.
	6/17/23 12:30	351.76	346	
	7/25/23 17:15	351.70	3	
	9/19/23 10:37	351.70	7	
	10/22/23 12:15	351.82	1,227	
	3/9/24 14:39	n/a	0	No flow, frozen.
	6/5/24 16:35	352.32	41,040	
	8/13/24 14:24	351.76	994	
	10/6/24 13:15	351.82	276	
	5/13/25 12:42	351.92	4780	
HF-06 Unnamed Waterbody 1 outflow	6/1/22 18:00	379.43	9,310	
	7/13/22 14:15	379.287	2,940	
	8/18/22 9:45	379.23	1,823	
	9/19/22 13:45	379.15	397	
	2/10/23 14:55	379.11	11	
	3/12/23 14:45	379.08	0	No flowing water.
	6/16/23 10:45	379.18	780	
	7/29/23 13:00	379.14	596	
	9/20/23 9:20	379.09	69	
	10/23/23 10:00	379.15	820	
	3/12/24 11:40	379.13	0	Frozen, no flow
	6/5/24 14:55	379.60	36,927	
	8/14/24 10:40	379.27	5,900	
	10/6/24 14:15	379.18	1,685	
	2/14/25 15:00	379.13	n/a	
	5/13/25 17:00	379.33	5,750	
HF-07 Dixie Lake outflow	6/2/2022 13:11	n/a	446,600	
	7/15/22 16:30	n/a	69,457	
	8/17/22 10:30	n/a	212,250	
	9/22/22 14:27	n/a	56,700	
	6/16/23 13:50	n/a	3,473	
	7/26/23 17:30	n/a	11,500	

Flow Station	Date and Time	Surveyed water level (masl)	Calculated discharge (m^3/day)	Notes
	9/21/23 14:05	n/a	2,972	
	10/21/23 12:56	n/a	5,910	
	6/8/24 13:00	n/a	452,320	
	8/11/24 10:25	n/a	61,740	
	10/8/24 14:41	n/a	37,960	
HF-08 Genessee Lake outflow	6/3/22 11:55	n/a	14,325	
	7/15/22 11:15	n/a	n/a	
	8/19/22 10:59	n/a	95	
	9/21/22 16:00	n/a	17.3	
	3/13/23 15:35	n/a	1,410	
	6/16/23 17:20	n/a	39	
	7/27/23 9:30	n/a	285	
	9/22/23 9:50	n/a	8.6	
	10/21/23 16:04	n/a	9,900	
	6/11/24 14:30	n/a	12,700	
	8/14/24 9:24	n/a	2,580	
	10/10/24 9:40	n/a	855	
	2/16/25 15:45	n/a	0.0	
	5/17/25 10:09	n/a	910	
HF-09 Unnamed Watercourse 8	9/25/23 15:40	n/a	190	
	10/20/23 14:52	n/a	605	
	3/11/24 9:52	n/a	1,685	
	6/6/24 9:30	n/a	1,201	
	8/11/24 17:31	n/a	1,045	
	2/15/25 12:50	n/a	899	
	5/17/2025	n/a	0	No flow present
HF-11 Unnamed Watercourse 7A	6/9/24 12:30	n/a	n/a	
	6/12/24 10:18	n/a	79,782	
	8/13/24 13:29	n/a	5,279	
	10/10/24 13:00	n/a	n/a	
	2/14/25 7:12	n/a	55,443	
	5/17/25 12:56	n/a	n/a	

Table 4-4A: September 2023 Low Flow Measurement Data from Dixie Creek

Monitoring Location(1)	Station Description	Date (2023)	Flow (m^3/day)
HF-07	Downstream of Dixie Lake (Photo 1 in Appendix B)	September 21	2,970
Sta 19	Flow from Unnamed Watercourse (UWC) 13 to Dixie Creek	September 13	0
HF-06	Flow from UWC 1 towards Dixie Creek (Photo 3)	September 20	69
HF-07B	Downstream of Large Beaver Dam and HF-07 (Photo 2)	September 21	104
Station 18	Unnamed Watercourse 2 to Dixie Creek (Photo 6)	September 24	181
Station 20	Flow from UWC 5 to Dixie Creek	September 13	0
Station 17	Unnamed Watercourse 4 to Dixie Creek (Photo 8)	September 24	397
Station 16	Minor tributary to Dixie Creek	September 13	0 (dry)
DC-01	Upstream of HF-03 on Dixie Creek (Photo 7)	September 20	484
HF-03	Tuzyk's Bridge (Photo 9)	September 25	751
		September 20 (estimate from rating curve) 3	3,735
HF-03B	Downstream of HF-03 and upstream of first riffle on Dixie Creek (Photo 10)	September 25	52(2)
HF-03C	Downstream of first riffles on Dixie Creek and Upstream of DC-02 (Photo 15)	September 25	259(2)
HF-04/ Sta 15	Flow contribution from Unnamed Watercourse 3	September 19 /September 22	6.9 /726
DC-02	Downstream of HF-04 (UWC 3) and riffles on Dixie Creek (Photo 20)	September 20	3,283
HF-02	Outlet of Unnamed Waterbody 6	September 22	0 (too low to measure)
HF-01	Tote Road Bridge (approximately 5 km downstream of site)	September 20	26,500

Notes:

1 Station locations shown on Figure 4-3.
2 Rocky stream section. May underestimate flow through stones in base of creek.
3 Estimate from rating curve taken at same time of day as DC-2 measurement.

Precipitation data measured at onsite met station leading to September 2023 flow measurements as are follows:

- No precipitation (<0.2 mm in one day), September 16 to evening of 21.
- 10.9 mm overnight evening of September 21.
- No precipitation (<0.2 mm in one day), from evening of September 21 to morning of September 24.
- 1.2 mm morning of September 24.

Table 4-4B: September 2023 Flow Measurement Data on Unnamed Watercourse 3

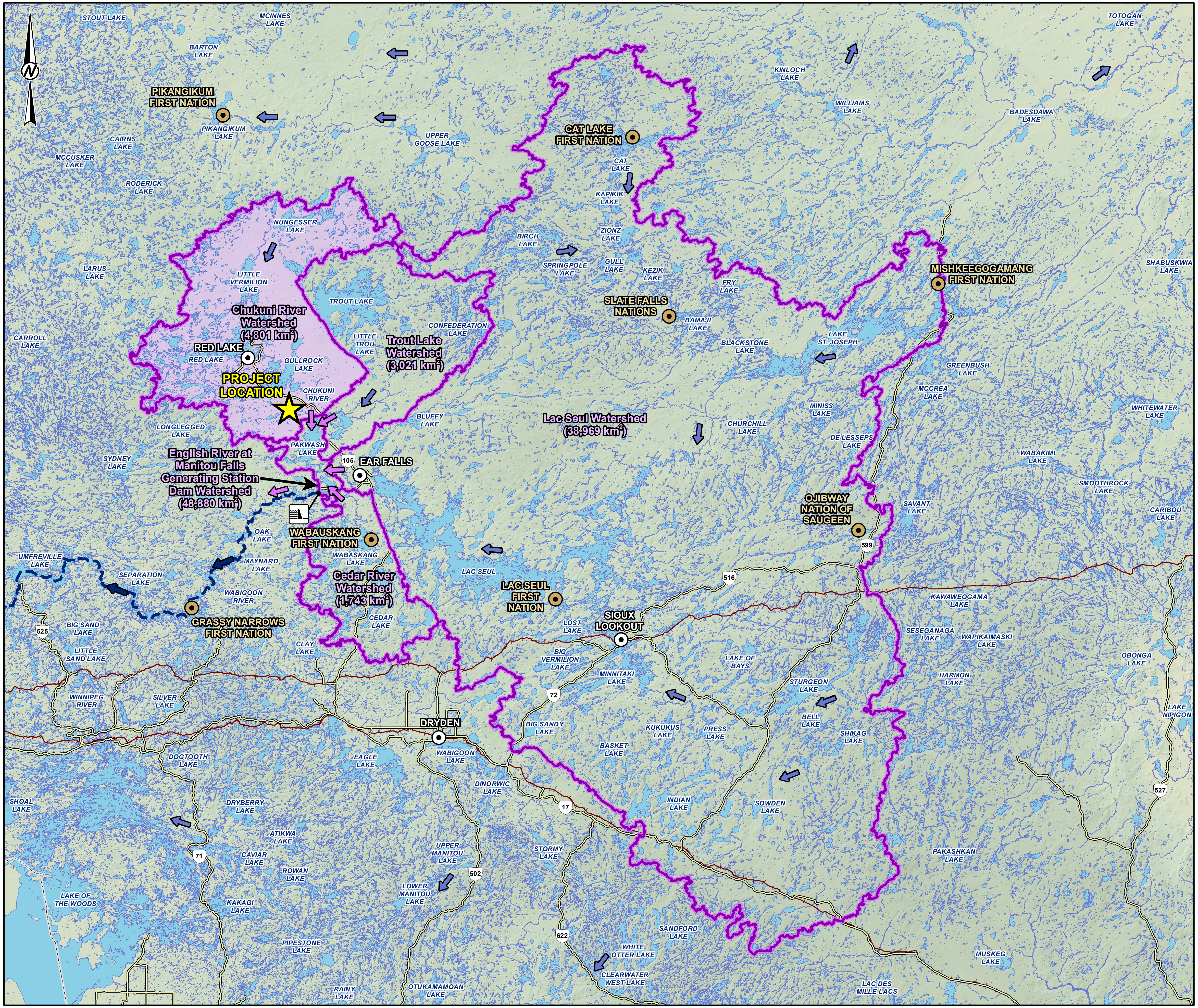
Monitoring Location	Station Description	Date (2023)	Flow (m^3/day)
LF-03/Sta 11	Upstream on Unnamed Watercourse 3 (adjacent to Station #11)	September 24	9
LF-02/Sta 12	Minor tributary of Unnamed Watercourse 3 (Photo 22 in Appendix B)	September 13	0 (Dry)
LF-01/Sta 13	Unnamed Watercourse to Unnamed Watercourse 3 (adjacent to Station #13) (Photo 21)	September 24	60
Sta 14	Minor Tributary of Unnamed Watercourse 3	September 13	0 (Dry)
HF-04/ Sta 15	Flow contribution from Unnamed Watercourse 3 (Photo 19)	September 19 /September 22	6.9 /726

Table 4-5: Estimation of per unit area Water Contribution from Average and Low Flow Measurements

Station	Low flow observations (m^3/day)	Year of low flow observation	Contributing area (km^2) to flow station[1]	Contributing area made of wetlands or lakes[1] (km^2)	Equivalent contribution on per unit area basis (mm/year)
HF-03 (Dixie Creek)	47,156	Monthly Mean flows in March (WSP 2024d)	201.5	45.9 (23%)	85.4
	10,368	7Q20 (WSP, 2024d)			18.8
	18,987	2022 under ice			34.4
	33,532	2023 under ice			60.7
	725	2023 dry conditions			1.3
HF-01 (Dixie Creek)	29,100	2022 under ice	357.2	91.7 (26%)	29.7
	39,813	2023 under ice			40.7
	26,500	2023 dry conditions			27.1
Sta 6/HF-06 (UWC 1)	100	2023 dry conditions	8.05	2.25 (28%)	4.6
	350	2024			15.9
Sta 18 (UWC 2)	18	2023 dry conditions	0.27	n/a	24.3
	195	2024			263.6
Sta 17 (UWC 4)	148	2023 dry conditions	0.80	n/a	67.5
	295	2024			134.6
Sta 19 (UWC 13)	0	2023 dry conditions and 2024	Not calculated	Not calculated	0
Sta 20 (UWC 5)	0	2023 dry conditions and 2024	Not calculated	Not calculated	0
Sta 15/HF-04 (UWC 3)	2.5	2023 dry conditions	9.41	1.64 (17%)	0.1
	58.6	2024			2.3
Sta 11 (UWC 3E)	9	2023 dry conditions	Not calculated	Not calculated	n/a
	0	2024			
Sta 12 (UWC 3A)	0	2023 dry conditions and 2024	Not calculated	Not calculated	0
Sta 13 (UWC 3B)	60	2023 dry conditions	2.78	Not calculated	7.9
	28.1	2024			3.9
Sta 14 (UWC 3)	0	2023 dry conditions and 2024	Not calculated	Not calculated	0
Sta 7 (UWC 3B)	29.4	2024	Not calculated	Not calculated	n/a
Sta 8 (UWC 6B)	0	2023 dry conditions and 2024	1.85	n/a	0
Sta 9 (UWC 6A	0	2023 dry conditions	1.34	n/a	0
	30.9	2024			8.4
Sta 10 (UWC 6A)	0	2023 dry conditions	Not calculated	Not calculated	n/a
	7.7	2024			
HF-11 (UWC 7A)	n/a	n/a	41.1	n/a	n/a
Sta 01 (UWC 8)	n/a	2023 dry conditions	1.34	n/a	n/a
	165.1	2024			16.3
HF-09 (UWC 8)	n/a	2024	5.34	n/a	n/a
Sta 04 (UWC 12)	0	2023 dry conditions and 2024	Not calculated	Not calculated	0

Notes:

1 Calculated using Ontario Watershed Information Tool



LEGEND

- PROJECT LOCATION
- FIRST NATION RESERVE
- TOWN
- MANITOU FALLS GENERATING STATION
- CHUKUNI RIVER WATERSHED
- OTHER WATERSHED
- APPROXIMATE FLOW DIRECTION OF THE ENGLISH RIVER SYSTEM
- HIGHWAY
- RAILWAY
- NATIONAL BOUNDARY
- WATERSHED OUTLET
- FLOW DIRECTION

0 12.5 25 50
1:1,400,000 KILOMETRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE – ONTARIO
2. WATERSHEDS DELINEATED USING ONTARIO WATERSHED INFORMATION TOOL (MNRF).
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

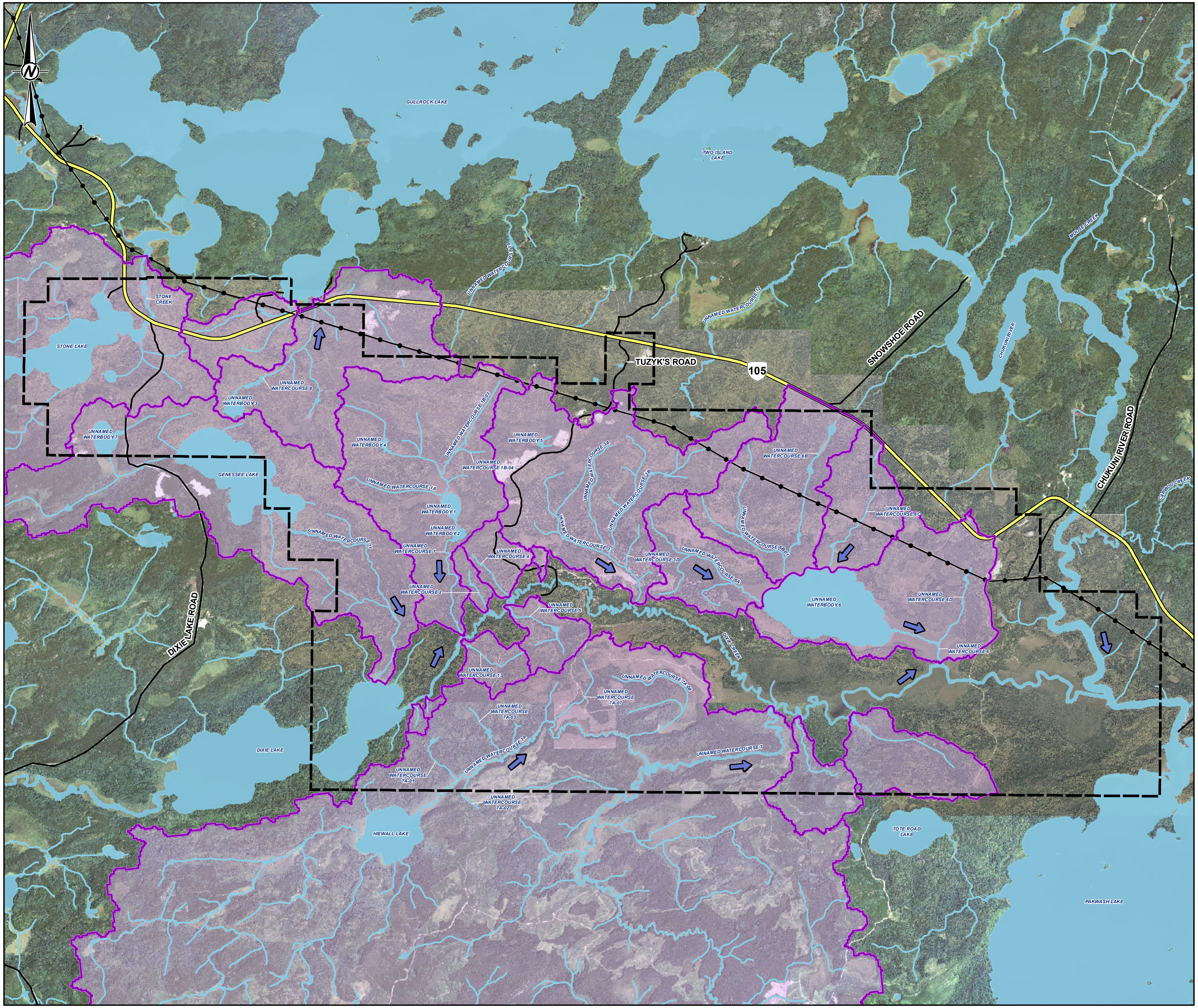
TITLE
REGIONAL WATERSHED AREAS

CONSULTANT
wsp

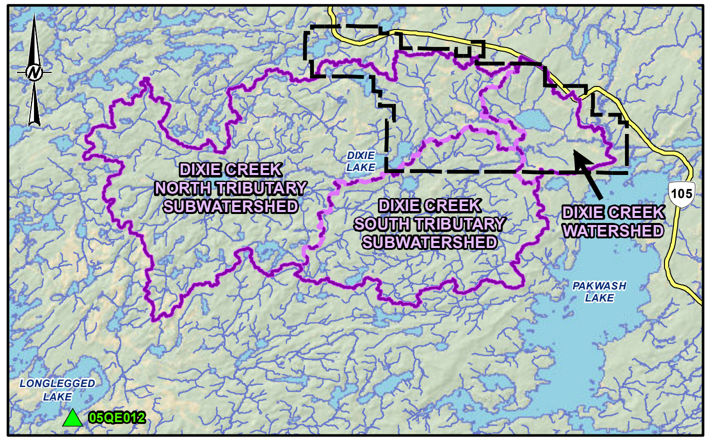
YYYY-MM-DD	2024-11-21
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
OMEMA2303	0001	A	4-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B



KEY MAP



SCALE 1:485,000

LEGEND

- PROPERTY BOUNDARY
- HYDROMETRIC STATION
- PROPERTY SUBCATCHMENT
- DIXIE CREEK SUBWATERSHED
- DIXIE CREEK WATERSHED
- HIGHWAY
- LOCAL ROAD
- EXISTING TRANSMISSION LINE
- WATERCOURSE
- WATERBODY
- FLOW DIRECTION

0 1 2 4

1:70,000 KILOMETRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. AERIAL IMAGERY PROVIDED BY KINROSS (SCENE DATE: SEPTEMBER 2022).
3. PROPERTY BOUNDARY PROVIDED BY KINROSS, AUGUST 2024.
4. ROADS INFORMATION PROVIDED BY KINROSS, AUGUST 2022.
5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

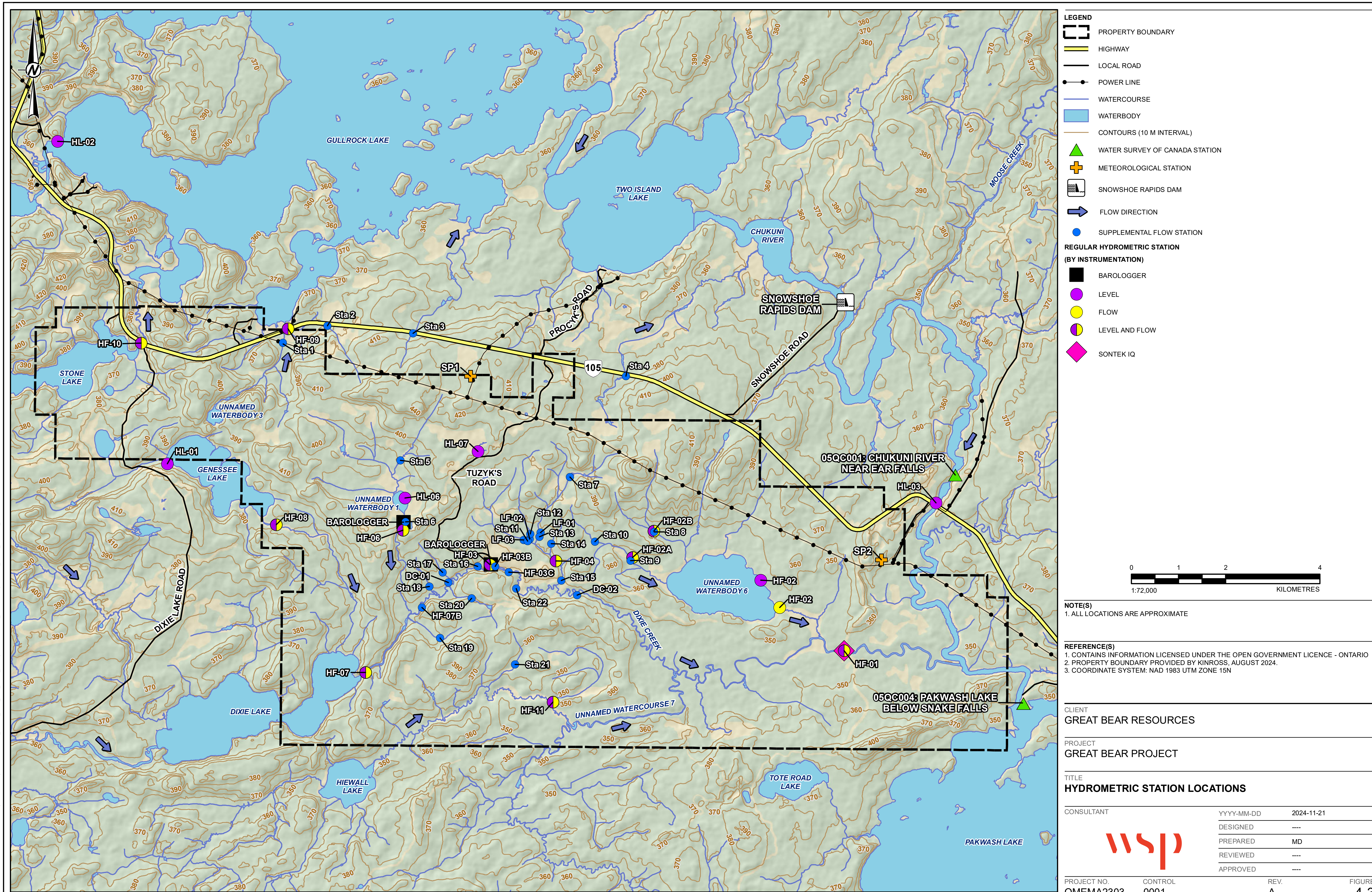
TITLE
LOCAL WATERSHED AREAS

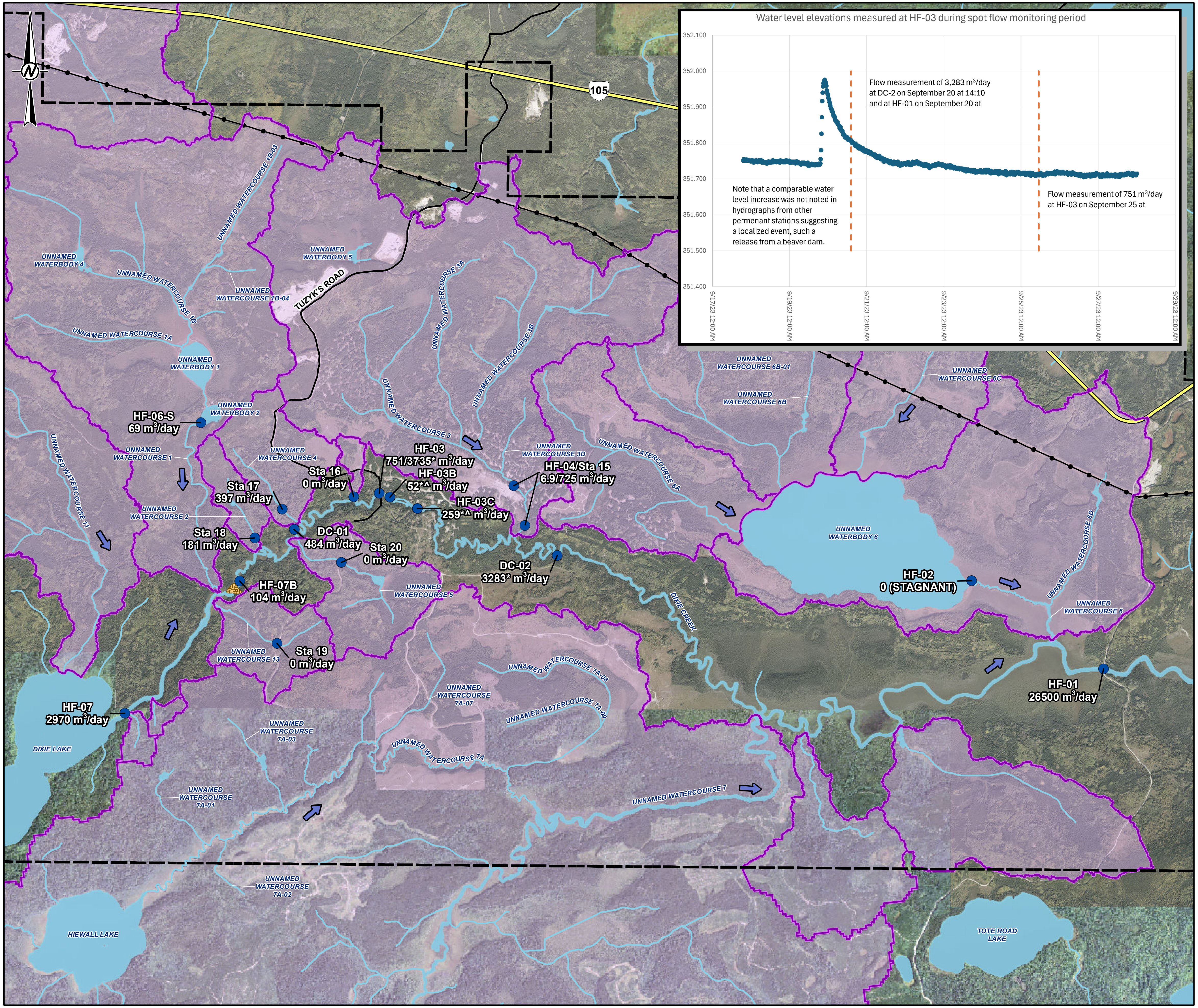
CONSULTANT

wsp

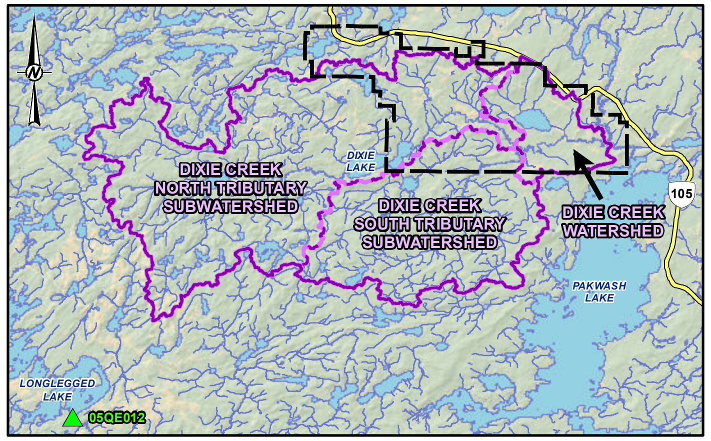
YYYY-MM-DD	2024-11-21
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
OMEMA2303	0001	A	4-2


LEGEND
PROPERTY BOUNDARY
HIGHWAY
LOCAL ROAD
POWER LINE
WATERCOURSE
WATERBODY
CONTOURS (10 M INTERVAL)
WATER SURVEY OF CANADA STATION
METEOROLOGICAL STATION
SNOWSHOE RAPIDS DAM
FLOW DIRECTION
SUPPLEMENTAL FLOW STATION
REGULAR HYDROMETRIC STATION (BY INSTRUMENTATION)
BAROLOGGER
LEVEL
FLOW
LEVEL AND FLOW
SONTEK IQ
GULLROCK LAKE
TWO ISLAND LAKE
CHUKUNI RIVER
MOOSE CREEK
STONE LAKE
UNNAMED WATERBODY 3
GENESSEE LAKE
UNNAMED WATERBODY 1
UNNAMED WATERBODY 6
DIXIE LAKE
DIXIE LAKE ROAD
DIXIE CREEK
HIEWALL LAKE
TOTE ROAD LAKE
PAKWASH LAKE
UNNAMED WATERCOURSE 7
PROCYK'S ROAD
SNOWSHOE ROAD
TUZYK'S ROAD
SNOWSHOE RAPIDS DAM
105
05QC001: CHUKUNI RIVER NEAR EAR FALLS
05QC004: PAKWASH LAKE BELOW SNAKE FALLS
HL-01
HL-02
HL-03
HL-06
HL-07
HF-01
HF-02
HF-02A
HF-02B
HF-03
HF-03B
HF-03C
HF-04
HF-06
HF-07
HF-07B
HF-08
HF-09
HF-10
HF-11
LF-01
LF-02
LF-03
DC-01
DC-02
SP1
SP2
BAROLOGGER
Sta 1
Sta 2
Sta 3
Sta 4
Sta 5
Sta 6
Sta 7
Sta 8
Sta 9
Sta 10
Sta 11
Sta 12
Sta 13
Sta 14
Sta 15
Sta 16
Sta 17
Sta 18
Sta 19
Sta 20
Sta 21
Sta 22
0 1 2 4
1:72,000
KILOMETRES
NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE
REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. PROPERTY BOUNDARY PROVIDED BY KINROSS, AUGUST 2024.
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N
CLIENT
GREAT BEAR RESOURCES
PROJECT
GREAT BEAR PROJECT
TITLE
HYDROMETRIC STATION LOCATIONS
CONSULTANT
YYYY-MM-DD 2024-11-21
DESIGNED ----
PREPARED MD
REVIEWED ----
APPROVED ----
PROJECT NO. OMEMA2303
CONTROL 0001
REV. A
FIGURE 4-3
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B



KEY MAP



SCALE 1:485,000

LEGEND

- PROPERTY BOUNDARY
- SPOT FLOW MEASUREMENT (SEPTEMBER 2023, VERY LOW FLOW CONDITIONS, EXCEPT FOR MEASUREMENTS TAKEN ON SEPTEMBER 20 FROM HF-03 TO DC-2 AT HIGHER FLOWS, INDICATED BY *. ^ INDICATES MEASUREMENT IMPACTED BY FLOW THROUGH BLOUDER SUBSTRATE, UNDERESTIMATING FLOW)
- LARGE BEAVER DAM
- HYDROMETRIC STATION
- PROPERTY SUBCATCHMENT
- DIXIE CREEK SUBWATERSHED
- DIXIE CREEK WATERSHED
- HIGHWAY
- LOCAL ROAD
- EXISTING TRANSMISSION LINE
- WATERCOURSE
- WATERBODY
- FLOW DIRECTION

0 0.5 1 2

1:40,000 KILOMETRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. AERIAL IMAGERY PROVIDED BY KINROSS (SCENE DATE: SEPTEMBER 2022).
3. PROPERTY BOUNDARY PROVIDED BY KINROSS, AUGUST 2024.
4. ROADS INFORMATION PROVIDED BY KINROSS, AUGUST 2022.
5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

TITLE
SPOT FLOW MEASUREMENTS FROM DIXIE CREEK DURING SEPTEMBER 2023, LOW FLOW CONDITIONS

CONSULTANT

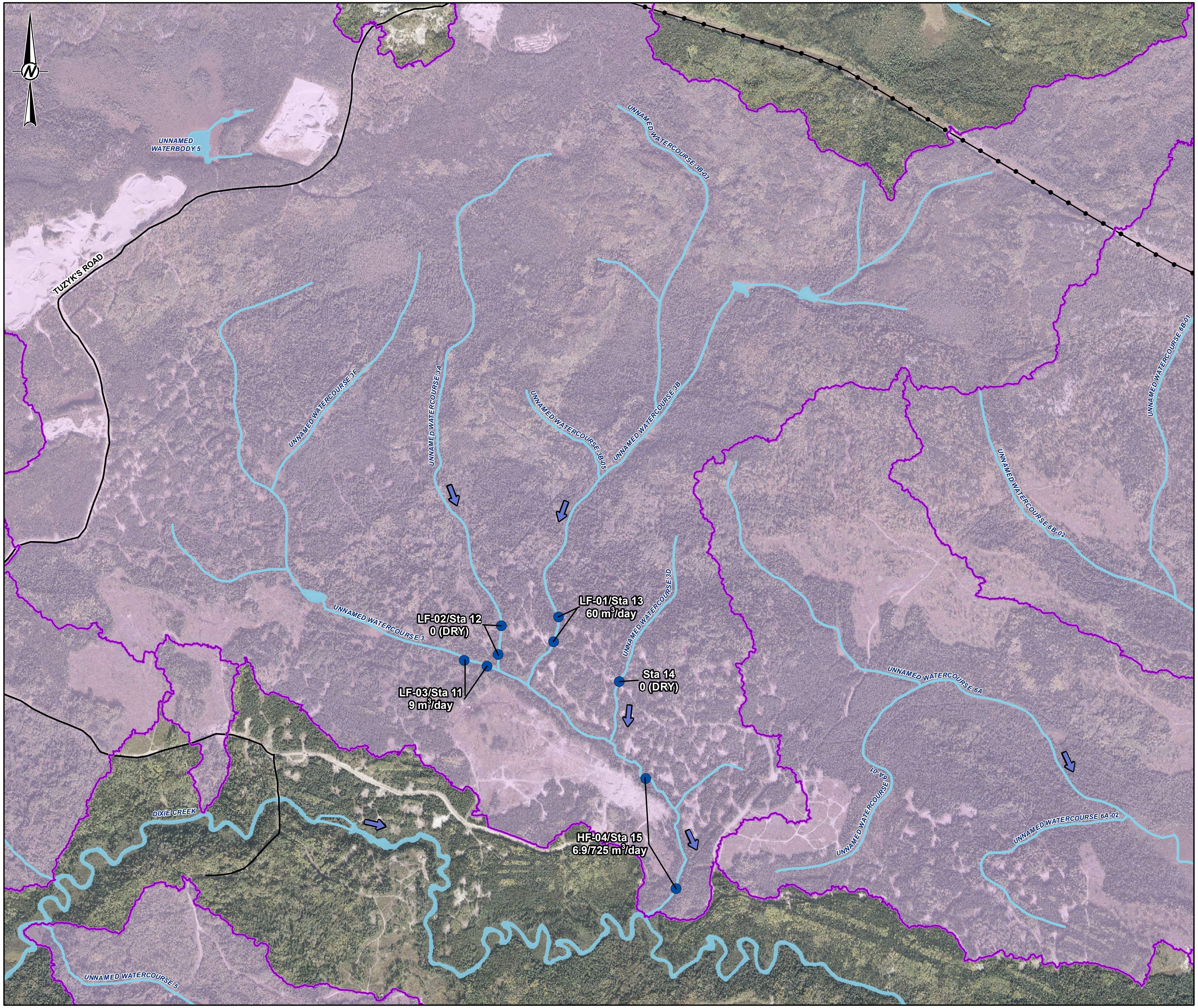
wsp

YYYY-MM-DD	2024-11-21
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

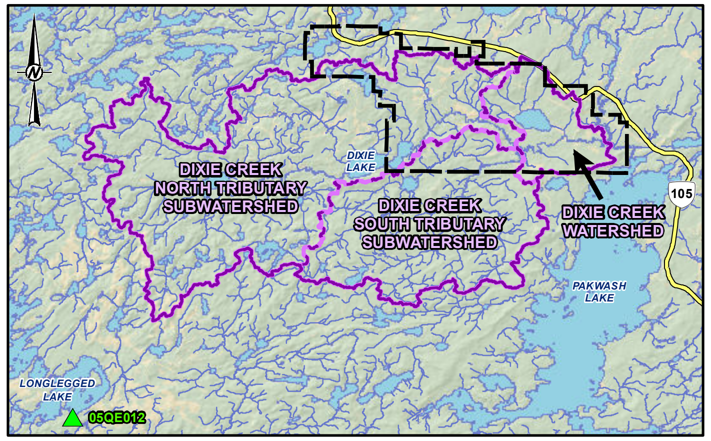
PROJECT NO.	CONTROL	REV.	FIGURE
OMEMA2303	0001	A	4-4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm



KEY MAP



SCALE 1:485,000

LEGEND

- PROPERTY BOUNDARY
- SPOT FLOW MEASUREMENT (SEPTEMBER 2023, LOW FLOW CONDITIONS)
- HYDROMETRIC STATION
- PROPERTY SUBCATCHMENT
- DIXIE CREEK SUBWATERSHED
- DIXIE CREEK WATERSHED
- HIGHWAY
- LOCAL ROAD
- EXISTING TRANSMISSION LINE
- WATERCOURSE
- WATERBODY
- FLOW DIRECTION

0 0.25 0.5 1
1:14,500 KILOMETRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
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3. PROPERTY BOUNDARY PROVIDED BY KINROSS, AUGUST 2024.
4. ROADS INFORMATION PROVIDED BY KINROSS, AUGUST 2022.
5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

TITLE
SPOT FLOW MEASUREMENTS FROM UNNAMED WATERCOURSE 3 DURING SEPTEMBER 2023, LOW FLOW

CONSULTANT

YYYY-MM-DD	2024-11-21
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
OMEMA2303	0001	A	4-5

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

5 HYDROGEOLOGY

Baseline hydrogeological conditions for the Property have been established based on the ongoing groundwater baseline investigation, geotechnical investigations, exploration drilling, existing historical data, geophysical profiling, and publicly available information. Data and information presented in the following sub-sections represent the basis for the conceptual hydrogeological model development discussed in Section 7.

Available monitoring well details are provided in WSP (2025a) and monitoring well locations are shown on Figure 5-1. Monitoring wells are screened within the overburden and just below the overburden/bedrock interface, specifically 157 monitoring well locations within the Property, with 23 of these being nested well locations and a total of 180 monitoring wells on site. These include 110 monitoring wells screened in overburden or bedrock / overburden interface and 52 monitoring wells screened in bedrock surface just below the overburden / bedrock interface.

In addition to the monitoring wells, detailed stratigraphic information is available from geotechnical boreholes, test pits and cone penetration test (CPT) bore locations that were drilled without monitoring wells. Bedrock information comes from the more than 2,500 exploration drillhole logs, including 12 drillholes equipped with a total of 37 vibrating wire piezometers (VWPs).

Additional information on the results of the drilling and hydrogeologic testing program, including borehole logs and hydraulic testing results can be found in the hydrogeological factual field report (WSP 2025a).

5.1 GEOPHYSICAL SURVEYS

In addition to intrusive investigations, two geophysical surveys have been conducted at the site, one along the north side of Dixie Creek for the purpose of determining the continuity of bedrock above creek level, and a second set of survey lines beneath Waterbody 1, across the valley and parallel to the valley. The following sections briefly describe the results of those surveys.

5.1.1 5.1.1 DIXIE CREEK GEOPHYSICAL SURVEY

A geophysical survey (Simcoe Geophysics, 2023) consisting of 4.2 km of Ground Penetrating Radar (GPR) and Electrical Tomography (ERT) was conducted along existing trails on the north side of Dixie Creek downstream of the bridge on Tuzyk's Road where it crosses Dixie Creek. The survey transect location is shown on Figure 5-1 and was conducted to map the bedrock surface as well as to help assess the soil types above the bedrock.

The geophysics survey identified several areas where bedrock or till were suspected of being close to surface, with these areas being generally consistent with the location of the trail at higher elevations away from the creek. Anecdotally, this is likely why the trail was located there, to be away from the wet boggy conditions that would otherwise make the trail impassable.

Inverse modelling was used to interpret the results of the survey with the results suggesting the along the minor northwest-southeast topographic high north of Dixie Creek, the bedrock topography is generally higher than the creek level, which is consistent with drilling results. The main observations from the geophysical surveys were:

- Two dips in the bedrock topography were identified: a 10 m wide interval near the upstream end of the survey transect, and a 50 m wide interval, located on a protrusion of land south into the Dixie Creek valley, likely parallel to the path of the creek.
- A wider bedrock low beneath lowest reach of Unnamed Watercourse 3 at the confluence with Dixie Creek (estimated bedrock elevation of 340 masl, below the creek level) with a thick clay cover, previously identified in drilling was also confirmed by the geophysics.

- The geophysics also suggested that the area of two small cascades identified in Dixie Creek, are likely bedrock or till controlled, which is similar to results indicated by drilling.

5.1.2 5.1.2 UNNAMED WATERBODY 1 GEOPHYSICAL SURVEY

A geophysical survey (Simcoe Geophysics 2024) consisting of 2.3 km of GPR and ERT was conducted in winter conditions and over ice both perpendicular and parallel to the orientation of Unnamed Waterbody 1 (survey transects are shown on Figure 5-1). The purpose of the survey was to map the bedrock surface as well as to help assess the soil types above the bedrock in the area of Unnamed Waterbody 1, which had been previously inaccessible due to the boggy ground conditions and the pond.

The quality of data collected during parts of the survey under Unnamed Waterbody 1 was reported as poor due to difficulties in establishing a good connection to the sediments underlying the organics, and no resistivity data could be collected from Unnamed Waterbody 2 due to the depth of the water. Inversion modelling was used to help interpret the results of the survey that were collected. The main observations from the geophysical surveys were:

- The GPR survey parallel to the orientation of Unnamed Waterbody 1 reported the peat thickness to be between 1.7 and greater than 4.0 m, underlain by clay.
- Both the GPR and ERT surveys confirmed the presence of a clay unit under the flat topographic intervals of the survey, beneath Unnamed Waterbody 1, and extending northwest under the wetland. The perpendicular survey confirmed the presence of bedrock at or near surface at either end of the survey transect, with the bedrock topography dropping towards the pond, however the elevation of bedrock beneath the pond itself could not be estimated with a high degree of accuracy.
- The ERT survey parallel to the orientation of Unnamed Waterbody 1 indicated a bedrock low is present under the northwest end of the profile, however the data collected made interpretation under the waterbody itself uncertain. In this area, there is a high resistivity feature under Unnamed Waterbody 1, which the report suggests may possibly reflect poor grounding of the electrodes on highly resistive organics, or the presence of a shallow bedrock under the clay under the pond. Alternatively, the high resistivity may result from there being unsaturated sediments under the clay, consistent with interpretation that the lake is perched from the groundwater level data.

5.2 HYDROSTRATIGRAPHY

The hydrogeologic system at the Property consists of bedrock, with varying degrees of fracturing / faulting, that is overlain by Quaternary deposits of varying thickness, ranging from being absent at the locations of bedrock outcroppings to as much as almost 40 m total thickness in some locations. Groundwater flow is anticipated to flow mainly within the more permeable portions of the overburden with relatively little groundwater movement occurring in the bedrock, primarily along fractures.

The main hydrostratigraphic units are:

- Sand Deposits: Sand deposits typically present to the north of the site with thickness varying from almost absent at bedrock outcrops to greater than 15 m over bedrock lows and along esker ridges (up to 15.3 m at MW23-06). The sand layer mainly overlies the glacial till but is also observed overlying the glaciolacustrine silts and clays in multiple low-lying areas that surround the proposed portal. Blow count values acquired during drilling (N values) for the sand are usually quite low and it retains little moisture above the water table. The sand layer is expected to act as a conduit to groundwater flow (aquifer) and can be a significant recharge zone where it is exposed on surface. As a surficial feature with good drainage characteristics, frequently located on high ground, significant thicknesses of sand in higher elevation areas area above the water table, and therefore not part of the aquifer system. The saturated portion of the sand unit is generally on the order of a few metres, meaning that despite the widespread occurrence of sand materials, its significance as a water producing aquifer is limited.

- Glaciolacustrine Clay and Silt: Glaciolacustrine silts and clays typically present in the low-lying areas that surround the site, including along the Dixie Creek valley and floodplain, the areas adjacent to Gullrock Lake and the Chukuni River. This unit was deposited when the area is submerged beneath glacial Lake Agassiz and the sediments often exhibit varved clays in lower elevations areas. This layer is mainly underlain by glacial till but is also observed with underlying sand and bedrock at some locations. This layer generally thins with increasing elevation but can be quite variable in thickness, being absent where there is bedrock outcropping to over 20 m (i.e., BH22-101). The Dixie Creek valley, including Unnamed Watercourses 7 and 11 and the middle to lower reaches of Unnamed Watercourses 3, 6, 8, 10 and 12 are mapped as underlain by glaciolacustrine sediments, which is expected to act as an aquitard in the shallow subsurface flow system (although there are two known windows along the creek).
- Glacial Till: A layer of glacial till, consisting of mostly sand and gravel with some silt / clay and occasional cobble / boulders overlies the bedrock at site. The till is generally quite compact, with N-value typically in the range of 40 to 50, although the shallow-most till is often comparatively loose. The till thickness is generally less than 15 m at most of the locations but is observed as almost 30 m at MW4/22 Deep. Due to the variable composition of the till, its hydrogeologic behavior may locally vary between aquifer and aquitard; however, the unit is generally expected to behave as an aquifer of limited productivity due to the presence of some sand and gravel layers interbedded in the till. In a few boreholes, the sand unit is observed between the glaciolacustrine deposits and the glacial till, this sand unit was then grouped as the glacial till when developing the hydrostratigraphic model for the purpose of simplification. This simplification was deemed as reasonable due to the similar hydraulic properties between the sand units and the shallow till (i.e., hydraulic conductivity, composition and compactness).
- Bedrock. Bedrock lithologies at site consist primarily of mafic to felsic volcanic rock intercalated with sedimentary (siltstone, argillite) and various intrusive rocks. Packer testing across the potential Auro Fault suggests that this feature may act as a narrow conduit to groundwater flow (aquifer); however, parts of the fault are gouge filled and may act as an aquitard, depending on the properties and depth of the surrounding bedrock. In addition to the Auro Fault, two shear zones have been identified. These shear zones were created by ductile deformation and are less likely to be conduits of groundwater flow.

Stratigraphic cross sections, prepared along the lower elevation portions of the site, i.e., below elevation 380 masl, along Dixie Creek, illustrating the hydrostratigraphy described above, are provided in Appendix E and shows the coverage of glaciolacustrine deposits which overlay the glacial till which is in contact with the bedrock. These clay sediments are anticipated to act as an aquitard and limit the interaction between the bedrock flow system and surface water features such as Dixie Creek.

Stratigraphic cross sections, prepared through the higher elevation portions of the site, in the inferred groundwater recharge area are shown in Appendix E illustrate that, at higher elevations, the glaciolacustrine sediments are absent, and glaciofluvial sediments, or exposed till and bedrock are present across these areas. The continuous sand layer is underlain by glacial till and these are expected to act as a conduit to groundwater flow (aquifer) where they are saturated.

5.2.1 HYDROSTRATIGRAPHIC MODEL

In order to support groundwater conceptual and numerical model development, a hydrostratigraphic model was developed in Leapfrog Works (Seequent, 2020). This model utilized data from over 200 boreholes and monitoring wells at site as well as over 2,500 resource exploration holes at site, in addition to several other data sources including Quaternary geology map, geophysical investigations and the site digital elevation model (DEM). The stratigraphic model also utilized control points to further constrain layer interpolation, which includes two linear regression analyses between overburden thickness and ground surface elevation, and between overburden thickness and till thickness from the available data.

The top surface of the stratigraphic model (i.e., the ground surface DEM) was constructed using the site LiDAR survey provided by Great Bear Resources, along with publicly available provincial digital elevation model (MNRF 2022), for those areas outside of the site LiDAR survey.

Multiple contact surfaces were then developed according to the various surface types. This stratigraphic model includes four geologic units (volumes) described in Section 5.1 above, which were implemented as deposit type surfaces.

Contact surfaces were created from lithology data from borehole and control points, with additional constraints to refine surfaces which were implemented as interpretations, including:

- Control points to refine the presence of each unit at surface according to the quaternary geology map.
- Additional control points applied at topographic high locations where bedrock outcrops are expected to occur.

The resulting layer thickness maps and the total overburden thickness as well as the borehole locations are depicted on Figures 5-2 to 5-4.

Surficial sand distribution is shown on Figure 5-2. Sand extends over the northern part of the Project site and a roughly coincident with the extents shown on the regional mapping shown on Figure 3-1. Sand thickness is variable and is generally between about 2 m to 10 m where it is present, although can reach over 20 m thickness is some places.

The Lake Agassiz glaciolacustrine clays and silts, shown on Figure 5-3, extend over much of the central and southern portion of the Project site. Borehole drilling at the site indicates that the glaciolacustrine sediments are generally between 2 m to about 10 m thick where they are present although there are some local pockets of over 20 m thickness in places. The clays are continuous across the lower elevation areas of the project area including underneath most of Dixie Creek, with the exception of two small cascade areas and an area far downgradient, where a second esker cuts across the watershed near the confluence of Dixie Creek and the Chukuni River.

Glacial till distribution is shown on Figure 5-4. Except where bedrock is outcropping, till is present across most of the Project site and is the basal overburden layer that is in contact with the bedrock. Till thickness usually ranges from between 5 m to 10 m across most areas, although there are localized pockets where it is thicker (as much as 40 m). Despite this unit have a lower hydraulic conductivity than the sand aquifer, it is often the only overburden unit of moderate hydraulic conductivity present below the water table, and as such often the most transmissive unit present where it is thick and saturated. Areas where the till is thick and saturated, and therefore likely important in terms of transmissivity, are generally located above bedrock lows which can be seen on Figure 5-5, which shows the bedrock topography. These bedrock lows can be seen on Figure 5-5 above the main ore zone and from Unnamed Waterbody 1 to Dixie Creek.

5.3 HYDRAULIC TESTING PROGRAM SUMMARY

Hydraulic conductivity (K) data has been acquired for site materials with a total of 234 hydraulic tests consisting of 85 single well response tests in the form of either a rising or falling head test (i.e., slug / bail tests); 12 single well response tests in the form of a constant head test; one pumping test (7 hour duration); and 179 packer tests conducted in the shallow and deep bedrock in the form of either a falling head test or a constant head injection test. One pumping test was successfully completed in the sand unit, while one pumping test in a 122 m deep bedrock well failed due to a lack of water production. Hydraulic conductivity estimates have also been made for overburden materials utilizing grain-size distributions and the Hazen method (10 estimates; Fetter 2000). In addition, hydraulic conductivity estimates for clay materials were made using a Flexiwall Permeameter (4 lab tests). The locations and hydrostratigraphy of these hydraulic conductivity estimates are shown on Figure 5-6.

Complete details of the hydraulic testing program can be found in the WSP Hydrogeology Field Report (WSP, 2025a). Major results are summarized below.

A summary table of all currently available hydraulic conductivity testing data (including estimates derived though Hazen method and lab permeability testing), is provided in Table 5-1. Data in this table are grouped by the hydrostratigraphic units denoted above in Section 5.1. It should be noted that those values obtained through hydraulic testing are expected to be largely indicative of horizontal hydraulic conductivity (KH) values, as these tests have generally been conducted in vertical wells.

5.3.1 HYDRAULIC CONDUCTIVITY OF SANDS

The geometric mean hydraulic conductivity of the sands is estimated to be 1.3×10-5 metres per second (m/s) based on 38 measurements (28 singe well response tests and 10 Hazen calculations) and ranges from 4.1×10-7 m/s to 4.1×10-4 m/s. The hydraulic conductivity of a seven-hour pumping test conducted in an onsite potable well returned a hydraulic conductivity of 2.0 to 2.7 x10-5 m/s based on the response in an observation well for the drawdown and recovery portions of the test. Although there is some layering in the sands, the variation between vertical and horizontal hydraulic conductivities is not expected to play a significant role in groundwater flow, and the sands are considered to be isotropic with respect to horizontal and vertical hydraulic conductivity.

5.3.2 HYDRAULIC CONDUCTIVITY OF GLACIOLACUSTRINE CLAY

The geometric mean of hydraulic conductivity of the glaciolacustrine clay, is estimated to be 6.0×10-8 m/s based on 14 field measurements, and ranges from 1.4×10-10 m/s to 3.2×10-6 m/s. Lab permeability testing (Flexiwall Permeameter) of 4 samples of glaciolacustrine materials returned results of 2.2×10-9 m/s to 1.5×10-8 m/s, indicating low permeabilities. Estimates of hydraulic conductivity made with the Flexiwall Permeameter are considered to be more representative of vertical hydraulic conductivity (KZ).

5.3.3 HYDRAULIC CONDUCTIVITY OF GLACIAL TILL

Estimated hydraulic conductivity values for glacial till range from 4.1×10-8 m/s to 9.1×10-4 m/s with a geometric mean value of 8.7×10-6 m/s. These estimates are based on 26 single well response test measurements.

5.3.4 BEDROCK HYDRAULIC CONDUCTIVITY

Bedrock hydraulic conductivity has been assessed at site primarily through analysis of rising and falling head tests conducted in shallow (< 20 m) bedrock holes and by packer testing in deeper bedrock holes. Packer testing was conducted in intervals using a single packer system as drilling advanced with packer testing intervals generally being 20 m and test depths ranging from 1 metres below ground surface (m bgs) to 400 m bgs.

Estimated hydraulic conductivities for bedrock, for the complete packer testing program, with some exceptions explained below, are presented graphically on Figure 5-7. Within this data set, there were a large number of deep packer tests returned higher than expected hydraulic conductivity values were where the tested drillhole passed in close proximity one of the more than 2,500 open (ungrouted) exploration drillholes (Figure 5-8). An analysis of the mean hydraulic conductivity results for packer tests based on their distance to open boreholes found that, where a packer test was conducted in a test interval within 10 m or more of another open exploration drillhole, the packer test results returned results that significantly higher than tests conducted in test intervals farther away (Table 5-2). Test results within 10 m of an exploration drillhole were roughly one order of magnitude higher than those more than 10 m away. This effect is expected to decrease with distance to open exploration drillholes.Sufficient data were collected as part of the program that a statistical relationship between proximity of the packer test interval to nearby open diamond drillholes could be established and is shown in Figure 5-9. This relationship between higher hydraulic conductivity and proximity to open drill holes indicate that the effect of a hydraulic connection with an open drill hole dominated the response to the packer test, and the result is not representative of bedrock without nearby open drillholes.

Based on the above assessment, hydraulic conductivity values from tests undertaken within 10 m of an open drillhole, showing evidence of hydraulic connections to nearby open drillholes, were excluded from the dataset of values representative of the country bedrock, along with those results in fault or shear zones.

To investigate the effect of faults and shear zones on the bedrock hydraulic conductivity, the dataset was examined for those test intervals which intercepted identified fault or shear zones. Packer test results from intervals intercepting the Auro Fault (large dashed squares in Figure 5-7) were one to two orders of magnitude higher than those not intercepting structures, while those intercepting the LP Shear Zone (large dashed triangles in Figure 5-7) showed a similar relationship (Figure 5-7). Test zones intercepting unnamed bedrock structures (large dashed squares in Figure 5-7) also exhibited elevated hydraulic conductivities relative to the general country rock. However, most packer tests of the fault or shear zones were within 25 m of an open drillhole and, therefore, were likely impacted by water loss via hydraulic connection to the open drillhole, potentially biasing their results high by one or two orders of magnitude. As such the faults are very unlikely to have hydraulic conductivities that are consistently as high as these tests may indicate. Bedrock structures are therefore assumed to have hydraulic conductivities that are roughly ten times that of the country rock.

The resulting dataset is summarized in Table 5-3 and was used for the assessment of bedrock hydraulic conductivity of the country rock with only limited impacts from open drillholes and faults.

Inferred typical ranges that are anticipated with depth for the Project site are shown on Figure 5-7 as dashed lines. The relationship between hydraulic conductivity and depth illustrated on this figure are used in the development of the site conceptual hydrogeologic model which is described in Section 8 of this report.

A review of the hydraulic for the shallow bedrock, found there is an association between lower hydraulic conductivity and certain areas of bedrock topographic high areas, which could be related to bedrock highs being composed of more competent, resistant bedrock, compared to bedrock lows. The geometric mean of hydraulic conductivity values for shallow bedrock from testing conducted along the bedrock ridge that dominates the drainage divide between the Dixie Creek and more northern watersheds was 1.8×10^{-8} m/s, which is approximately one order of magnitude greater than the overall shallow country rock in general(1.7×10^{-7} m/s; Table 5-2). Lower hydraulic conductivity values for these bedrock highs is consistent with the high elevation water table conditions reported in monitoring wells at these locations, which would otherwise drain seasonally if the bedrock were more permeable.

No significant association could be determined for the different major rock types encountered in the program, when mean hydraulic conductivity values were compared against major bedrock type. This maybe because the effect of different rock types is small compared to the overwhelming effect of the open exploration drillholes. Outside of the immediate area of investigation, the Tonalite-Granodiorite rocks to the north of Unnamed Waterbody 6, to the far west and to the southeast along parts of drainage divide between Dixie Creek and Unnamed Watershed 7A (Figure 3-4) could be expected to have lower hydraulic conductivities than other bedrock types in the area, but this has not been incorporated into the numerical groundwater model.

Packer testing generally focused on the upper 300 m of bedrock due to practical limitations. Limited data are therefore available below this depth. It would be expected that hydraulic conductivity of bedrock would generally continue to decrease with depth, along the same general trend, as increasing confining pressures progressively seal bedrock fractures. The hydraulic conductivity will converge towards the matrix permeability of the bedrock, which is typically on the order of 10^{-10} to 10^{-14} m/s for unfractured metamorphic and igneous rocks (Freeze and Cherry 1979; Jiang et al. 2009).

5.4 GROUNDWATER LEVEL NETWORK

Details of the groundwater monitoring network that has been installed at the Project site are presented in the Hydrogeology Field Data Report prepared by WSP (2025a) and are summarized below. Groundwater monitoring locations are shown on Figure 5-1.

The groundwater monitoring network consists of a total of 175 monitoring wells and drive points that have been installed between 2022 and early 2025 in the overburden and shallow bedrock, with additional wells being added as investigations continue. In an addition to these monitoring wells, 12 locations have been installed as grouted-in VWP installations in the intermediate / deep bedrock with between 2 and 5 VWPs each depending on the location, for a total of 37 VWPs.

Of the 175 monitoring wells installed at the site at the time of the preparation of this report, a large portion of them have been equipped with pressure transducers to monitor water levels on a daily basis or less. Five of these locations have been monitored with transducers since 2022 while the rest were equipped with transducers in 2024 or 2025. In addition to the transducer collected water levels, manual water level measurements have been conducted on a near monthly basis in most other wells since their installation. These wells, along with the remainder of the monitoring wells are manually measured on a quarterly basis for baseline reporting. Tabulated monitoring data are presented in WSP (2025a).

Groundwater pressure information is also collected by transducer and datalogger from the deep bedrock from VWPs installed in grouted exploration drillholes. This dataset includes locations with monitoring from 2022, with additional piezometers wells having data from 2023, 2024 and 2025.

5.4.1 GROUNDWATER FLOW DIRECTIONS

Groundwater flow patterns can be estimated through extrapolation of measured groundwater levels in onsite monitoring wells and selected exploration drillholes which have been equipped with VWPs. Groundwater levels which correspond to the shallow bedrock and overlaying till (or sands) have been used to infer shallow groundwater flow directions across the Project site. Data from these locations, shown on Figure 5-10 were grouped together as these units are hydraulically well connected to each other and can be used to represent the shallow groundwater flow system at the Project site.

Data from the glaciolacustrine deposits, i.e., those wells screened in the clays were excluded from the analysis as these units are not as well hydraulically connected to the predominant shallow groundwater flow system.

Figure 5-10 shows the interpolated groundwater elevation contours within the till / shallow bedrock unit. Equipotential contours shown on this figure are based on the quarterly groundwater elevation monitoring observations at the Project site which have been made beginning in fall/winter of 2022 and are continuing as of this report preparation. Tabulated water level observations for the monitoring wells can be found in the WSP (2025a) Hydrogeology Field Data Report, while a brief description of the dataset used to generate the equipotential contours is described below.

A total of 134 available groundwater level measurement locations, from the shallow bedrock, till and sand have been used to generate the shallow groundwater equipotential contours. Where multiple groundwater elevations are available for a single monitoring location, they have been averaged. Grouted VWP's installed in the intermediate depth and deep bedrock have not been incorporated into the interpolation.

Groundwater equipotential interpolation was completed using the simple kriging interpolation scheme within Surfer® (v25) from Golden Software (2023). Surface water elevations of large waterbodies such as Genessee Lake, Dixie Lake and Unnamed Waterbody 6 were included in the interpolation as these features are either located in the surficial sand, as is the case with Genessee Lake, or are inferred to be large enough that they are well connected to the shallow groundwater flow system although they are present in areas of surficial clays, as is the case with Dixie Lake and Unnamed Waterbody 6. Representation of the many smaller surface watercourse features which are located across the Project site, in areas of surficial sand/till, were accommodated using a semi-automated, iterative approach, whereby the interpolated groundwater equipotential surface was compared against the surface elevation of these water features (as taken from the available LiDAR mapping) and adjusted along the portions of surface water reaches which fell below the interpolated surface. For those reaches where the interpolated equipotential contours fell below surface water reaches no adjustments were made to the interpolated contours. This approach to incorporate the potential interaction between the shallow groundwater and surface water features was used as it represents a reasonable compromise between ignoring the smaller creeks/tributaries and artificially 'forcing' the interpolation scheme to honour the surface water elevations given that it is not realistic, or even possible, to know in great detail the actual portions of small creeks that may be 'gaining' or 'losing' to groundwater. Surface water features such as Unnamed Waterbody 1, and Dixie Creek, which are located in areas of surficial clay were not incorporated into the interpolation as these features can be isolated from the shallow groundwater and it is anticipated that the clays will act to decrease the potential hydraulic connection to these features. An exception to this is the two locations along Dixie Creek where there is a strong indication, through creek geomorphology, that the creek bed is connected to the shallow bedrock, i.e., the bouldery cascading sections. At these locations it was assumed that the shallow groundwater head values could be approximated by the creek surface elevation.

In areas of sparse observation points, the effect of topography on the shallow groundwater equipotential contours was accounted for by introducing control points along significant local topographic high ground which are inferred to act as local groundwater flow divides. An example of this can be seen on Figure 5-10 with the 380 m equipotential contour south of Genessee Lake which represents the inferred groundwater flow divide between this lake and Dixie Lake to the south. Logically, a groundwater flow divide would be expected in this area as 1), it coincides with the local topographic high and, 2) it is in an area of surficial sand and would be expected to be an area of groundwater recharge.

Using this approach, a number of topographic control points were introduced into the interpolation at locations which are inferred to represent the logical natural groundwater divides at the Project site scale following the guiding principle that in this type of setting, the shallow groundwater flow system often represents a muted expression of the overall topography. This approach was preferred over methods such as cokriging the groundwater observation data with elevation as it produces a realistic representation of the shallow groundwater flow system, given the current understanding of the site hydrogeology and available data, yet does not produce a water table map that appears to overly mimic the topography which can result if cokriging is improperly used.

Inferred groundwater equipotential contours for the shallow groundwater flow system show that:

- Groundwater elevations correlate with ground surface elevations with the highest water levels generally corresponding to the topographic high areas at the north portion of the Project site. These areas are either coincident with the area of glacial sand and represent the inferred groundwater recharge area at the site or located on bedrock highs in areas where bedrock permeability is thought to be quite low, resulting in slow drainage of water table.
- Steep groundwater gradients along the area of the bedrock ridge (both north and south) coincident with the northern drainage divide between the Dixie Creek and more northern watershed, likely reflects the lower bedrock hydraulic conductivity of this ridge area.
- Groundwater flow across most of the Project site is directed primarily south and west, following the general topography towards a combination of:
    - Dixie Creek / lower portion of Unnamed Watercourse 3, which both connect to further downgradient areas via till units of moderate (and a zone of higher bedrock permeability resulting from the presence of open exploration drillholes) beneath Dixie Creek to the eastern esker discharge area several kilometres downstream of the site and locally discharge to Dixie Creek in the two small cascade areas beneath Dixie Creek,
    - Eastward groundwater flow under Unnamed Waterbody 6, likely to discharge zones associated with eastern esker discharge area, and perhaps to Waterbody 6, along the southern shoreline where bedrock is exposed, and
    - An area comprising the lower portion of Unnamed Watercourse 1 and upper portions of Unnamed Watercourses 2 and 4, where groundwater discharge is contributing the cool water conditions reported in Unnamed Waterbody 2, and the continuous, all year flow conditions in these watercourses.

5.4.2 ARTESIAN CONDITIONS

Several exploration drillholes experience artesian flows, indicating that these areas have hydraulic heads above the local ground surface. Locations of exploration drillholes with known artesian conditions are shown along with vertical hydraulic gradients are shown on Figure 5-11. Exploration drillholes that show artesian conditions are located in low-lying areas with a glaciolacustrine cover and illustrate the confining nature of these glaciolacustrine deposits. Groundwater recharge, which occurs upgradient in the topographic high areas, likely provides the driving force for this and several exploration drillholes have intersected bedrock fractures which are connected to these areas.

5.4.3 VERTICAL HYDRAULIC GRADIENTS

Vertical hydraulic gradients have been assessed at the Project site for both the shallow groundwater flow system, i.e., between the uppermost bedrock and bedrock contact overburden units and also for the intermediate and deep bedrock. Vertical hydraulic gradients for the shallow flow system are characterized through multi-level nested well installations with screens generally set in the overburden and shallow bedrock, with both screens usually less then 10 to 15 m bgs and a drive point locations where shallow groundwater levels can be compared to surface water levels adjacent to the drive points.

Vertical gradients in the deep groundwater flow system are monitored using multi-level VWP installations grouted in between 30 m bgs to as much as 430 m bgs.

Vertical hydraulic gradients for the two flow systems are described below.

5.4.3.1 VERTICAL HYDRAULIC GRADIENTS BETWEEN SHALLOW BEDROCK/ OVERBURDEN

Vertical hydraulic gradients between shallow bedrock and the overburden are available for the following nested monitoring wells installed across the Project site:

- BH22-202 - shallow (sand), deep (bedrock)
- MW10/22 – intermediate (silty sand), deep (till)
- MW11/22 - shallow (till), deep (bedrock)
- MW12/22 – intermediate (clay), deep (till)
- MW2/22 - shallow (sand), deep (bedrock)
- MW4/22 – intermediate (till), deep (till)
- MW7/22 – shallow (till), deep (bedrock)
- MW9/22 – shallow (sand), deep (till)
- MW1/22 – shallow (clay), deep (bedrock)
- BH23-AEX-08 – shallow (sand), deep (bedrock)
- MW23/02 – shallow (sand), deep (sand)
- MW23-04 – shallow (silt), deep (clay)
- MW23-13 - shallow (clay/silt), deep (till)
- BH24-206 - shallow (clay / silt), deep (sand)
- MW24-210 – shallow (till), deep (till).

The average vertical hydraulic gradients calculated from the nested multi-level monitoring wells are summarized in Table 5-4 and shown graphically on Figure 5-11. Vertical hydraulic gradients are typically weak to mild with the strongest vertical gradients being observed at BH24-206 and MW23-04 between screens separated by glaciolacustrine clays. Stronger vertical gradient would be anticipated between these material types which have quite different hydraulic conductivities (see Section 5.2) and is a likely indication of limited hydraulic connection between these units relative to the sand/tills which are present across much of the Project site.

Downward vertical hydraulic gradients are observed across the areas, generally in areas above about 380 masl elevation, that correspond to areas that are comprised of glacial sands or till as the surficial material. These areas represent the inferred groundwater recharge zones across the Project site.

Vertical upward hydraulic gradients are observed at MW7/22, MW11/22, and MW23-04 which are all located close to surface water features in the lower elevation areas to the southeast of the topographic high ground. Vertical upward hydraulic gradients in these areas are likely due to the presence of the overlying glaciolacustrine clay / silt, which is expected to act as an aquitard/confining unit and reduce the hydraulic connection between the surface water features and the shallow groundwater flow system. Evidence of the glaciolacustrine clays acting as an aquitard can also be observed from anecdotal evidence of artesian conditions recorded at some exploration drillholes which are also shown on Figure 5-11. Granted these exploration drillholes are in the bedrock flow system, it is an indication that the clays are acting as an aquitard in these areas.

The direction of vertical gradients assessed in the drive points generally agrees with that assessed in nearby multi-level monitoring wells. Downward gradients are indicated for the drive points located in the middle to lower portions of the minor Unnamed Watercourses 5 and 7A, likely reflecting their position in the watercourse and local topographic controls on surface water levels.

5.4.3.2 AREAS WITH PERCHED SURFACE WATER CONDITIONS

In addition to the areas with vertical groundwater gradients identified in nested piezometers, areas with perched surface water conditions can be identified from a comparison of surface water elevations to groundwater elevations. A comparison of surface water elevation of Unnamed Waterbody 2 to groundwater elevations in nearby MW4/22, indicates that the pond elevation is 10 m above the groundwater elevation, and is perched. It is also likely that given the proximity of Unnamed Waterbody 1 to Unnamed Waterbody 2, this pond is also perched.

5.4.3.3 VERTICAL HYDRAULIC GRADIENTS IN BEDROCK

Vertical hydraulic gradients in bedrock have been assessed at the Project site through a network of nested VWP installations which have been installed as part of the hydrogeological baseline characterization study. The following 8 drill holes have been instrumented with VWPs at varying depths ranging from between 30 m bgs to as much as 430 m bgs which have been programmed to monitor groundwater elevations at 6 hour intervals and have sufficient data to assess vertical gradients (see Appendix D for groundwater level hydrographs, other VWP installations have insufficient data or quality at the time of issuance of this report to assess long term vertical gradients):

- During the 2022 field season 3 directional exploration drillholes were instrumented with VWPs (BH22-07, BH22-12, and BH22-21), while 1 vertical hole was instrumented (MW8/22).
- During the 2023 field season, 4 directional drillholes were instrumented with multi-level VWPs (BH23-04, BH23-06, BH23-13, and BH23-20).

Each of these locations is equipped with between 2 and 5 VWPs for a total of 24 installations. In addition to the above, an additional vertical drillhole (BH24-11) was instrumented in the 2024 summer field.

The following general observations can be made based on the 19 installations available at the time of reporting:

- Downward gradients prevail at BH22-07, BH23-13, BH23-20 and MW8/22.
- No significant gradient is observed in BH22-12 and BH23-04, which are located near the middle of the site.
- Upward gradients prevail in BH22-21, located adjacent to Dixie Creek.

Distribution of vertical hydraulic gradients in bedrock from the VWP installations are shown graphically on Figure 5-12 along with the locations of exploration drillholes that were observed to be artesian. It is probable that in areas with a high density of open exploration drillholes, the piezometric heads and have the vertical gradients will be not fully reflective of an undisturbed environment, and may show some influence of exploration drilling activities, however average vertical gradients over the available monitoring period, indicated on the figure, show that BH23-04, located at the southeastern edge of the inferred groundwater recharge area is essentially neutral and that the remaining VWPs indicate downward vertical hydraulic gradients, with the exception of BH22-21 which indicates upward hydraulic gradients. Downward hydraulic gradients in the deeper bedrock, below the shallow groundwater flow system show less influence from the shallow surface water features such as Dixie Creek and Unnamed Waterbody 6 with the ultimate discharge locations for deeper groundwater being larger, more regional features such as Pakwash Lake.

5.4.4 SEASONAL VARIATION IN SHALLOW GROUNDWATER LEVELS

In addition to the VWP data presented above for the deep bedrock, manual water level measurements have been taken in the site monitoring wells installed in the locations shown on Figure 5-1 on a quarterly to monthly basis since the fall of 2022. Along with these manual water levels measurements, a number of the monitoring wells have been equipped with pressure transducers to record continuous water levels. Plots of available continuous water levels measurements from the transducer equipped monitoring wells are shown in Appendix D. Tabulated data is presented in WSP (2025a).

At the time of preparation of this report, multiple measurements of groundwater elevations were available from 129 monitoring wells. In these wells, the average range in groundwater level from manual measurements was 1.7 m, with 85% of the monitoring wells having a range in water level of less than 3 m, and 78% having a range of less than 2 m. The average range in water levels in wells with less than 2 m of measured variation was 0.66 m, indicating that in most cases there is limited variation in groundwater levels. Where groundwater level fluctuations are larger, they tend to occur in wells that are completed in bedrock or clay. The higher measured range in groundwater levels in both these units is possibly a function of a combination of the low permeability of these units that slows drainage sufficiently to be captured in the periodic manual water level measurements. In addition, higher fluctuations in the bedrock would be expected due to the low storage of the bedrock fractures which result in more rapid groundwater increases in response to recharge, where the wells were located on higher ground and open to recharge.

5.4.5 DRILLING INDUCED VARIATIONS IN GROUNDWATER LEVELS

Several of the hydrographs shown above for boreholes equipped with multi-level VWPs show changes in water levels which can be correlated to nearby exploration drilling activity which is being conducted at the Project site at the time. This can clearly be seen at BH22-07 with the sharp increases in water levels in mid-December 2023 and at BH22-12 over the same time frame (Appendix D). These rises in water levels coincide with the shutdown of exploration drilling operations over the final 2 weeks of December 2023.

Water levels at both of these locations then sharply drop at the beginning of February 2024, which coincides with the resumption of exploration drilling activities after the holiday site shutdown in mid December 2023.

The types of drilling activity that have been noted to cause temporary water level fluctuations are: injection of cooling water during drilling; injection of grout sometime following completion of the drillhole and the taking of water to provide cooling water for drilling. These effects may be exaggerated where there are a large number of open exploration drillholes (Figure 5-8), which would allow hydraulic communication between drilling and VWP locations, and therefore are not expected to be fully representative of undisturbed native bedrock, or areas where exploration holes have been grouted.

At BH22-07 it appears that VWP2 (68.5 m bgs) showed a stronger response to drilling than observed at the shallower VWP1 depth (27.7 m bgs) and is a possible indication that the hydraulic connection is closer to the deeper VWP. At BH22-12 the opposite is true, with the deepest VWP installation showing a more muted response to the drilling than the shallow one. These locations intersect the LP Shear and Auro Fault respectively and the hydraulic connection observed at these locations may reflect of the influence of these features, in combination with open drillholes.

5.4.6 EXPLORATION DRILLHOLE GROUTING

There are currently over 2,500 exploration drillholes which have been advances at the Property. These boreholes have the potential to act as a conduit for the movement of groundwater between water producing features such as fractures / faults. Great Bear Resources is undertaking a grouting program to seal off exploration drillholes which began in February of 2024 and continuing at the time of this report preparation. Table 5-1: Summary of Hydraulic Conductivity by Hydrostratigraphic Unit for Overburden

Unit	Number of Tests	Hydraulic Conductivity (m/s)		
		Minimum	Maximum	Geometric Mean
Overburden Units				
Glaciolacustrine (SWRTs)	14	1.4×10^{-10}	3.2×10^{-6}	6.0×10^{-8}
Glaciolacustrine (Flexiwall Permeameter) (1)	4	2.2×10^{-9}	1.5×10^{-8}	4.2×10^{-9}
Sand (SWRTs)	28	4.1×10^{-7}	4.1×10^{-4}	6.3×10^{-6}
Sand (Hazen Formula)	10	3.1×10^{-5}	4×10^{-4}	9.2×10^{-5}
Sand (7-hour pumping test observation well)	1	n/a	n/a	2.7×10^{-5}
Glacial Till (SWRTs)	26	4.1×10^{-8}	9.1×10^{-4}	8.7×10^{-6}

Note:

1 Four soil samples were collected from MW10-22 (2 samples), MW11-22 (1 sample) and MW12-22 (1 sample).

Table 5-2: Summary of Bedrock Hydraulic Testing Statistics with Depth

Depth Interval (m)		All Data			<10 m from open DDH [1]			Bedrock Structure Intercepts [2]			Country Rock (>10 m from open DDH and no bedrock structure intercepted)		
		Geometric Mean	Harmonic Mean	Count	Geometric Mean	Harmonic Mean	Count	Geometric Mean	Harmonic Mean	Count	Geometric Mean	Harmonic Mean	Count
Shallow Bedrock (0 to 20)		1.7×10^{-7}	8.6×10^{-9}	57	-	-	0	2.1×10^{-7}	9.4×10^{-8}	5	1.7×10^{-7}	8.6×10^{-9}	57
Intermediate Bedrock (20 to 80)		1.0×10^{-7}	1.6×10^{-8}	76	8.6×10^{-7}	2.7×10^{-7}	12	2.3×10^{-6}	4.9×10^{-7}	4	1.0×10^{-7}	1.3×10^{-8}	61
Deep Bedrock (>80)	80 to 300	7.5×10^{-8}	1.3×10^{-8}	64	2.9×10^{-7}	8.5×10^{-8}	18	1.2×10^{-7}	2.6×10^{-8}	2	7.5×10^{-8}	8.6×10^{-9}	41
	>300	9.8×10^{-9}	9.6×10^{-9}	12	-	-	0	2.5×10^{-7}	1.9×10^{-7}	3	9.8×10^{-9}	8.1×10^{-9}	10
All Depths		9.7×10^{-8}	1.2×10^{-8}	209	4.6×10^{-7}	1.2×10^{-7}	30	4.0×10^{-7}	9.0×10^{-8}	14	9.7×10^{-8}	9.7×10^{-9}	169

Notes:

1) Includes some tests that intercept bedrock structures
2) Includes some tests within 10 m of exploration holes

Table 5-3: Summary statistics of representative bedrock hydraulic conductivity data

Depth Interval (m)		Hydraulic Conductivity (m/s)					Comments:
		Total Number [1]	Min	Max	Geometric Mean	Harmonic Mean	
Shallow bedrock (0 m to 20 m)	All Shallow Country Rock (not within 10 m of DDH or intercepting bedrock structure)	57	1.0×10^{-9}	6.3×10^{-5}	1.7×10^{-7}	8.6×10^{-9}	Wide ranges in hydraulic conductivity within the uppermost bedrock are anticipated. Range is due to use of short interval tests either intercepting competent or fractured/weathered rock, with the rock exhibiting almost no permeability where competent, and some permeability in a shallow zone of weathering and/or increased fracturing
	Bedrock ridges	15	1.0×10^{-9}	-	1.7×10^{-8}	3.2×10^{-9}	Hydraulic test results from BH22-208, BH22-209, Q4-BH23-001, Q4-BH23-002, MW2/22Deep, MW23-07, MW23-11.
Intermediate Bedrock (20 m to 80 m)		61	1.0×10^{-9}	1.2×10^{-5}	1.0×10^{-7}	1.3×10^{-8}	Results from test intervals <20m of open exploration drillholes and fault/shear intercepts were excluded
Deep Bedrock (>80 m)	80 to 300	41	6.0×10^{-10}	1.4×10^{-5}	7.5×10^{-8}	8.6×10^{-9}	
	>300	10	4.3×10^{-9}	3.6×10^{-8}	9.8×10^{-9}	8.1×10^{-9}	

Notes:

1 Total number of tests does not include those excluded from analysis (test intervals in fault zones and near other open drillholes).
2 Value assigned to test intervals where hydraulic response was too small to measure, i.e., very low hydraulic conductivity).
3 Computed based short interval packer and single well response tests.

Table 5-4: Vertical Hydraulic Gradients in Shallow Flow System

Well	Average Ground Water Elevation	Screen Depth			Completion Unit	Vertical Hydraulic Gradient[1] (m)	Direction
		Top	Bottom	Mid Point			
	(masl)	(mbgs)	(mbgs)	(mbgs)			
BH22-202 Deep	378.95	11.28	14.33	12.805	Bedrock	-0.045	Down
BH22-202 Shallow	379.28	4.57	6.1	5.335	Silty Sand		
BH23-AEX-08 Deep	373.78	9.45	12.5	10.975	Bedrock	-0.002	Down
BH23-AEX-08 Shallow	373.79	5.75	8.8	7.275	Silt and Sand		
MW1/22 Deep	383.31	8.55	11.6	10.075	Bedrock	-0.024	Down
MW1/22 Shallow	383.45	3.65	5.17	4.41	Silty Clay		
MW2/22 Deep	421.55	4	7.05	5.525	Bedrock	-0.043	Down
MW2/22 Shallow	421.71	1.1	2.62	1.86	Sand		
MW4/22 Deep	369.70	33.82	39.92	36.87	Sand and Gravel Till	0.004	Up
MW4/22 Intermediate	369.61	12.18	18.28	15.23	Sand and Gravel Till		
MW7/22 Deep	348.55	3.82	5.37	4.595	Bedrock	0.041	Up
MW7/22 Shallow	348.46	1.89	2.8	2.345	Sand and Gravel Till		
MW9/22 Deep	397.81	22.85	25.9	24.375	Sand & Gravel Till	0.000	Down
MW9/22 Shallow	397.82	10.05	13.1	11.575	Sand		
MW10/22 Deep	355.79	9.55	12.6	11.075	Sand and Gravel Till	-0.036	Down
MW10/22 Intermediate	355.91	6.95	8.47	7.71	Silty Sand		
MW11/22 Deep	349.58	8.07	11.12	9.595	Bedrock	0.033	Up
MW11/22 Shallow	349.45	4.1	7.15	5.625	Clayey Silt / Sand & Gravel Till		
MW12/22 Deep	359.48	8.75	11.8	10.275	Sand & Gravel Till	-0.111	Down
MW12/22 Intermediate	359.95	5.8	6.41	6.105	Silty Clay		
MW23-02 Deep	372.80	17.68	20.73	19.205	Silty Sand	-0.006	Down
MW23-02 Shallow	372.84	10.67	13.72	12.195	Silty Sand		
MW23-04 Intermediate	349.57	6.1	7.62	6.86	Silty Clay	0.191	Up
MW23-04 Shallow	348.87	2.44	3.96	3.2	Clayey Silt		
BH24-206 Deep	396.94	11	14	12.5	Silty Sand	0.566	Up
BH24-206 Shallow	393.06	4.4	6.9	5.65	Sand		
MW24-210 Deep	394.92875	5.23	7.67	6.45	Cobbles/Gravel/ Sandy Till	0.023	Up
MW24-210 Shallow	394.86525	2.97	4.5	3.735	Cobbles/Sandy Till/Gravel		

LEGEND

O	**ORGANIC DEPOSITS:** PRIMARILY PEAT, BUT CAN INCLUDE ORGANIC CLAY AND OTHER HOLOCENE DEPOSITS.
GLS	**GLACIOLACUSTRINE SHORELINE:** SAND AND SILT, INCLUDES GRAVEL AND COBBLES AT SOME LOCATIONS; SHORELINE AND SHALLOW WATER DEPOSITS.
GLU	**GLACIOLACUSTRINE DEEP WATER:** CLAY, OFTEN VARVED WITH SILT LAMINAE, AND SILTY CLAY; DEPOSITED IN GLACIAL LAKE AWAY FROM ICE MARGIN.
GL	**GLACIOLACUSTRINE UNDIFFERENTIATED:** CLAY, SILT, INCLUDING FINE SAND.
GF	**GLACIOFLUVIAL:** SAND AND SILTY SAND, CAN INCLUDE GRAVEL; OUTWASH DEPOSITS THAT MAY HAVE FORMED IN SUB-AQUEOUS FANS AND SIMILAR ENVIRONMENTS.
GFI	**ICE CONTACT GLACIOFLUVIAL:** SAND AND GRAVEL, INCLUDES COBBLES, BOULDERS AND MAY INCLUDE SOME FINER GRAINED STRATIFIED SEDIMENTS; FORMED IN ESKERS AND OTHER SUBGLACIAL AND ICE MARGIN ENVIRONMENTS.
M	**GLACIAL TILL:** MIXTURE OF SAND, SILT, GRAVEL, COBBLES, BOULDERS, AND SOME CLAY; LIKELY DEPOSITED SUBGLACIALLY; MAY INCLUDE SOME STRATIFIED DEPOSITS; ALSO REFERRED TO AS MORAINE; OFTEN INTERSPERSED WITH BEDROCK OUTCROPS.
R	**BEDROCK:** ARCHEAN BEDROCK - INCLUDING METAVOLCANICS, METASEDIMENTS, AND PLUTONIC ROCKS; OFTEN INTERSPERSED WITH MORAINE, WITH A DISCONTINUOUS VENEER OF TILL OR SAND.

GEOLOGICAL BOUNDARY, APPROXIMATE
SMALL BEDROCK OUTCROP
BEDROCK OUTCROP (LOCATION PROVIDED BY KINROSS)
SMALL OUTCROPS OF TILL
TRANSVERSE MORAINE RIDGE
ABANDONED SHORELINE FEATURE
SAND OR GRAVEL PIT

CONTOURS (10 m INTERVAL)
RIVER / CREEK
PROPERTY LINE
TRACE OF GEOPHYSICAL SURVEY
ROAD / TRAIL
HIGHWAY
TRANSMISSION LINE (EXISTING)

BH24-101 WSP BOREHOLE
BH24-108 WSP BOREHOLE WITH MONITORING WELL
BH24-201 WSP BOREHOLE WITH VIBRATING WIRE PIEZOMETER
MW24-210 WSP MONITORING WELL
BS1-BH23-004 NON-WSP MONITORING WELL
BH22-10 PACKER TEST
BR-499 EXPLORATION DRILLHOLE
DP-01 DRIVE POINTS

REDUCED SIZE

0 500 1,000
1:17,500 METRES

REFERENCE(S)

1. EXISTING GROUND CONTOURS PROVIDED BY KINROSS, FILE NAME: "22_Kinross_GreatBear_MainArea_1m_Contours_EXT.dwg", SURVEYED: 29 SEPTEMBER 2022, RECEIVED: 24 JANUARY 2024.
2. WATERCOURSE AND WATERBODY DATA, LOCAL ROADS, AND HIGHWAYS OBTAINED FROM LAND INFORMATION ONTARIO (MNRF), AND MODIFIED TO MATCH AERIAL IMAGERY AND LIDAR.
3. AEX AND MINE SITE PLAN, PITS AND STOCKPILES (VERSION 20) PROVIDED BY KINROSS AS MULTIPLE SHAPEFILES, RECEIVED: 18 FEBRUARY 2025.
4. THE QUATERNARY GEOLOGY MAP IS FROM WSP (2025).

CLIENT
KINROSS Great Bear

CONSULTANT
WSP

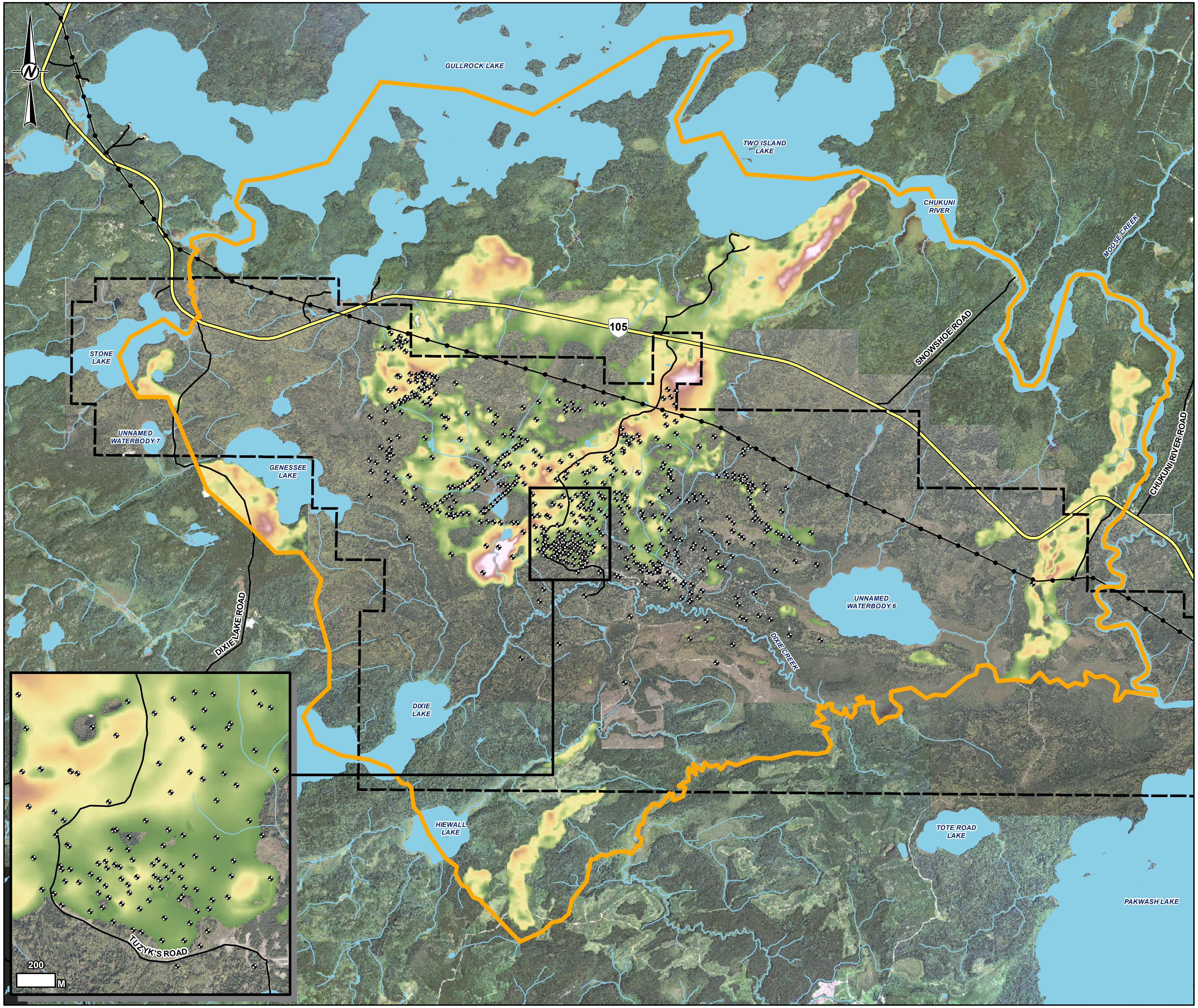
YYYY-MM-DD	2025-07-08
DESIGNED	SG
PREPARED	NK
REVIEWED	SG
APPROVED	SG

PROJECT
GREAT BEAR
HYDROGEOLOGY BASELINE

TITLE
MONITORING WELL AND BOREHOLE LOCATIONS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0031272.9242	0001	A	5-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D



LEGEND

- DOMAIN OF CONCEPTUAL HYDROGEOLOGICAL MODEL
- PROPERTY BOUNDARY
- HIGHWAY
- LOCAL ROAD
- EXISTING TRANSMISSION LINE
- WATERCOURSE
- WATERBODY
- BOREHOLE

SAND LAYER THICKNESS

THICKNESS UNIT: METRES

33.8

0

0 1 2 4

1:70,000 KILOMETRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. AERIAL IMAGERY PROVIDED BY GREAT BEAR RESOURCES (SCENE DATE: SEPTEMBER 2022).
3. PROPERTY BOUNDARY PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2024.
4. ROADS INFORMATION PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2022.
5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT

GREAT BEAR RESOURCES

PROJECT

GREAT BEAR PROJECT

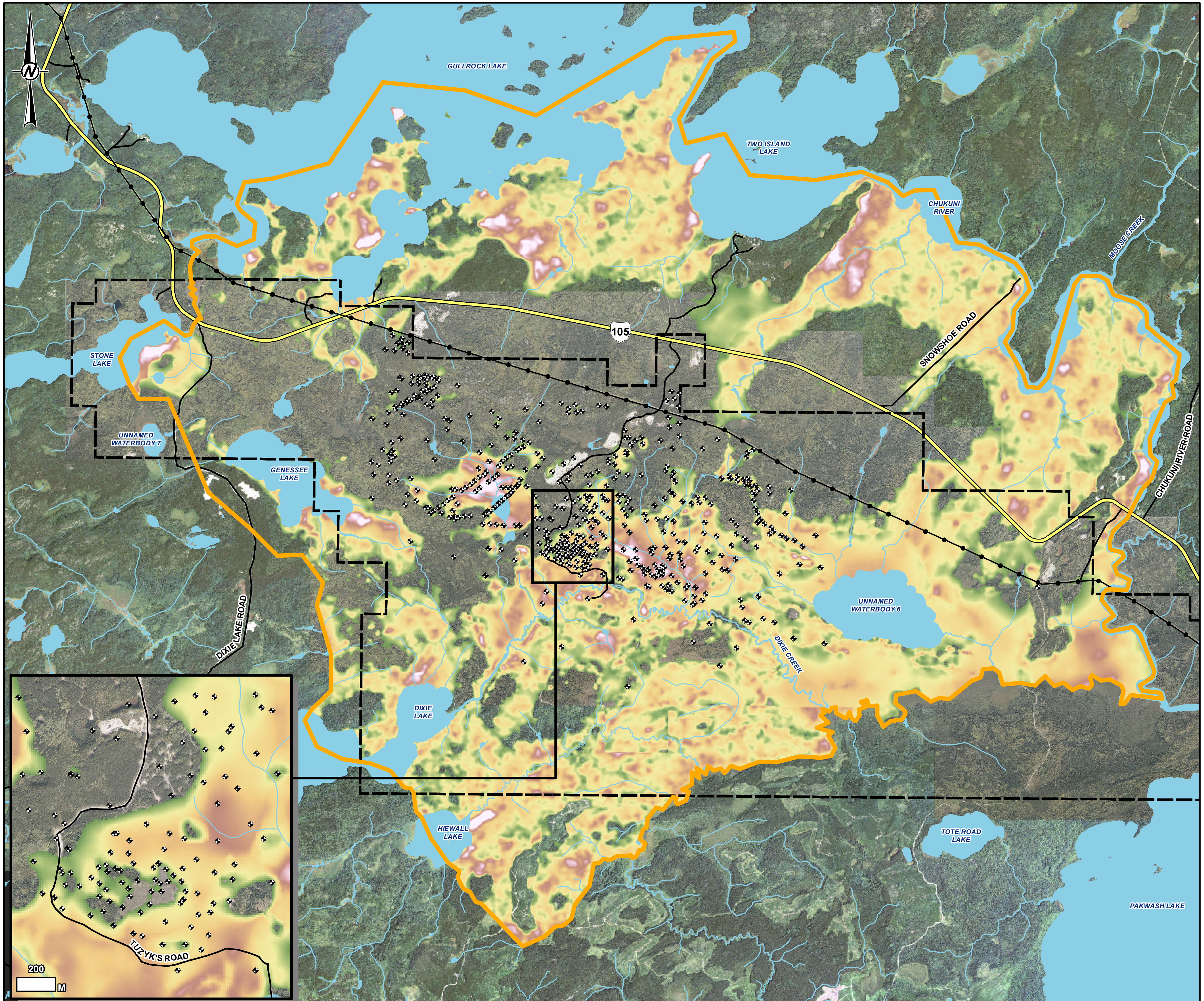
TITLE

SAND THICKNESS

CONSULTANT

YYYY-MM-DD	2025-06-05
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
CA0031272	0001	A	5-2



LEGEND

- DOMAIN OF CONCEPTUAL HYDROGEOLOGICAL MODEL
- PROPERTY BOUNDARY
- HIGHWAY
- LOCAL ROAD
- EXISTING TRANSMISSION LINE
- WATERCOURSE
- WATERBODY
- BOREHOLE

GLACIOLACUSTRINE LAYER THICKNESS

THICKNESS UNIT: METRES

22.9

0

0 1 2 4

1:70,000 KILOMETRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. AERIAL IMAGERY PROVIDED BY GREAT BEAR RESOURCES (SCENE DATE: SEPTEMBER 2022).
3. PROPERTY BOUNDARY PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2024.
4. ROADS INFORMATION PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2022.
5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT

GREAT BEAR RESOURCES

PROJECT

GREAT BEAR PROJECT

TITLE

GLACIOLACUSTRINE DEPOSIT THICKNESS

CONSULTANT

wsp

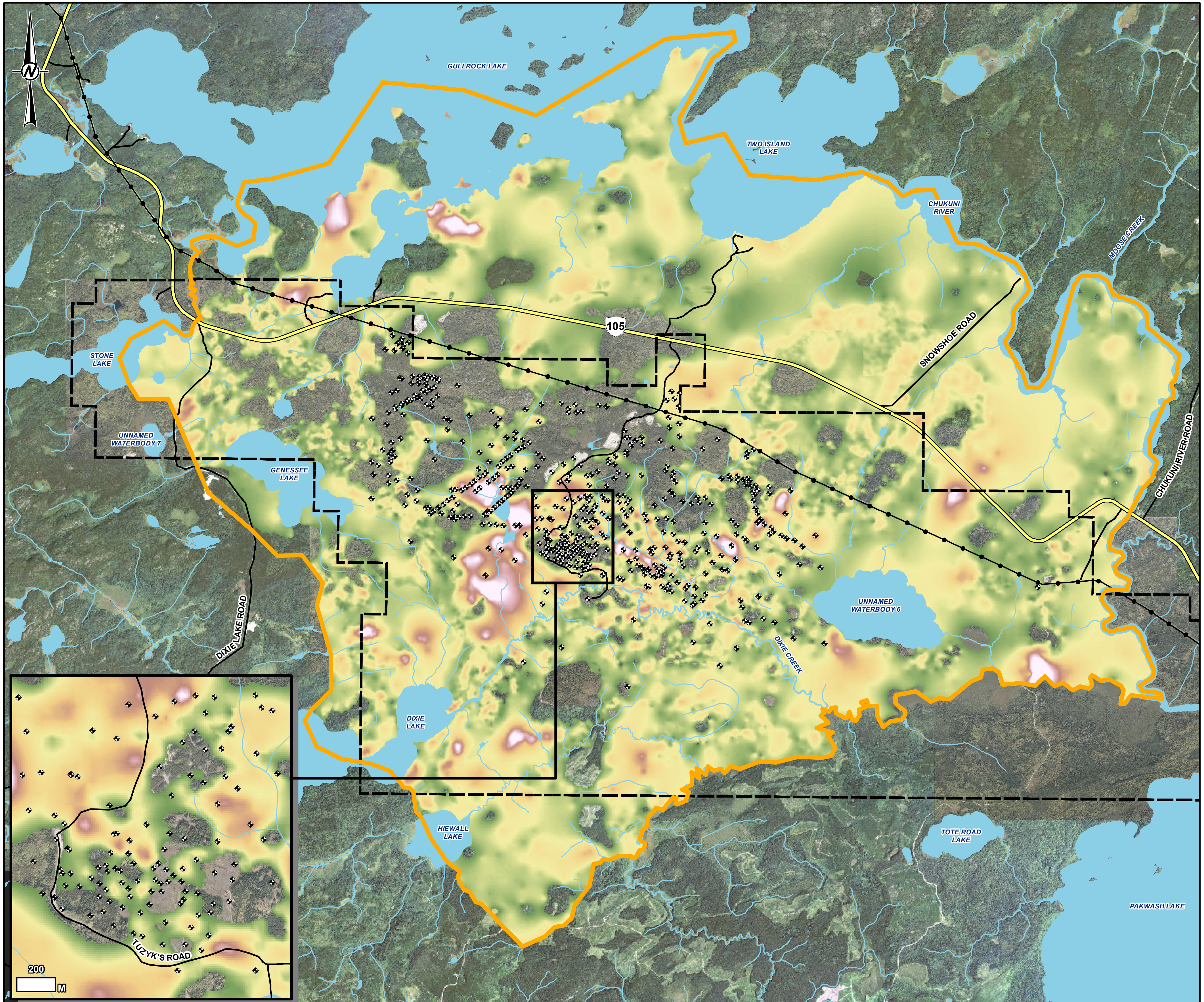
YYYY-MM-DD	2025-06-05
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
CA0031272	0001	A	5-3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm

0



LEGEND

- DOMAIN OF CONCEPTUAL HYDROGEOLOGICAL MODEL
- PROPERTY BOUNDARY
- HIGHWAY
- LOCAL ROAD
- EXISTING TRANSMISSION LINE
- WATERCOURSE
- WATERBODY
- BOREHOLE

GLACIAL TILL LAYER THICKNESS

THICKNESS UNIT: METRES

48.2

0

0 1 2 4

1:70,000 KILOMETRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. AERIAL IMAGERY PROVIDED BY GREAT BEAR RESOURCES (SCENE DATE: SEPTEMBER 2022).
3. PROPERTY BOUNDARY PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2024.
4. ROADS INFORMATION PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2022.
5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

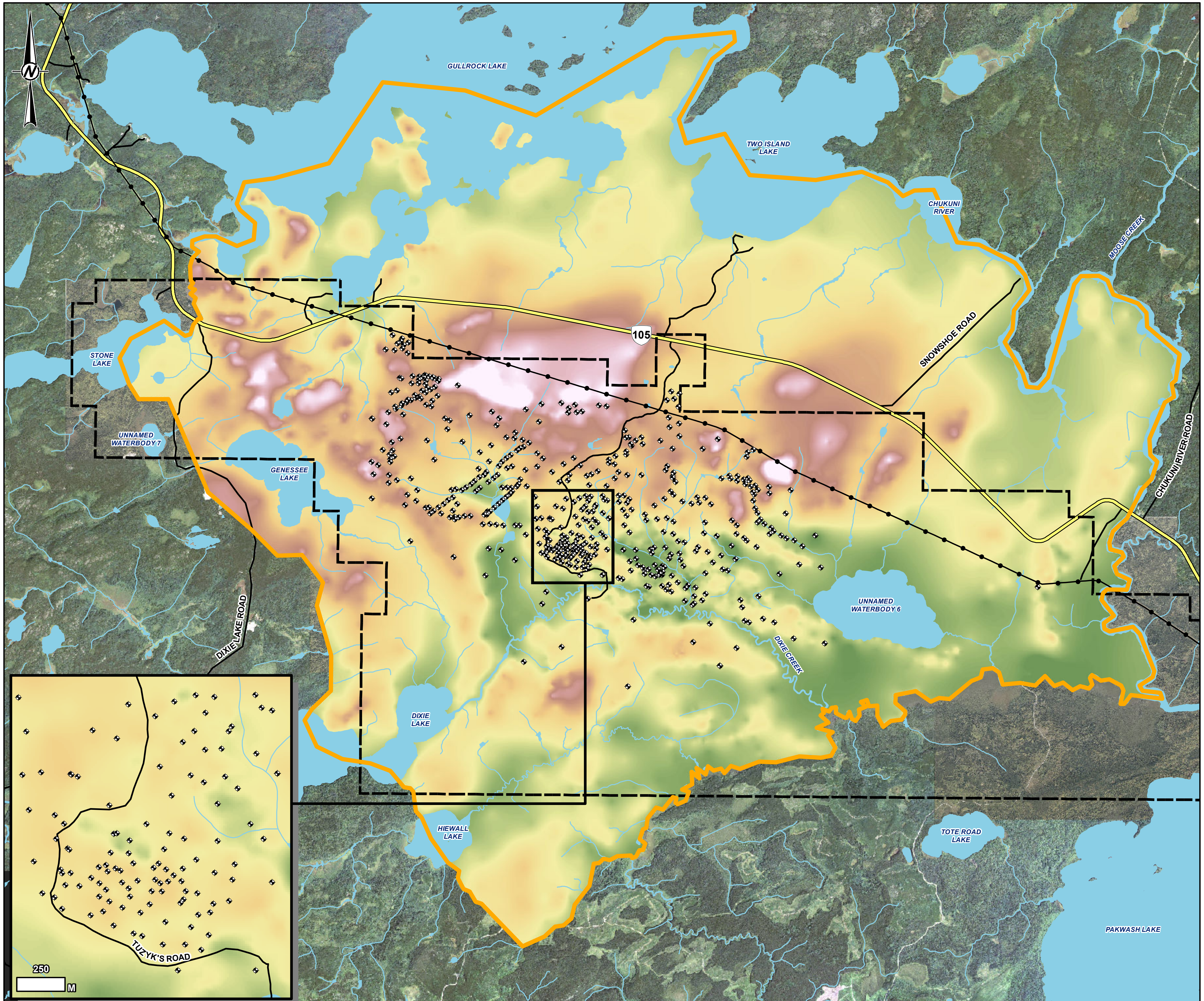
TITLE
GLACIAL TILL THICKNESS

CONSULTANT

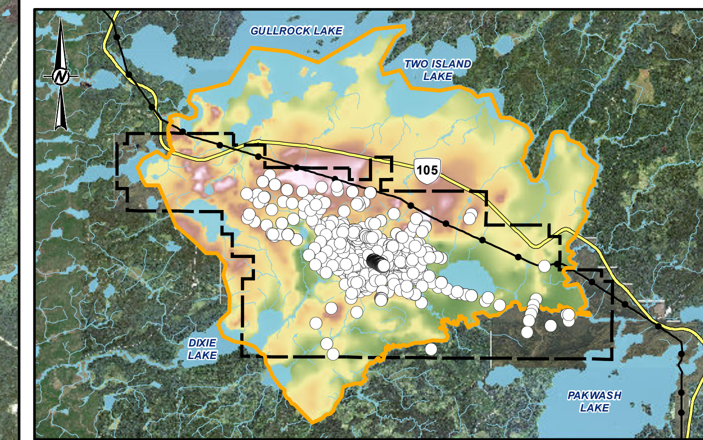
wsp

YYYY-MM-DD	2025-06-05
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
CA0031272	0001	A	5-4



KEY MAP



SCALE 1:315,000

LEGEND

- DOMAIN OF CONCEPTUAL HYDROGEOLOGICAL MODEL
- PROPERTY BOUNDARY
- HIGHWAY
- LOCAL ROAD
- EXISTING TRANSMISSION LINE
- WATERCOURSE
- WATERBODY
- BOREHOLE
- DIAMOND DRILLHOLE LOCATION (SHOWN IN KEY MAP)

BEDROCK TOPOGRAPHY

UNIT: MASL

474.7

295.4

0 1 2 4

1:70,000 KILOMETRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. AERIAL IMAGERY PROVIDED BY GREAT BEAR RESOURCES (SCENE DATE: SEPTEMBER 2022).
3. PROPERTY BOUNDARY PROVIDED BY GREAT BEAR RESOURCES, MARCH 2023.
4. ROADS INFORMATION PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2022.
5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT

GREAT BEAR RESOURCES

PROJECT

GREAT BEAR PROJECT

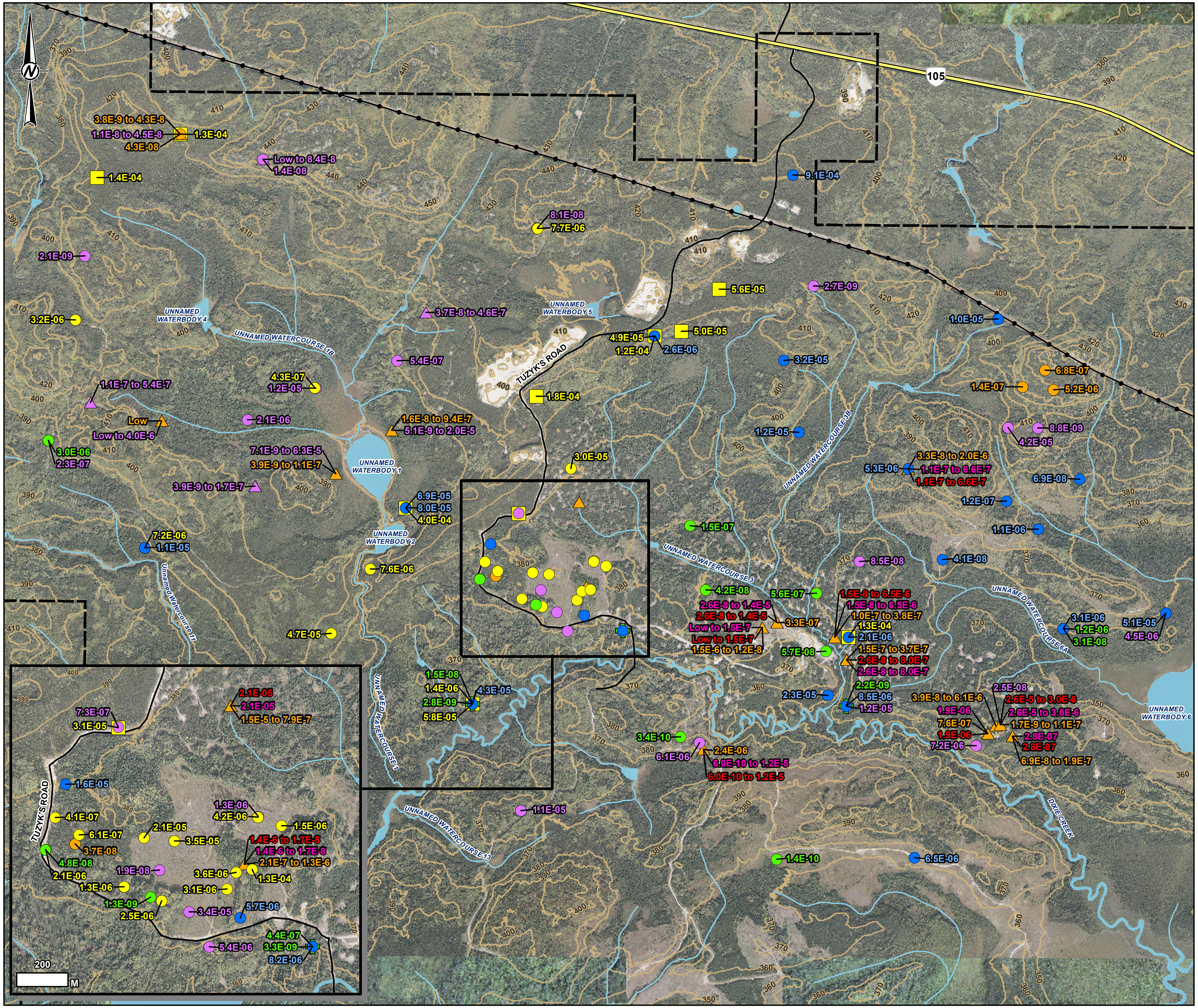
TITLE

BEDROCK TOPOGRAPHY

CONSULTANT

YYYY-MM-DD	2025-06-05
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
CA0031272	0001	A	5-5



LEGEND

- PROPERTY BOUNDARY
- HIGHWAY
- LOCAL ROAD
- EXISTING TRANSMISSION LINE
- CONTOURS (10 M INTERVAL)
- WATERCOURSE
- WATERBODY

SITE HYDRAULIC CONDUCTIVITY MEASUREMENT LOCATIONS (LABELLED WITH HYDRAULIC CONDUCTIVITY (M/SEC))

TEST TYPE

- FLEXIWALL PERMEAMEATER
- HAZEN FORMULA
- PACKER TEST
- SINGLE WELL RESPONSE TEST

STRATIGRAPHIC UNIT

- GLACIAL TILL
- GLACIOLACUSTRINE
- SAND
- SHALLOW BEDROCK (0 TO 20 M)
- INTERMEDIATE BEDROCK (20 TO 80 M)
- DEEP BEDROCK (80 TO 300 M)
- DEEP BEDROCK (> 300 M)

0 0.25 0.5 1

1:28,000 KILOMETRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. AERIAL IMAGERY PROVIDED BY GREAT BEAR RESOURCES (SCENE DATE: SEPTEMBER 2022).
3. PROPERTY BOUNDARY PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2024.
4. ROADS INFORMATION PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2022.
5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT

KINROSS GOLD CORPORATION

PROJECT

GREAT BEAR PROJECT

TITLE

LOCATIONS OF HYDRAULIC TESTING

CONSULTANT

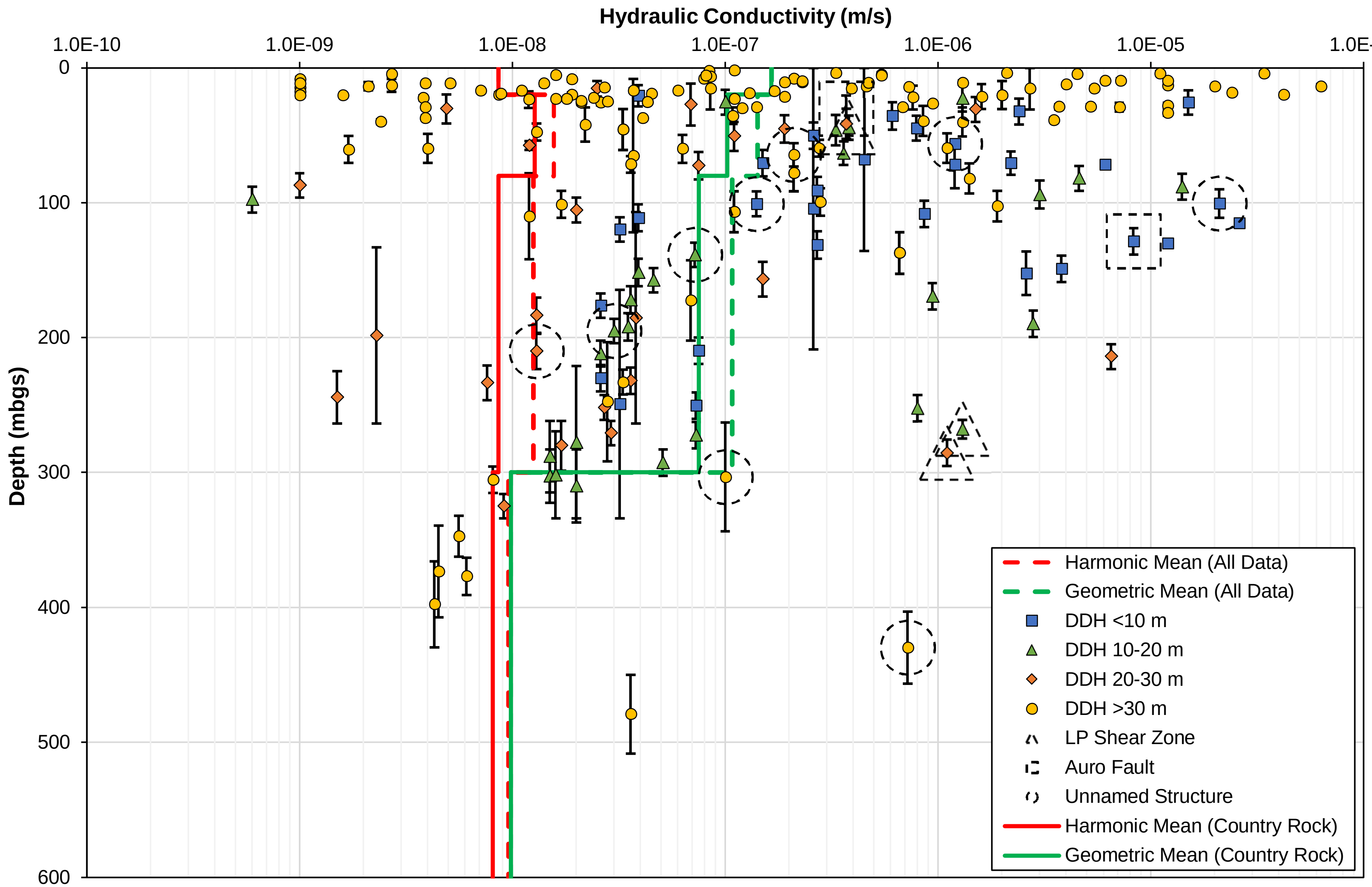
wsp

YYYY-MM-DD	2025-06-06
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

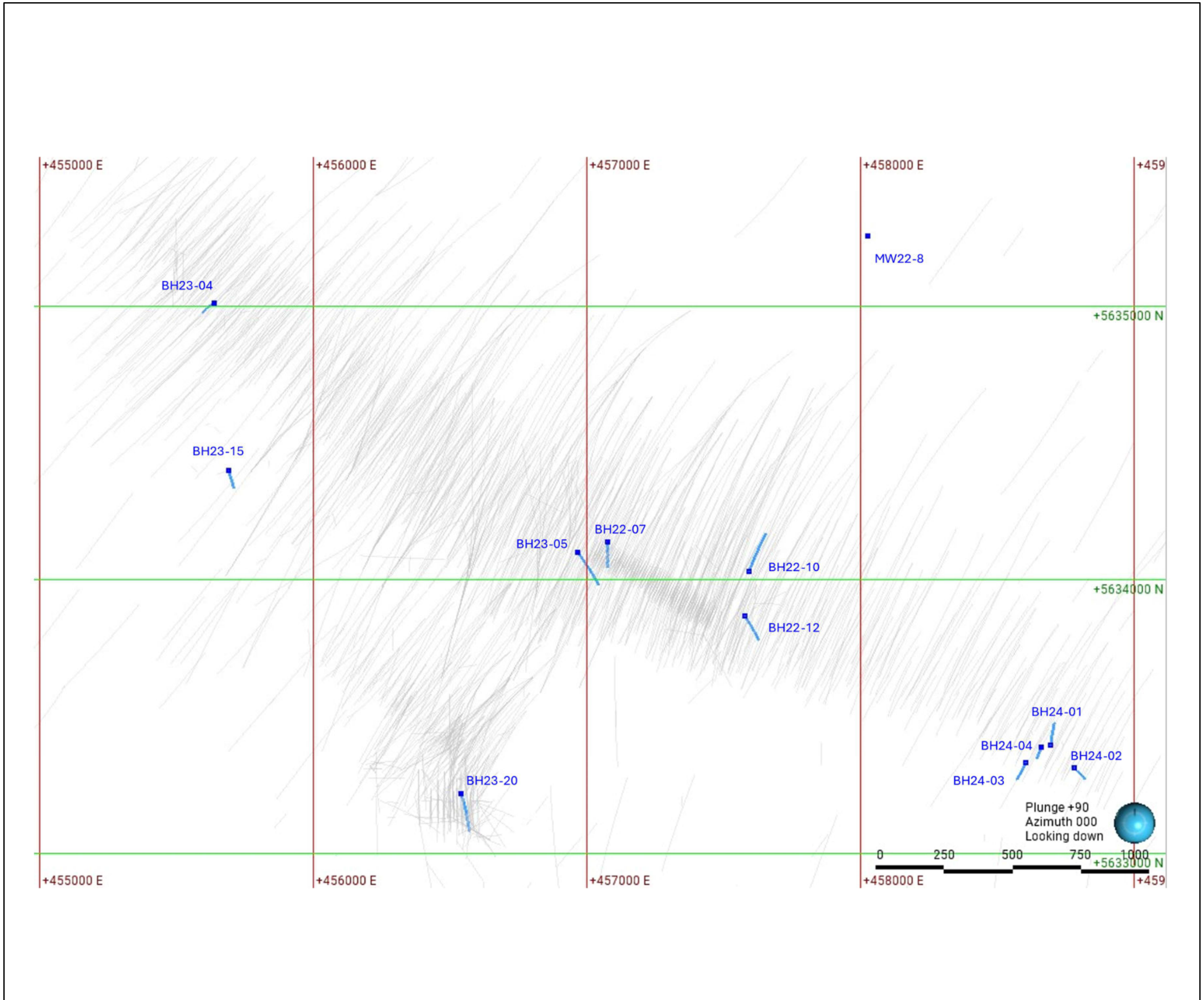
PROJECT NO.	CONTROL	REV.	FIGURE
CA0031272	0001	A	5-6

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm



wsp	Figure No: 5-7	**Great Bear Resources Hydrogeology Baseline Report**
	Project No: OMEMA2303	
	Date: 6-Jun-25	**Impact of drillhole proximity on hydraulic conductivity results**
	Rev: 0	



LEGEND

NOTE(S)

REFERENCE(S)

CLIENT
GREAT BEAR RESOURCES

PROJECT
Hydrogeology Baseline

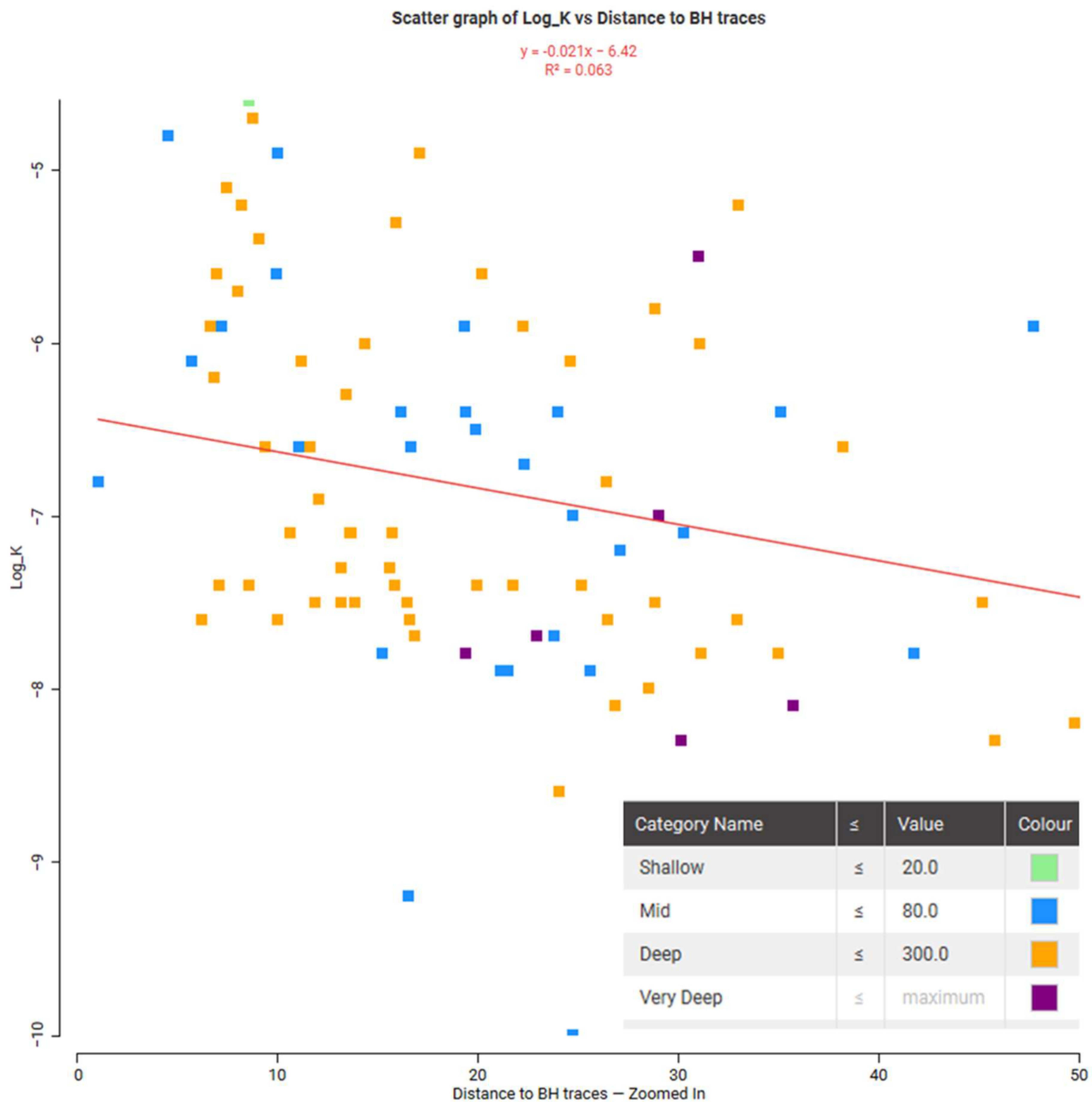
TITLE
UNGROUTED EXPLORATION DRILL HOLE TRACES AND PACKER TESTED BOREHOLE TRACES

CONSULTANT

wsp

YYYY-MM-DD	2024-08-22
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
OMEMA2303	0001	A	5-8



LEGEND

NOTE(S)

REFERENCE(S)

CLIENT
GREAT BEAR RESOURCES

PROJECT
Hydrogeology Baseline

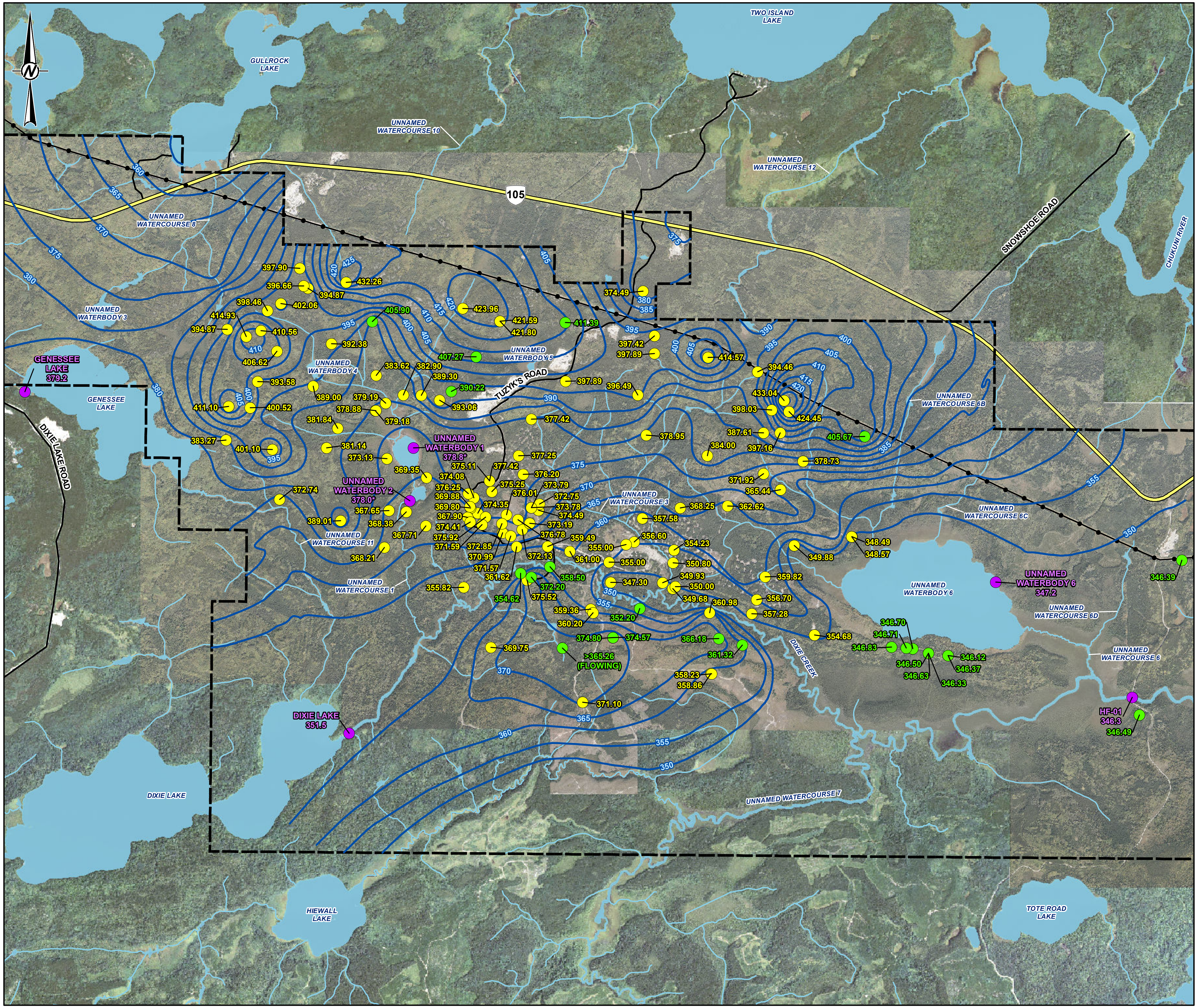
TITLE
SCATTERPLOT SHOWING HYDRAULIC TESTING RESULTS IN RELATION TO EXPLORATION DRILL HOLE PROXIMITY

CONSULTANT

wsp

YYYY-MM-DD	2024-08-22
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
OMEMA2303	0001	A	5-9



LEGEND

PROPERTY BOUNDARY

MEASURED GROUNDWATER LEVELS (AVERAGE VALUES FROM 2022 - 2023 QUARTERLY MONITORING ROUNDS)

MEASURED GROUNDWATER LEVELS (DATA COLLECTED FROM EXPLORATION DRILLHOLES)

SURVEYED WATER LEVEL (SUMMER 2023, MASL) (*UNNAMED WATERBODY 1 AND UNNAMED WATERBODY 2 ARE PERCHED ABOVE THE WATER TABLE AND HAVE NOT BEEN INCLUDED IN THE INTERPOLATION OF THE GROUNDWATER EQUIPOTENTIAL CONTOURS)

INTERPRETED GROUNDWATER LEVEL CONTOURS (LABELLED WITH ELEVATION (MASL))

HIGHWAY

LOCAL ROAD

EXISTING TRANSMISSION LINE

WATERCOURSE

WATERBODY

0 0.5 1 2

1:50,000 KILOMETRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. AERIAL IMAGERY PROVIDED BY GREAT BEAR RESOURCES (SCENE DATE: SEPTEMBER 2022).
3. PROPERTY BOUNDARY PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2024.
4. ROADS INFORMATION PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2022.
5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

TITLE
SHALLOW GROUNDWATER LEVELS AND EQUIPOTENTIALS

CONSULTANT

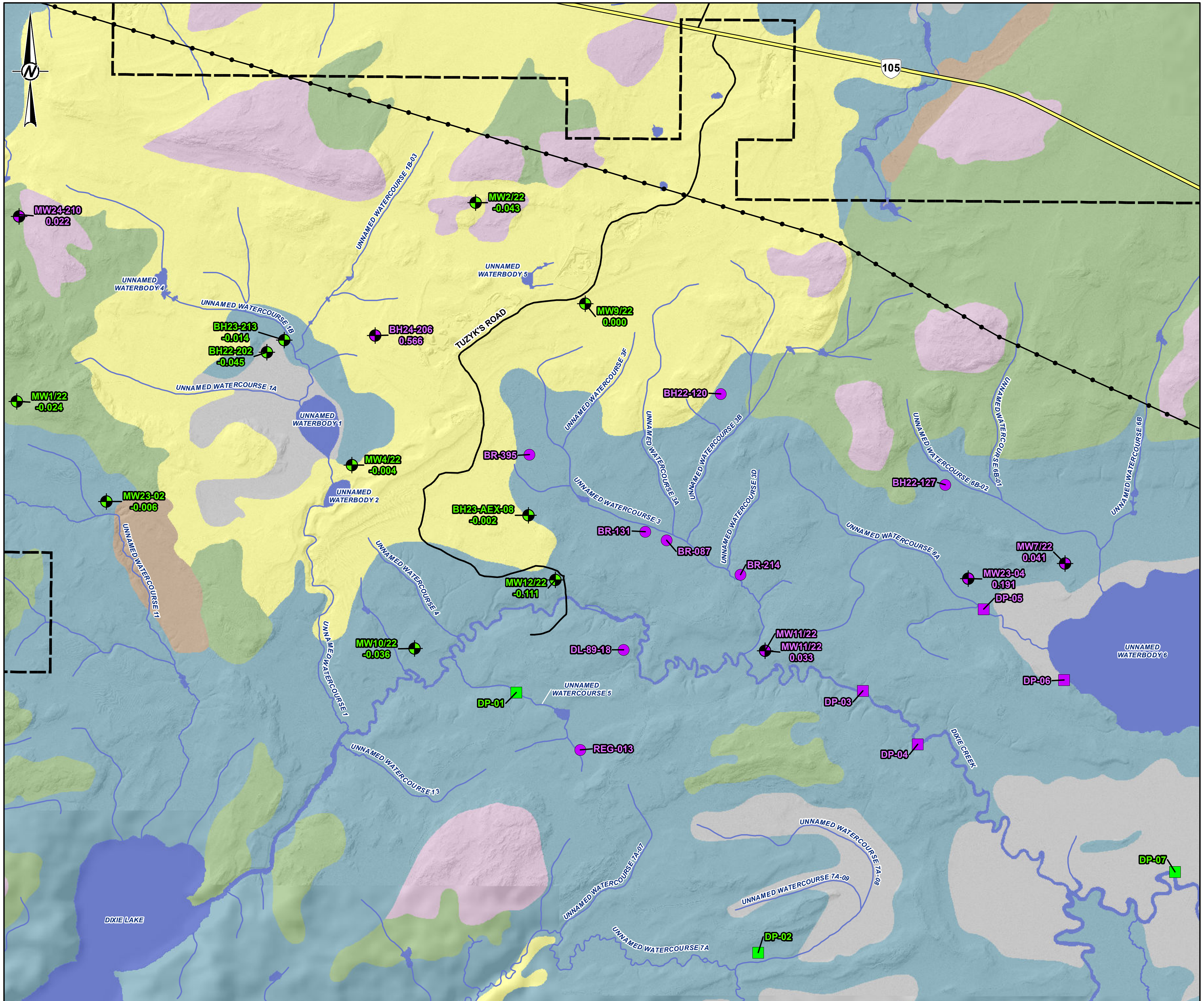
YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
CA0031272	0001	A	5-10

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm

PATH: X:\CA\CADA\300-OAK\MIS-FS1-Project\F2023\Projects\DMEMA2303_Kinross_Great_Bear_Envt7_GIS\HydroGeoBaseline_2024\MXD\Shallow_GW_Levels_Equipotentials_9.mxd PRINTED ON: 2025-06-27 AT: 1:59:18 PM



LEGEND

- PROPERTY BOUNDARY
- HIGHWAY
- LOCAL ROAD
- EXISTING TRANSMISSION LINE
- WATERCOURSE
- WATERBODY
- BOREHOLE OBSERVED WITH ARTESIAN CONDITION

MONITORING WELLS LABELLED WITH VERTICAL HYDRAULIC GRADIENT

- UPWARD HYDRAULIC GRADIENT
- DOWNWARD HYDRAULIC GRADIENT

DRIVE POINT LOCATIONS LABELLED WITH VERTICAL HYDRAULIC GRADIENT

- UPWARD HYDRAULIC GRADIENT
- DOWNWARD HYDRAULIC GRADIENT

QUATERNARY GEOLOGY

- ORGANIC DEPOSITS
- GLACIOLACUSTRINE DEPOSITES (DEEP WATER DEPOSITS)
- GLACIOLACUSTRINE DEPOSITES (SHORELINE AND SHALLOW WATER DEPOSITS)
- OUTWASH DEPOSITS (SAND AND GRAVEL)
- TILL
- BEDROCK

0 0.25 0.5 1

1:30,000 KILOMETRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. AERIAL IMAGERY PROVIDED BY GREAT BEAR RESOURCES (SCENE DATE: SEPTEMBER 2022).
3. PROPERTY BOUNDARY PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2024.
4. ROADS INFORMATION PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2022.
5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

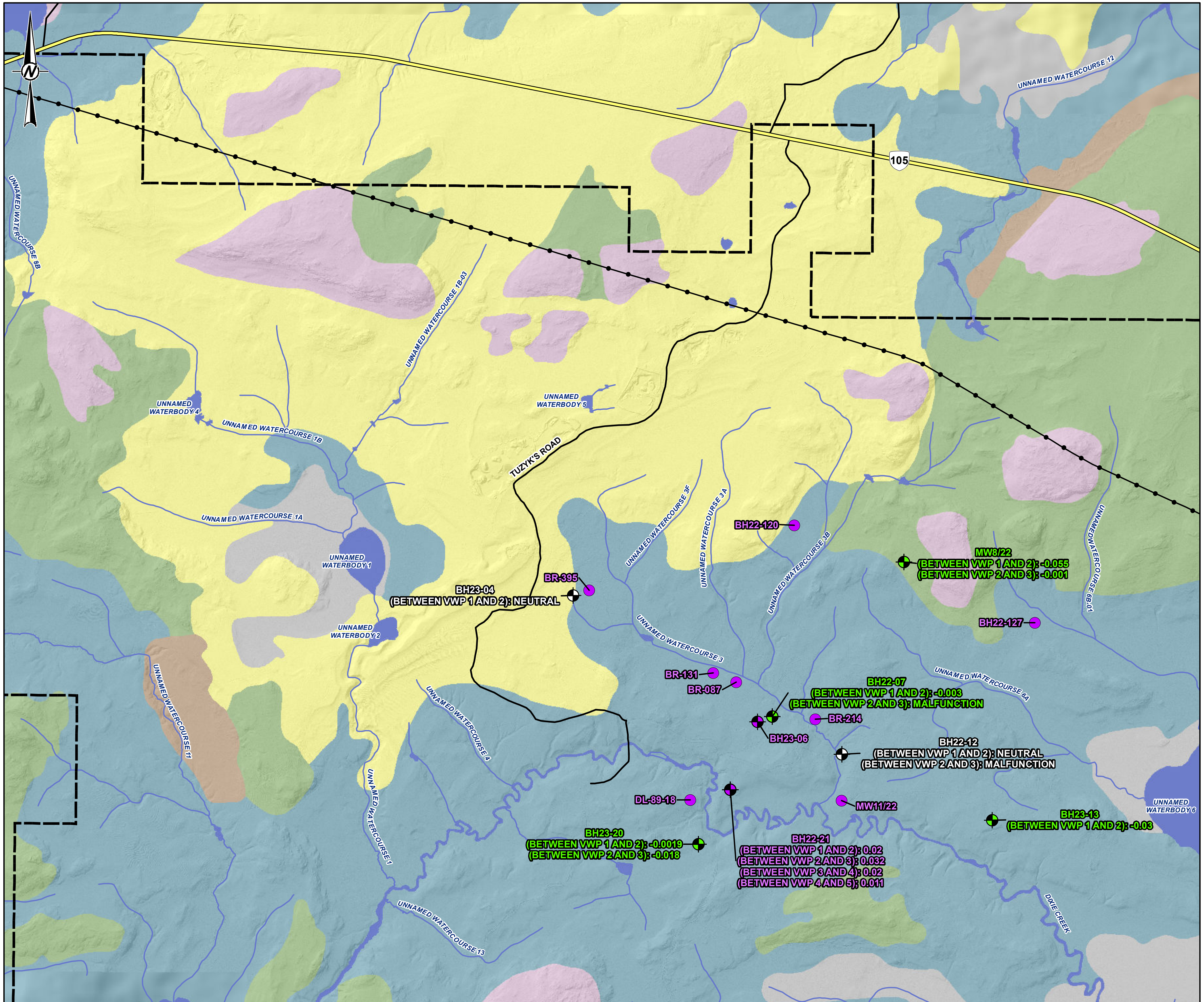
TITLE
VERTICAL HYDRAULIC GRADIENTS IN SHALLOW FLOW SYSTEM

CONSULTANT

wsp

YYYY-MM-DD	2025-06-06
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
CA0031272	0001	A	5-11



LEGEND

- PROPERTY BOUNDARY
- HIGHWAY
- LOCAL ROAD
- EXISTING TRANSMISSION LINE
- WATERCOURSE
- WATERBODY
- BOREHOLE OBSERVED WITH ARTESIAN CONDITION

MONITORING WELLS LABELLED WITH VERTICAL HYDRAULIC GRADIENT

- UPWARD HYDRAULIC GRADIENT
- DOWNWARD HYDRAULIC GRADIENT
- NEUTRAL HYDRAULIC GRADIENTC
- NO DATA / MALFUNCTION

QUATERNARY GEOLOGY

- ORGANIC DEPOSITS
- GLACIOLACUSTRINE DEPOSITES (DEEP WATER DEPOSITS)
- GLACIOLACUSTRINE DEPOSITES (SHORELINE AND SHALLOW WATER DEPOSITS)
- OUTWASH DEPOSITS (SAND AND GRAVEL)
- TILL
- BEDROCK

0 0.25 0.5 1

1:28,000 KILOMETRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. AERIAL IMAGERY PROVIDED BY KINROSS (SCENE DATE: SEPTEMBER 2022).
3. PROPERTY BOUNDARY PROVIDED BY KINROSS, AUGUST 2024.
4. ROADS INFORMATION PROVIDED BY KINROSS, AUGUST 2022.
5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

TITLE
VERTICAL HYDRAULIC GRADIENTS IN INTERMEDIATE/DEEP BEDROCK

CONSULTANT

YYYY-MM-DD	2024-11-21
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
OMEMA2303	0001	A	5-12

6 WATER QUALITY SUMMARY

6.1 SURFACE WATER QUALITY SAMPLING RESULTS SUMMARY

Surface water quality sampling has been conducted at the Property since 2019 with a greater focus starting in 2022 and is ongoing at the time of this report preparation. Surface water quality monitoring locations are shown on Figure 6-1. A separate baseline report provides a more in-depth description of the surface water quality sampling results (WSP 2024b), and only a summary is provided here. Overall results indicate surface water quality of the Chukuni River is typical of northern Ontario. This includes a circumneutral pH, low concentrations of most nutrients (nitrate, nitrite, ammonia) and low concentrations of major anions (sulphate, chloride). Total metal and dissolved metal concentrations were also generally low on the Chukuni River, and were consistently below identified water quality guidelines for the protection of aquatic life (WQG PAL), with few exceptions - arsenic concentrations were greater than the WGQ PAL at all stations along the Chukuni River and approximately 25% of observations for phosphorous were greater than the WQG PAL. Additionally, less than 10% of total observations indicated exceedances for aluminum and copper.

Surface water quality of Dixie Creek is also typical of northern Ontario, showing a circumneutral pH, low concentrations of most nutrients (nitrate, nitrite, ammonia) and low concentrations of major anions (sulphate, chloride). Concentrations of dissolved organic carbon (DOC) were moderately high which likely reflects influences of wetlands and local flooding caused by beaver dams on surface water quality.

Total metal and dissolved metal concentrations were very low in Dixie Creek, and were consistently below identified WQG PAL, with few exceptions. Aluminum concentrations were consistently greater than WQG PAL upstream and mid-field stations on Dixie Creek and most observations for total phosphorus were greater than WQG PAL at all monitoring station on Dixie Creek, except for the upstream station (SSW-03).

In addition to the above, low frequency (less than 10% of observations across the period of record) exceedances were observed for cobalt and iron at stations SW-08 and SW-09. These stations are proximate to the identified mineralized zones in the area where there has been significant drilling activity and some tree clearing, and elevated concentrations are most likely related to combination of area geology, rock weathering, tree clearing, and disturbances due to exploration drilling activities.

Water quality of unnamed tributaries and Project area lakes appear to be highly influenced by adjacent wetlands and relatively shallow depth; waters are moderately hard, exhibit seasonal temperature fluctuations, and have high levels total and dissolved organic carbon, which is consistent with seasonal flooding of the meadow marsh type wetlands present in the area. Concentrations of phosphorus in Project area lakes are elevated and Project area lakes were classified as meso-eutrophic to eutrophic.

6.2 SHALLOW GROUNDWATER QUALITY SAMPLING RESULTS SUMMARY

Regular groundwater quality sampling was completed as part of hydrogeological field programs conducted by Great Bear Resources during 2022 and 2023 field programs and is ongoing at the time of this report preparation. A separate baseline report provides a more in-depth description of the surface water quality sampling results (WSP, 2024b), and only a summary is provided here. Shallow groundwater samples reported in WSP (2024b) were collected from more than30 monitoring well locations, including nested well locations and a total of approximately 50 monitoring wells on site, with additional samples collected from some exploration drillholes in 2021. Additional groundwater sampling locations have also been added since the publication of WSP (2024b). Monitoring wells are screened within the overburden and just below the overburden / bedrock interface. Monitoring wells that were part of the above-mentioned groundwater water quality sampling locations are shown on Figure 6-1. All of these monitoring wells are completed in the overburden or shallow bedrock, such that these samples would only be representative of the shallow groundwater system.

In general, groundwater quality samples collected from the monitored wells is circumneutral to slightly alkaline, with high hardness, and moderate to high conductivity. Concentrations of nitrogen species (ammonia, nitrite, nitrate), chloride, and sulphate are low, being at or below analytical detection limits, or below the WQG PAL.

Concentrations of dissolved metals are also low, with most parameters at or below analytical detection limits, or below WQG PAL, however exceptions were noted for:

- Phosphorus
- Cobalt
- Copper
- Iron
- Molybdenum
- Tungsten
- Uranium.

Groundwater quality concentrations greater than WQG PAL occurred at relatively low frequencies (less than 10% of observations) for all parameters except cobalt and phosphorus. Cobalt and phosphorus are consistently greater than WQG PAL values with the most frequent concentrations greater than WQG PAL being associated with overburden monitoring wells, screened into the glaciolacustrine clays.

The occurrence of naturally elevated concentrations in groundwater is commonly observed in areas of similar geologic setting across northern Ontario and is often the result of the natural weathering processed, including chemical oxidation or mineral dissolution, and subsequent mobilization of solid-phase constituents (e.g., metals), which are then transported to groundwater and surface water.

6.2.1 MAJOR ION CHEMISTRY INDICATORS OF GROUNDWATER DISCHARGE

Table 6-1 provides a summary of groundwater and surface water major ion chemistry results available from the 2023/2024 sampling campaigns. The table includes minimum, maximum and average concentrations and values for surface water sampling locations and for all the groundwater wells that were sampled in the sampling period. Clear distinctions can be made between groundwater and surface water results in terms of alkalinity and related parameters of hardness and calcium, which are notably higher in the groundwater results on average than in the surface water results. The alkalinity differences are also reflected in the lower pH and higher electrical conductivity in groundwater. One surface water sampling location on Unnamed Watercourse 12 (SW-17) at Highway 105 appears to have at least one sampling event with very elevated sodium and chloride concentrations, probably reflecting the impact of road salt application on the highway, otherwise sodium and chloride concentrations are lower in surface water than groundwater.

A review of the average concentrations related to alkalinity in the surface water samples can provide some potential insight into the proportions of groundwater inputs into surface water features. Some of the lower reaches of the smaller surface water features, such as, Unnamed Watercourse 4 (SW-3) and Unnamed Watercourse 6A (SW-11) show above average alkalinity indicating groundwater discharge may make up a higher proportion of their flow than other features. Conversely, the upper reaches of several small watercourses, i.e., the upstream branch of Unnamed Watercourse 1 (SW-TR), Unnamed Watercourse 12 (SW-17), and Unnamed Watercourse 10 (SW-18), show very low alkalinity, indicating that they are runoff dominated. Similarly, surface samples taken along Dixie Creek (DC-US to SW-15) show no distinctive trend of increasing alkalinity downstream, indicating a lack of a high proportion of groundwater discharge.

These observations are consistent with observations of gaining and losing flow under low flow conditions, and generally support the observations of limited groundwater-surface water interaction, except for Unnamed Watercourses 1, 3 and parts of SW12a. In watercourses 1 and 3, cooler water and occasional signs of upwelling groundwater have been observed in the field, also indicating signs of groundwater discharge.

No springs or seeps were found during inspections of the wetlands in the lower reaches of Dixie Creek, around Unnamed Waterbodies 1 and 6 by terrestrial survey crews (Northern Bioscience, 2024), consistent with the water quality results and the understanding of groundwater setting at the site.

6.2.2 DEEP GROUNDWATER ELECTRICAL CONDUCTIVITY PROFILES

An indication of groundwater chemistry at depth can be inferred from review of downhole electrical conductivity profiles that have been completed at the Property. Electrical conductivity profiles with depth were completed for 16 open exploration drillholes ranging in depths from 100 m to over 500 m deep, under static and/or pumping conditions (see Figure 6-1 for locations). Results of the electrical conductivity profiling, summarized in Table 6-2, indicate that while electrical conductivity varies between borehole, there is a trend of increasing electrical conductivity with depth.

When compared to surface water quality and shallow groundwater sample measurements of electrical conductivity, the groundwater profile results can be tens of times greater, indicating heavier dissolved major ion chemistry than either the surface water or shallow groundwater. The lack of surface water samples from features with similarly high electrical conductivity is an indication of a relative lack of groundwater discharge to the surface water system.

6.2.3 DEEP GROUNDWATER SAMPLING RESULTS

A deep groundwater sampling program was undertaken in six of exploration drillholes at the site with previous electrical conductivity profiles described above (WSP 2025b). While these samples were collected in open holes, where some hydraulic connection between water producing intervals is expected and whose chemistry could be influenced by drilling activities, they were of sufficiently different chemistry to the samples collected from monitoring wells completed in shallow bedrock to provide an indication of the water quality in the deep groundwater system.

Table 6-3 provides a summary of the parameters collected from the deep groundwater system as part of this program, the locations of which are shown in Figure 6-1. Concentrations of most dissolved metals were low, with most parameters at or below analytical detection limits, or below Provincial Water Quality Objectives, however exceptions were noted for: phosphorus, aluminum, iron, tungsten and zinc. There was some suspended sediment in some of the samples, which were not filtered, and could account for the higher concentrations of some parameters, and in particular aluminium.

Chloride, calcium and sulphate concentrations were significantly higher than in the shallow groundwater samples, particularly from the deeper samples. The average chloride concentration from the deep groundwater samples was 348 mg/L compared to 1.9 mg/L in the shallow groundwater samples, while the average sulphate concentration from the deep groundwater samples was 255 mg/L compared to 11.9 mg/L in the shallow groundwater samples. The higher concentrations of these parameters in the deep groundwater samples is consistent with the interpretation that groundwater flow is the deep system is very slow compared to the shallow groundwater system. No groundwater discharge locations have been identified at the site with concentrations similar to those found in the deep groundwater sampling, indicating a lack of hydraulic connection between the deep groundwater flow system and surface water.

Table 6-1: Summary of Surface Water and Shallow Groundwater Chemical Analytical Results from 2024

Sample Location	Statistic	Alkalinity - Total (as CaCO3) (mg/L)	Calcium - Dissolved (mg/L)	Chloride (mg/L)	Conductivity - Lab (µS/cm)	Hardness Dissolved (as CaCO3) (mg/L)	Iron - Dissolved (mg/L)	pH - Lab (pH units)	Potassium Dissolved (mg/L)	Sodium Total (mg/L)	Sulphate (as SO4) (mg/L)
SW-GL Genessee Lake	Minimum	30.9	8.6	0.2	64.1	29.9	<0.1	7.4	0.6	1.2	0.6
	Maximum	41.9	11.7	0.8	86.7	40.2	0.4	7.7	13.7	1.8	1.6
	Count	8	8	8	8	8	8	8	8	8	8
	Average	36.0	10.0	0.3	75.7	35.1	0.1	7.6	2.4	1.5	0.8
DL-REF Inlet of Dixie Lake	Minimum	25.9	7.7	0.2	55.9	29.8	0.3	6.8	0.7	1.4	0.6
	Maximum	48.5	13.8	0.5	106.0	54.0	0.8	7.3	1.2	2.0	1.1
	Count	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	Average	37.2	10.8	0.3	81.0	41.9	0.6	7.0	1.0	1.7	0.9
DC-US Outlet of Dixie Creek	Minimum	30.6	8.4	0.2	64.2	31.6	0.3	7.2	0.8	1.4	0.7
	Maximum	54.0	15.3	0.5	114.0	56.4	0.3	7.4	1.4	2.8	0.8
	Count	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
	Average	46.2	13.0	0.4	97.4	48.1	0.3	7.2	1.2	2.3	0.8
SW-01 UWB 1	Minimum	7.6	5.8	0.1	34.6	20.6	0.4	6.1	0.1	1.1	0.5
	Maximum	58.3	19.0	3.0	151.0	68.8	6.1	6.7	1.0	4.9	2.9
	Count	7	7	5	7	7	7	7	6	7	6
	Average	20.0	9.3	0.9	62.7	33.6	1.6	6.4	0.5	2.0	1.5
SW-03 UWC 4	Minimum	43.3	15.9	0.7	103.0	57.6	0.0	7.1	1.8	1.9	0.7
	Maximum	138.0	36.0	1.1	262.0	128.0	1.0	8.2	4.4	3.0	3.8
	Count	5	5	5	5	5	4	5	5	5	5
	Average	97.3	27.8	0.9	192.8	97.4	0.5	7.7	3.0	2.6	2.2
SW-04 Dixie Creek at Tuzyk's	Minimum	29.8	9.6	0.2	65.2	36.4	0.2	7.2	0.8	1.4	0.6
	Maximum	61.5	17.8	0.9	124.0	63.9	0.5	7.6	1.3	2.5	1.0
	Count	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
	Average	45.4	13.3	0.4	95.1	49.2	0.3	7.3	1.1	1.9	0.8
SW-06	Minimum	13.1	13.3	0.4	95.1	49.2	0.3	7.3	1.1	1.9	0.8

Sample Location	Statistic	Alkalinity - Total (as CaCO3) (mg/L)	Calcium - Dissolved (mg/L)	Chloride (mg/L)	Conductivity - Lab (µS/cm)	Hardness Dissolved (as CaCO3) (mg/L)	Iron - Dissolved (mg/L)	pH - Lab (pH units)	Potassium Dissolved (mg/L)	Sodium Total (mg/L)	Sulphate (as SO4) (mg/L)
UWC 3 upstream	Maximum	13.1	8.9	1.2	49.6	32.0	0.9	6.5	0.3	1.8	1.2
	Count	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Average	13.1	8.9	1.2	49.6	32.0	0.9	6.5	0.3	1.8	1.2
SW-08 Dixie Creek at UWC 3	Minimum	30.1	9.5	0.2	67.2	34.8	0.2	7.2	0.8	1.4	0.6
	Maximum	57.7	18.1	3.3	119.0	66.5	0.4	7.6	1.5	4.3	1.1
	Count	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
	Average	41.8	12.6	1.0	90.8	46.7	0.3	7.4	1.1	2.3	0.9
SW-08a UWC 3	Minimum	26.5	8.0	0.2	8.0	8.0	0.2	7.0	0.5	1.4	0.5
	Maximum	31.7	18.1	8.0	119.0	66.5	8.0	8.0	8.0	8.0	8.0
	Count	3.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
	Average	29.4	11.2	1.7	71.5	39.2	1.3	7.4	1.7	2.9	1.7
SW-09 Dixie Creek at wetland	Minimum	30.8	8.0	0.2	8.0	8.0	0.2	7.0	0.5	1.4	0.5
	Maximum	34.5	18.1	9.0	119.0	66.5	9.0	9.0	9.0	9.0	9.0
	Count	2.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
	Average	32.7	9.8	0.3	70.6	36.8	0.4	7.5	0.9	1.5	0.8
SW-10 UWC 7	Minimum	38.1	9.8	0.3	70.6	36.8	0.4	7.5	0.9	1.5	0.8
	Maximum	38.1	11.2	0.2	81.4	42.9	0.3	7.4	1.0	1.8	0.8
	Count	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Average	38.1	11.2	0.2	81.4	42.9	0.3	7.4	1.0	1.8	0.8
SW-11 UWC 6A	Minimum	39.1	13.5	2.7	108.0	52.6	0.8	7.1	1.5	5.2	1.8
	Maximum	167.0	53.3	121.0	779.0	224.0	2.4	7.6	5.1	83.2	70.4
	Count	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.0
	Average	88.8	28.8	42.7	341.0	117.4	1.6	7.3	2.7	31.5	36.1
SW-12b UWC 6B	Minimum	26.7	10.1	0.1	63.6	39.1	0.2	6.4	0.4	1.7	0.9
	Maximum	65.1	15.0	3.4	155.0	56.3	1.0	6.8	3.2	6.5	1.2
	Count	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0

Sample Location	Statistic	Alkalinity - Total (as CaCO3) (mg/L)	Calcium - Dissolved (mg/L)	Chloride (mg/L)	Conductivity - Lab (µS/cm)	Hardness Dissolved (as CaCO3) (mg/L)	Iron - Dissolved (mg/L)	pH - Lab (pH units)	Potassium Dissolved (mg/L)	Sodium Total (mg/L)	Sulphate (as SO4) (mg/L)
	Average	45.9	12.6	1.8	109.3	47.7	0.6	6.6	1.8	4.1	1.0
SW-14 UWB 6	Minimum	34.0	9.7	4.3	83.2	36.6	0.0	7.1	0.9	3.3	0.5
	Maximum	54.6	11.2	5.2	130.0	41.9	0.1	7.5	1.0	5.7	0.6
	Count	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	Average	44.3	10.4	4.7	106.6	39.3	0.1	7.3	1.0	4.5	0.5
SW-14-B UWB 6 deep	Minimum	34.0	10.1	4.2	83.4	38.6	0.1	7.2	1.0	3.2	0.5
	Maximum	57.0	16.3	5.4	136.0	61.8	0.1	7.5	1.5	4.8	0.6
	Count	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	Average	45.5	13.2	4.8	109.7	50.2	0.1	7.3	1.2	4.0	0.5
SW-15 Dixie Creek at Tote Rd.	Minimum	36.1	10.7	0.6	80.2	40.4	0.3	7.2	1.0	1.8	0.9
	Maximum	70.1	18.4	0.8	150.0	71.0	0.3	7.4	1.5	3.3	1.3
	Count	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	Average	53.1	14.6	0.7	115.1	55.7	0.3	7.3	1.3	2.6	1.1
SW-17 UWC 12	Minimum	2.5	3.7	25.2	109.0	13.4	0.1	5.6	0.3	3.0	1.6
	Maximum	5.2	40.2	1420.0	4190.0	136.0	0.7	5.8	26.6	844.0	22.2
	Count	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	Average	3.9	21.9	722.6	2149.5	74.7	0.4	5.7	13.5	423.5	11.9
SW-18 UWC 18	Minimum	6.3	5.1	3.8	46.3	17.9	0.8	5.8	0.4	8.4	1.5
	Maximum	6.3	5.1	3.8	46.3	17.9	0.8	5.8	0.4	8.4	1.5
	Count	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Average	6.3	5.1	3.8	46.3	17.9	0.8	5.8	0.4	8.4	1.5
SW-GL02 UWC 8	Minimum	14.5	8.9	0.2	45.4	30.1	0.7	6.7	0.2	1.3	0.4
	Maximum	49.3	17.3	65.0	308.0	60.7	2.7	7.4	1.2	33.6	3.0
	Count	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
	Average	28.7	12.1	25.6	128.4	41.5	1.7	6.9	0.6	10.9	1.2
SW-GL-B	Minimum	32.0	8.6	0.2	64.6	29.8	0.1	6.9	0.6	1.2	0.5

Sample Location	Statistic	Alkalinity - Total (as CaCO3) (mg/L)	Calcium - Dissolved (mg/L)	Chloride (mg/L)	Conductivity - Lab (µS/cm)	Hardness Dissolved (as CaCO3) (mg/L)	Iron - Dissolved (mg/L)	pH - Lab (pH units)	Potassium Dissolved (mg/L)	Sodium Total (mg/L)	Sulphate (as SO4) (mg/L)
Genessee Lake	Maximum	38.8	11.7	0.2	86.6	39.8	2.8	7.6	0.8	1.4	0.7
	Count	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
	Average	36.3	10.3	0.2	76.6	35.9	0.8	7.3	0.7	1.3	0.6
SW-TR UWB 5	Minimum	1.0	2.1	0.5	31.9	8.2	0.8	4.3	0.1	0.7	0.3
	Maximum	1.6	8.4	2.5	67.2	31.6	3.8	4.9	0.4	3.0	0.9
	Count	2.0	6.0	3.0	6.0	6.0	6.0	6.0	4.0	6.0	3.0
	Average	1.3	5.1	1.3	47.5	19.2	2.4	4.6	0.2	1.8	0.6
Mean of surface water values	Minimum	1.0	2.1	0.1	8.0	8.0	0.0	4.3	0.1	0.7	0.3
	Maximum	167.0	53.3	1420.0	4190.0	224.0	8.0	8.2	26.6	844.0	70.4
	Count	21	21	21	21.0	21	21	21	21	21	21
	Average	37.7	12.9	4.7	102.4	47.7	0.7	6.9	1.8	4.6	3.2
Mean of shallow ground water values[1]	Minimum	16.9	3.4	0.2	39.7	13.5	<0.1	6.2	0.4	1.6	0.9
	Maximum	423.0	92.0	41.7	782.0	404.0	3.6	9.5	8.4	380.0	189.0
	Count	42.0	42.0	40.0	42.0	42.0	37.0	42.0	42.0	12.2	7.3
	Average	167.8	39.0	1.9	321.8	138.5	0.7	7.7	2.8	12.2	11.9
Mean of deep ground water values[2]	Minimum	18.1	67.5	20.4	662	217	<0.010	7.25	0.7985	23.2	0.4
	Maximum	431	551	1260	4310	1420	1.53	8.61	8.95	440.0	513
	Count	17	17	17	17	17	17	17	17	17	17
	Average	132	205.4	366.0	1935	562	0.1716	7.80	3.51	180.2	252

Notes:

Chloride, Conductivity and Sodium values averages exclude road salt impacted result from SW-17.

The maximum groundwater values of 380 mg/L sodium and 189 mg/L sulphate are likely a byproduct of bentonite hydration in one monitoring well (23-AEX-25) and have been removed for the calculation of average for sodium and sulphate.

Capital B in sample location indicates bottom or deep sample, taken at the same location as the sample without the B.

[1] calculated from results reported in WSP (2024b) up to fall 2024.

2 calculated from results reporting in WSP (2025b)

Table 6-2: Summary of Groundwater Electrical Conductivity with Depth from Borehole Geophysical Profiles

Depth Interval	Average Electrical Conductivity results (µS/cm) and pumping condition during profiling																	
	BH22-05	BH22-10	BH22-11		BH22-16	BH22-17	BH22-20	BH22-23	BH22-24	BH--27	BH22-27A	BR-073	BR-145		BR-228	BR-395	BR-492	BR-605
	static	static	static	pumping	static	static	static	static	pumping	static	pumping	pumping	static	pumping	static	pumping	pumping	static
0-100	1613	786	2044	2416	1097	681	2259	547	726	49	221	851	690	881	845	292	285	741
100-200	1655	1096	2081	2466	1114	678	3633		744			847	617	752	828	291	344	575
200-300	1700	1199	2116	2215	2291	664	3980					842	1111	989	832	346	375	629
300-400	1827		2113	1603	2546	659						836	7510	7070	835	496	370	4195
400-500					3069							841	9081	8718	836			6685
500+					3208							861	9665	9244	832			
Depth (m) at which conductivity >1,000 (µS/cm)	1.6	117	1.5	(-)[1]	6.0	(-)[2]	10.7	(-)[3]	(-)[4]	(-)[5]	(-)[6]	(-)[7]	285.7	288.7	(-)[8]	(-)[9]	(-)[10]	297.2

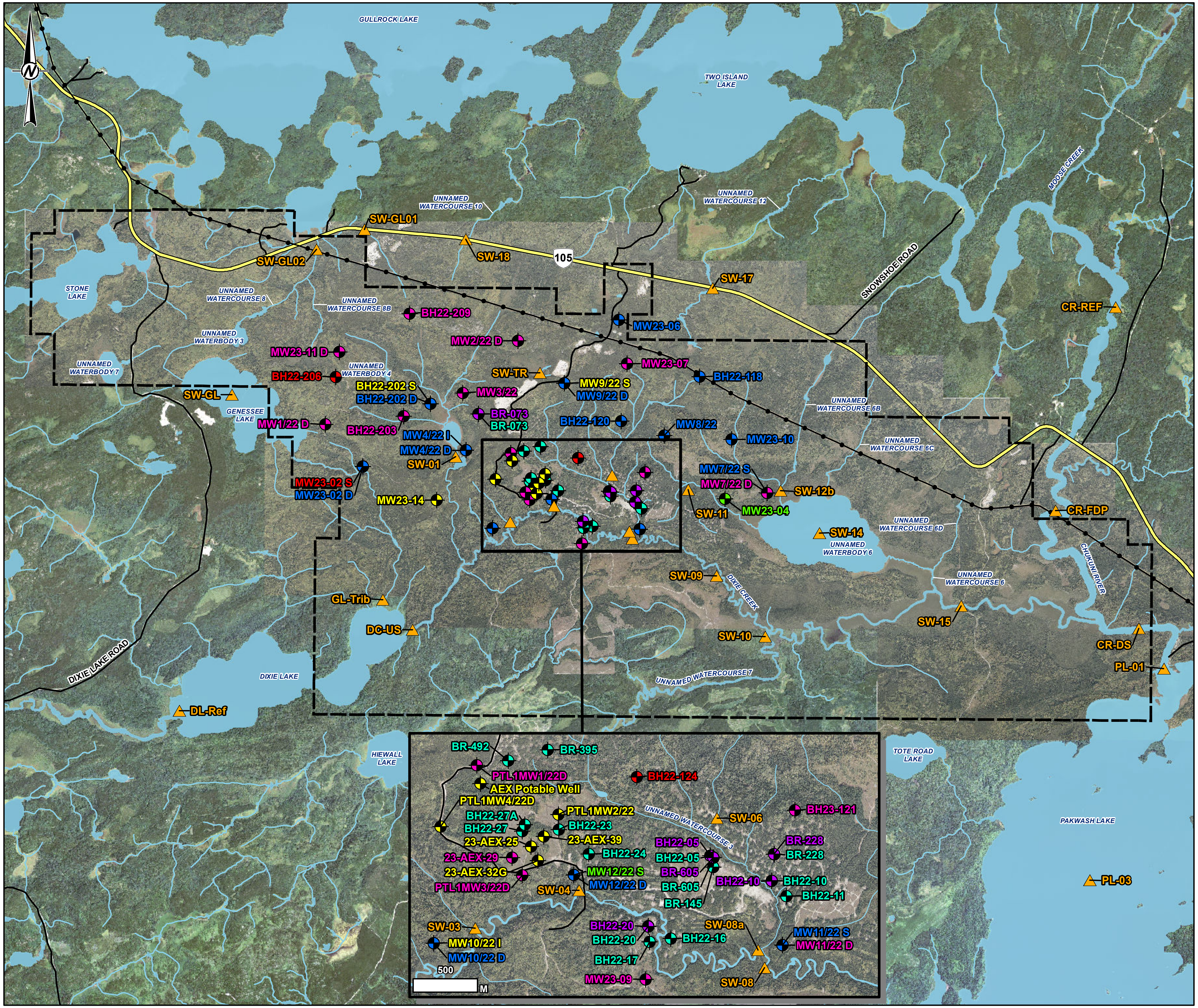
Notes:

1 EC is continually above 1,000 (µS/cm) at first measurement depth of 13.2 m bgs
2 EC does not reach 1,000 (µS/cm) along borehole
3 EC does not reach 1,000 (µS/cm) by end of borehole at 98.0 m bgs
4 EC does not reach 1,000 (µS/cm) by end of borehole at 133.7 m bgs
5 EC does not reach 1,000 (µS/cm) by end of borehole at 50.7 m bgs
6 EC does not reach 1,000 (µS/cm) by end of borehole at 59.1 m bgs
7 EC does not reach 1,000 (µS/cm) by end of borehole at 672.8.1 m bgs
8 EC does not reach 1,000 (µS/cm) by end of borehole at 518.6 m bgs
9 EC does not reach 1,000 (µS/cm) by end of borehole at 341.0 m bgs
10 EC does not reach 1,000 (µS/cm) by end of borehole at 312.5 m bgs.

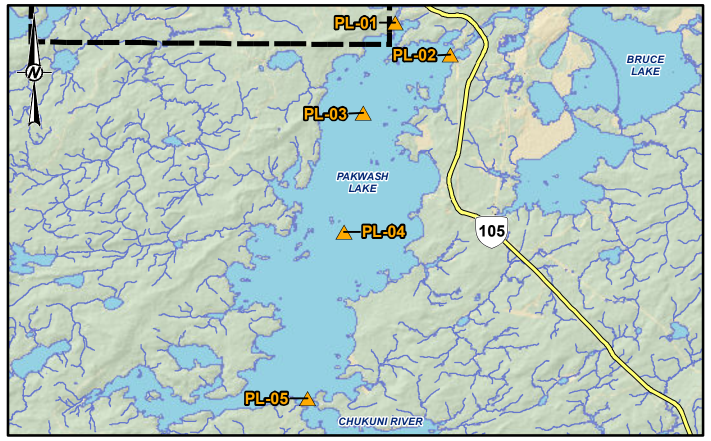
Table 6-3: Summary of sample analysis results from deep groundwater sampling

Sample ID	Vertical Depth of Sample (m)	pH	Chloride (mg/L)	Total Phosphorous (mg/L)	Sulphate as SO_4 (mg/L)	Dissolved Aluminum (mg/L)	Dissolved Iron (mg/L)	Dissolved Tungsten (mg/L)	Dissolved Zinc (mg/L)
WQG PAL Benchmark	-	6.5 – 8.5	120	0.03	218	0.075	1	0.03	0.023
BH22-05-50	50.8	7.92	**123**	0.0136	**464**	0.00977	<0.010	0.0299	<0.0010
BH22-05-50 DUP	50.8	7.89	117	0.0171	**446**	0.00808	<0.010	**0.0303**	<0.0010
BH22-05-150	150.0	7.91	**124**	0.0224	**470**	0.00814	<0.010	**0.0304**	<0.0010
BH22-05-290	290.0	7.83	**141**	0.0264	**513**	0.0106	<0.010	**0.0322**	<0.0010
BH22-10-100	99.7	8.46	**275**	0.0266	103	0.0185	0.023	**0.0424**	<0.0010
BH22-10-100-DUP	99.7	**8.54**	**294**	0.0271	113	0.0169	0.0209	**0.0411**	<0.0010
BH22-10-200	199.4	**8.61**	**201**	**0.0365**	58.4	0.026	0.057	**0.0447**	<0.0010
BH22-20-50	50.2	7.79	**779**	0.0118	**344**	0.00909	0.115	**0.0379**	<0.0010
BH22-20-125	125.6	7.52	**885**	0.0131	**397**	0.00729	0.0812	**0.0379**	<0.0010
BH22-20-205	205.7	7.25	**934**	0.00561	**415**	0.00417	0.0967	**0.0368**	<0.0010
BR-073-100	99.6	7.66	60.8	0.0201	**286**	0.00324	<0.010	**0.0587**	<0.0010
BR-073-275	275.8	7.65	60.6	**0.0328**	**286**	0.00508	<0.010	**0.0659**	<0.0010
BR-073-439	441.2	7.71	61.7	0.0325	**291**	0.00499	<0.010	**0.0628**	<0.0010
BR-228-100	100.3	8.16	20.4	0.00739	0.366	0.00301	<0.010	**0.123**	0.00163
BR-228-275	275.2	7.89	33.2	0.011	68.7	**0.0861**	**1.53**	0.0224	**0.0452**
BR-228-400	400.3	7.92	34.8	0.00863	67.9	**0.13**	0.915	0.0252	**0.0455**
BR-605-75	75.4	8.32	61.4	**0.0369**	101	0.0135	<0.010	**0.0603**	0.00112
BR-605-225	225.3	8.01	**1260**	0.0162	209	0.0128	<0.010	**0.204**	<0.0010
BR-605-378	378.4	7.84	**1160**	0.0182	215	0.0125	<0.010	**0.111**	<0.0010

Notes:
Bold text indicates concentration above WQP PAL benchmark



PAKWASH LAKE SURFACE WATER QUALITY SAMPLE LOCATIONS



SCALE 1:325,000

LEGEND

- PROPERTY BOUNDARY
- HIGHWAY
- LOCAL ROAD
- EXISTING TRANSMISSION LINE
- WATERCOURSE
- WATERBODY
- SURFACE WATER QUALITY SAMPLE LOCATION
- DEEP GROUNDWATER ELECTRICAL CONDUCTIVITY PROFILE

GROUNDWATER QUALITY SAMPLE LOCATION

STRATIGRAPHIC UNIT

- SHALLOW BEDROCK
- DEEP BEDROCK
- GLACIOLACUSTRINE
- SAND
- SILT
- TILL

0 1 2 4
1:71,000 KILOMETRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. AERIAL IMAGERY PROVIDED BY GREAT BEAR RESOURCES (SCENE DATE: SEPTEMBER 2022).
3. PROPERTY BOUNDARY PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2024.
4. ROADS INFORMATION PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2022.
5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

TITLE
GROUNDWATER AND SURFACE WATER QUALITY SAMPLING LOCATIONS

CONSULTANT

wsp

YYYY-MM-DD	2025-06-06
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
CA0031272	0001	A	6-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm

PATH: X:\CA\OAK\300-OAK\MS-FS1-Project\2022\Projects\CMEMA2303_Kinross_Great_Bear_Envt\7_GIS\HydroGeoBaseline_2024\MXD\Water_Quality_Sample_Locs_4.mxd PRINTED ON: 2025-06-06 AT: 10:29:36 AM

7 GROUNDWATER SURFACE WATER INTERACTION

Groundwater - surface water interactions at the site consists of both groundwater discharge to surface at locations such as Dixie Creek, Pakwash Lake, Gullrock Lake and their tributaries (among others) and groundwater recharge to the system along the inferred groundwater recharge areas in the north part of the property site that coincide with the topographic high ground and areas where surficial deposits consist of glacial sands. These glacial sands are capable of absorbing much more precipitation and snowmelt than the glaciolacustrine deposits which are found in the lower laying areas, such as the valley that hosts Dixie Creek and the wetlands downstream of the Project site. Groundwater discharge to surface water features is ultimately driven by this recharge.

The large area of glaciolacustrine deposits, located in the lower lying areas, generally below about 380 masl elevation (Figure 3-1A), are anticipated to severely limit the hydraulic connection between surface water features such as lower reaches of Dixie Creek, Unnamed Watercourse 3, Unnamed Course 6A, and Unnamed Watercourse 7 and almost all Unnamed Watercourses 5, 7A and 13, which flow almost entirely on clayey sediments. Evidence of this can been seen from the ephemeral nature of several of the smaller tributaries being observed to stop flowing during dry and winter conditions (Section 4.5) and the lack of gaining conditions in Dixie Creek, an indication that they are not as well connected to the shallow groundwater. Similarly, observations made from Infrared (IR) drone surveys in September of 2023 under dry conditions and September 2024 under wet conditions of parts of Dixie Creek, Unnamed Watercourse 7A and the south shore of Unnamed Waterbody 6 (Figure 7-1A and Figure 7-1B), with possibly one exception (discussed below) did not find areas of noticeable groundwater upwelling in the glaciolacustrine areas.

Groundwater - surface water interactions can also be affected by the presence of surficial clays in local areas at higher elevations as well, as evidenced by Unnamed Waterbody 1, which sits atop an area of organics / glaciolacustrine clay that is disconnected from the larger clay plain. Water levels in this lake are typically about 10 m higher than groundwater levels observed at nearby MW4/22 which is screened in the sand and gravel till below the clay. The likely perched nature of this lake means that the lake may recharge the groundwater system but this recharge will be limited by the clay which the lake sits atop.

Groundwater may also act interact with surface water as seeps and overland flow at some locations. Evidence of this can be seen in several small creeks that appear to originate close to the contact of the glaciofluvial and glaciolacustrine sediments, i.e., lower portion of Unnamed Watercourse 2, Unnamed Watercourse 2 and Unnamed Watercourse 4. These small tributaries, which sit primarily atop the glaciolacustrine clays see sustained groundwater flows relative to their surface water catchment size which suggests that they could be fed by springs along the base of the glaciofluvial sediments.

Two small gaps in the glaciolacustrine cover have also been identified in the bed of Dixie Creek near the Project site, where step wise drops in elevation cause cascades in the otherwise flat and meandering creek. Drilling near these sites, along with geophysical lines along the north side of the creek, indicate that these are areas of bedrock highs and till outcropping. Neither the bedrock nor the till are strong aquifers, and as such groundwater-surface water interaction at these features is expected to be poor. This expectation is consistent with flows measurements in September 2023 (Table 4-4) and infrared drone surveys (Section 4.4) that indicated only weak to no gaining conditions in this section of the creek. This includes sections of the creek where faults and shear zones pass close to or under the creek which do not appear to have groundwater seeps in the infrared drone surveys.

A much stronger hydraulic connection between groundwater and surface water is suspected much further downstream of the site, where a north-south orientated esker crosses Dixie Creek at the Tote Road bridge between the confluences of Dixie Creek and Unnamed Watercourse 6 and the Chukuni River, where potentially productive esker sands are present in close proximity to the creek and are noted on the south bank of the creek near bridge.

Groundwater flow around much of the project site is anticipated to follow the topography, being a muted expression of it, with the greatest flows being within the sands / glacial till that are in contact with the bedrock (depending on location). This is because the bulk of the bedrock at the Project site is expected to have a relatively low hydraulic conductivity which will significantly limit the movement of groundwater through it. Bedrock ridges, in particular, appear to have lower hydraulic conductivities than bedrock elsewhere, and where they cut through the overburden to surface, are expected to prevent groundwater flow. The bedrock topography is illustrated in Figure 5-5, with the main bedrock ridges located as follows:

- Watershed divide between Dixie Creek and the Chukuni River to the north and northwest
- Watershed divide between Dixie Creek and Unnamed Watercourse 1
- Watershed divide between Unnamed Watercourse 3 / Unnamed Watercourse 6 and Dixie Creek
- Watershed divide between Dixie Creek and Unnamed Watercourse 7A.

The ridges of low permeability bedrock would funnel groundwater flow into areas of lower bedrock topography that contain more permeable till units, however, as these are effectively capped by clay sediments, there are few outlets for groundwater once it enters these till sediments, which should result is relatively limited groundwater movement. As such groundwater pressures are expected to essentially backup, sometimes resulting in artesian pressures low lying areas, until they spill from the till aquifers where the glaciolacustrine sediments terminate, mostly along the Tote Road and Tuzyk's Road eskers, where the eskers are at lower elevations, like they are near the Tote Road Bridge, downgradient of the site, and where the Tuzyk's Road esker crosses the catchment area of Unnamed Watercourse 1.

7.1 NATURAL SPRINGS

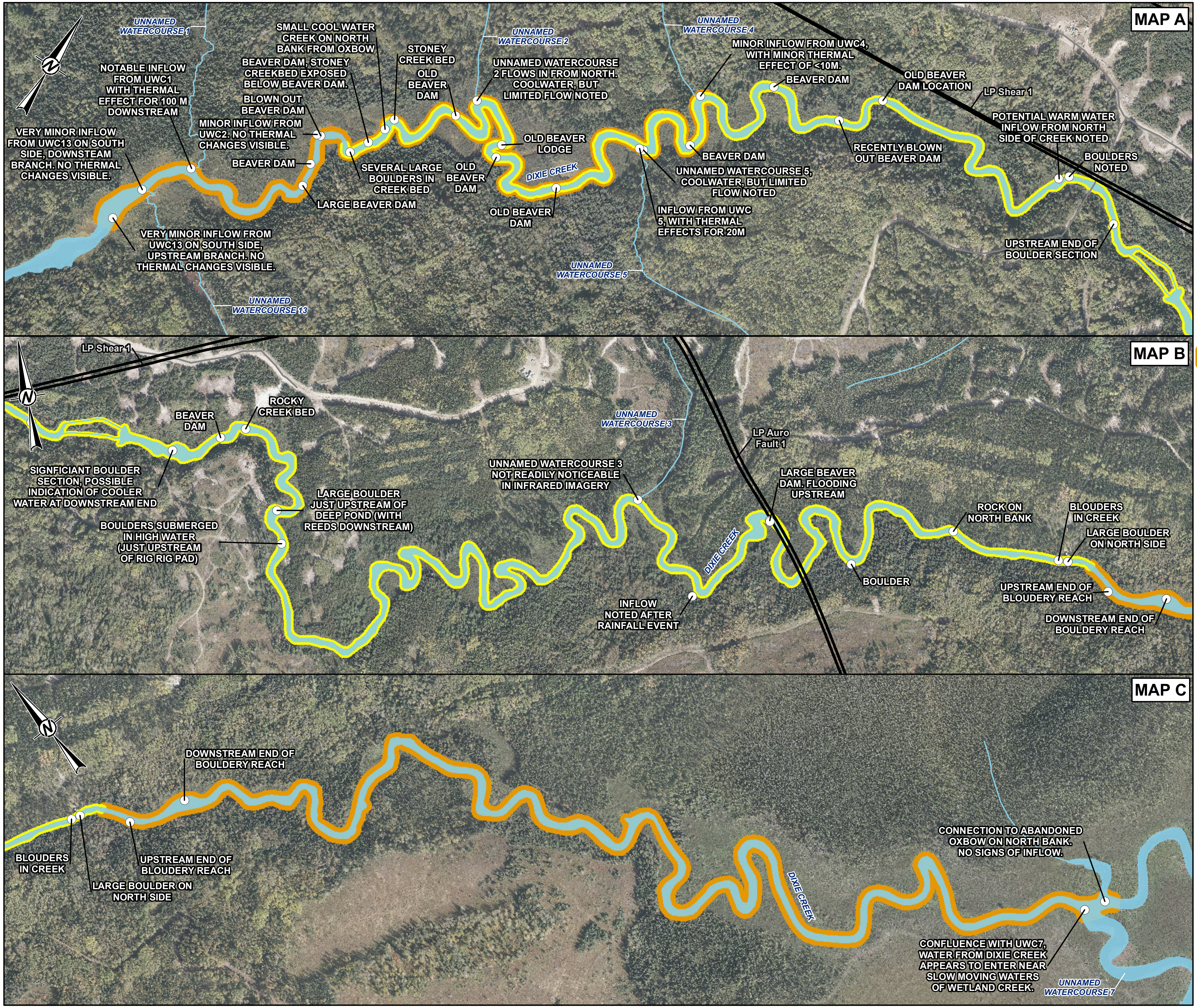
To date, no discrete natural springs have been located at the property. This is likely due to hydrogeology not being conducive to spring development due to the widespread presence of low permeability surficial clay and deeper layers in the subsurface that would generally preclude the formation of discrete conduits for groundwater flow that could express on surface as identifiable springs. However, some areas of visible groundwater upwelling, in the form of "boiling" sands have been observed in the Unnamed Watercourse 1 (above Unnamed Waterbody 1), likely where sand sediments are present in the tributary bed. Based on a comparison of the geology of this setting to other areas of the site, and areas with upward gradients, such phenomenon might also be present in the upper reaches of Unnamed Tributaries 2 and 4 and middle reach of Unnamed Tributary 1.

7.2 DEEP GROUNDWATER FLOW SYSTEM

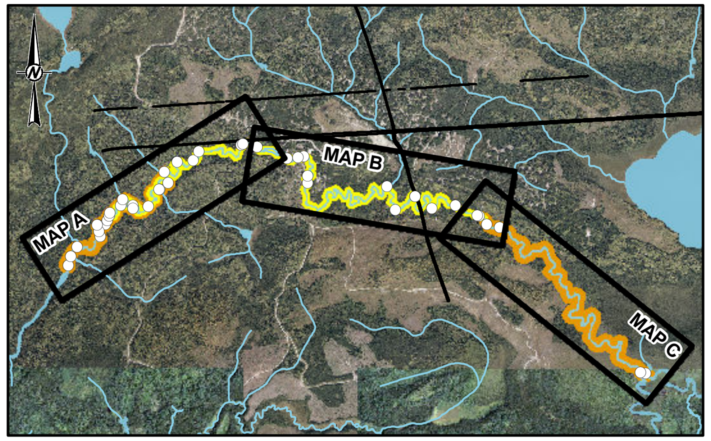
There is almost no groundwater flow expected to discharge from the deep groundwater system to surface water due to the very low hydraulic conductivities of the bedrock, and the presence of much more permeable groundwater pathways in the overlying sand and gravel and till units, which would be preferential for groundwater flow. Some deep faults have been idented at the site, but their occurrence is sparse, and they are not associated with areas of groundwater discharge where they cross local creeks to suggest they are significant conduits for the transmission of deep groundwater.

The groundwater quality of the waters in the deep groundwater system also reflects limited groundwater movement. The electrical conductivity at depth can be significantly higher than found in the shallow groundwater or surface water (Section 6.2). Average electrical conductivity from groundwater sampling in monitoring wells completed in the shallow groundwater system is 321 μS/cm (Table 6-1) which is far less than the several thousand μS/cm recorded in the deep groundwater (Table 6-2). The highest EC values recorded at depth are indicative of essentially no groundwater flushing by fresh water at these depths, and the lack of surface water and shallow groundwater chemistry results displaying similarly high electrical conductivity to that found in the deep groundwater in an indication there is very little interaction between the deep groundwater system and than either the shallow groundwater system or surface water.

Further evidence of the minimal mixing between the deep groundwater and shallower waters is the lack of identified mineral springs on the property. No mineral seeps have been found on site, either by terrestrial survey crews (Northern Bioscience, 2024) or other field staff, also indicating that the deep groundwater system plays little role in the shallow groundwater or surface water flow systems.



KEY MAP



SCALE 1:75,000

LEGEND

- POINT OF INTEREST
- FAULT
- DRONE SURVEY (2023)
- DRONE SURVEY (2024)
- LOCAL ROAD
- WATERCOURSE
- WATERBODY

0 100 200 400
1:8,500 METRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. AERIAL IMAGERY PROVIDED BY KINROSS (SCENE DATE: SEPTEMBER 2022).
3. ROADS INFORMATION PROVIDED BY KINROSS, AUGUST 2022.
4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

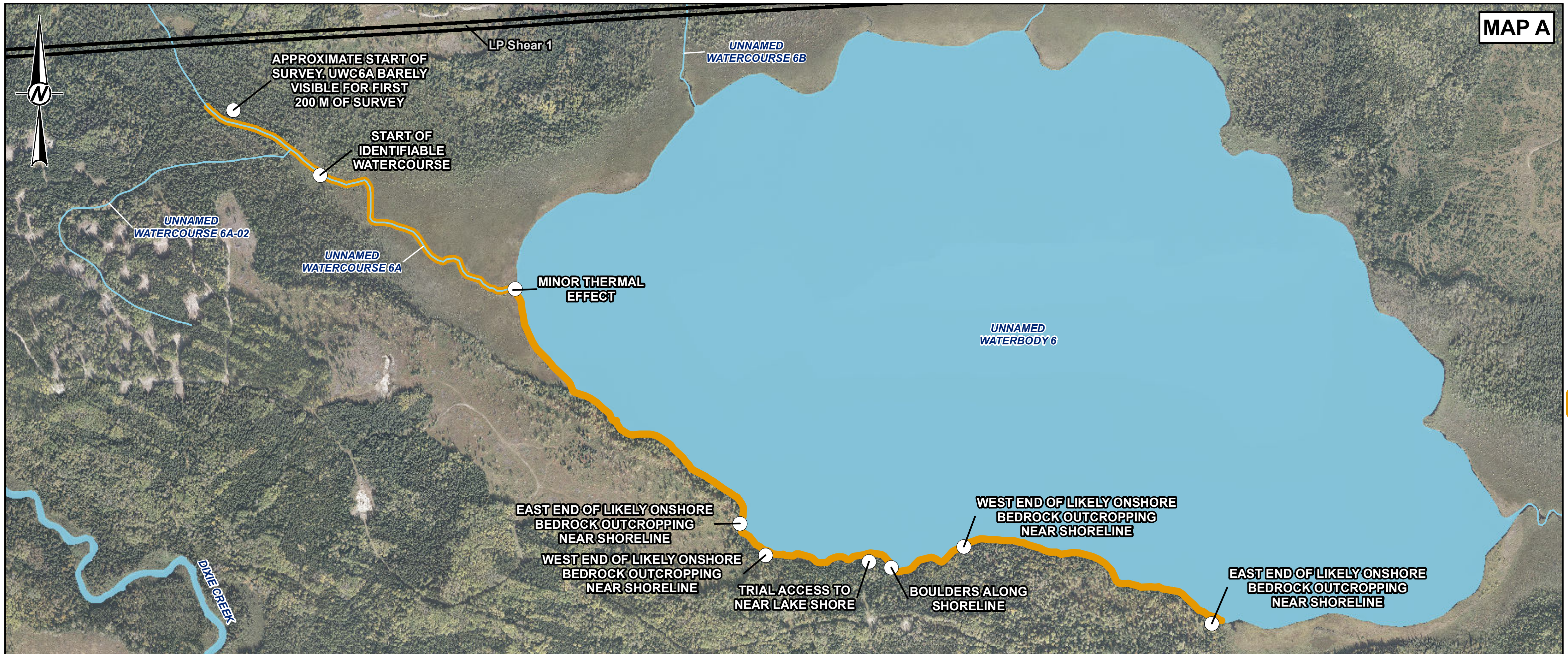
PROJECT
GREAT BEAR PROJECT

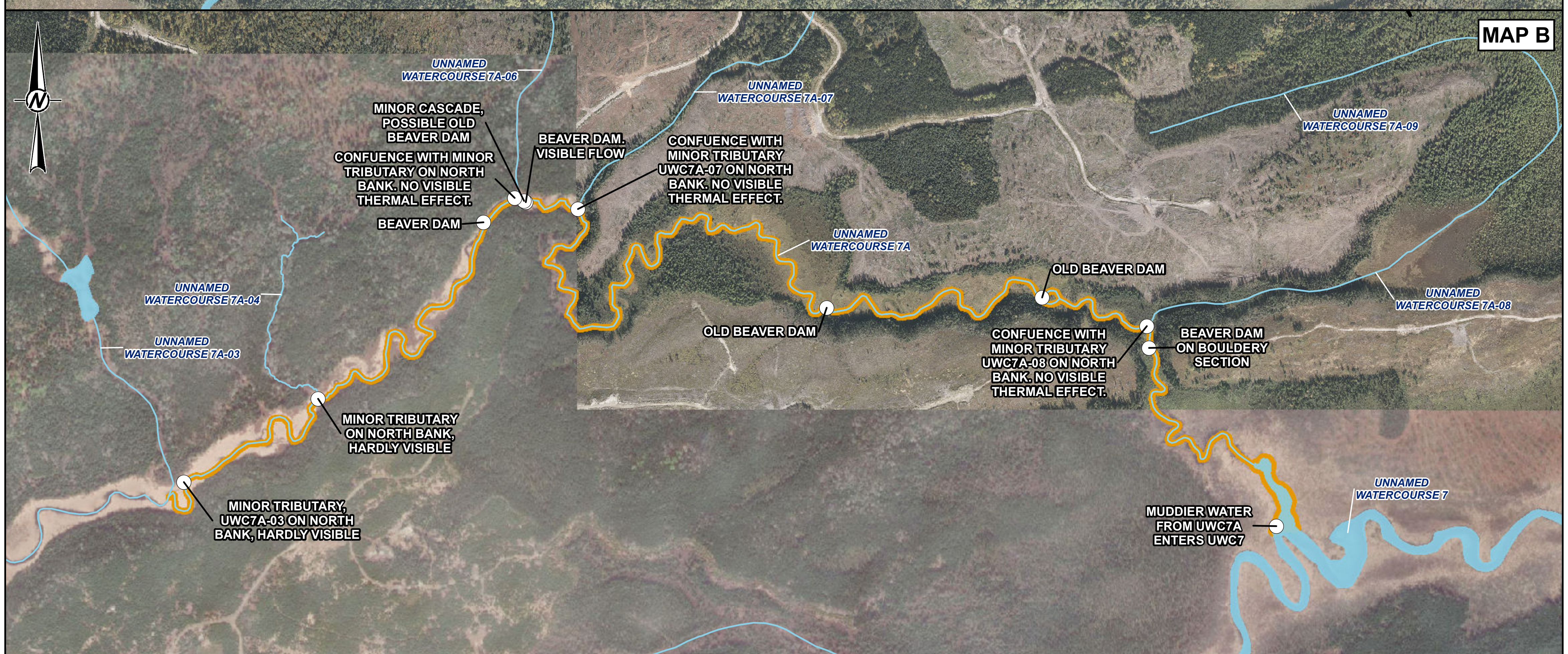
TITLE
INFRARED DRONE SURVEY LOCATION AND SUMMARY OF FINDINGS

CONSULTANT

YYYY-MM-DD	2024-11-21
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
OMEMA2303	0001	A	7-1A





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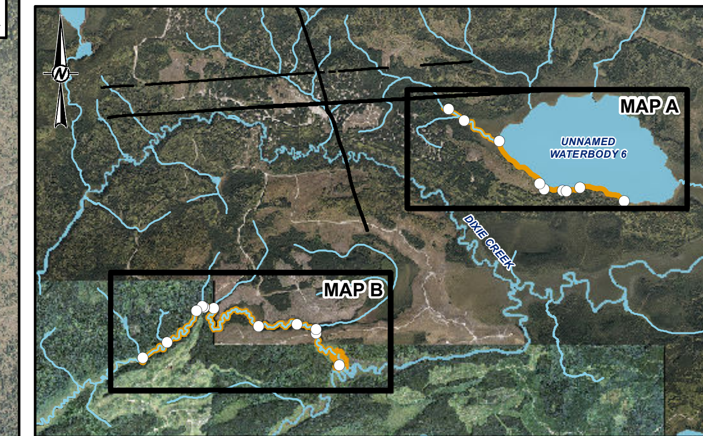

SCALE 1:100,000

LEGEND

- FAULT
- DRONE SURVEY (2024)
- WATERCOURSE
- WATERBODY

0 125 250 500
1:12,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

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CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

TITLE
INFRARED DRONE SURVEY LOCATION AND SUMMARY OF FINDINGS

CONSULTANT

YYYY-MM-DD	2024-11-21
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
OMEMA2303	0001	A	7-1B

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

8 CONCEPTUAL MODEL

The conceptual hydrogeological model for the Property is informed by the information provided in the preceding sections of this report. The illustrated major hydrostratigraphic units as well as the key discharge features are shown on Figure 8-1.

The bedrock system is typical of northern Ontario, being comprised of low permeability Pre-Cambrian, crystalline bedrock, showing decreasing hydraulic conductivity with depth. Only one fault with likely increased permeability has been identified at the site, the Auro Fault. Other geologic structures at the site are Shear Zones, for which are much less likely to be features of continuous higher hydraulic conductivity.

Locally near the area of exploration, the bedrock groundwater system has been influenced by the large number of open exploration holes, resulting in changes to the bedrock hydraulic conductivity and heads. However, even considering the faulted zone and the impacts of exploration drilling, the overall bedrock hydraulic conductivity is low in comparison to that of some overburden units, where the bulk of groundwater flow occurs.

The overburden sequence in low lying areas to the south of the site were identified as an essentially continuous glaciolacustrine layer in areas of lower elevation underlain by glacial till that rests against the upper, slightly to moderately fractured bedrock. This sequence of sediments and bedrock suggests that a local aquifer with marginal productivity for water supply exists in the glacial till sediments, which is sandwiched between low permeability units of the varved clay and deeper, more competent bedrock. Recharge and discharge through the glaciolacustrine unit is anticipated to be low given the low hydraulic conductivity of the unit.

Further to the north, at higher elevations, the glaciolacustrine sediments are absent, and glaciofluvial sediments, or exposed till and bedrock are found. The continuous sand layer to the north of the site is underlain by glacial till and is expected to act as a conduit to groundwater flow (aquifer) and can be a significant recharge zone where it is exposed at surface.

The presence of the low permeability surficial glaciolacustrine overburden sequence under Dixie Creek and lakes (Unnamed Waterbody 6, Dixie Lake, and partially Genessee Lake) also suggests that the bedrock groundwater system is most likely separated from surface water where the clays are present and, therefore, that groundwater contributions from the till to surface water features are likely minimal in these areas. This lack of interaction between the main aquifer and surface water would apply to all local minor creeks in low lying areas, including almost all of Dixie Creek and Unnamed Waterbody 6, but not include the portions of those tributaries further upstream and downstream underlain by sand or till units, particularly where the esker is present several kilometers downgradient of the site. This arrangement would suggest that many of the smaller tributaries originate from contact between the upper sands and clays, however, would only flow during periods when the water table was sufficiently high to be above the threshold elevation to support flow, explaining why flow within most local minor watercourse is seasonal, and does not support cool or cold water fish habitat, despite the presence of significant recharge areas in the watershed.

The potentiometric surface map reflects the physical processes that control the groundwater flow system. This surface map has been interpreted to reflect the following processes:

- Groundwater elevations correlate with ground surface elevations with the highest water levels generally corresponding to the topographic high areas at the north portion of the Project site. These areas are either coincident with the area of glacial sand and represent the inferred groundwater recharge area at the site or are located on bedrock highs in areas where bedrock permeability is thought to be quite low, resulting in slow drainage of water table.
- Steep groundwater gradients along the area of the bedrock ridge (both north and south) coincident with the northern drainage divide between the Dixie Creek and more northern watershed, likely reflects the lower bedrock hydraulic conductivity of this ridge area.

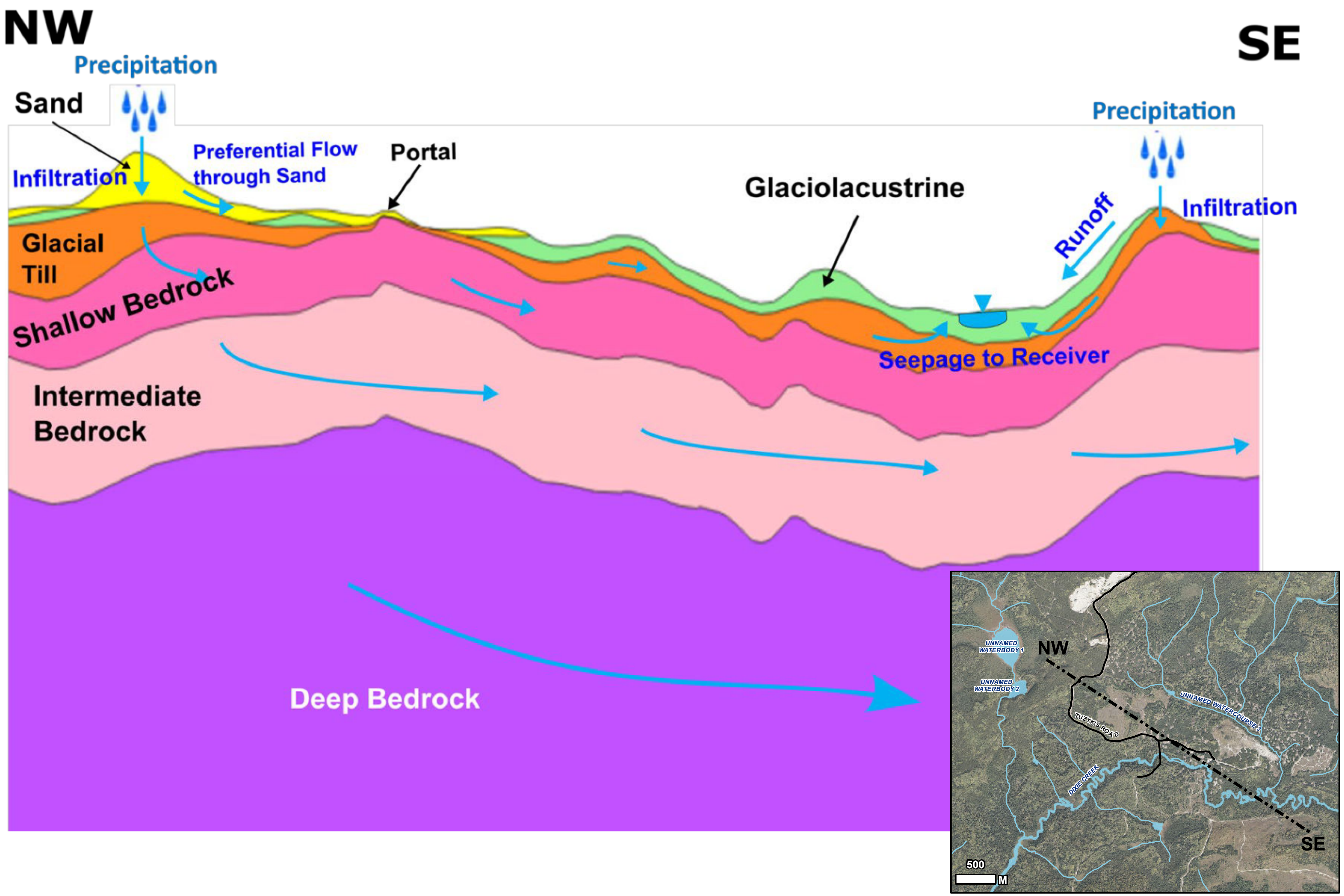
- Groundwater flow across most of the site where infrastructure is to be installed is directed primarily south and west following the general topography through a combination of:
  - Areas of thicker till under Dixie Creek / lower portion of Unnamed Watercourse 3, which both could possibly connect both to further downgradient areas via till units of moderate permeability (and a zone of higher bedrock permeability resulting from the presence of open exploration drillholes) beneath Dixie Creek to the eastern esker discharge area several kilometres downstream of the site, and locally to Dixie Creek in the two small cascade areas beneath the creek although discharge through these two areas will be limited by the permeability of the bedrock
  - Eastward groundwater flow under Unnamed Waterbody 6, likely to discharge zones associated with eastern esker discharge area, and perhaps to Waterbody 6, along the southern shoreline where bedrock is exposed
  - An area comprising the lower portion of Unnamed Watercourse 1 and upper portions of Unnamed Watercourses 2 and 4, where groundwater discharge is contributing the cool water conditions reported in these features, and the continuous, all year flow conditions in these watercourses. No other watercourses or waterbodies are classified as supporting cool or cold water fish habitats.

Outside of groundwater inputs to Unnamed Watercourse 1, 2 and 4, and possibly two the cascade areas of Dixie Creek, groundwater contributions to surface water flows are low, reflected in the ephemeral nature of flow in most minor watercourse, and the low flows recorded in Dixie Creek in the summer and winter seasons, and lack of identified cool water or cold water fish habitats or springs. Beaver dams have been demonstrated to have a much larger impact on flows than groundwater inputs, in some cases resulting in a 90% decrease in flows.

Similarly, the wetland biota mapped by terrestrial specialists (Northern Bioscience, 2024) does not identify any groundwater dependent habitats in the studied area, with most local wetlands being meadow marshes associated with beaver ponds, or low nutrient fens, bogs or marshes, which are dependent on seasonal flooding of floodplains to sustain them or localised flooding by beaver ponds to disrupt further habitat development.

In summary, topography, often controlled by bedrock ridges is one of the most important controls of regional groundwater flow across the area of the Project site, which directs water towards low lying areas, where it either discharges to local watercourses (lower portions of Unnamed Watercourse 1 and upper portions of Unnamed Watercourse 2 and 4), some local discharge areas on Dixie Creek or flows into more regional aquifers that carry water towards downgradient discharge areas, likely associated with an esker to the east of the project site. Even though the topography will drive groundwater flow towards low lying areas, the rate of groundwater flow will be low as a result of the low permeability of local hydrostratigraphic units.

Bedrock topography is also expected to have a very strong control on groundwater flows on a local sub-watershed level. Bedrock highs are frequently found to form the basis of ridges between watersheds and subwatersheds, many of which have an approximate east-west orientation and because they interrupt the continuity of overburden aquifers can be expected to restrict groundwater flow perpendicular to them.



LEGEND

NOTE(S)

REFERENCE(S)

CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

TITLE
GROUNDWATER CONCEPTUAL MODEL

CONSULTANT

YYYY-MM-DD	2024-11-21
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
OMEMA2303	0001	A	8-1

9 REFERENCES

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- WSP, 2024f. Great Bear Project Draft Interim Ambient Air Baseline Monitoring Report. August 2024. -DRAFT.
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- WSP, 2025b. Deep Groundwater Sampling results from the Great Bear Project. Memo. DRAFT.

Appendix A
Water Supply Well Records

UTM 15 Z 467455 E 52K

19 R 5631101 N

Elev. 19 R 1160

Basin 51

The Ontario Water Resources Commission Act

MAR 31 1966   355

ONTARIO WATER RESOURCES

WATER WELL RECORD

~~County or~~ District ~~Ray~~ KENORA Township, Village, Town or City UNSURVEYED ~~Pakwash Lake~~

Con. .... Lot .... Date completed 12 (day) MAY (month) 1966 (year)

[redacted]dress PAKWASH LAKE CAMP

Casing and Screen Record

Inside diameter of casing 2"

Total length of casing ~~31~~ 29'

Type of screen 2" 60 MESH

Length of screen 27"

Depth to top of screen 29'

Diameter of finished hole 2"

Pumping Test

Static level ~~31'~~ 6'

Test-pumping rate 4 G.P.M.

Pumping level 8'

Duration of test pumping 1 hr

Water clear or cloudy at end of test Clear

Recommended pumping rate 4 G.P.M.

with pump setting of 22' feet below ground surface

Well Log

Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	Kind of water (fresh, salty, sulphur)
~~OVER BURDEN~~	~~0~~	~~31'~~	31'	fresh
~~CLAY~~	0	17		
~~QUICK SAND~~	17	31		
~~soft putty clay~~	31			
Blue clay	0	17		
soft putty	17	20		
quicksand	20	31		

For what purpose(s) is the water to be used? Tourist CAMP

Is well on upland, in valley, or on hillside? UPLAND

Drilling or Boring Firm Community Well Drilling

Address 907 1st SOUTH KENORA

Licence Number 1987

Name of Driller or Borer ALLAN WOLFRAME

Address 508 6th AVE SOUTH KENORA

Date MAY 12 1966

Allan Wolframe
(Signature of Licensed Drilling or Boring Contractor)

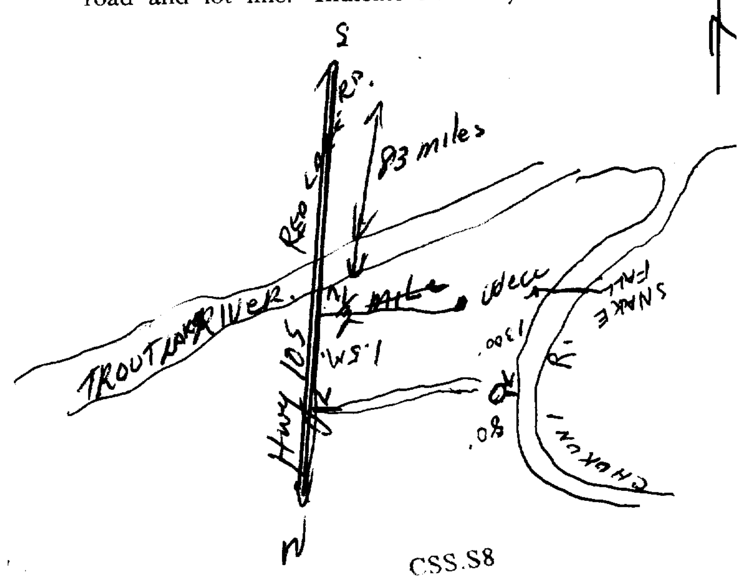
Form 7 15M-60-4138

S.U

OWRC COPY

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



CSS.S8

MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act   N.T.S. 52K/NW R

WATER WELL RECORD

Ontario

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 3101086 | MUNICIP. 31149 | CON.

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT 25-27
KENORA	Cullock Lake (Unsurveyed) South of HEYSON Township	Branch B. 6I	~~N11~~

[redacted] Box 527 RED LAKE, ONT.

DATE COMPLETED 48-53: DAY 06 MO 09 YR 76

[redacted]4/1000 | RC 7 | ELEVATION 1200 | RC 7 | BASIN CODE 51

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	TO
Brw.	Clay			0	26
White Sand and boulders				26	35
Grey Hardpan				35	45
Black Rock				45	80
pink and	Black Rock			80	110

31 | 0026605 | 00351 2813 | 0045214 | 0080826 | 0110726

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0106ft	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	TO
06	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	0045
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☒ BAILER | PUMPING RATE ___ GPM | DURATION OF PUMPING 01 HOURS 15 MINS

STATIC LEVEL: 023 FEET | WATER LEVEL END OF PUMPING: ~~Recovery 3 1/2 G.P.M.~~ | WATER LEVELS DURING 1 ☐ PUMPING 2 ☐ RECOVERY: 15 MINUTES / 30 MINUTES / 45 MINUTES / 60 MINUTES

IF FLOWING, GIVE RATE ___ GPM | PUMP INTAKE SET AT ___ FEET | WATER AT END OF TEST 1 ☐ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE ☐ SHALLOW ☒ DEEP | RECOMMENDED PUMP SETTING 100 FEET | RECOMMENDED PUMPING RATE 0003 ~~3 1/4~~

___ GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.

DRILLERS REMARKS:

FINAL STATUS OF WELL 1: 1 ☒ WATER SUPPLY, 2 ☐ OBSERVATION WELL, 3 ☐ TEST HOLE, 4 ☐ RECHARGE WELL, 5 ☐ ABANDONED, INSUFFICIENT SUPPLY, 6 ☐ ABANDONED, POOR QUALITY, 7 ☐ UNFINISHED

WATER USE 05: 1 ☐ DOMESTIC, 2 ☐ STOCK, 3 ☐ IRRIGATION, 4 ☐ INDUSTRIAL, ☐ OTHER, 5 ☒ COMMERCIAL, 6 ☐ MUNICIPAL, 7 ☐ PUBLIC SUPPLY, 8 ☐ COOLING OR AIR CONDITIONING, 9 ☐ NOT USED

METHOD OF DRILLING 1: 1 ☒ CABLE TOOL, 2 ☐ ROTARY (CONVENTIONAL), 3 ☐ ROTARY (REVERSE), 4 ☐ ROTARY (AIR), 5 ☐ AIR PERCUSSION, 6 ☐ BORING, 7 ☐ DIAMOND, 8 ☐ JETTING, 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: EVEN'S WELDING & DRILLING | LICENCE NUMBER 1924
ADDRESS: Box 414 EMO, ONT.
NAME OF DRILLER OR BORER: ROGER EVE | LICENCE NUMBER 2006
SIGNATURE OF CONTRACTOR: E. Even | SUBMISSION DATE DAY 14 MO. 9 YR. 76

OFFICE USE ONLY

DATA SOURCE 1 | CONTRACTOR 1924 | DATE RECEIVED 191076
DATE OF INSPECTION | INSPECTOR
REMARKS: CSS.S8 | P ls. | WI

letter sent & answered - map on other side

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 MOE 07-091

Ministry of the Environment

Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 3101844 | MUNICIP. 31000 | CON.

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
KENORA	UNSURVEYED	HK 249	

[redacted] 327 - Red Lake, Ont.

DATE COMPLETED: DAY 22 MO 10 YR 82

30800 | RC | ELEVATION | RC | BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Soil			0	8
Black	Granite			8	275

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
78	1 ☑ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
115	1 ☑ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
210	1 ☑ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
270	1 ☑ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼	1 ☑ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	11.5
6	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☑ OPEN HOLE		115	275
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.) | DIAMETER INCHES | LENGTH FEET

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☑ PUMP 2 ☐ BAILER	8 GPM	1 HOURS MINS

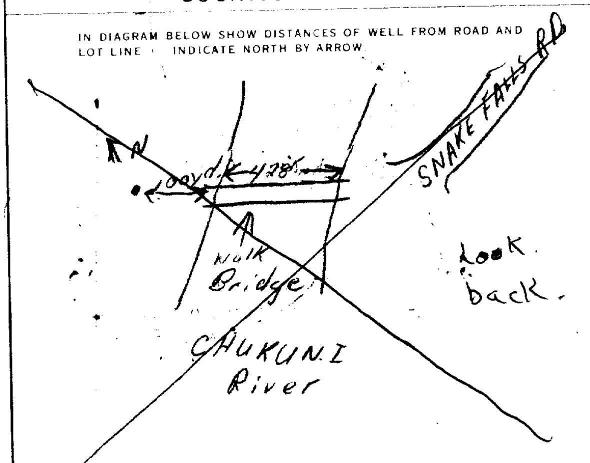
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING 1 ☑ PUMPING 2 ☐ RECOVERY: 15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
FEET	265 FEET	FEET	FEET	FEET	FEET

IF FLOWING GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	265 FEET	1 ☑ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☑ DEEP	265 FEET	6 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS: 52 K/14 N 30.8 E 67.2

FINAL STATUS OF WELL

1 ☑ WATER SUPPLY
2 ☐ OBSERVATION WELL
3 ☐ TEST HOLE
4 ☐ RECHARGE WELL
5 ☐ ABANDONED, INSUFFICIENT SUPPLY
6 ☐ ABANDONED, POOR QUALITY
7 ☐ UNFINISHED

WATER USE

1 ☐ DOMESTIC
2 ☐ STOCK
3 ☐ IRRIGATION
4 ☐ INDUSTRIAL
☐ OTHER
5 ☑ COMMERCIAL
6 ☐ MUNICIPAL
7 ☐ PUBLIC SUPPLY
8 ☐ COOLING OR AIR CONDITIONING
9 ☐ NOT USED

METHOD OF DRILLING

1 ☐ CABLE TOOL
2 ☐ ROTARY (CONVENTIONAL)
3 ☐ ROTARY (REVERSE)
4 ☐ ROTARY (AIR)
5 ☑ AIR PERCUSSION (Rotary)
6 ☐ BORING
7 ☐ DIAMOND
8 ☐ JETTING
9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Bill Morrison Water Wells | LICENCE NUMBER: 3736

ADDRESS: RR# 13 Lakeshore Dr.

NAME OF DRILLER OR BORER: Grant Ferguson | LICENCE NUMBER

SIGNATURE OF CONTRACTOR: [signature] | SUBMISSION DATE: DAY MO. YR.

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR 3736 | DATE RECEIVED 180383

DATE OF INSPECTION | INSPECTOR

REMARKS: WDE CSS. S

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506—4—77 FORM 7

The Ontario Water Resources Act

WATER WELL RECORD

Ministry of the Environment, Ontario

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 3101844 | MUNICIP. 31000 | CON.

COUNTY OR DISTRICT: KENORA | TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: UNSURVEYED | CON., BLOCK, TRACT, SURVEY, ETC.: HK249 | LOT

[redacted] 327 - Red Lake, Ont

DATE COMPLETED: DAY 22 MO 10 YR 82

21 | 15 | 467200 | 5630800 | RC. | ELEVATION | RC. | BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	TO
Brown	Soil			0	8
Black	Granite			8	275

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
78	☑ FRESH
115	☑ FRESH
210	☑ FRESH
270	☑ FRESH

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	TO
6¼	☑ STEEL	188	0	115
6	☑ OPEN HOLE		115	275

SCREEN: SIZE(S) OF OPENING (SLOT NO.) | DIAMETER INCHES | LENGTH FEET | MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

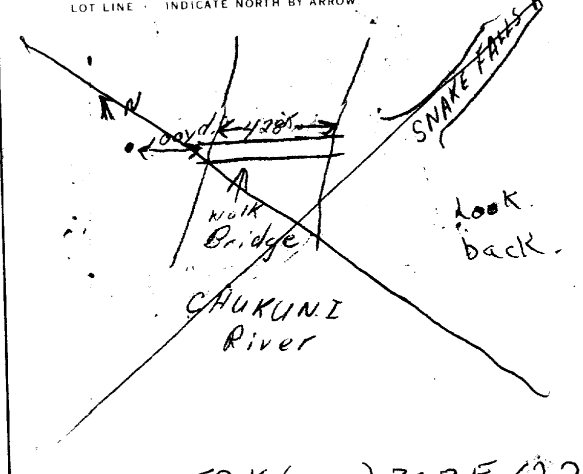
DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD	☑ AIR
PUMPING RATE	8 GPM
DURATION OF PUMPING	1 HOURS
STATIC LEVEL	
WATER LEVEL END OF PUMPING	265 FEET
WATER LEVELS DURING	☑ PUMPING
IF FLOWING GIVE RATE	
PUMP INTAKE SET AT	265 FEET
WATER AT END OF TEST	☑ CLEAR
RECOMMENDED PUMP TYPE	☑ DEEP
RECOMMENDED PUMP SETTING	265 FEET
RECOMMENDED PUMPING RATE	6 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS: 52K/14 N 30.8 E 67.2

FINAL STATUS OF WELL: ☑ WATER SUPPLY

WATER USE: ☑ COMMERCIAL

METHOD OF DRILLING: ☑ AIR PERCUSSION

CONTRACTOR

NAME OF WELL CONTRACTOR: Bill Morrison Water Wells | LICENCE NUMBER: 3736

ADDRESS: RR# 13 Lakeshore Dr.

NAME OF DRILLER OR BORER: Grant Ferguson

SIGNATURE OF CONTRACTOR: [signature]

SUBMISSION DATE: DAY ___ MO. ___ YR. ___

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR 3736 | DATE RECEIVED 180383

DATE OF INSPECTION | INSPECTOR

REMARKS: WDE CSS.S8 CSS. S

FORM NO. 0506-4-77 FORM 7

MINISTRY OF THE ENVIRONMENT COPY

Ontario | Ministry of the Environment

Measurements recorded in: [X] Metric [ ] Imperial

Well Ta... elow)
A076249

Well Record

Regulation 903 Ontario Water Resources Act

Page ______ of ______

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
Pracy ks Rd.		5	m 627

County/District/Municipality	City/Town/Village	Province	Postal Code
	Red Lake	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	15	458771	5640111		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Brown	Sand + Boulders		Loose	0	8.22
Brown	Silt		Loose	8.22	14.32
Red	Granite		Hard	14.32	16.76

Annular Space

Depth Set at (m/ft) From	Depth Set at (m/ft) To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	14.93	Stradex	

Results of Well Yield Testing

After test of well yield, water was: [X] Clear and sand free [ ] Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft): 13.71

Pumping rate (l/min / GPM): 45.46

Duration of pumping: 3 hrs + 0 min

Final water level end of pumping (m/ft): 5.79

If flowing give rate (l/min / GPM):

Recommended pump depth (m/ft): 13.71

Recommended pump rate (l/min / GPM): 45.46

Well production (l/min / GPM): 227+

Disinfected? [X] Yes [ ] No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	13.71		13.71
1	13.71	1	
2	13.71	2	
3	13.71	3	
4	13.71	4	
5	13.71	5	
10		10	
15		15	
20		20	
25		25	
30	13.71	30	
40		40	
50		50	
60	13.71	60	

Method of Construction

[ ] Cable Tool [ ] Diamond [ ] Rotary (Conventional) [ ] Jetting [ ] Rotary (Reverse) [ ] Driving [ ] Boring [ ] Digging [X] Air percussion [ ] Other, specify

Well Use

[ ] Public [ ] Commercial [ ] Not used [X] Domestic [ ] Municipal [ ] Dewatering [ ] Livestock [ ] Test Hole [ ] Monitoring [ ] Irrigation [ ] Cooling & Air Conditioning [ ] Industrial [ ] Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
26.00	Steel	0.188	0	14.93

Status of Well

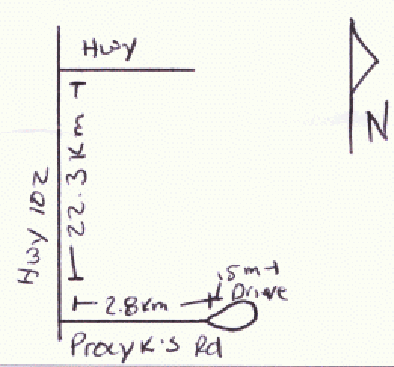
[X] Water Supply [ ] Replacement Well [ ] Test Hole [ ] Recharge Well [ ] Dewatering Well [ ] Observation and/or Monitoring Hole [ ] Alteration (Construction) [ ] Abandoned, Insufficient Supply [ ] Abandoned, Poor Water Quality [ ] Abandoned, other, specify [ ] Other, specify

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To

Map of Well Location

Please provide a map below following instructions on the back.



Water Details

Water found at Depth	Kind of Water
16 (m/ft)	[X] Fresh [ ] Untested [ ] Gas [ ] Other, specify
(m/ft)	[ ] Fresh [ ] Untested [ ] Gas [ ] Other, specify
(m/ft)	[ ] Fresh [ ] Untested [ ] Gas [ ] Other, specify

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
14.32	16.76	15.55

Well Contractor and Well Technician Information

Business Name of Well Contractor: Wolframe's Community Well Drilling

Well Contractor's Licence No.: 6947

Business Address (Street Number/Name): Box 486 Dryden

Municipality:

Province: ON | Postal Code: P8N2Z2 | Business E-mail Address:

Bus. Telephone No. (inc. area code): 8079374862 | Name of Well Technician (Last Name, First Name): Wolframe Dwayne

Well Technician's Licence No.: 0443 | Signature of Technician and/or Contractor: [signature] | Date Submitted: 20081128

Comments:

Well owner's information package delivered: [X] Yes [ ] No

Date Package Delivered: 20081125

Date Work Completed: 20081125

Ministry Use Only

Audit No. Z 91325

DEC 23 2008

Received

0506E (12/2007)

Ministry's Copy

Ontario Ministry of the Environment

Measurements recorded in: ☒ Metric ☐ Imperial

Well Tag No. (Place Sticker and/or Print Below): **A076252**

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	Well Constructed by Well Owner
	NORTHWOODS BAY RESORT		☐

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
P.O. BOX RED LAKE #402		ONT.	P0V2M0	8072223300

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
NORTHWOODS BAY RESORT.	RED LAKE	4.5 AC	68C 80FR

County/District/Municipality	City/Town/Village	Province	Postal Code
KENORA		Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	15	467434	5631411	RED 123 HK104 CHUKUNI RIVER 2387 3853	

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	To
Grey	Clay		Packed	0	9.14
Grey	Silt		Loose	9.14	13.71
					~~18.5~~
Grey	Silt & Gravel		Loose	13.71	14.78
Grey	Granite		Hard	14.78	25.90

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	15.54	Stradex	

Results of Well Yield Testing

After test of well yield, water was: ☒ Clear and sand free ☐ Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft): 18.2

Pumping rate (l/min / GPM): 340.95

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping (m/ft): 5.18

If flowing give rate (l/min / GPM):

Recommended pump depth (m/ft): 18.2

Recommended pump rate (l/min / GPM): 45.46

Well production (l/min / GPM):

Disinfected? ☒ Yes ☐ No

Draw Down Time (min)	Water Level (m/ft)	Recovery Time (min)	Water Level (m/ft)
Static Level	4.5		5.18
1	5.18	1	4.5
2	5.18	2	
3	5.18	3	
4	5.18	4	
5	5.18	5	
10	5.18	10	
15	5.18	15	
20	5.18	20	
25	5.18	25	
30	5.18	30	
40	5.18	40	
50	5.18	50	
60	5.18	60	

Method of Construction

☐ Cable Tool ☐ Rotary (Conventional) ☐ Rotary (Reverse) ☐ Boring ☒ Air percussion ☐ Other, specify ☐ Diamond ☐ Jetting ☐ Driving ☐ Digging

Well Use

☒ Public ☒ Domestic ☐ Livestock ☐ Irrigation ☐ Industrial ☐ Other, specify ☐ Commercial ☐ Municipal ☐ Test Hole ☐ Cooling & Air Conditioning ☐ Not used ☐ Dewatering ☐ Monitoring

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	To
20.00	Steel	.188	0	15.54

Status of Well

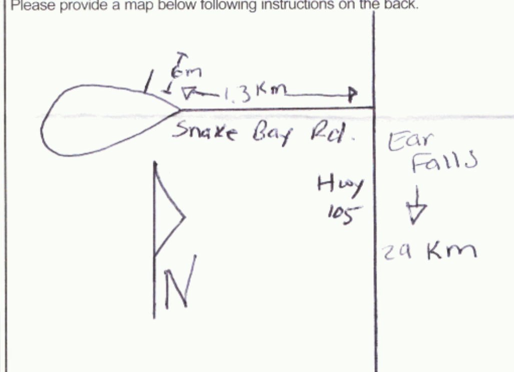
☒ Water Supply ☐ Replacement Well ☐ Test Hole ☐ Recharge Well ☐ Dewatering Well ☐ Observation and/or Monitoring Hole ☐ Alteration (Construction) ☐ Abandoned, Insufficient Supply ☐ Abandoned, Poor Water Quality ☐ Abandoned, other, specify ☐ Other, specify

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	To

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Water Details

Water found at Depth 25 (m/ft) ☐ Gas — Kind of Water: ☒ Fresh ☐ Untested ☐ Other, specify

Water found at Depth (m/ft) ☐ Gas — Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify

Water found at Depth (m/ft) ☐ Gas — Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
15.54	25.9	15.55

Well Contractor and Well Technician Information

Business Name of Well Contractor: Community Well Drilling — Well Contractor's Licence No.: 6947

Business Address (Street Number/Name): Box 486 Dryden — Municipality:

Province: ON — Postal Code: P8N 2Z2 — Business E-mail Address:

Bus. Telephone No. (inc. area code): 8079374867 — Name of Well Technician (Last Name, First Name): Wolframe Dwayne

Well Technician's Licence No.: 0443 — Signature of Technician and/or Contractor: [signature] — Date Submitted: 20090601

Well owner's information package delivered: ☒ Yes ☐ No

Date Package Delivered: 20090515

Date Work Completed: 20090515

Ministry Use Only

Audit No. Z 91334

JUN 04 2009

Received

0506E (12/2007)

Ministry's Copy

Ontario Ministry of the Environment

Well Tag (… below) **A 092029**

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

Measurements recorded in: [X] Metric [ ] Imperial

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
LOT #3 TWO ISLAND LAKE.	WILLANS.	#3	PCL 457 DPL CL 5044

County/District/Municipality	City/Town/Village	Province	Postal Code
KENORA.	RED LAKE	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	15	458696	5640168		PLAN M627

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	To
Brown	Sand		Loose	0	13.10
Red	Granite		Hard	13.10	16.76

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	14.63	Stradex	

Method of Construction

[ ] Cable Tool [ ] Diamond [ ] Rotary (Conventional) [ ] Jetting [ ] Rotary (Reverse) [ ] Driving [ ] Boring [ ] Digging [X] Air percussion [ ] Other, specify

Well Use

[ ] Public [ ] Commercial [ ] Not used [X] Domestic [ ] Municipal [ ] Dewatering [ ] Livestock [ ] Test Hole [ ] Monitoring [ ] Irrigation [ ] Cooling & Air Conditioning [ ] Industrial [ ] Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	To
20.00	Steel	.188	0	14.63

Status of Well

[X] Water Supply [ ] Replacement Well [ ] Test Hole [ ] Recharge Well [ ] Dewatering Well [ ] Observation and/or Monitoring Hole [ ] Alteration (Construction) [ ] Abandoned, Insufficient Supply [ ] Abandoned, Poor Water Quality [ ] Abandoned, other, specify [ ] Other, specify

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	To

Results of Well Yield Testing

After test of well yield, water was: [X] Clear and sand free [ ] Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft): 12.19

Pumping rate (l/min / GPM): 45

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping (m/ft): 12.10

If flowing give rate (l/min / GPM): —

Recommended pump depth (m/ft): 13.70

Recommended pump rate (l/min / GPM): 45

Well production (l/min / GPM): 175+

Disinfected? [X] Yes [ ] No

Draw Down Time (min)	Water Level (m/ft)	Recovery Time (min)	Water Level (m/ft)
Static Level	2.74		2.74
1	2.74	1	
2	2.74	2	
3	2.74	3	
4	2.74	4	
5	2.74	5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	
50		50	
60	2.74	60	2.74

Water Details

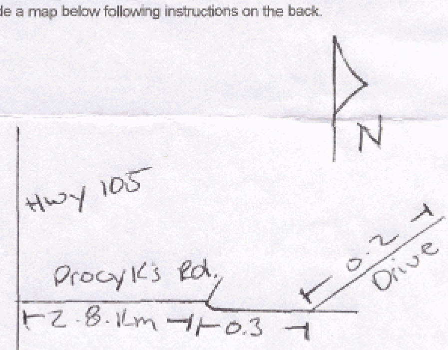
Water found at Depth	Kind of Water
16 (m/ft) [ ] Gas	[X] Fresh [ ] Untested [ ] Other, specify
(m/ft) [ ] Gas	[ ] Fresh [ ] Untested [ ] Other, specify
(m/ft) [ ] Gas	[ ] Fresh [ ] Untested [ ] Other, specify

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
13.10	16.76	15.55

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor: Wolframe's Community Well Drilling

Well Contractor's Licence No.: 6947

Business Address (Street Number/Name): Box 486 Dryden

Municipality:

Province: ON

Postal Code: P8N2Z2

Business E-mail Address:

Bus.Telephone No. (inc. area code): 8079374862

Name of Well Technician (Last Name, First Name): Wolframe Dwayne

Well Technician's Licence No.: 0443

Signature of Technician and/or Contractor: [signature]

Date Submitted: 20100628

Well owner's information package delivered: [X] Yes [ ] No

Date Package Delivered: 20100628

Date Work Completed: 20100623

Ministry Use Only

Audit No. Z116731

Received JUL 02 2010

Ontario Ministry of the Environment

Well Tag No. (Place sticker and/or print below): A 092031

Well Record

Regulation 903 Ontario Water Resources Act

Page ______ of ______

Measurements recorded in: ☒ Metric ☐ Imperial

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
Hwy 105 Two Island Lake.		2	

County/District/Municipality	City/Town/Village	Province	Postal Code
KENORA.	Red Lake.	Ontario	P0V 2M0

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	15	458643	5640092	M627 PCC-6111 + 6562 & PT 1 ON 23R6852	ON 2 Island Lake.

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Brown	Sand	Boulders	Loose	0	7.31
Red	Granite	Grey Granite	Hard	7.31	74.67

Annular Space

Depth Set at (m/ft) From	Depth Set at (m/ft) To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	8.53	Stradex	—

Results of Well Yield Testing

After test of well yield, water was:
☒ Clear and sand free
☐ Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft): 68.96.

Pumping rate (l/min / ~~GPM~~): 15.14

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping (m/ft): 26.81

If flowing give rate (l/min / GPM):

Recommended pump depth (m/ft): 76.2

Recommended pump rate (l/min / GPM): 15.14

Well production (l/min / GPM): 15.14

Disinfected? ☒ Yes ☐ No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	7.62		26.81
1	8.2	1	26.7
2	9.1	2	26.2
3	9.4	3	26
4	9.7	4	25
5	10	5	25
10	11	10	24.5
15	12	15	24.1
20	14.7	20	23.1
25	15.8	25	22.5
30	17.37	30	22.5
40	20.11	40	21.33
50	23.46	50	20.11
60	26.51	60	18.89

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☒ Air percussion
☐ Other, specify

Well Use

☐ Public ☐ Commercial ☐ Not used
☒ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
20.00	Steel	.188	0	8.53

Status of Well

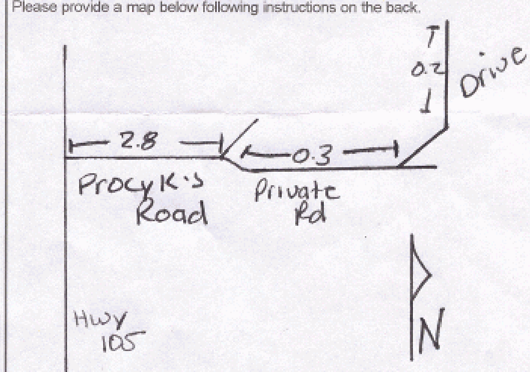
☒ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Water Details

Water found at Depth 74 (m/ft) ☐ Gas — Kind of Water: ☒ Fresh ☐ Untested ☐ Other, specify
Water found at Depth (m/ft) ☐ Gas — Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify
Water found at Depth (m/ft) ☐ Gas — Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
8.53	74.67	15.55

Well Contractor and Well Technician Information

Business Name of Well Contractor: Wolframe's Community Well Drilling
Well Contractor's Licence No.: 6947
Business Address (Street Number/Name): Box 486 Dryden
Municipality:
Province: ON
Postal Code: P8N 2Z2
Business E-mail Address: dwolframe@drytel.net.
Bus. Telephone No. (inc. area code): 8079374862
Name of Well Technician (Last Name, First Name): Wolframe Dwayne
Well Technician's Licence No.: 0443
Signature of Technician and/or Contractor: [signature]
Date Submitted: 2010 09 07

Well owner's information package delivered: ☒ Yes ☐ No
Date Package Delivered: 2010 07 29
Date Work Completed: 2010 07 29

Ministry Use Only
Audit No. Z116732
Received SEP 10 2010

Ministry's Copy

Ontario Ministry of the Environment

Measurements recorded in: ☒ Metric ☐ Imperial

Well Tag No. *(Place Sticker and/or Print Below)* A 109347

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
PROCYK'S ANGLERS PARADISE LODGE			

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
PO BOX 1100 RED LAKE		ONT.	P0V2M0	8077353349

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
Two Island Lake.	South of Williams Twp.		

County/District/Municipality	City/Town/Village	Province	Postal Code
KENORA.		Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	15	458402	5640232	RFD 198 Ref # 102369	

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	To
BROWN	SAND		LOOSE	0	2.4
GREY	GRANITE		HARD.	2.4	19.81

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	6.09	CEMENT	1m

Results of Well Yield Testing

After test of well yield, water was: ☒ Clear and sand free ☐ Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft): 13.71

Pumping rate (l/min / GPM): 45.45

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping (m/ft): 4.5

If flowing give rate (l/min / GPM):

Recommended pump depth (m/ft): 13.71

Recommended pump rate (l/min / GPM): 45.50

Well production (l/min / GPM): 136.50 +

Disinfected? ☒ Yes ☐ No

Draw Down Time (min)	Water Level (m/ft)	Recovery Time (min)	Water Level (m/ft)
Static Level	3.94		4.5
1	4.5	1	4.2
2	4.5	2	3.94
3	4.5	3	
4	4.5	4	
5	4.5	5	
10	4.5	10	
15	4.5	15	
20	4.5	20	
25	4.5	25	
30	4.5	30	
40	4.5	40	
50	4.5	50	
60	4.5	60	

Method of Construction

☐ Cable Tool ☐ Diamond ☐ Rotary (Conventional) ☐ Jetting ☐ Rotary (Reverse) ☐ Driving ☐ Boring ☐ Digging ☒ Air percussion ☐ Other, specify

Well Use

☐ Public ☐ Commercial ☐ Not used ☐ Domestic ☐ Municipal ☐ Dewatering ☐ Livestock ☐ Test Hole ☐ Monitoring ☐ Irrigation ☐ Cooling & Air Conditioning ☐ Industrial ☐ Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	To
20.00	STEEL	.188	0	6.09

Status of Well

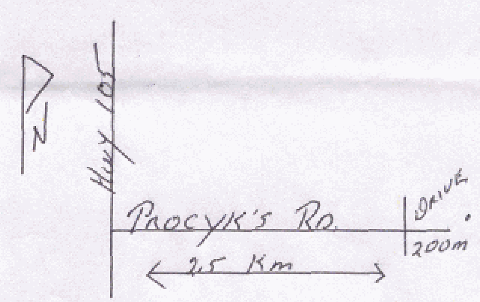
☒ Water Supply ☐ Replacement Well ☐ Test Hole ☐ Recharge Well ☐ Dewatering Well ☐ Observation and/or Monitoring Hole ☐ Alteration (Construction) ☐ Abandoned, Insufficient Supply ☐ Abandoned, Poor Water Quality ☐ Abandoned, other, specify ☐ Other, specify

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	To

Map of Well Location

Please provide a map below following instructions on the back.



Water Details

Water found at Depth 19.81 (m/ft) ☐ Gas — Kind of Water: ☒ Fresh ☐ Untested ☐ Other, specify

Water found at Depth ____ (m/ft) ☐ Gas — Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify

Water found at Depth ____ (m/ft) ☐ Gas — Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
6.09	19.81	15.55

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Wolframe's Community Well Drilling	6947

Business Address (Street Number/Name)	Municipality
P.O. Box 486, 738 Richan Rd.	Dryden

Province	Postal Code	Business E-mail Address
Ont	P8N2Z2	dwolframe@drytel.net

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
8079374862	Dwayne Wolframe.

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
0443	D. Wolframe	20110509

Comments:

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☑ Yes ☐ No	20110418	20110418

Ministry Use Only

Audit No. Z123542

Received MAY 19 2011

0506E (2007/12)

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Ontario Ministry of the Environment

Measurements recorded in: ☐ Metric ☐ Imperial

Well Tag No. (Place Sticker and/or Print Below)
A109348

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
		137 + 138	

County/District/Municipality	City/Town/Village	Province	Postal Code
Rainy River.	Mine Centre.	Ontario	

UTM Coordinates Zone Easting Northing: NAD 8 3 | 1 5 | 4 5 8 4 0 2 | 5 6 4 0 2 3 2

Municipal Plan and Sublot Number / Other: Mining Location AL149 SubDivision M75.

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	To
Grey	Granite		Hard.	0	50.29

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	6.09	Cement.	1m.

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☒ Air percussion
☐ Other, specify

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	To
20.00	Steel	.188	0	6.09

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	To

Status of Well

☒ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Results of Well Yield Testing

After test of well yield, water was:
☒ Clear and sand free
☐ Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft): 42.67

Pumping rate (l/min / GPM): 15.14

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping (m/ft): 24.07

If flowing give rate (l/min / GPM):

Recommended pump depth (m/ft): 42.67

Recommended pump rate (l/min / GPM): 22.75

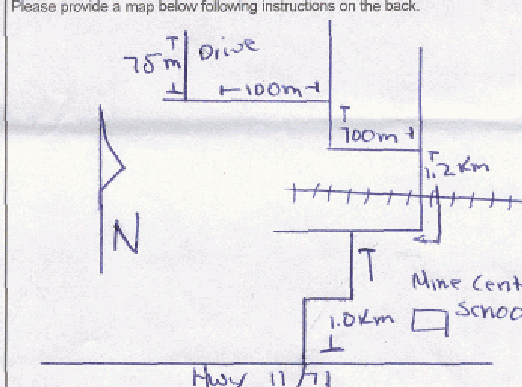
Well production (l/min / ~~GPM~~): 22.75

Disinfected? ☒ Yes ☐ No

Draw Down Time (min)	Water Level (m/ft)	Recovery Time (min)	Water Level (m/ft)
Static Level	7.92		
1	7.9	1	23.7
2	8.2	2	23.4
3	8.8	3	23.1
4	9.4	4	23.1
5	9.7	5	22.8
10	11.8	10	22.2
15	13.7	15	21.3
20	15.6	20	20.4
25	17.06	25	19.5
30	11.5	30	18.8
40	21.01	40	17.5
50	22.8	50	16.1
60	24.0	60	15.2

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Water Details

Water found at Depth	Kind of Water
50.29 (m/ft) ☐ Gas	☒ Fresh ☐ Untested ☐ Other, specify
(m/ft) ☐ Gas	☐ Fresh ☐ Untested ☐ Other, specify
(m/ft) ☐ Gas	☐ Fresh ☐ Untested ☐ Other, specify

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
6.09	50.29	15.55

Well Contractor and Well Technician Information

Business Name of Well Contractor: Wolframe's Community Well Drilling LTD

Well Contractor's Licence No.: 6 9 4 7

Business Address (Street Number/Name): P.O Box 486

Municipality:

Province: Dryden

Postal Code: P 8 N 2 Z 2

Business E-mail Address: dwolframe@drytel.net

Bus. Telephone No. (inc. area code): 8 0 7 9 3 7 4 8 6 2

Name of Well Technician (Last Name, First Name): Dwayne Wolframe

Well Technician's Licence No.: 0 4 4 3

Signature of Technician and/or Contractor: [signature]

Date Submitted: 2 0 1 1 0 5 0 9

Well owner's information package delivered	Date Package Delivered	Ministry Use Only
☒ Yes	2 0 1 1 0 4 2 0	Audit No. Z123544
☐ No	Date Work Completed: 2 0 1 1 0 4 2 0	Received MAY 19 2011

Ontario Ministry of the Environment

Well Tag No. *(Place Sticker and/or Print Below)*

Tag#: A144171

Well Record

Regulation 903 Ontario Water Resources Act

Page ______ of ______

Measurements recorded in: ☒ Metric ☐ Imperial

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
		BR-53	PCL 2628

County/District/Municipality	City/Town/Village	Province	Postal Code
Kenora	Red Lake	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	15	446424	5641875		BUG RIVER

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BROWN	SAND	SILT.	LOOSE	0	19.20
GREY	GRANITE		HARD	19.20	56.38
RED	GRANITE		MED	56.38	86.86

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	19.20	STRADEX	

Results of Well Yield Testing

After test of well yield, water was:
☒ Clear and sand free
☐ Other, specify ______

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

Well production (l/min / GPM)

Disinfected? ☒ Yes ☐ No

Draw Down Time (min)	Water Level (m/ft)	Recovery Time (min)	Water Level (m/ft)
Static Level	6		47.5
1	9	1	43
2	11.8	2	43
3	12.2	3	42.7
4	12.8	4	41.5
5	13.4	5	41.5
10	16.1	10	38.8
15	18.8	15	36.1
20	21.5	20	33.4
25	24.2	25	30.7
30	26.9	30	28
40	32.9	40	25
50	38.8	50	23.5
60	43.5	60	21.3

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☒ Air percussion
☐ Other, specify ______

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, specify ______

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	To
20.00	STEEL	.188	0	19.20

Status of Well

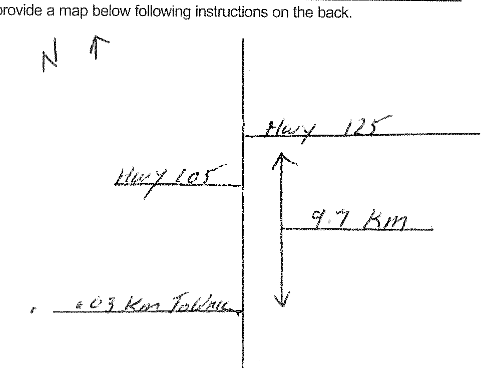
☒ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify ______
☐ Other, specify ______

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	To

Map of Well Location

Please provide a map below following instructions on the back.



Water Details

Water found at Depth 86.86 (m/ft) ☐ Gas | Kind of Water: ☒ Fresh ☐ Untested ☐ Other, specify ______

Water found at Depth ____ (m/ft) ☐ Gas | Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify ______

Water found at Depth ____ (m/ft) ☐ Gas | Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify ______

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
19.20	86.86	15.55

Well Contractor and Well Technician Information

Business Name of Well Contractor: Wolframe's Community Well Drilling

Well Contractor's Licence No.: 6947

Business Address (Street Number/Name): P.O. Box 486 738 Richan Rd

Municipality: Dryden

Province: Ont

Postal Code: P8N2Z2

Business E-mail Address: dwolframe@drytel.net

Bus. Telephone No. (inc. area code): 8079374862

Name of Well Technician (Last Name, First Name): Wolframe Dwayne

Well Technician's Licence No.: 0443

Signature of Technician and/or Contractor: [signature]

Date Submitted: 20140521

Comments:

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☒ Yes ☐ No	20140521	20140521

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Audit No. Z166271

Received JUL 07 2014

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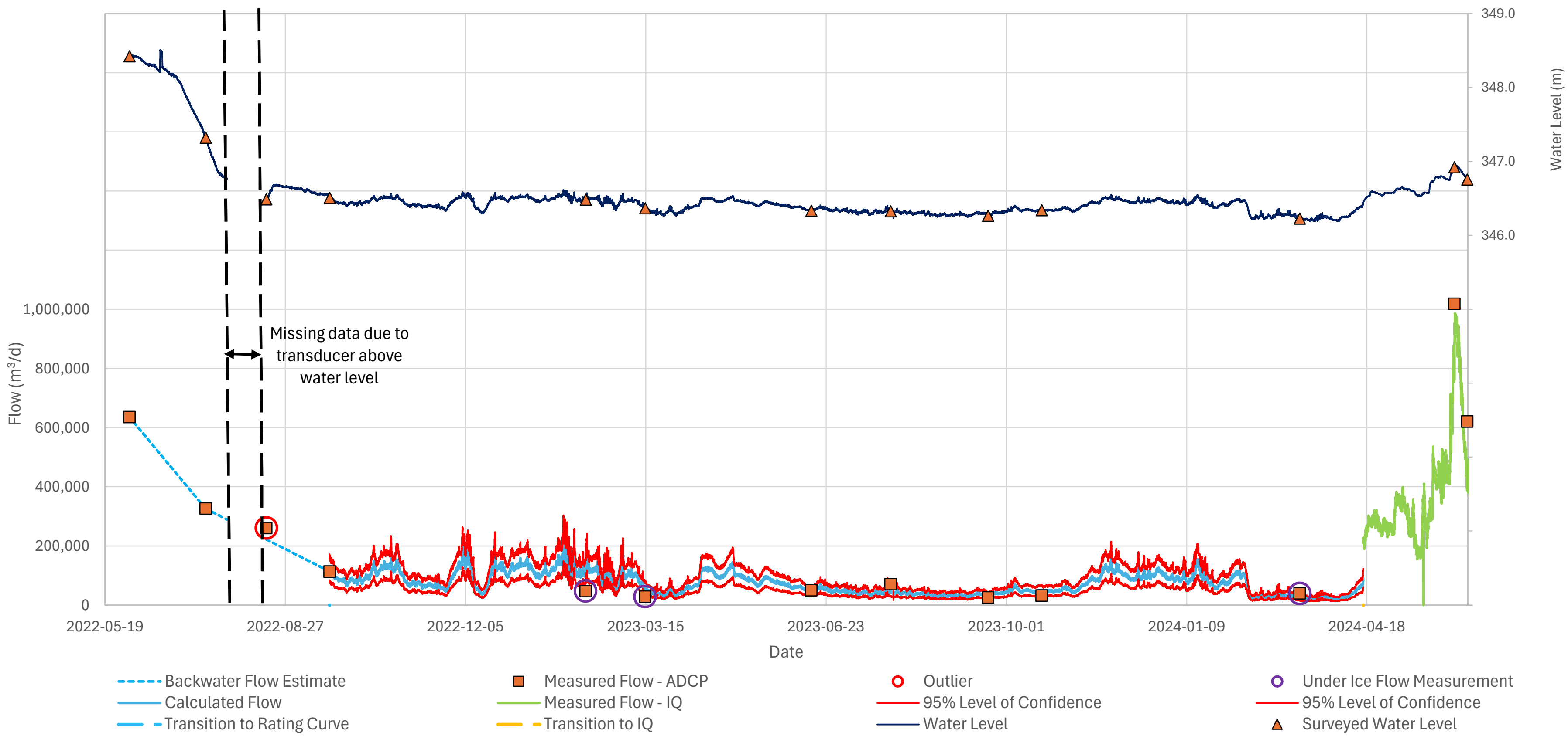
Appendix B
Hydrograph Data from Hydrometric Network

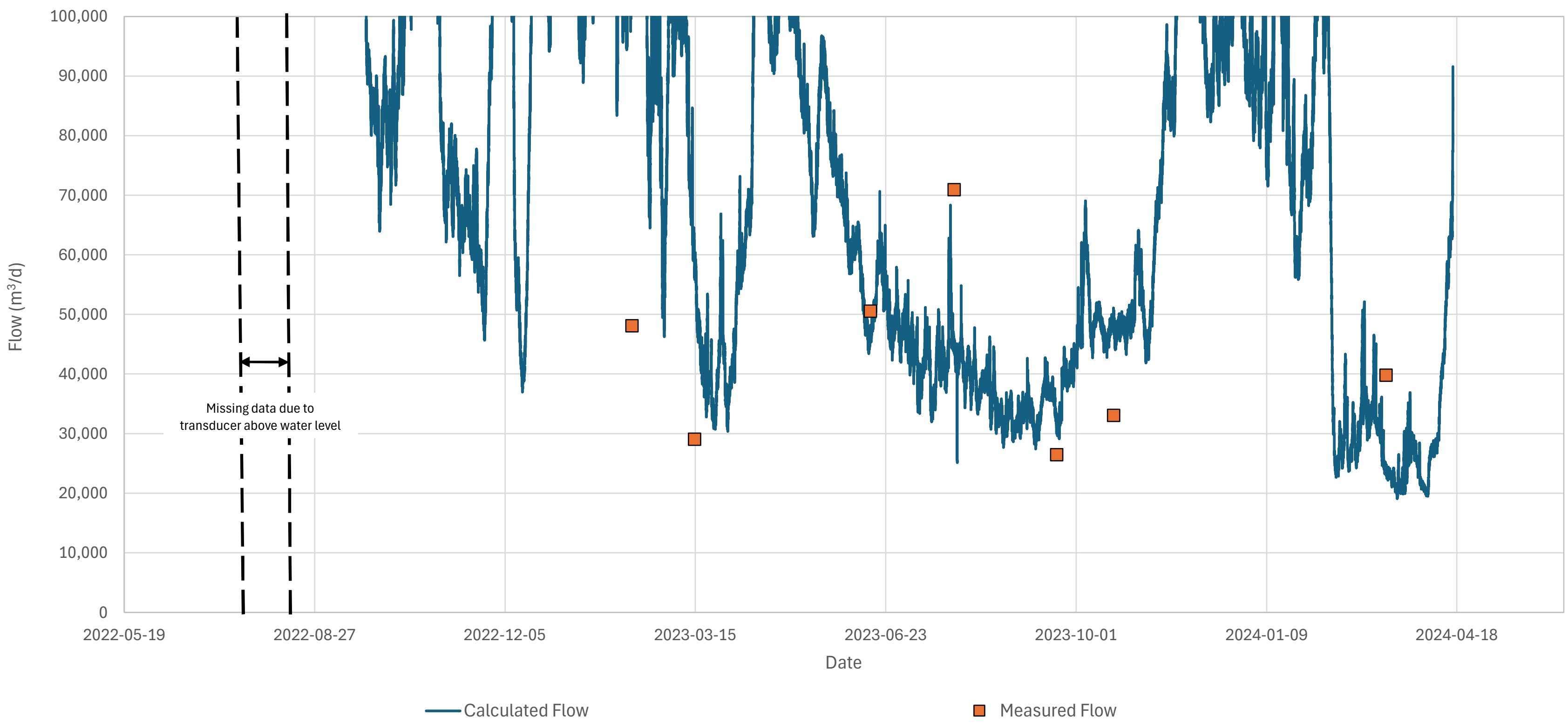


Notes

WSP

KINROSS

Tote Road Bridge HF-01 - WATER LEVEL & HYDROGRAPH			
Great Bear Resources			
Hydrogoelogy Baseline			
Figure Number		B1a	
Project Number		OMEMA2303	
Date		Nov-24	
Drawn	MR	Reviewed	SG



Notes

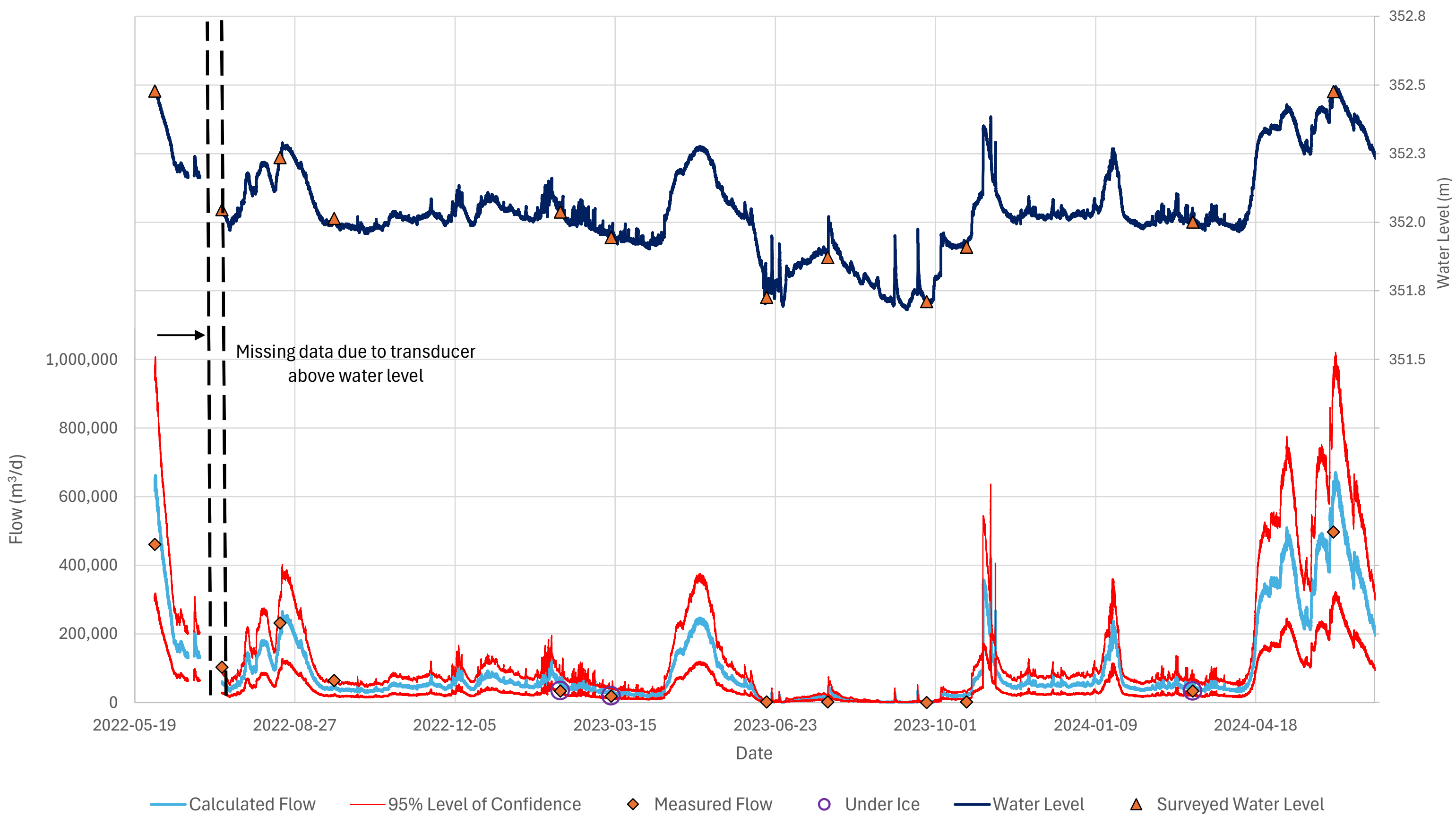
WSP
KINROSS

Tote Road Bridge HF-01- Hydrograph Illustrating Low Flow Data

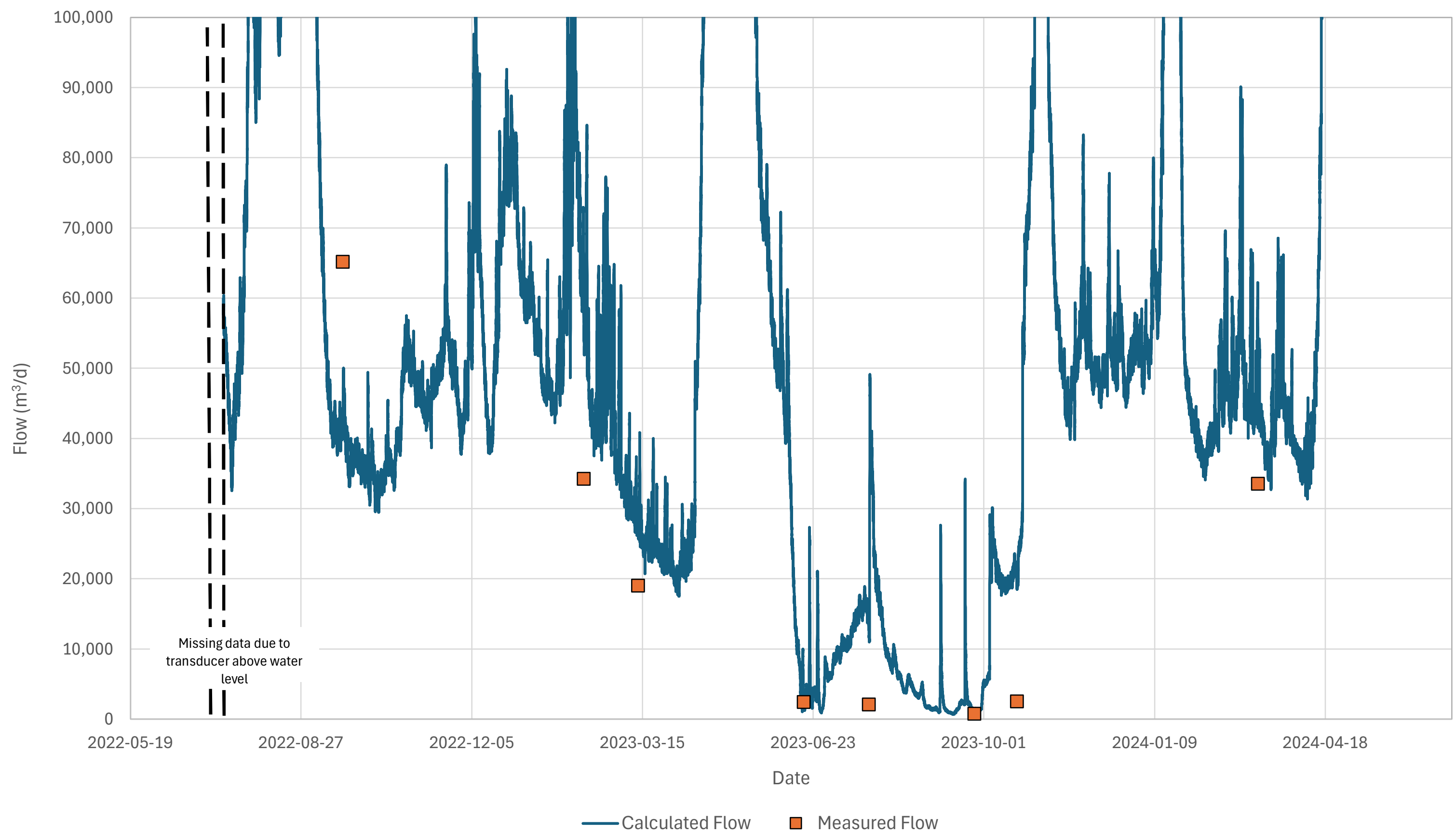
Great Bear Resources

Hydrogoelogy Baseline

Figure Number		B1b	
Project Number		OMEMA2303	
Date		Nov-24	
Drawn	MR	Reviewed	SG



Notes		Tuzyk's Road Bridge HF-03 - WATER LEVEL & HYDROGRAPH			
	WSP / KINROSS	Great Bear Resources			
		Hydrogoelogy Baseline			
		Figure Number		B2a	
		Project Number		OMEMA2303	
		Date		Nov-24	
		Drawn	MR	Reviewed	SG



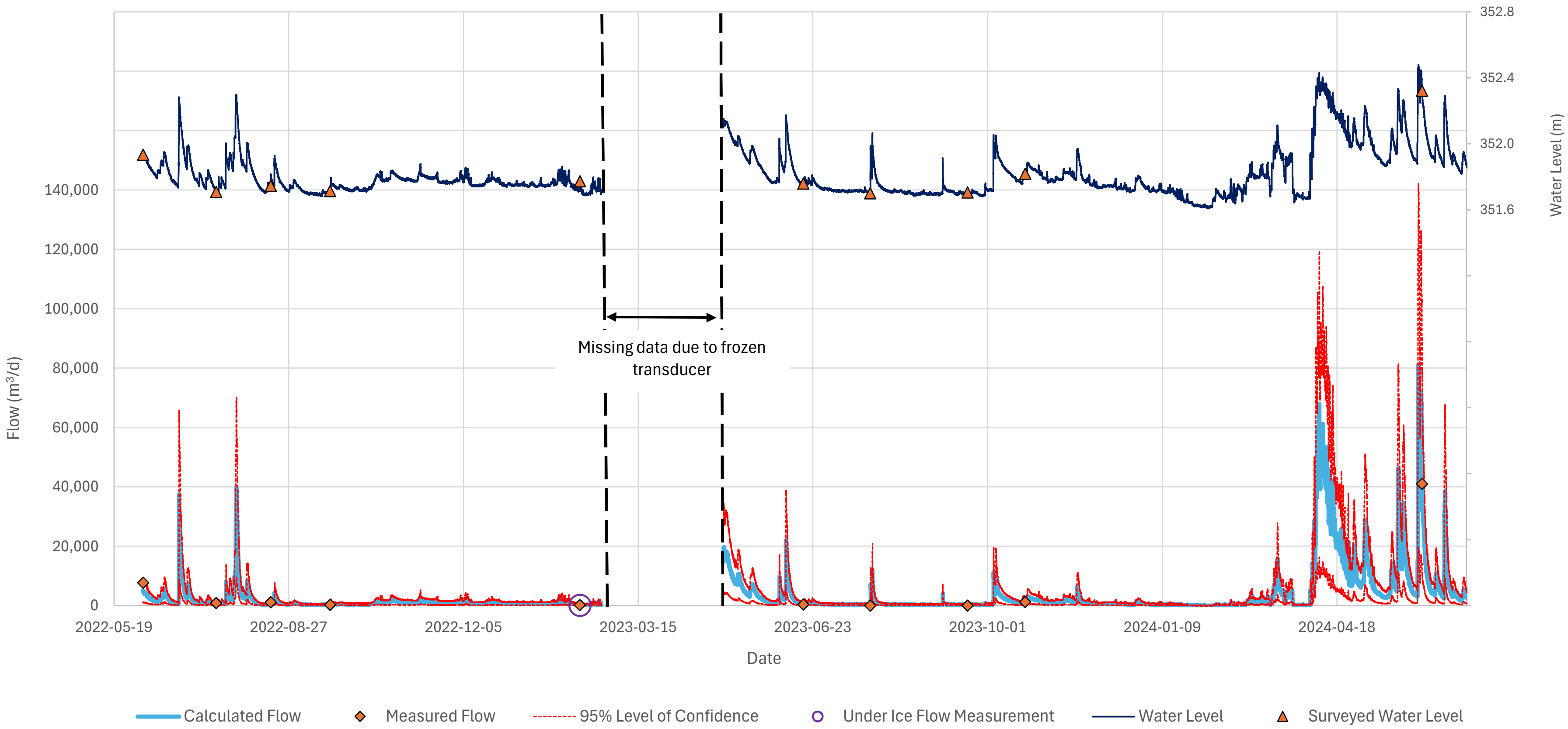
Notes

Tuzyk's Road Bridge HF-03- Hydrograph Illustrating Low Flow Data

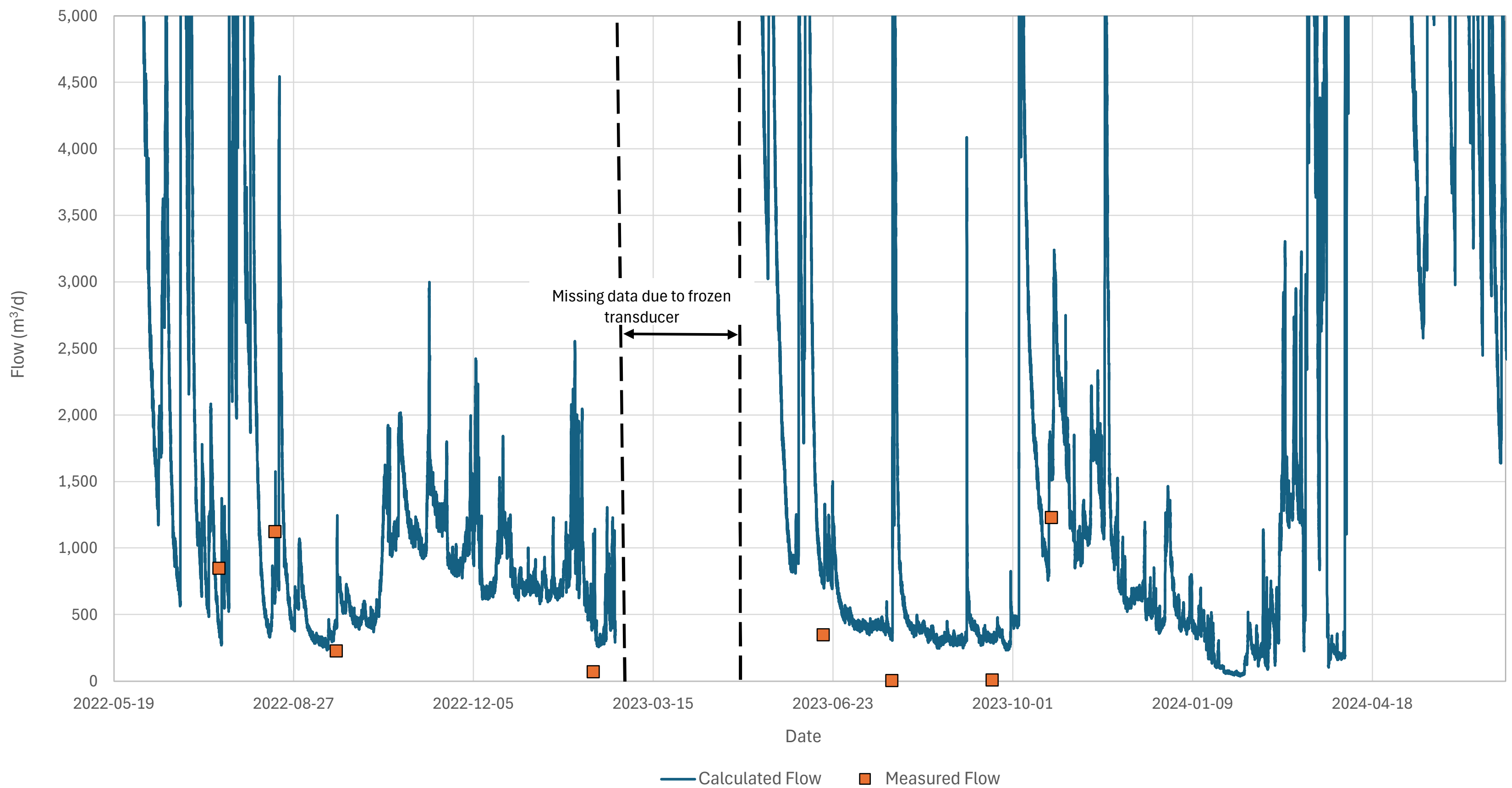
Great Bear Resources

Hydrogoelogy Baseline

Figure Number		B2b	
Project Number		OMEMA2303	
Date		Nov-24	
Drawn	MR	Reviewed	SG

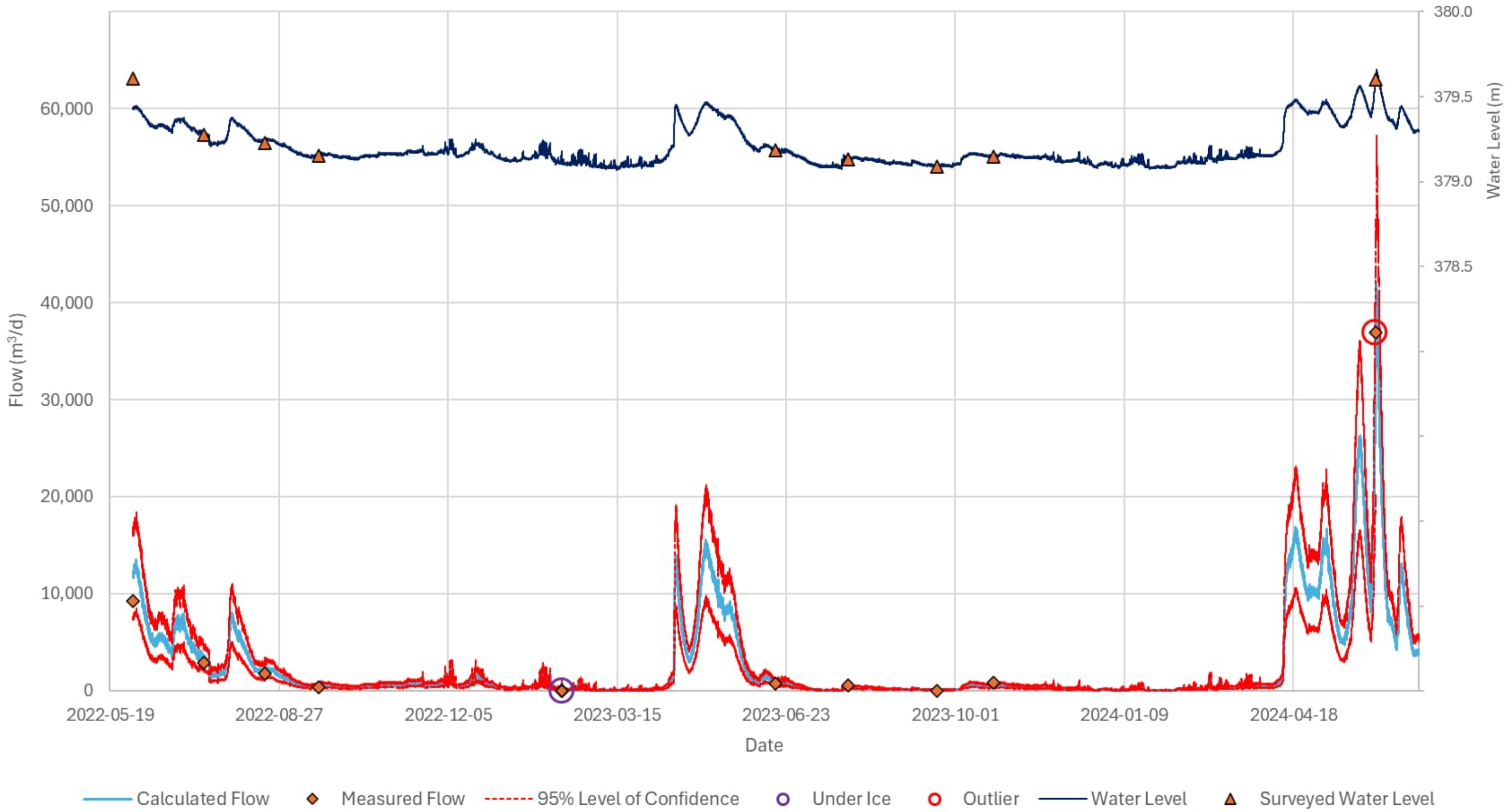


Notes		Unamed Watercourse 4 HF-04 - WATER LEVEL & HYDROGRAPH			
	WSP KINROSS	Great Bear Resources			
		Hydrogoelogy Baseline			
		Figure Number		B3a	
		Project Number		OMEMA2303	
		Date		Nov-24	
		Drawn	MR	Reviewed	SG



Notes		

Unnamed Watercourse 4 HF-04- Hydrograph Illustrating Low Flow Data			
Great Bear Resources			
Hydrogoelogy Baseline			
Figure Number		B3b	
Project Number		OMEMA2303	
Date		Nov-24	
Drawn	MR	Reviewed	SG

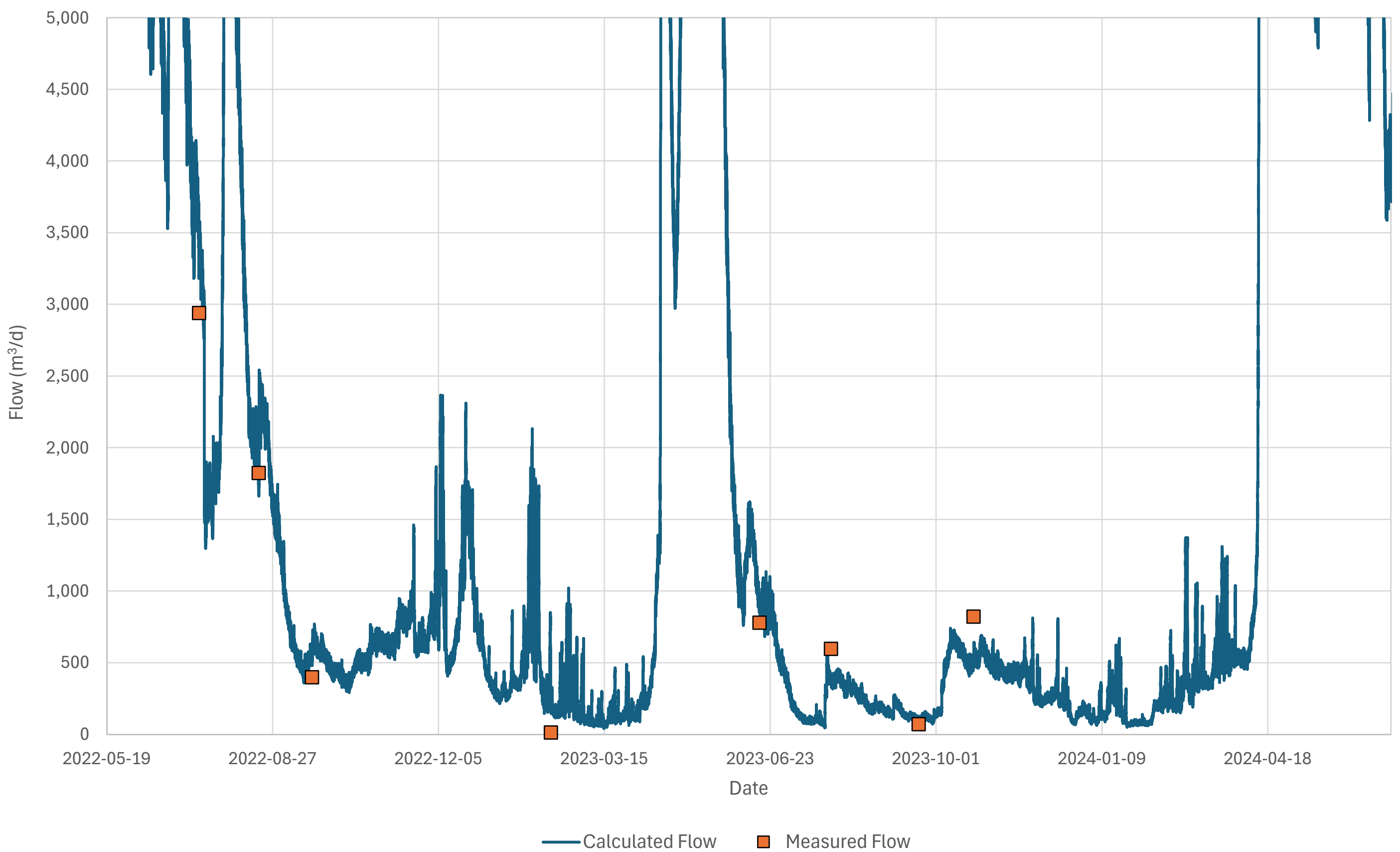


Notes

WSP

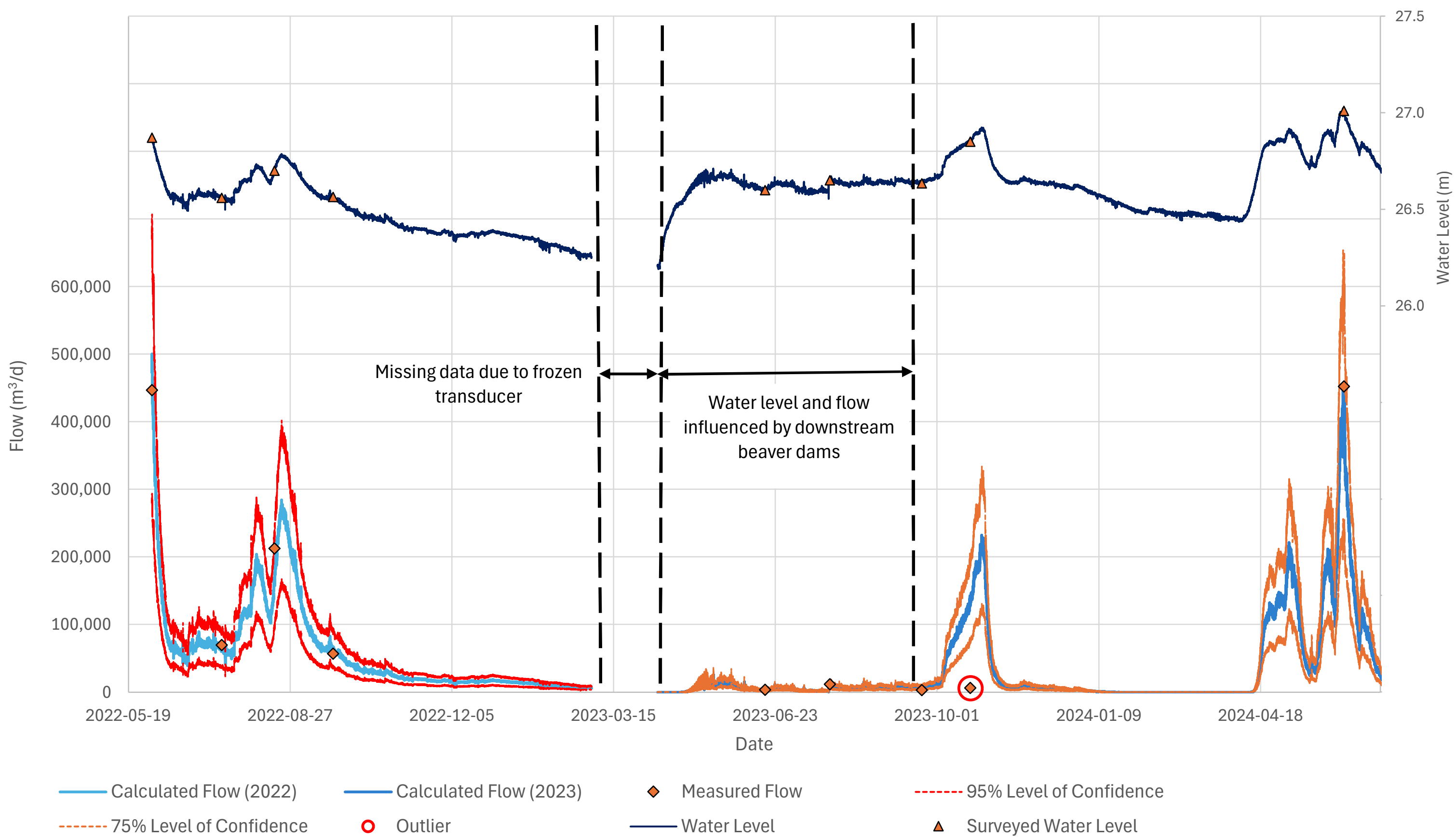
KINROSS

Unnamed Watercourse 1 HF-06 - WATER LEVEL & HYDROGRAPH			
Great Bear Resources			
Hydrogoelogy Baseline			
Figure Number		B4a	
Project Number		OMEMA2303	
Date		Nov-24	
Drawn	MR	Reviewed	SG



Notes		Unnamed Watercourse 1 HF-06- Hydrograph Illustrating Low Flow Data			
		Great Bear Resources			
		Hydrogoelogy Baseline			
		Figure Number		B4b	
		Project Number		OMEMA2303	
		Date		Nov-24	
		Drawn	MR	Reviewed	SG

KINROSS



Notes

WSP

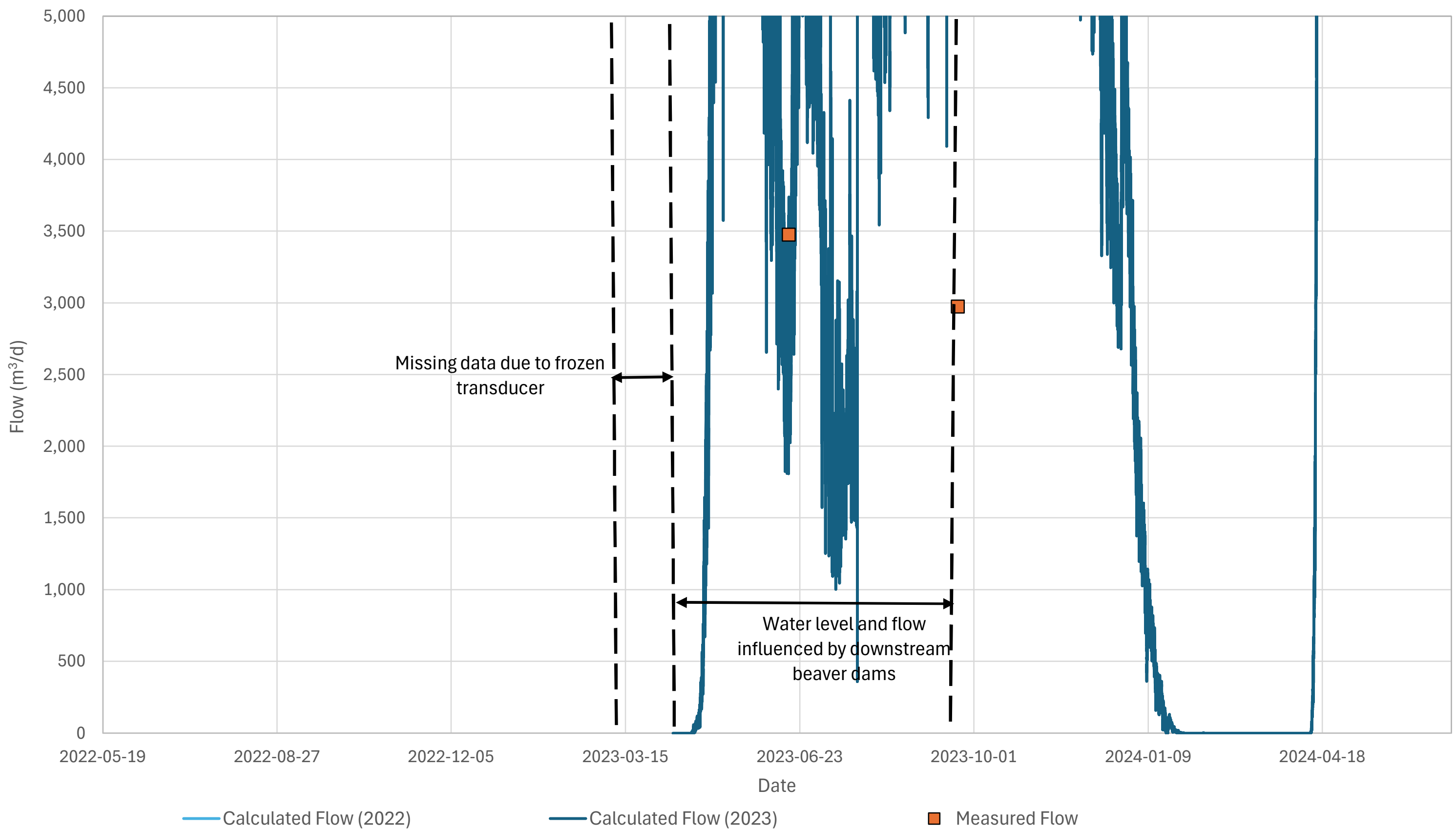
KINROSS

Dixie Lake Outflow HF-07 - WATER LEVEL & HYDROGRAPH

Great Bear Resources

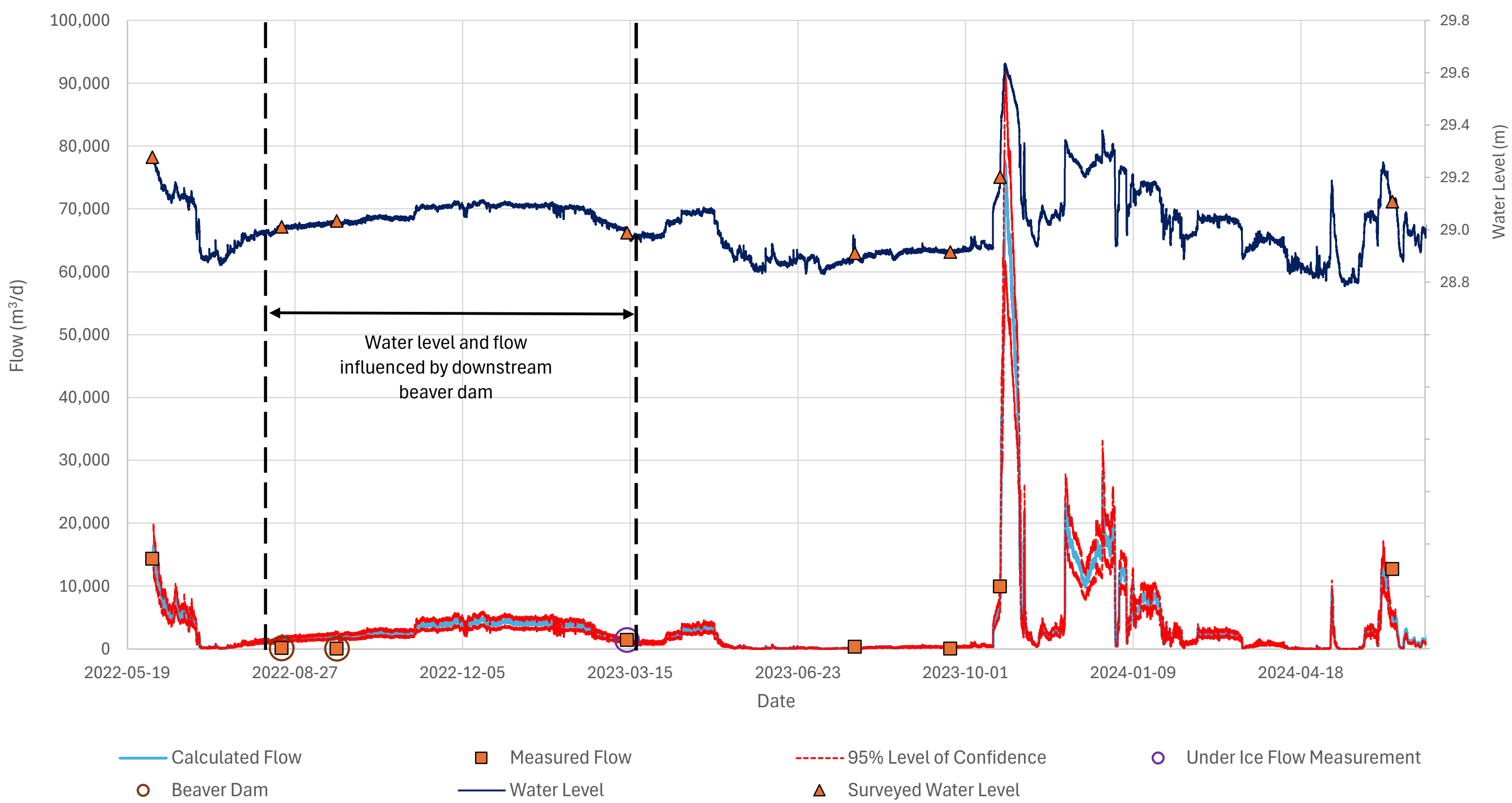
Hydrogoelogy Baseline

Figure Number		B5a	
Project Number		OMEMA2303	
Date		Nov-24	
Drawn	MR	Reviewed	SG



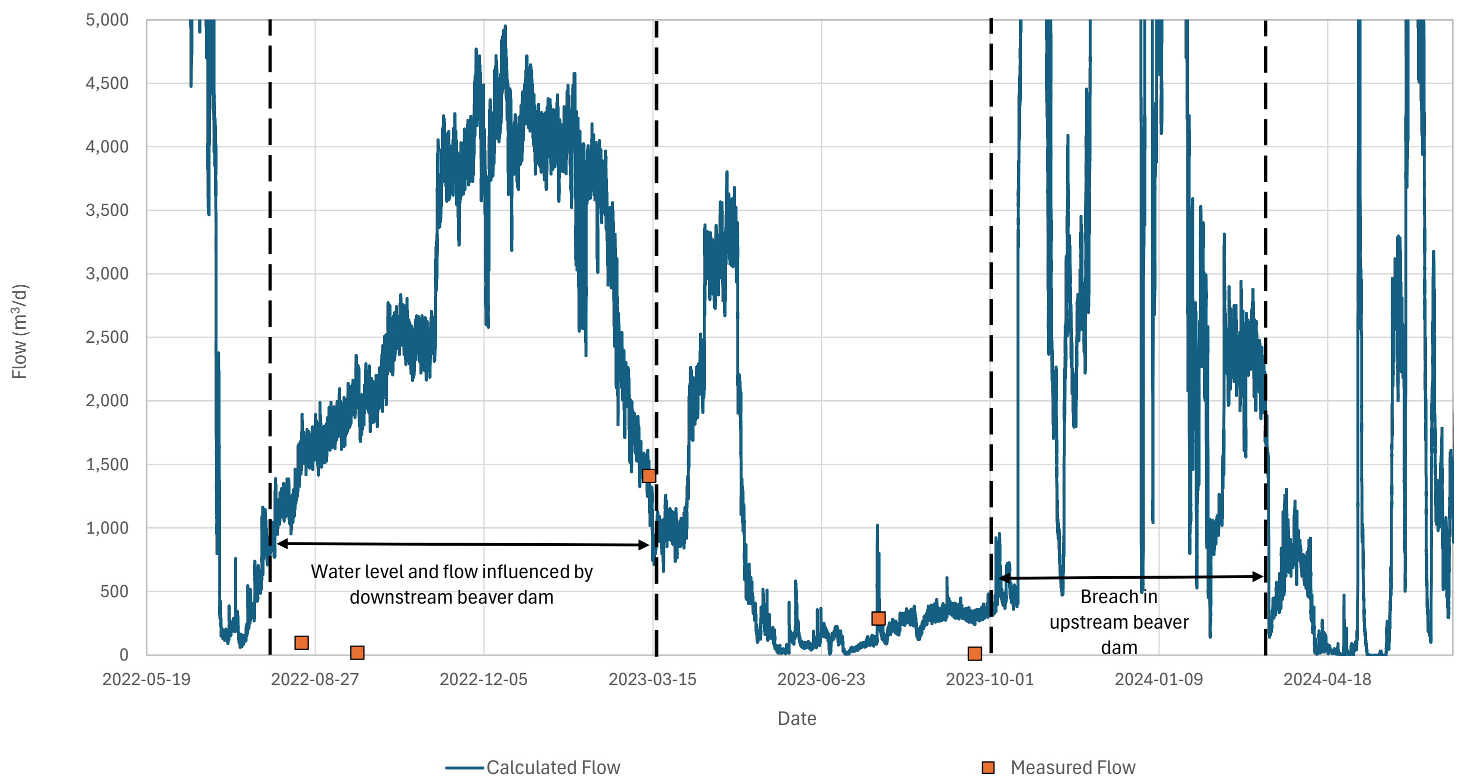
Notes

Dixie Lake Outflow HF-07- Hydrograph Illustrating Low Flow Data			
Great Bear Resources			
Hydrogoelogy Baseline			
Figure Number	B5b		
Project Number	OMEMA2303		
Date	Nov-24		
Drawn	MR	Reviewed	SG

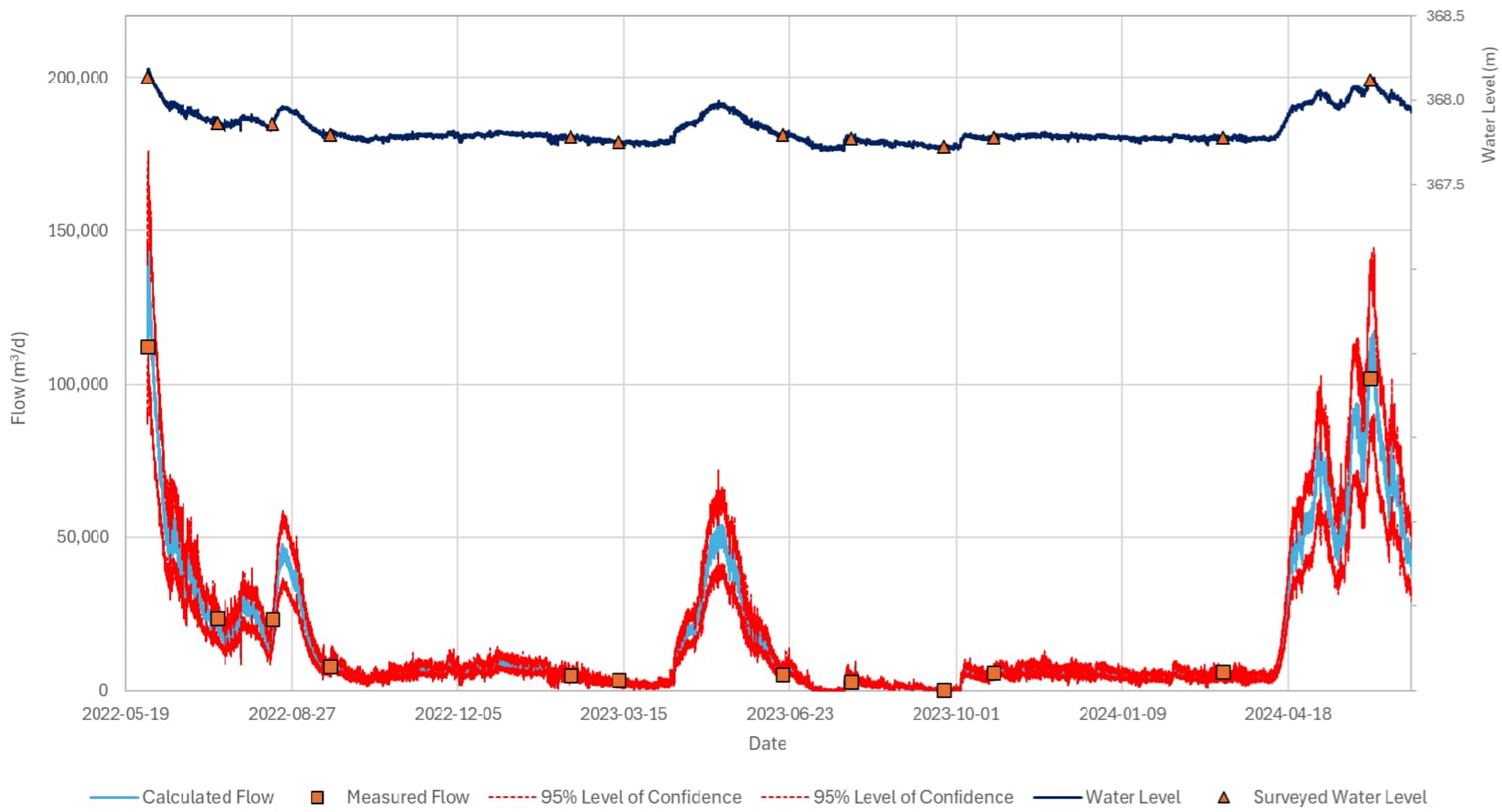


Notes

Genessee Lake Outflow HF-08 - WATER LEVEL & HYDROGRAPH			
Great Bear Resources			
Hydrogoelogy Baseline			
Figure Number	B6a		
Project Number	OMEMA2303		
Date	Nov-24		
Drawn	MR	Reviewed	SG



Notes			
Genessee Lake Outflow HF-08- Hydrograph Illustrating Low Flow Data			
Great Bear Resources			
Hydrogoelogy Baseline			
Figure Number		B6b	
Project Number		OMEMA2303	
Date		Nov-24	
Drawn	MR	Reviewed	SG



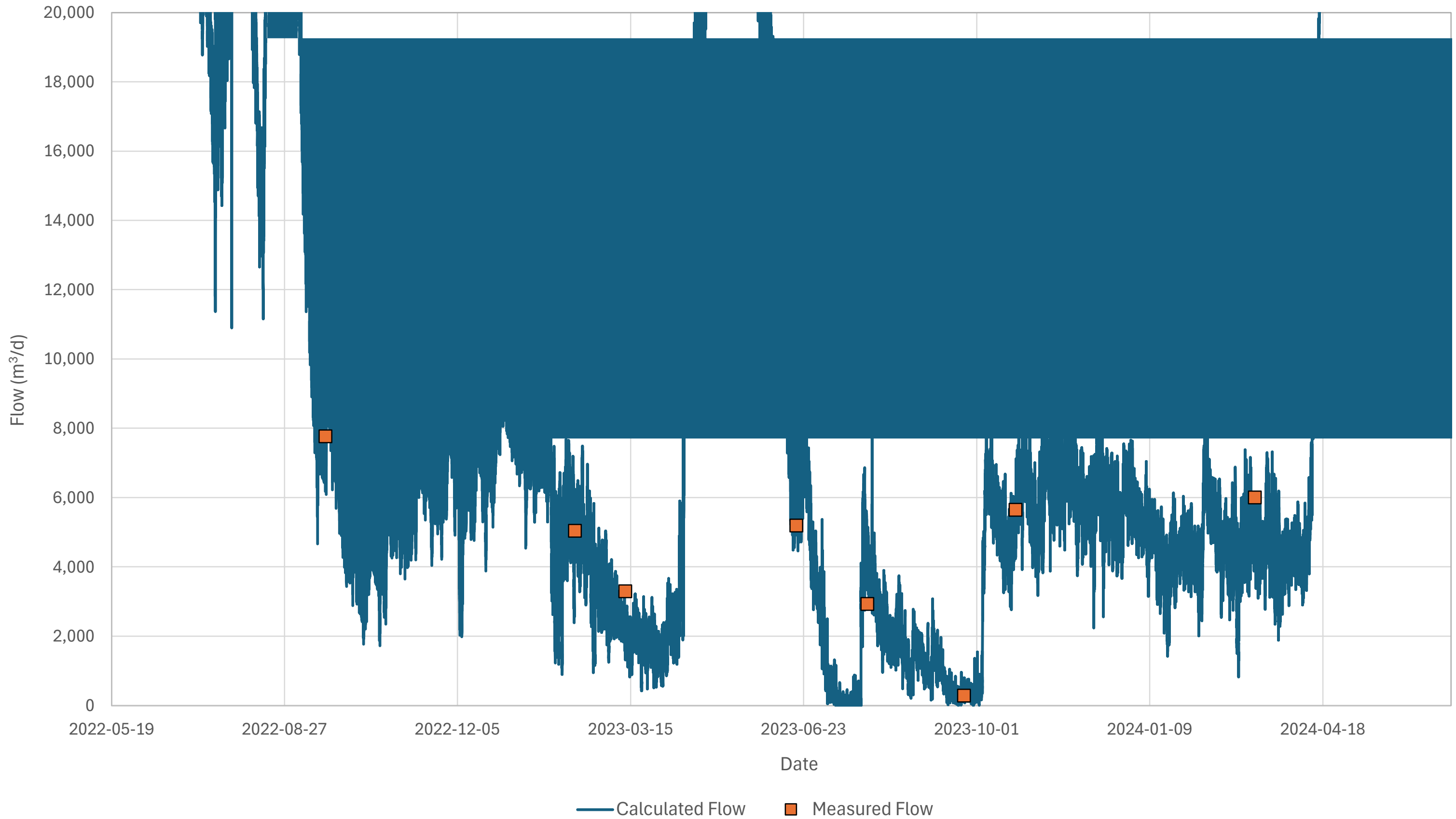
Notes

Stone Lake Outflow HF-10 - WATER LEVEL & HYDROGRAPH

Great Bear Resources

Hydrogoelogy Baseline

Figure Number		B7a	
Project Number		OMEMA2303	
Date		Nov-24	
Drawn	MR	Reviewed	SG



Notes

Stone Lake Outflow HF-10- Hydrograph Illustrating Low Flow Data			
Great Bear Resources			
Hydrogoelogy Baseline			
Figure Number		B7b	
Project Number		OMEMA2303	
Date		Nov-24	
Drawn	MR	Reviewed	SG

Appendix C
Photographic Log

PHOTOGRAPHIC LOG

Great Bear	Dixie Creek and local water features	CA0031272.9242

Photo No.	Date	
1	September 21, 2023	
View of Dixie Creek upstream of HF-07 looking upstream towards Dixie Lake.		

Photo No.	Date	
2	September 21, 2023	
View of first beaver dam downstream of Dixie Lake, indicating height of dam. Dam removed in October 2023.		

Photo No.	Date	
3	September 20, 2023	
View of Unnamed Watercourse 1 at the HF06 flow station		

Photo No.	Date	
4	September 19, 2023	
View of Unnamed Waterbody 1		

PHOTOGRAPHIC LOG		
Great Bear	**Dixie Creek and local water features**	**CA0031272.9242**

Photo No.	**Date**	
5	September 20, 2023	
View of Unnamed Waterbody 2		

Photo No.	**Date**	
6	September 25, 2023	
View of Unnamed Watercourse 2 at Flow Station (Sta) 18		

PHOTOGRAPHIC LOG		
Great Bear	**Dixie Creek and local water features**	**CA0031272.9242**

Photo No.	**Date**	
7	September 19, 2023	
View of Dixie Creek At DC-1 looking upstream.		

Photo No.	**Date**	
8	September 24, 2023	
View of Unnamed Watercourse 4 at Flow Station 17		

Photo No.	Date	
9	September 19, 2023	
View of Dixie Creek, looking upstream from Tuzyk's bridge near flow station HF-03		

Photo No.	Date	
10	September 25, 2023	
View of Dixie Creek at flow station HF-03B, showing stoney section at start of the upper cascade.		

PHOTOGRAPHIC LOG		
Great Bear	Dixie Creek and local water features	CA0031272.9242

Photo No.	Date	
11	September 25, 2023	
View of the only one of three channels of Dixie Creek showing flow between HF03B and HF03C		

Photo No.	Date	
12	September 25, 2023	
View of Dixie Creek at lower end of upper cascade, showing entire width of creek (there are no separate channels at this section).		

Photo No.	Date	
13	September 25, 2023	
View of Dixie Creek, downstream of the lower end of upper cascade, upstream of HF03C, looking downstream		

Photo No.	Date	
14	September 25, 2023	
View of Dixie Creek, downstream of the lower end of upper cascade, upstream of HF03C, looking upstream, back to stoney section		

PHOTOGRAPHIC LOG

Great Bear	Dixie Creek and local water features	CA0031272.9242

Photo No.	Date
15	September 25, 2023

View of Dixie Creek at HF03C

Photo No.	Date
16	September 26, 2023

View of small water feature at Sta 22. Feature is wet, but shows no flow.

PHOTOGRAPHIC LOG		
Great Bear	**Dixie Creek and local water features**	**CA0031272.9242**

Photo No.	**Date**	
17	September 26, 2023	
View of Dixie Creek near Sta 22		

Photo No.	**Date**	
18	September 24, 2023	
View of Unnamed Watercourse 3 at Sta 15		

PHOTOGRAPHIC LOG		
Great Bear	**Dixie Creek and local water features**	**CA0031272.9242**

Photo No.	**Date**
19	September 19, 2023
View of Unnamed Watercourse 3 at HF04	

Photo No.	**Date**
20	September 20, 2023
View of Dixie Creek at DC-02	

Photo No.	Date	
21	September 24, 2023	
View of Unnamed Watercourse 3 at LF1, no visual flow		

Photo No.	Date	
22	September 24, 2023	
View of Unnamed Watercourse 3 at LF2 showing no water		

Photo No.	Date
23	September 24, 2023
View of Unnamed Watercourse 3 at LF3 showing minor flow	

PHOTOGRAPHIC LOG		
Great Bear	**Dixie Creek and local water features**	**CA0031272.9242**

Photo No.	Date	
24	September 24, 2023	
View of Unnamed Watercourse 6A at Sta 9		

Photo No.	Date
25	September 24, 2023

View of Unnamed Watercourse 3 at Sta13

Photo No.	Date
26	September 22, 2023

View of Dixie Creek, downstream of Genesse Lake at flow station HF-08

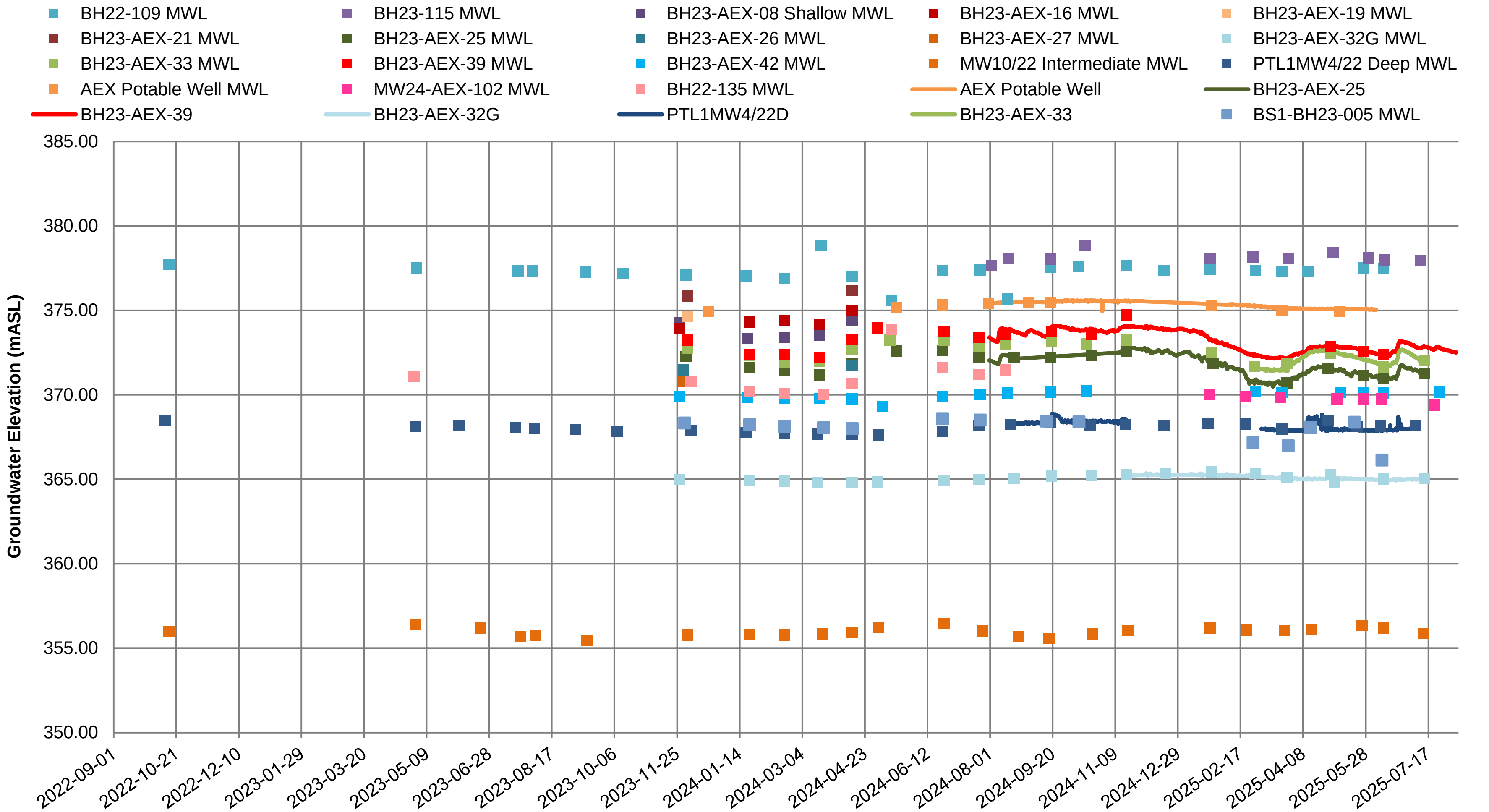
Photo No.	Date	
27	September 23, 2023	
View of Unnamed Watercourse 8 at flow station HF09 at Highway 105		

Photo No.	Date	
28	June 16, 2023	
View of Unnamed Watercourse 8 showing cascade in upper reaches of tributary where it flows from bedrock into the clay flood plain.		

PHOTOGRAPHIC LOG		
Great Bear	Dixie Creek and local water features	CA0031272.9242

Photo No.	Date	
29	June 8, 2023	
View of Unnamed Watercourse 1C downstream of upwelling zone		

Appendix D
Groundwater Hydrographs
(from WSP 2025a, Field Report)



Notes

Decommissioned May 2024: BH23-AEX-27, BH23-AEX-26, BH23-AEX-19, BH23-AEX-21, BH23-AEX-08, BH23-AEX-16

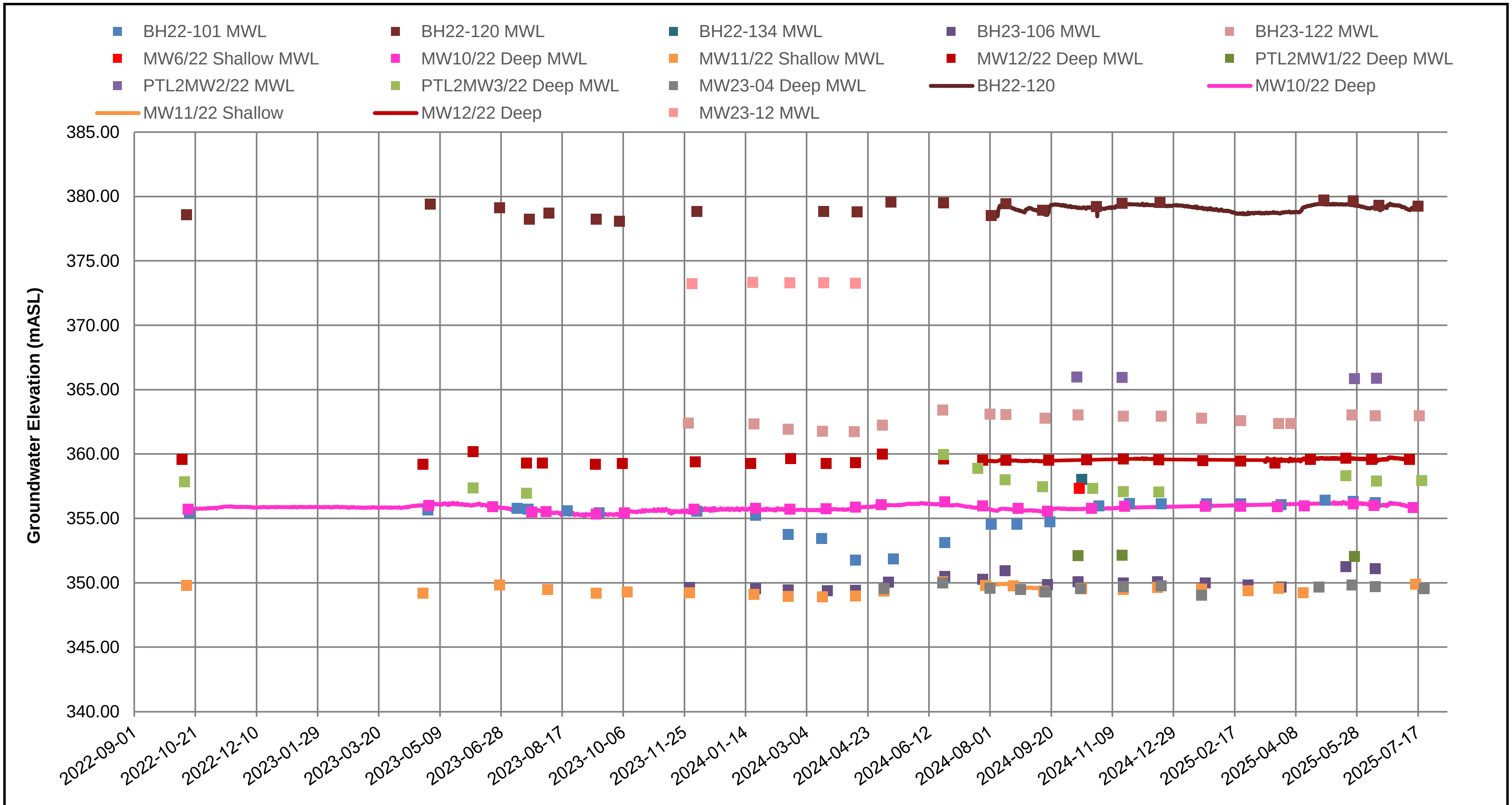
Manual water levels when the well was dry or frozen are not shown on this figure

Water Level Monitoring
Open Pit and Underground Area
Sand Installations

Great Bear Project

Great Bear Resources

Figure Number	6-1		
Project Number	CA0031272		
Date	August 25, 2025		
Drawn	VO	Reviewed	SG



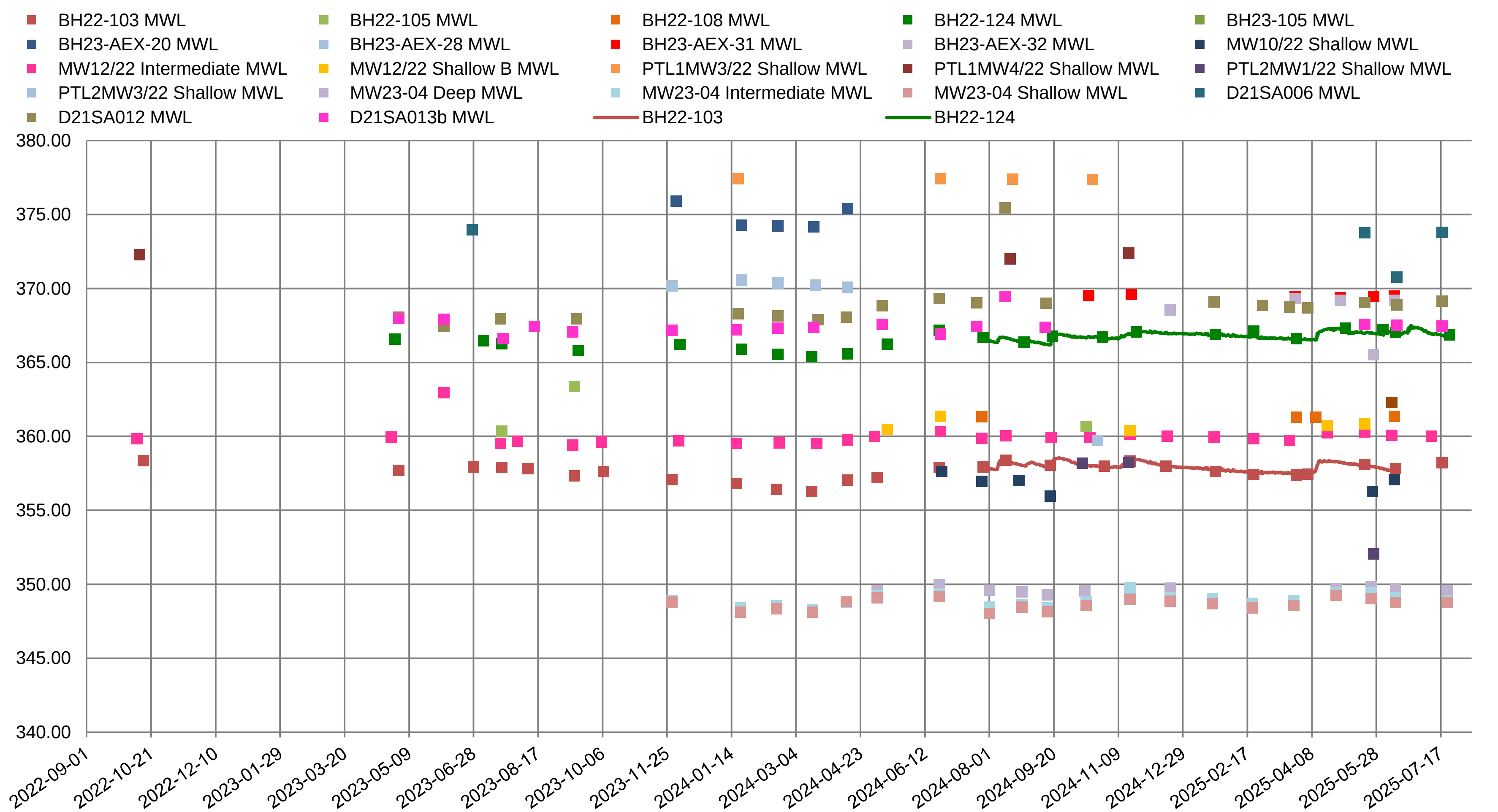
Notes

MW10/22 Deep transducer malfunction November 2024

MW23-12 decomissioned May 2024

Manual water levels when the well was dry or frozen are not shown on this figure

Water Level Monitoring Open Pit and Underground Area Till Installations			
Great Bear Project			
Great Bear Resources			
Figure Number		6-2	
Project Number		CA0031272	
Date		August 25, 2025	
Drawn	VO	Reviewed	SG



Notes

BH23-AEX-28 decomissioned May 2024

Manual water levels when the well was dry or frozen are not shown on this figure

wsp

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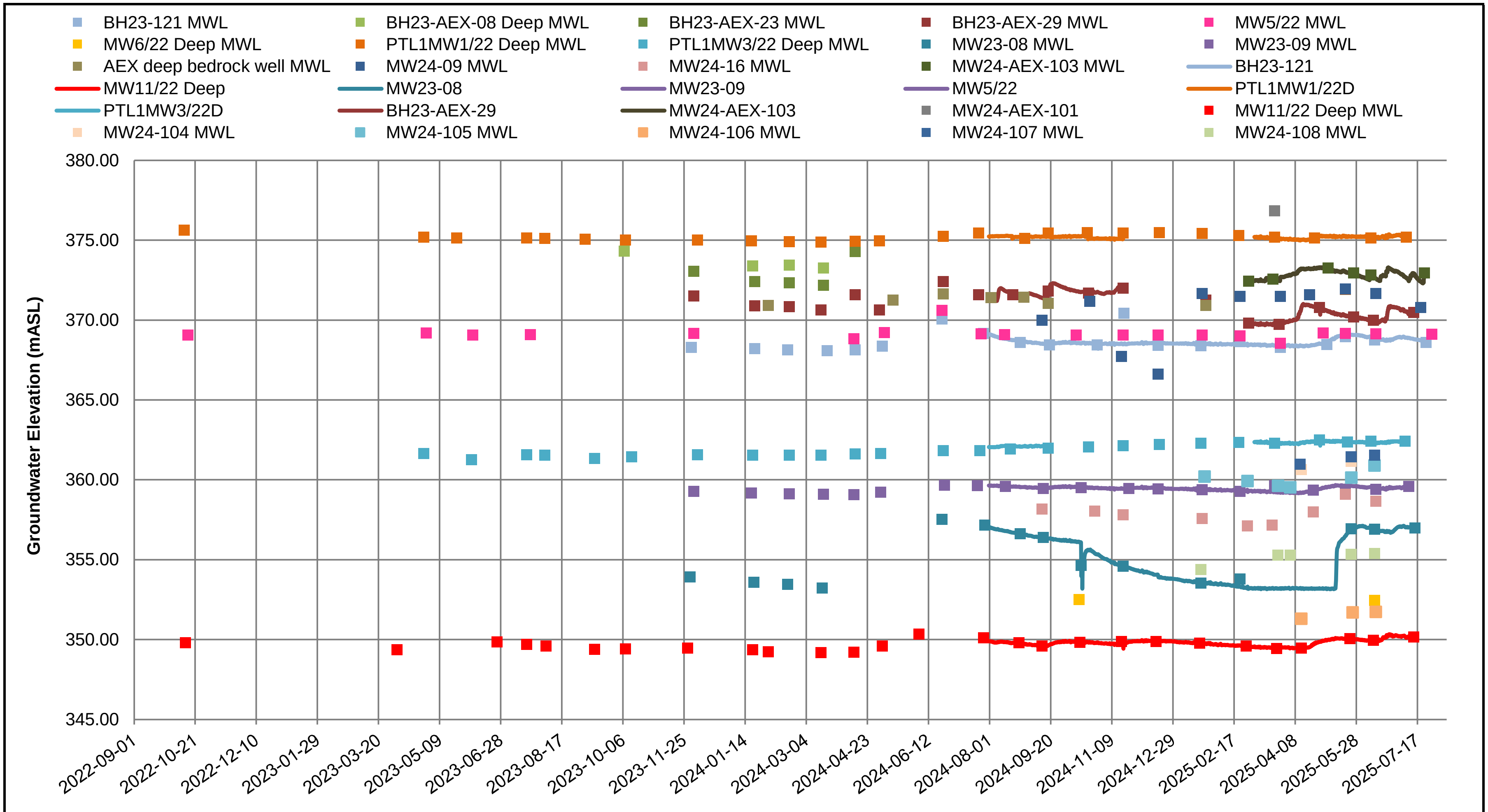
Water Level Monitoring
Open Pit and Underground Area
Clay/Silt Installations

Great Bear Project

Great Bear Resources

Figure Number	6-3		
Project Number	CA0031272		
Date	August 25, 2025		
Drawn	VO	Reviewed	SG



Notes

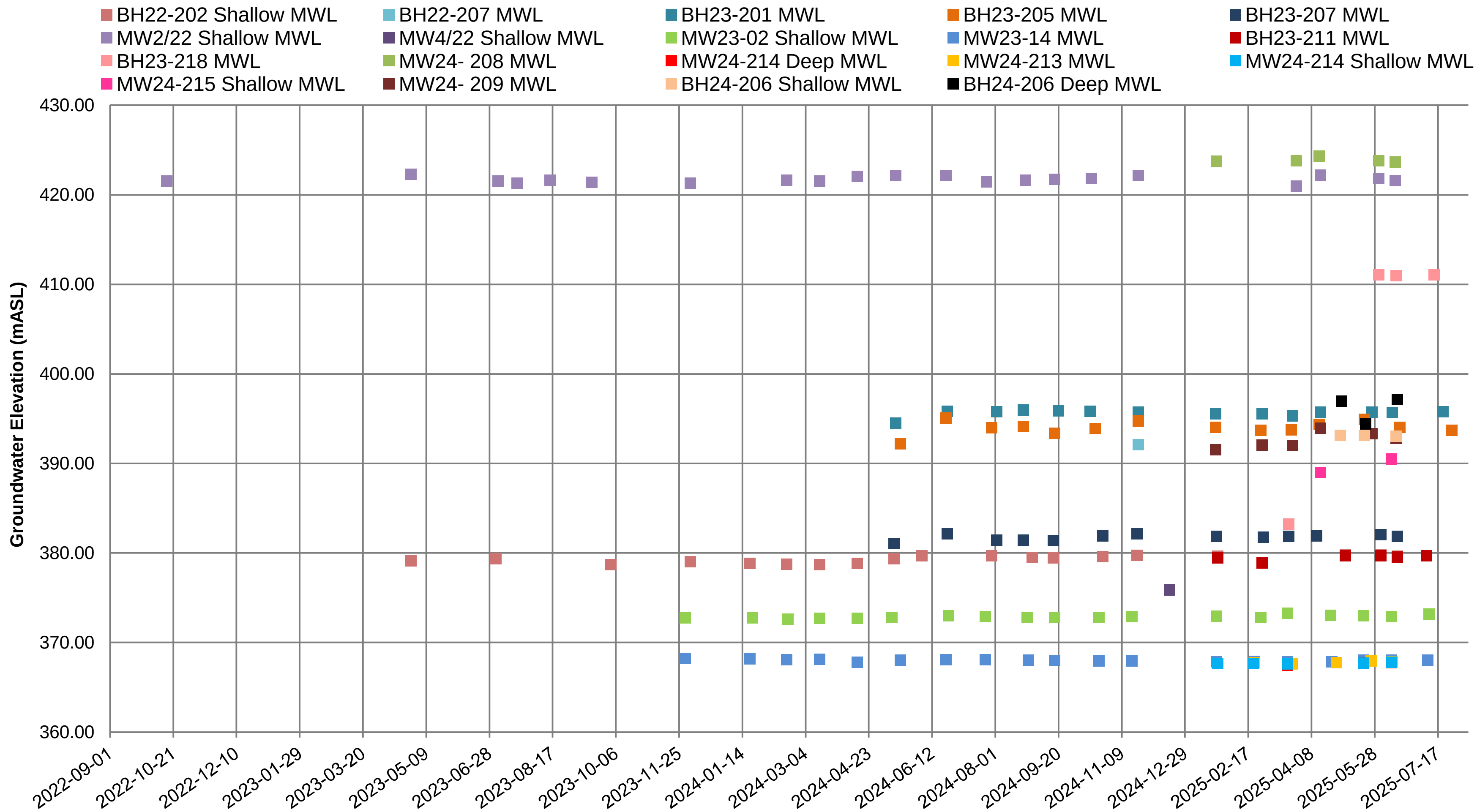
Manual water levels when the well was dry or frozen are not shown on this figure

Water Level Monitoring
Open Pit and Underground Area
Bedrock Installations

Great Bear Project

Great Bear Resources

Figure Number	6-4		
Project Number	CA0031272		
Date	August 25, 2025		
Drawn	VO	Reviewed	SG



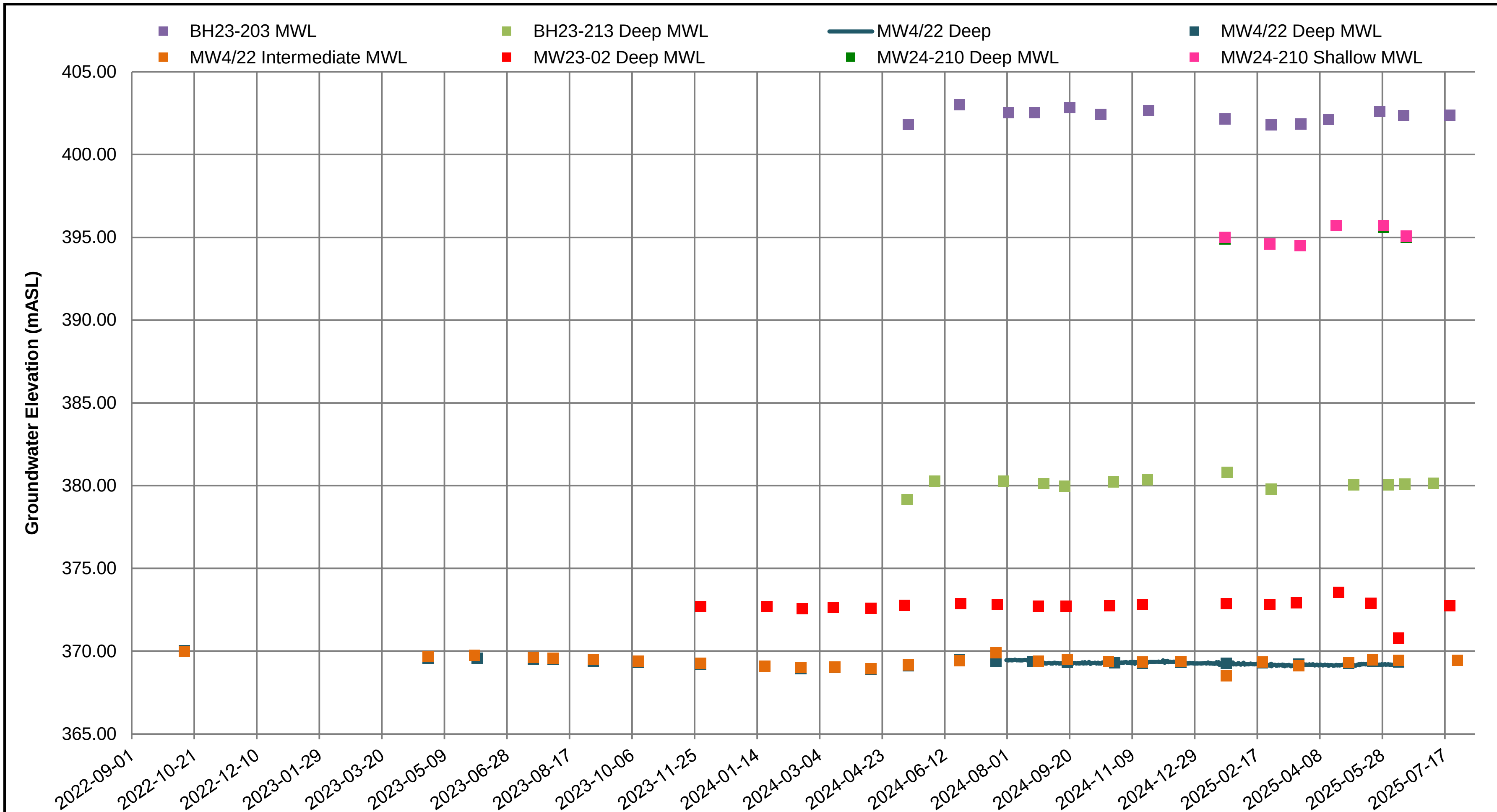
Notes

Manual water levels when the well was dry or frozen are not shown on this figure

wsp

KINROSS

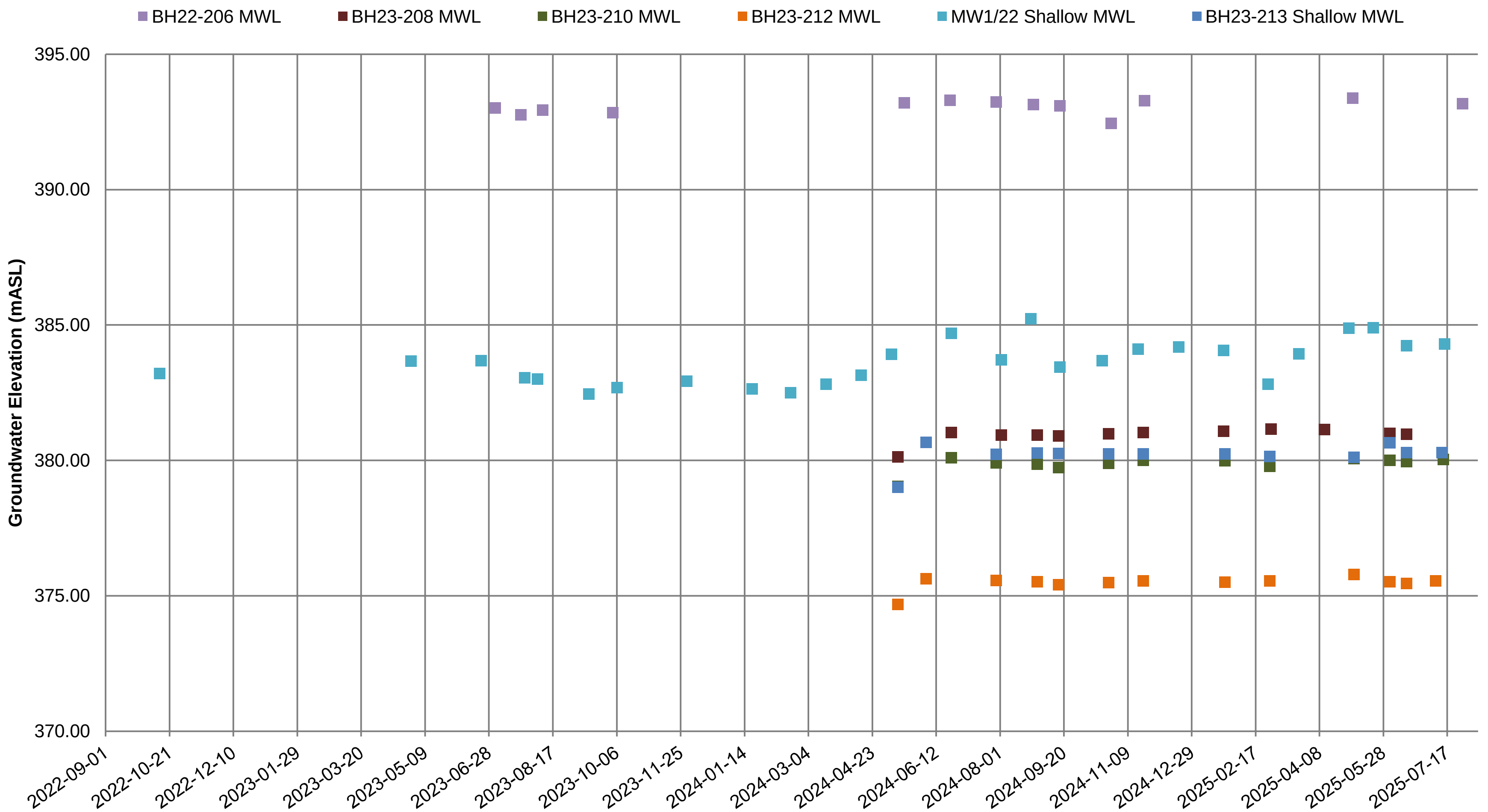
Water Level Monitoring **TMF Area** **Sand Installations**			
Great Bear Project			
Great Bear Resources			
Figure Number		6-5	
Project Number		CA0031272	
Date		August 25, 2025	
Drawn	VO	Reviewed	SG



Notes

Manual water levels when the well was dry or frozen are not shown on this figure

Water Level Monitoring TMF Area Till Installations			
Great Bear Project			
Great Bear Resources			
Figure Number		6-6	
Project Number		CA0031272	
Date		August 25, 2025	
Drawn	VO	Reviewed	SG



Notes

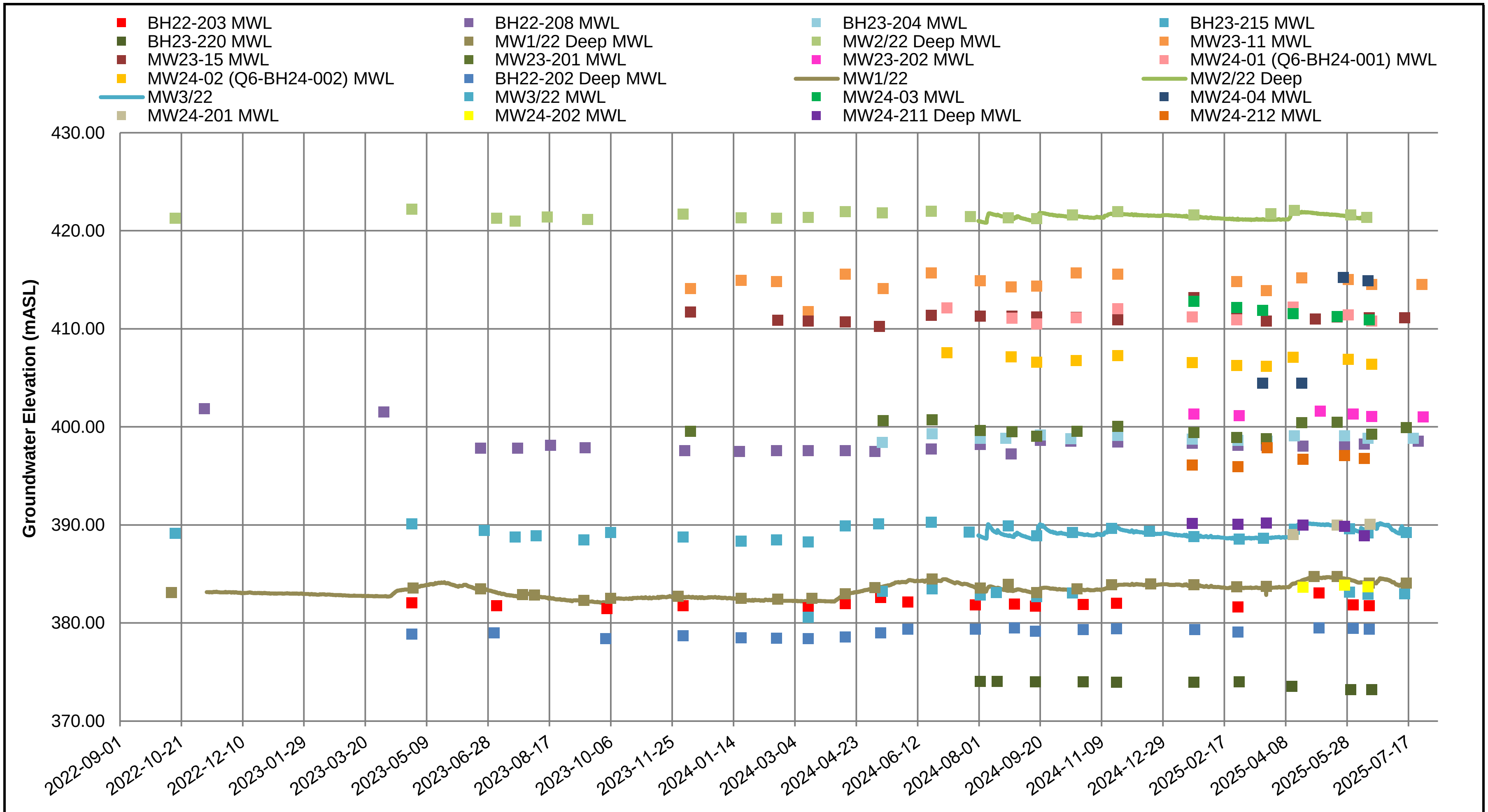
Manual water levels when the well was dry or frozen are not shown on this figure

Water Level Monitoring
TMF Area
Clay/Silt Installations

Great Bear Project

Great Bear Resources

Figure Number		6-7	
Project Number		CA0031272	
Date		August 25, 2025	
Drawn	VO	Reviewed	SG



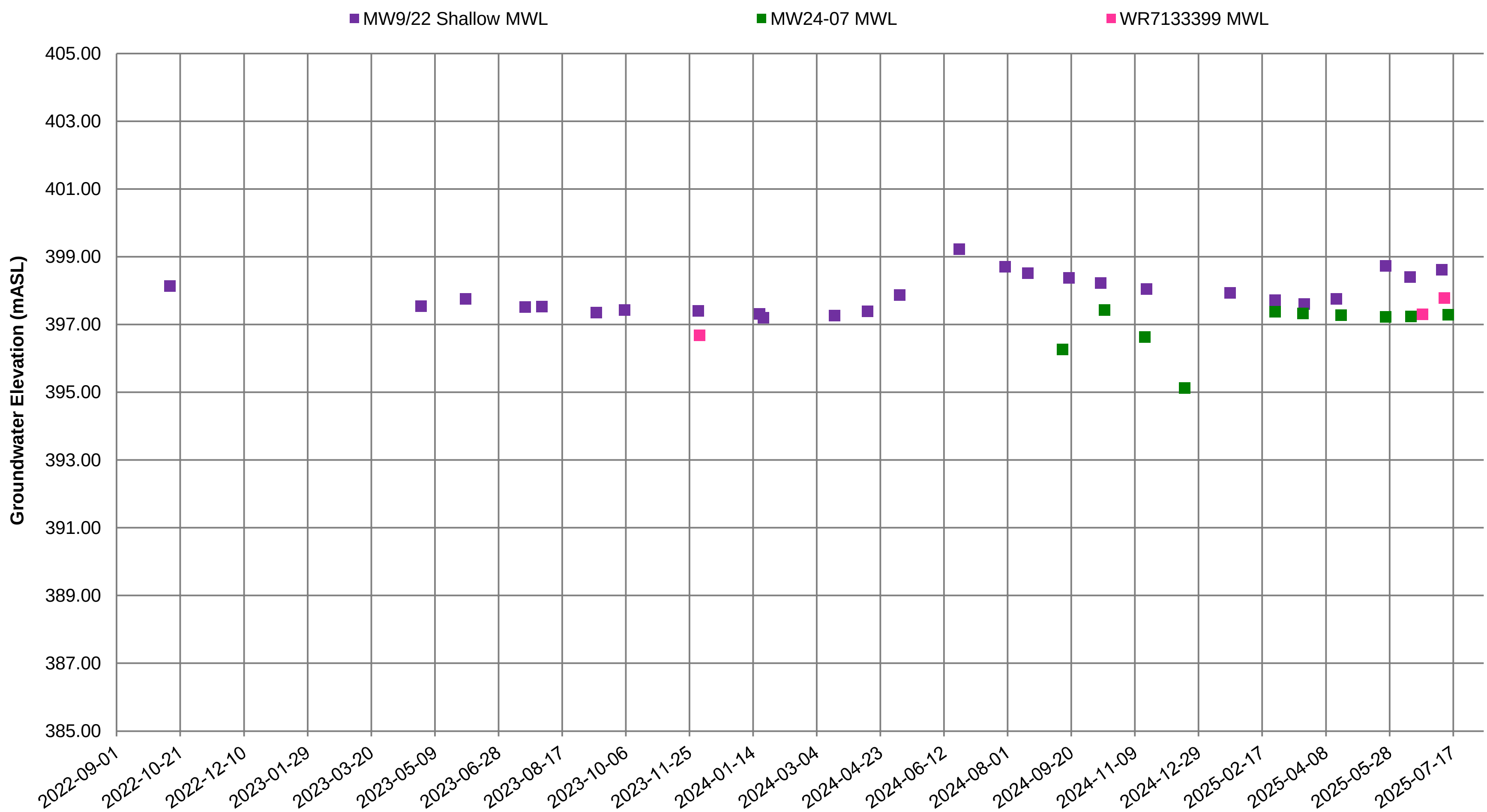
Notes

Manual water levels when the well was dry or frozen are not shown on this figure

WSP

KINROSS

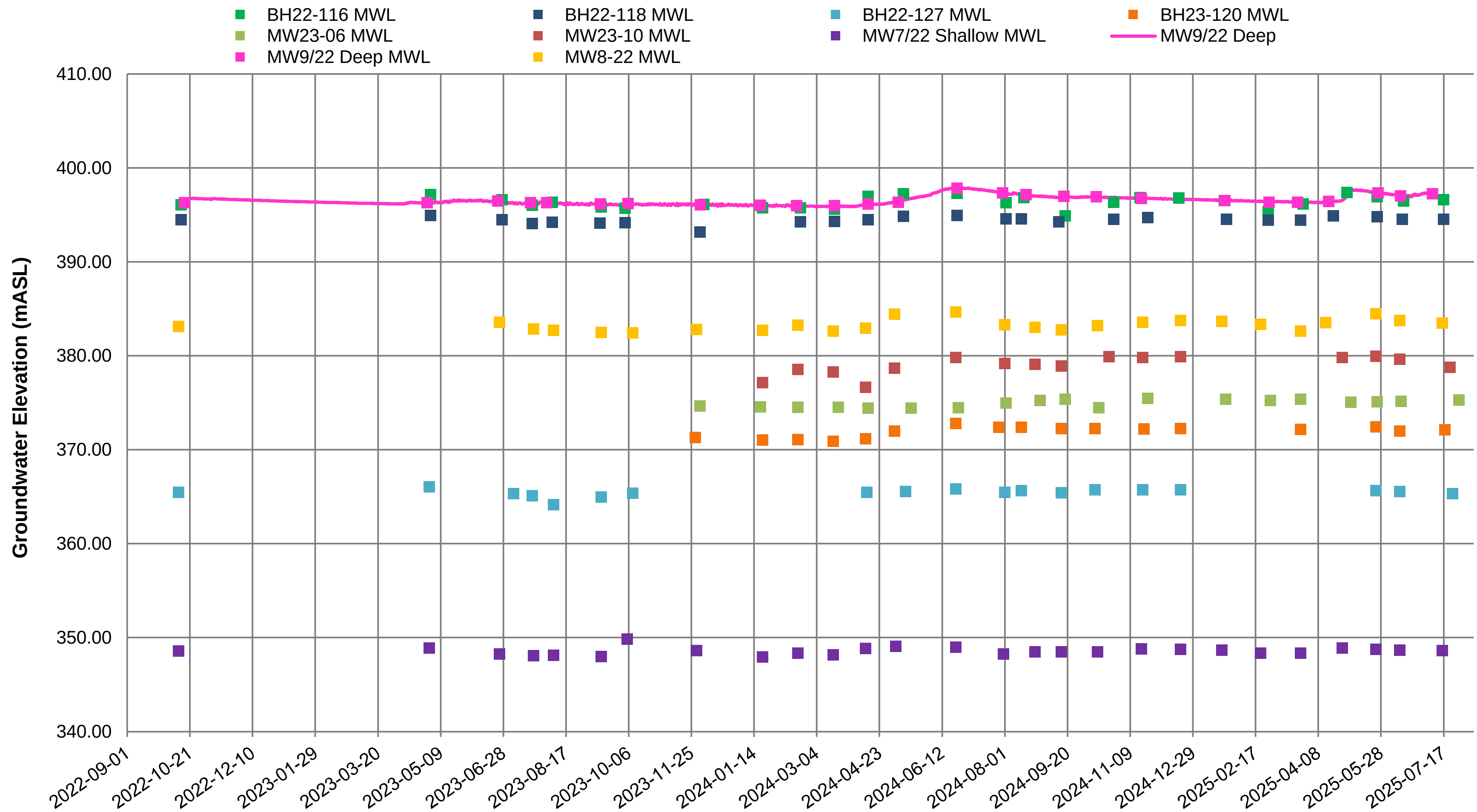
Water Level Monitoring TMF Area Bedrock Installations	
Great Bear Project	
Great Bear Resources	
Figure Number	6-8
Project Number	CA0031272
Date	August 25, 2025
Drawn VO	Reviewed SG



Notes

Manual water levels when the well was dry or frozen are not shown on this figure

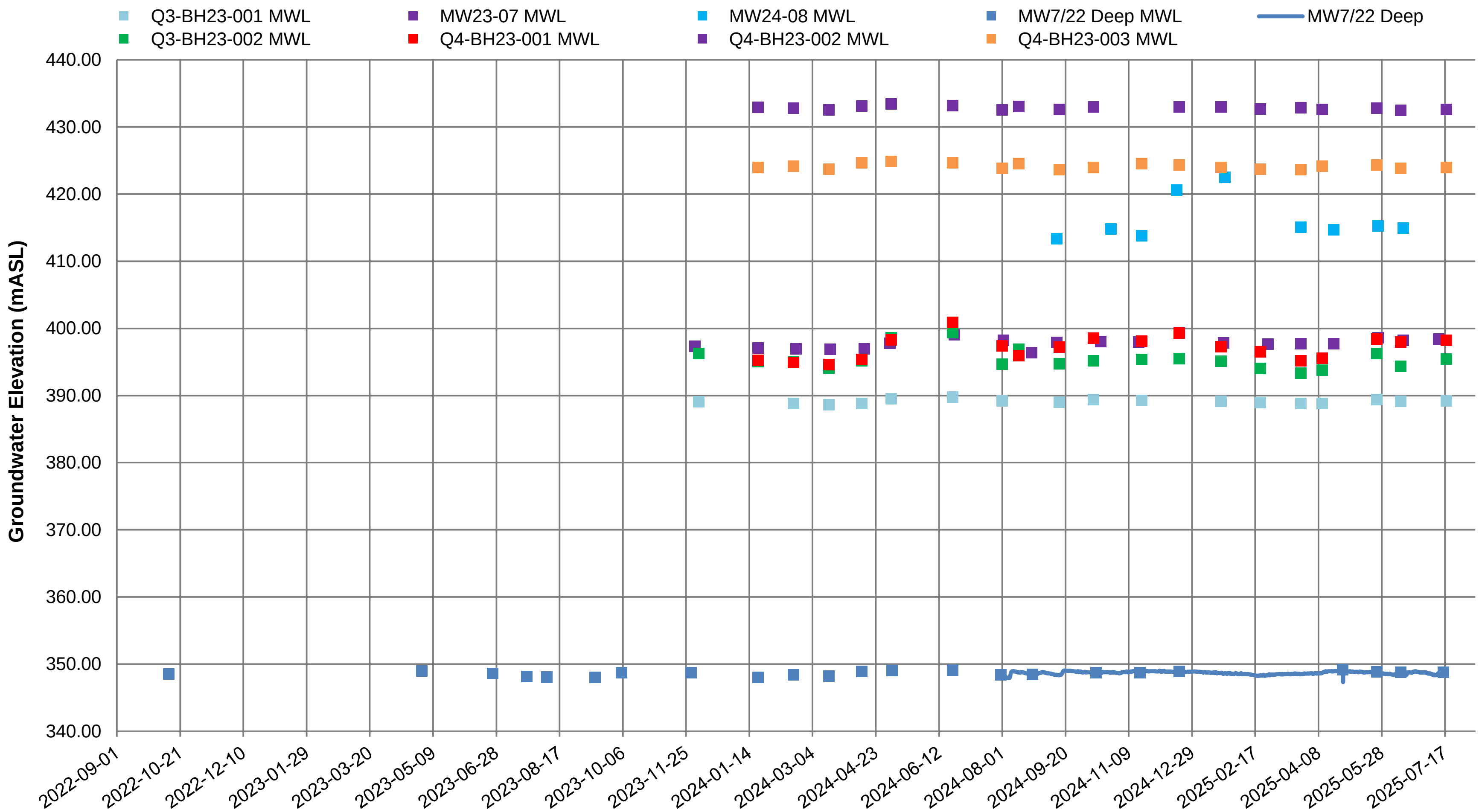
Water Level Monitoring MRS Area Sand Installations			
Great Bear Project			
Great Bear Resources			
Figure Number		6-9	
Project Number		CA0031272	
Date		August 25, 2025	
Drawn	VO	Reviewed	SG



Notes

Manual water levels when the well was dry or frozen are not shown on this figure

Water Level Monitoring MRS Area Till Installations			
Great Bear Project			
Great Bear Resources			
Figure Number		6-10	
Project Number		CA0031272	
Date		August 25, 2025	
Drawn	VO	Reviewed	SG



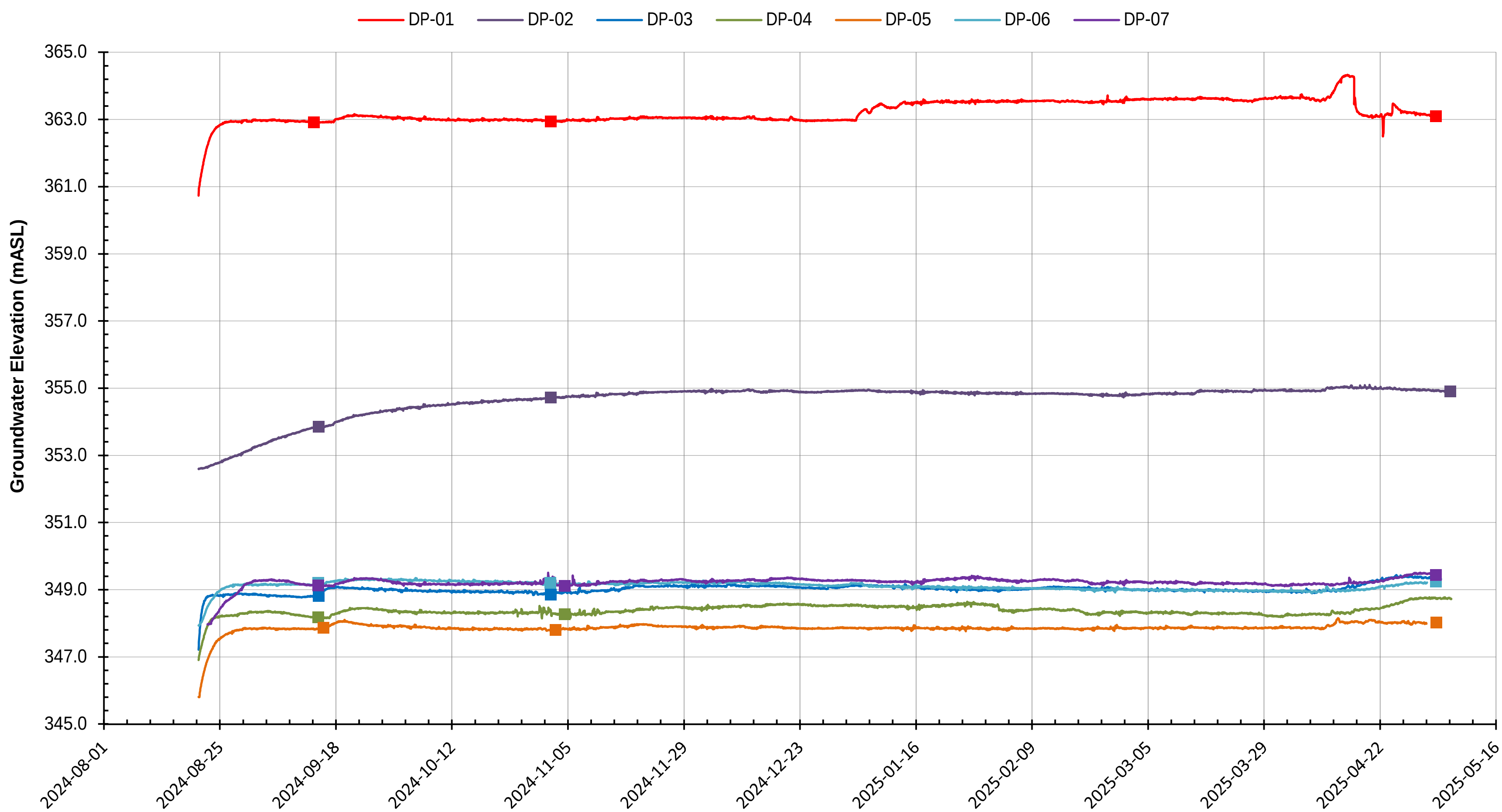
Notes

Manual water levels when the well was dry or frozen are not shown on this figure

WSP

KINROSS

Water Level Monitoring MRS Area Bedrock Installations			
Great Bear Project			
Great Bear Resources			
Figure Number		6-11	
Project Number		CA0031272	
Date		August 25, 2025	
Drawn	VO	Reviewed	SG



Notes

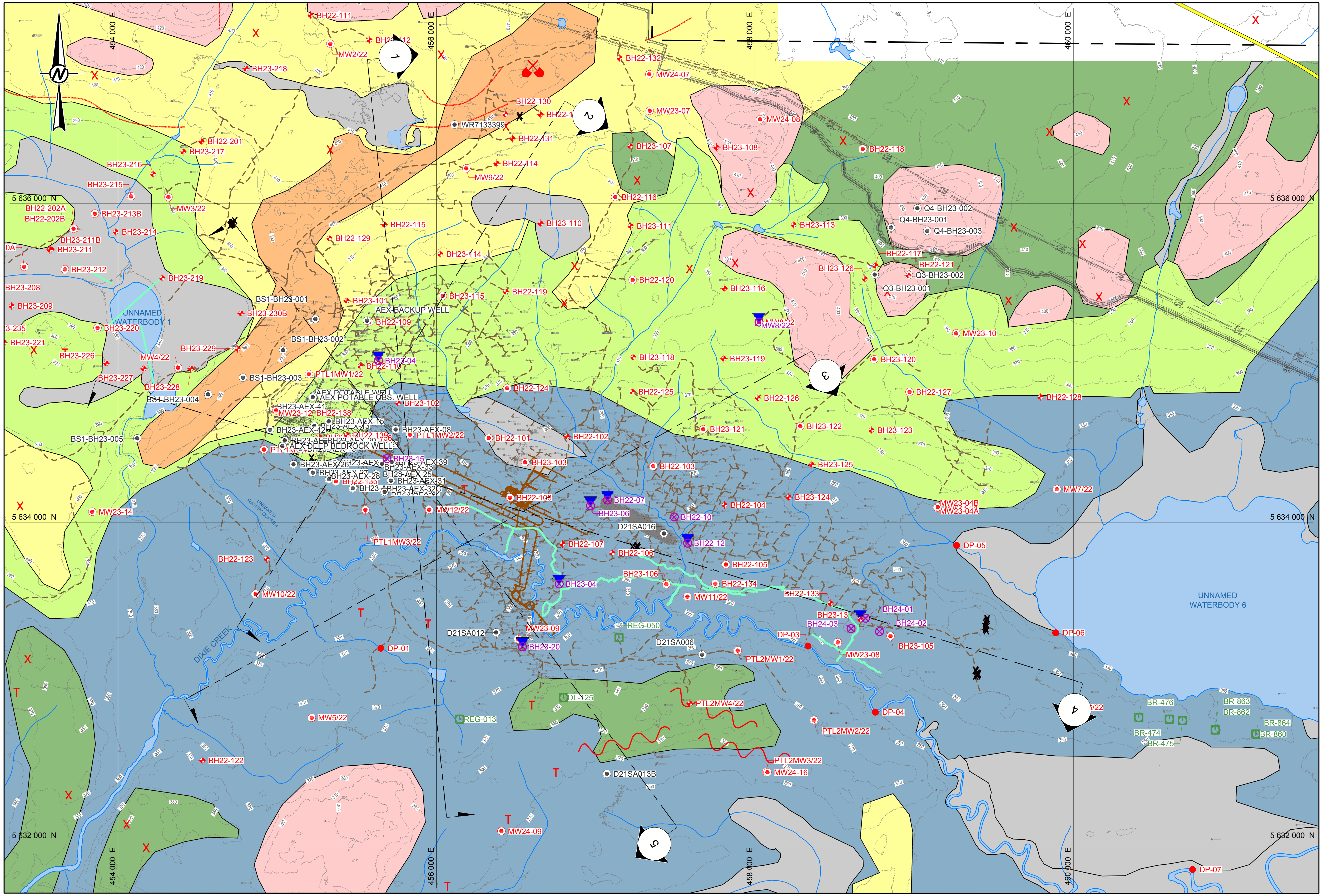
Manual water levels when the well was dry or frozen are not shown on this figure

wsp

KINROSS

Water Level Monitoring Open Pit and Underground Area Drive Points			
Great Bear Project			
Great Bear Resources			
Figure Number		6-12	
Project Number		CA0031272	
Date		August 25, 2025	
Drawn	VO	Reviewed	SG

Appendix E
Cross Sections



NOTE(S)

1. THIS FIGURE ILLUSTRATES THE QUATERNARY GEOLOGY BASE MAPPING AT THE KINROSS GREAT BEAR PROJECT ALONG WITH A CONCEPTUAL ALIGNMENT OF A TAILINGS STORAGE FACILITY.
2. ALL ELEVATION AND GRID COORDINATES SHOWN ON THIS FIGURE ARE IN METRES. GRID COORDINATES AND ELEVATIONS ARE REFERENCED TO NAD83 ZONE 15.
3. QUATERNARY GEOLOGY BASE MAPPING IS EXTRACTED FROM QUATERNARY GEOLOGY OF THE RED LAKE-CONFEDERATION LAKE AREA; SHARPE, D R; RUSSELL, H A J. GEOLOGICAL SURVEYS OF CANADA, OPEN FILE 2876, 1996.
4. GROUND SURFACE CONTOURS (2 m INTERVAL) PROVIDED BY KINROSS GOLD CORPORATION.
5. THIS FIGURE SHALL BE READ WITH THE ACCOMPANYING REPORT.

GEOLOGY LEGEND

- GEOLOGICAL BOUNDARY, APPROXIMATE
- SMALL BEDROCK OUTCROP
- BEDROCK OUTCROP (LOCATION PROVIDED BY KINROSS)
- SMALL OUTCROPS OF TILL
- TRANSVERSE MORAINE RIDGE
- ABANDONED SHORELINE FEATURE
- SAND OR GRAVEL PIT

LEGEND

- CONTOURS (10 m INTERVAL)
- RIVER / CREEK
- PROPERTY LINE
- TRACE OF GEOPHYSICAL SURVEY
- ROAD / TRAIL
- HIGHWAY
- TRANSMISSION LINE (EXISTING)
- BH23-202 WSP BOREHOLE
- BH22-208 WSP MONITORING WELL
- BH23-AEX-15 NON-WSP MONITORING WELL
- VIBRATING WIRE PIEZOMETER
- BH23-20 PACKER TEST
- BR-860 EXPLORATION DRILLHOLE
- DP-01 DRIVE POINTS

0 500 1,000

1:25,000 METRES

GEOLOGY LEGEND

O	**ORGANIC DEPOSITS:** PRIMARILY PEAT, BUT CAN INCLUDE ORGANIC CLAY AND OTHER HOLOCENE DEPOSITS.
GLS	**GLACIOLACUSTRINE SHORELINE:** SAND AND SILT, INCLUDES GRAVEL AND COBBLES AT SOME LOCATIONS; SHORELINE AND SHALLOW WATER DEPOSITS.
GLU	**GLACIOLACUSTRINE DEEP WATER:** CLAY, OFTEN VARVED WITH SILT LAMINAE, AND SILTY CLAY; DEPOSITED IN GLACIAL LAKE AWAY FROM ICE MARGIN.
GL	**GLACIOLACUSTRINE UNDIFFERENTIATED:** CLAY, SILT, INCLUDING FINE SAND.
GF	**GLACIOFLUVIAL:** SAND AND SILTY SAND, CAN INCLUDE GRAVEL; OUTWASH DEPOSITS THAT MAY HAVE FORMED IN SUB-AQUEOUS FANS AND SIMILAR ENVIRONMENTS.
GFI	**ICE CONTACT GLACIOFLUVIAL:** SAND AND GRAVEL, INCLUDES COBBLES, BOULDERS AND MAY INCLUDE SOME FINER GRAINED STRATIFIED SEDIMENTS; FORMED IN ESKERS AND OTHER SUBGLACIAL AND ICE MARGIN ENVIRONMENTS.
M	**GLACIAL TILL:** MIXTURE OF SAND, SILT, GRAVEL, COBBLES, BOULDERS AND SOME CLAY; LIKELY DEPOSITED SUBGLACIALLY; MAY INCLUDE SOME STRATIFIED DEPOSITS; ALSO REFERRED TO AS MORAINE; OFTEN INTERSPERSED WITH BEDROCK OUTCROPS.
R	**BEDROCK:** ARCHEAN BEDROCK - INCLUDING METAVOLCANICS, METASEDIMENTS, AND PLUTONIC ROCKS; OFTEN INTERSPERSED WITH MORAINE, WITH A DISCONTINUOUS VENEER OF TILL OR SAND.

CLIENT

Great Bear Resources

KINROSS

PROJECT

GREAT BEAR Hydrogeology Baseline

CONSULTANT

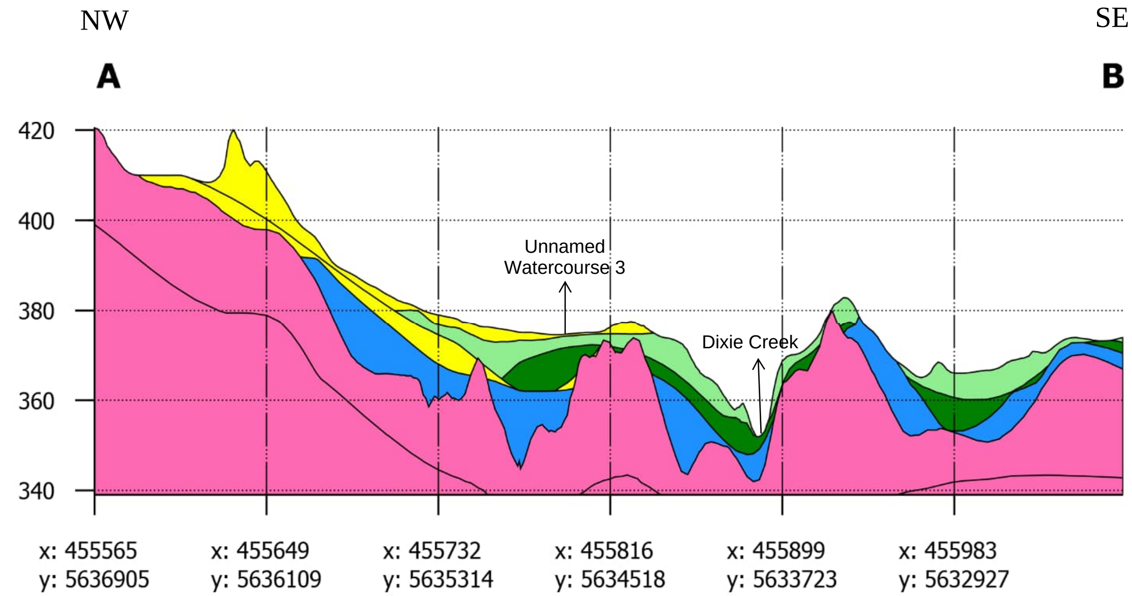
wsp

YYYY-MM-DD	2024-11-XX
DESIGNED	SG
PREPARED	NK
REVIEWED	SG
APPROVED	SG

TITLE

SECTIONS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0031269.9231	0001	A	E



Sand1 | Sand2 | Clay | Till | Silt2 | Bedrock

Location

A: 455565, 5636905

B: 456065, 5632146

Scale: 1:30,000

Vertical exaggeration: 20x

0m 1000m

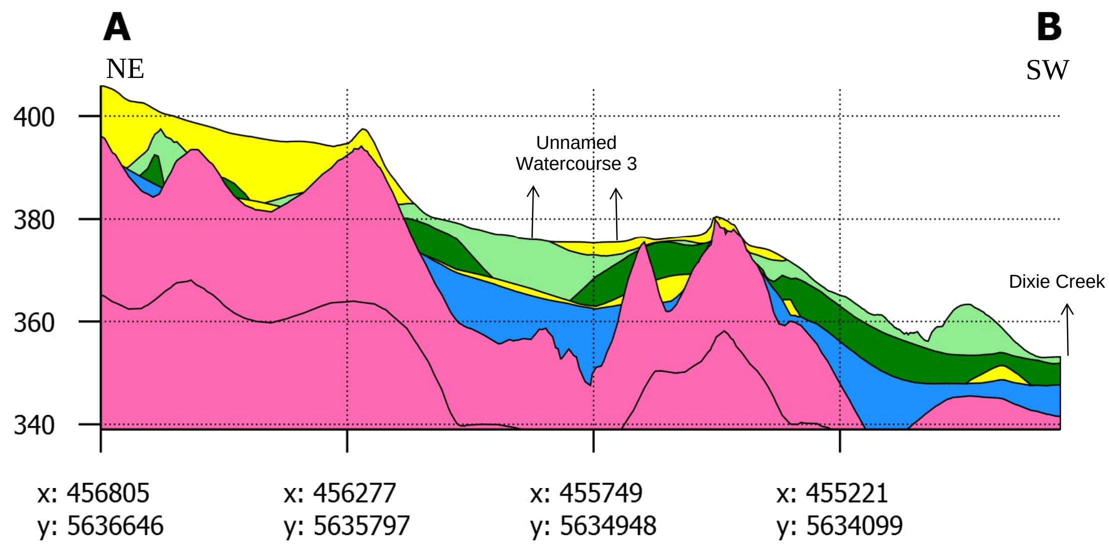
Notes

Cross sections generated from Leapfrog Model

Great Bear Resources

Hydrogoelogy Baseline

Figure Number	E1		
Project Number	OMEMA2303		
Date	Nov-24		
Drawn	MR	Reviewed	SG



Sand1 | Sand2 | Clay | Till | Silt2 | Bedrock

Location

A: 456805, 5636646

B: 454749, 5633339

Scale: 1:30,000

Vertical exaggeration: 20x

0m 1900m

Notes

wsp

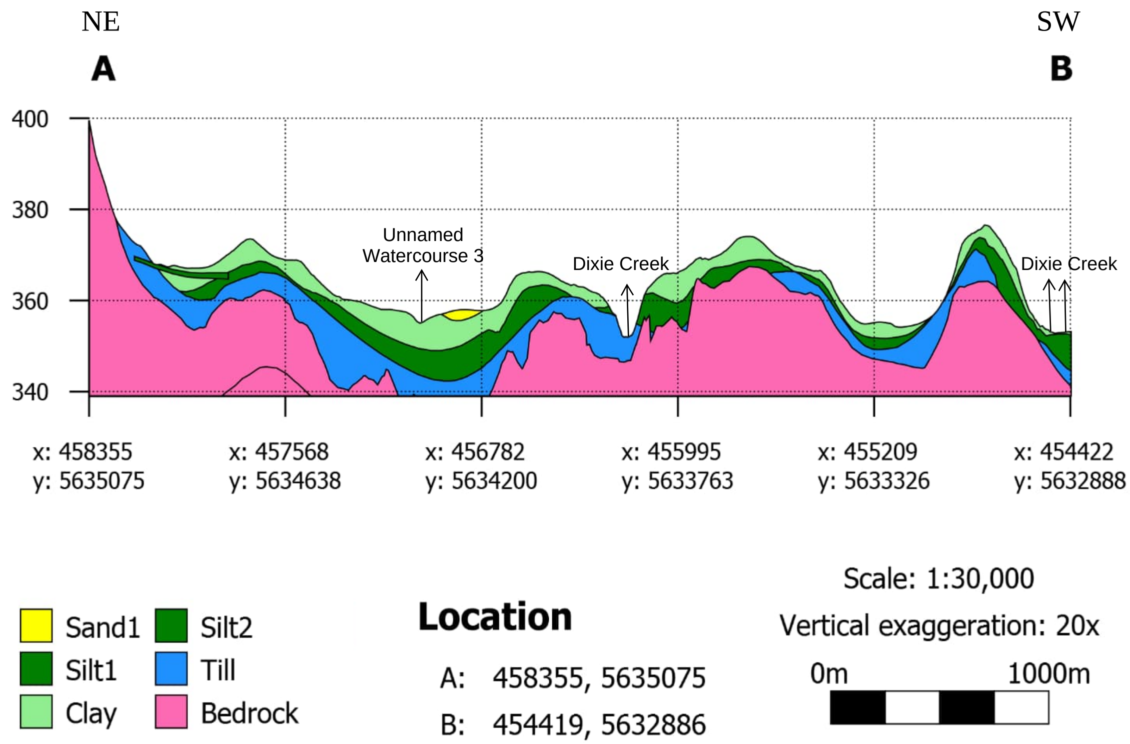
KINROSS

Cross sections generated from Leapfrog Model

Great Bear Resources

Hydrogoelogy Baseline

Figure Number		E2	
Project Number		OMEMA2303	
Date		Nov-24	
Drawn	MR	Reviewed	SG



Notes

wsp

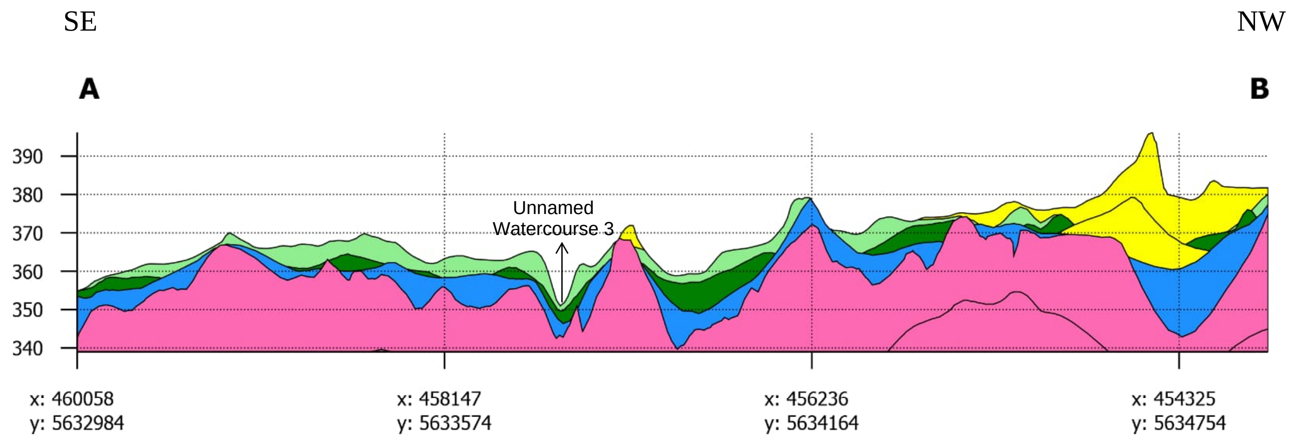
KINROSS

Cross sections generated from Leapfrog Model

Great Bear Resources

Hydrogoelogy Baseline

Figure Number		E3	
Project Number		OMEMA2303	
Date		Nov-24	
Drawn	MR	Reviewed	SG



Sand1 Sand2
Clay Till
Silt2 Bedrock

Location

A: 460058, 5632984

B: 453862, 5634897

Scale: 1:30,000

Vertical exaggeration: 20x

0m 1000m

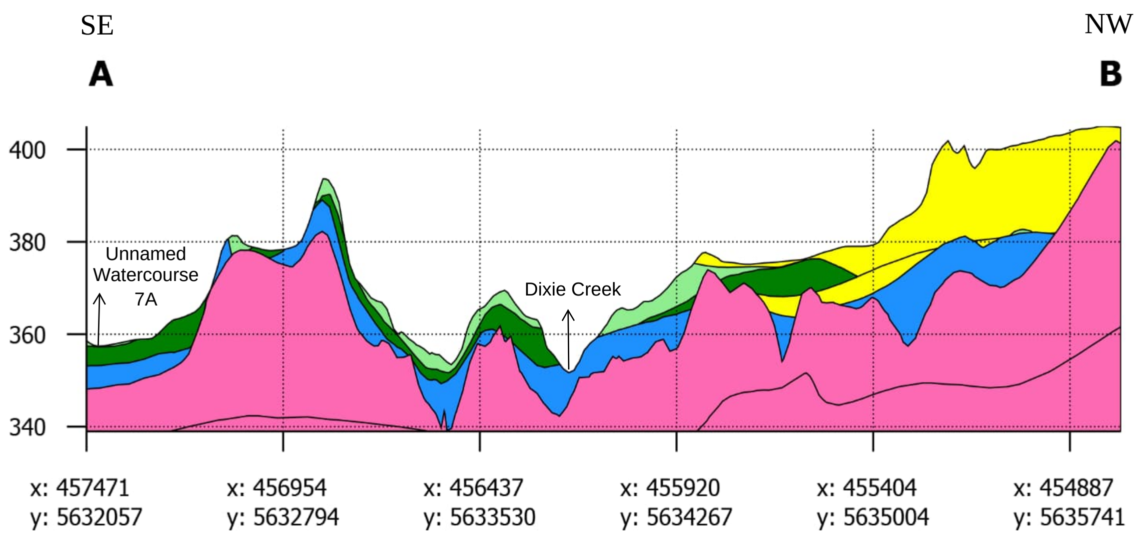
Notes

Cross sections generated from Leapfrog Model

Great Bear Resources

Hydrogoelogy Baseline

Figure Number	E4		
Project Number	OMEMA2303		
Date	Nov-24		
Drawn	MR	Reviewed	SG



Location

A: 457471, 5632057

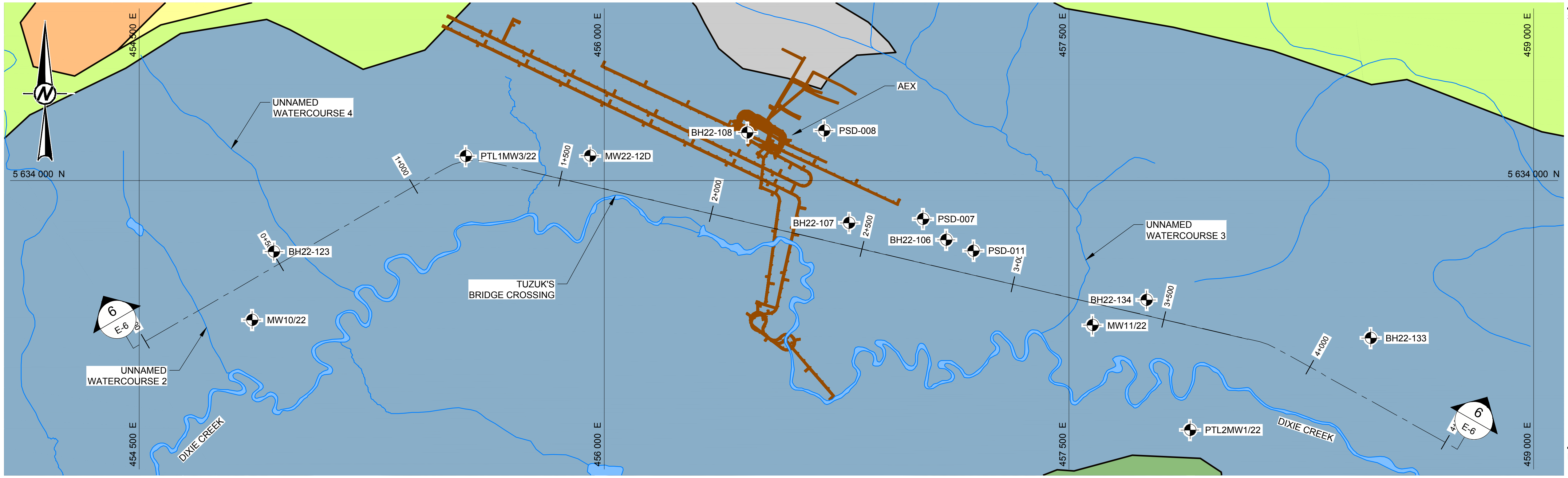
B: 454753, 5635931

Scale: 1:30,000

Vertical exaggeration: 20x

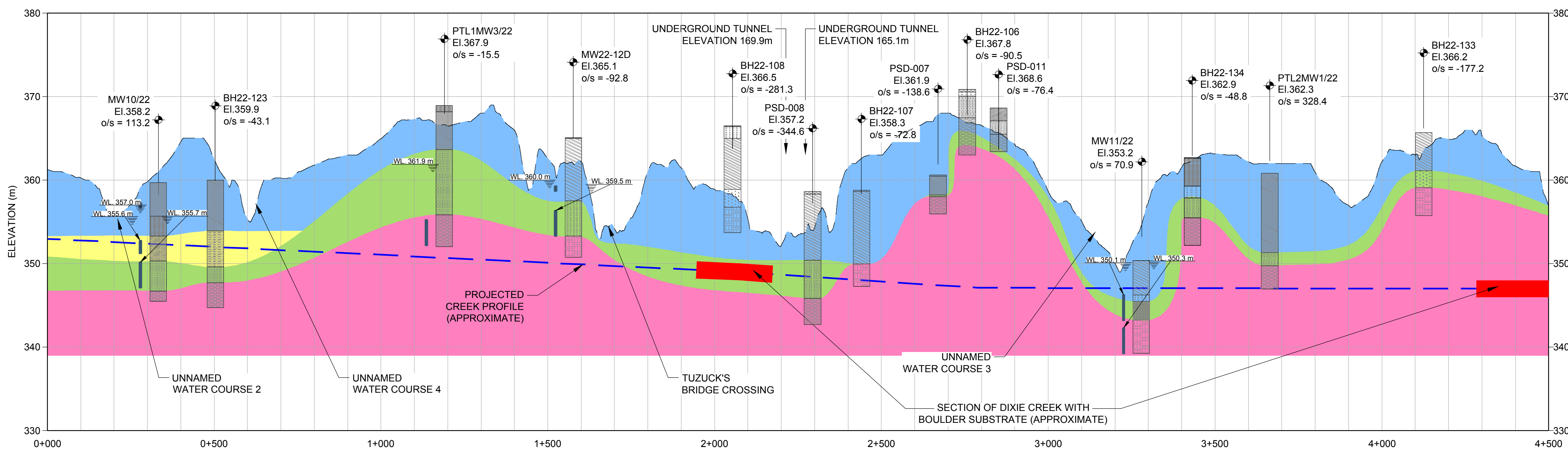
0m 1000m

Notes	WSP / KINROSS	Cross sections generated from Leapfrog Model			
		Great Bear Resources			
		Hydrogoelogy Baseline			
		Figure Number	E5		
		Project Number	OMEMA2303		
		Date	Nov-24		
		Drawn	MR	Reviewed	SG



PLAN VIEW

SCALE 1:15,000 m



SCALE 1:15,000 m — 6 / E-6 — PROFILE 6-6'

STRATIGRAPHY LEGEND

- ORGANIC DEPOSITS
- GLACIOLACUSTRINE SHORELINE
- GLACIOLACUSTRINE DEEP WATER
- GLACIOLACUSTRINE UNDIFFERENTIATED
- GLACIOFLUVIAL
- ICE CONTACT GLACIOFLUVIAL
- GLACIAL TILL
- BEDROCK

BOREHOLE STRATIGRAPHY LEGEND

- TOPSOIL
- SILT
- SANDY SILT
- CLAYEY SILT
- CLAY
- SILTY CLAY
- SANDY SLT
- SAND
- TILL
- BEDROCK

NOTES

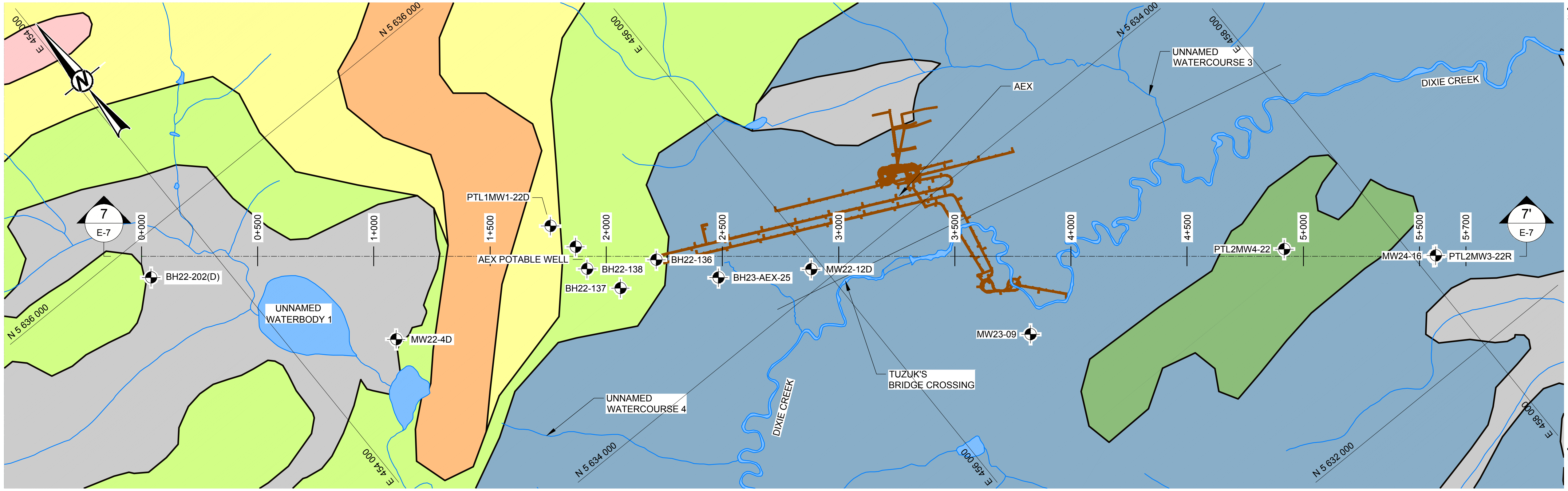
1. ALL ELEVATION AND GRID COORDINATES SHOWN ON THIS FIGURE ARE IN METRES. GRID COORDINATES AND ELEVATIONS ARE REFERENCED TO NAD83 ZONE 15.
2. o/s MEANS OFF SECTION.
5. THIS FIGURE SHALL BE READ WITH THE ACCOMPANYING REPORT.

REFERENCES

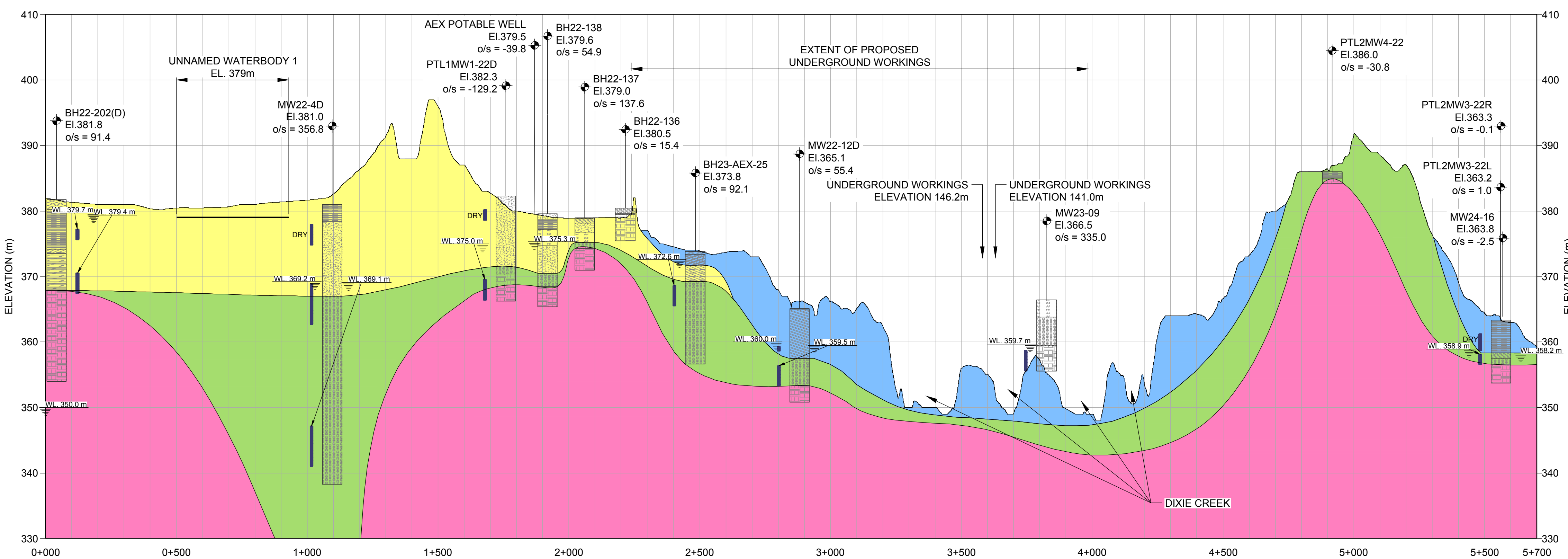
1. QUATERNARY GEOLOGY: EXTRACTED FROM QUATERNARY GEOLOGY OF THE RED LAKE-CONFEDERATION LAKE AREA; SHARPE, D R; RUSSELL, H A J. GEOLOGICAL SURVEYS OF CANADA, OPEN FILE 2876, 1996.
2. GROUND SURFACE: 22_GBear_DEM_1m_2023_08_22.tif PROVIDE BY KINROSS GOLD CORPORATION.

0 250 500
1:15,000 METRES

CLIENT		PROJECT	
Great Bear Resources		GREAT BEAR PROJECT GREAT BEAR Hydrogoelogy Baseline	
CONSULTANT	YYYY-MM-DD: 2024-11-04	TITLE	
wsp	DESIGNED: XXX	**INFERRED GEOLOGICAL PROFILE ALONG SECTION 6**	
	PREPARED: KKJ		
	REVIEWED: XXX	PROJECT NO. CA0031269.9231 / CONTROL 0001	REV. A / FIGURE E-6
	APPROVED: XXX		



PLAN VIEW
SCALE 1:20,000 m



SCALE 1:20,000 m 6 PROFILE 7-7'
E-6

STRATIGRAPHY LEGEND

- ORGANIC DEPOSITS
- GLACIOLACUSTRINE SHORELINE
- GLACIOLACUSTRINE DEEP WATER
- GLACIOLACUSTRINE UNDIFFERENTIATED
- GLACIOFLUVIAL
- ICE CONTACT GLACIOFLUVIAL
- GLACIAL TILL
- BEDROCK

BOREHOLE STRATIGRAPHY LEGEND

- TOPSOIL
- SILT
- SANDY SILT
- CLAYEY SILT
- CLAY
- SILTY CLAY
- SANDY SLT
- SAND
- TILL
- BEDROCK

NOTES

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2. o/s MEANS OFF SECTION.
5. THIS FIGURE SHALL BE READ WITH THE ACCOMPANYING REPORT.

REFERENCES

1. QUATERNARY GEOLOGY: EXTRACTED FROM QUATERNARY GEOLOGY OF THE RED LAKE-CONFEDERATION LAKE AREA; SHARPE, D R; RUSSELL, H A J. GEOLOGICAL SURVEYS OF CANADA, OPEN FILE 2876, 1996.
2. GROUND SURFACE: 22_GBear_DEM_1m_2023_08_22.tif PROVIDE BY KINROSS GOLD CORPORATION.

0 500 1,000
1:20,000 METRES

CLIENT
Great Bear Resources

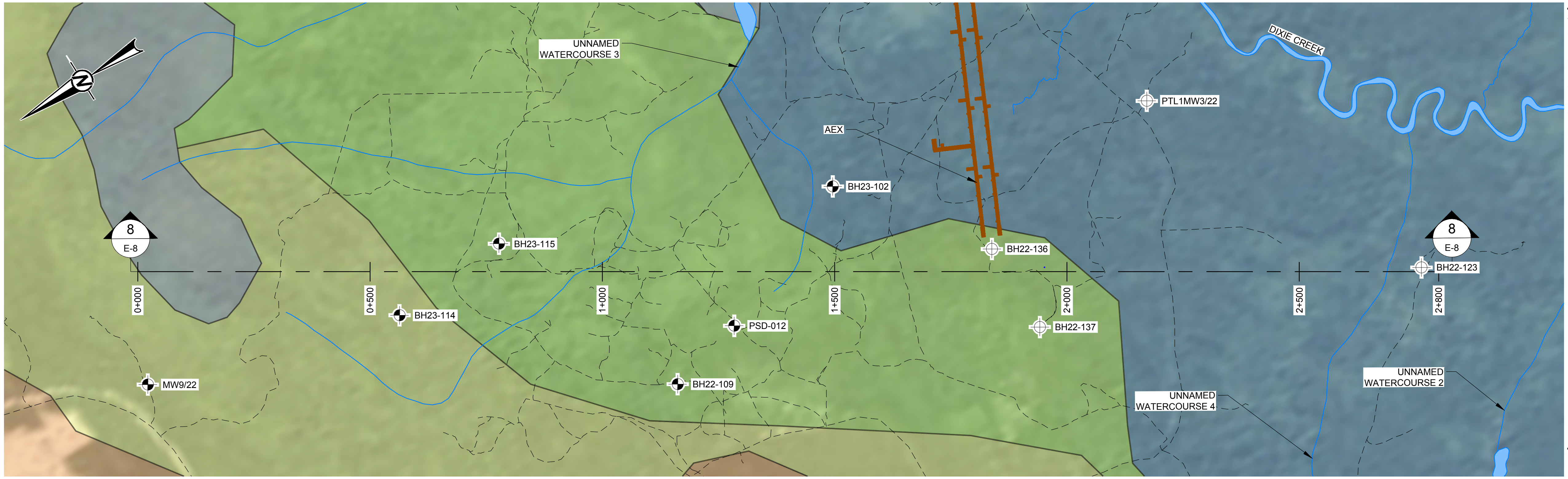
CONSULTANT

YYYY-MM-DD	2024-11-04
DESIGNED	XXX
PREPARED	KKJ
REVIEWED	XXX
APPROVED	XXX

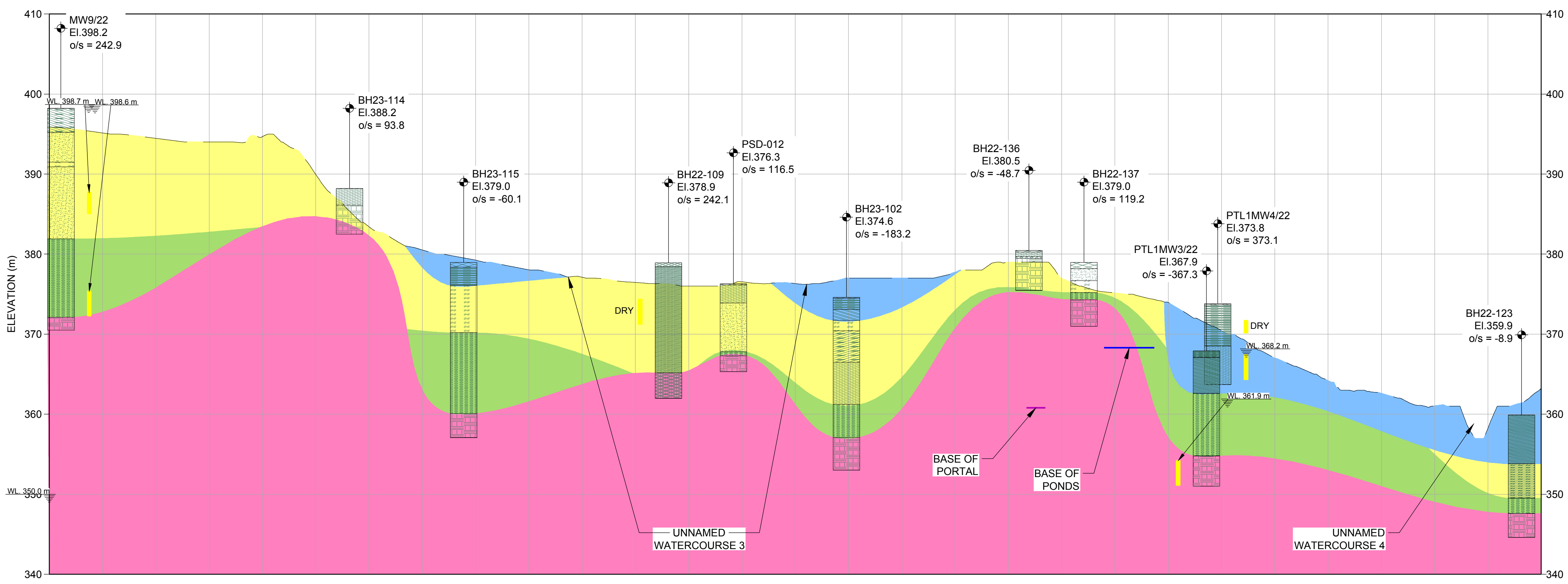
PROJECT
GREAT BEAR PROJECT
GREAT BEAR Hydrogoelogy Baseline

TITLE
INFERRED GEOLOGICAL PROFILE ALONG SECTION 7

PROJECT NO.	CONTROL	REV.	FIGURE
CA0031269.9231	0001	A	E-7



PLAN VIEW
SCALE 1:10,000 m



SCALE 1:10,000 m 8 E-8 PROFILE 8-8'

STRATIGRAPHY LEGEND

- ORGANIC DEPOSITS
- GLACIOLACUSTRINE SHORELINE
- GLACIOLACUSTRINE DEEP WATER
- GLACIOLACUSTRINE UNDIFFERENTIATED
- GLACIOFLUVIAL
- ICE CONTACT GLACIOFLUVIAL
- GLACIAL TILL
- BEDROCK

BOREHOLE STRATIGRAPHY LEGEND

- TOPSOIL
- SILT
- SANDY SILT
- CLAYEY SILT
- CLAY
- SILTY CLAY
- SANDY SLT
- SAND
- TILL
- BEDROCK

NOTES

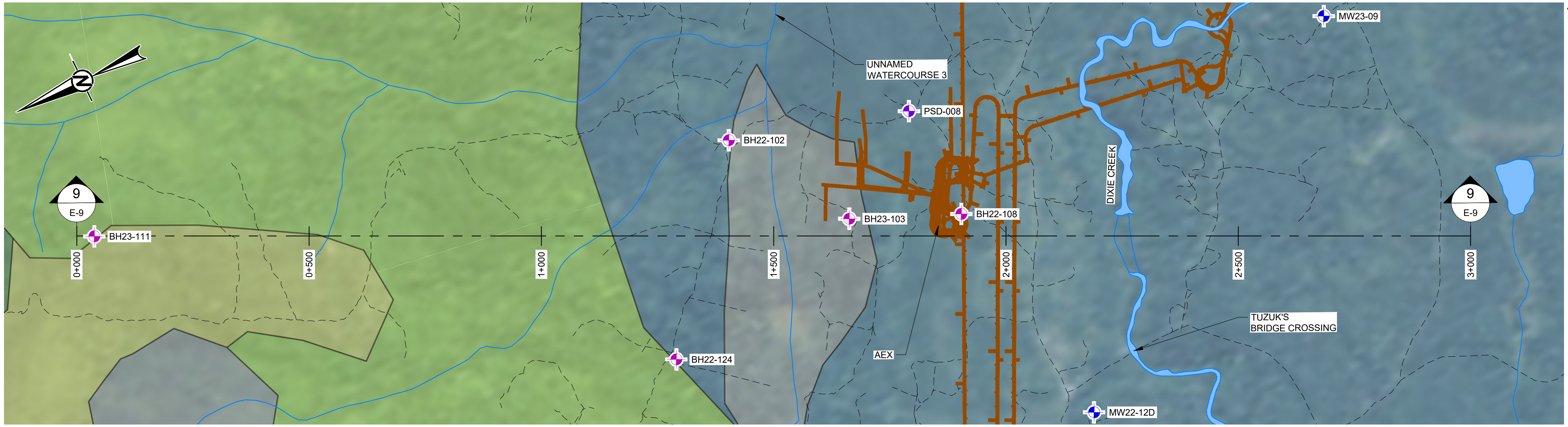
1. ALL ELEVATION AND GRID COORDINATES SHOWN ON THIS FIGURE ARE IN METRES. GRID COORDINATES AND ELEVATIONS ARE REFERENCED TO NAD83 ZONE 15.
2. o/s MEANS OFF SECTION.
5. THIS FIGURE SHALL BE READ WITH THE ACCOMPANYING REPORT.

REFERENCES

1. QUATERNARY GEOLOGY: EXTRACTED FROM QUATERNARY GEOLOGY OF THE RED LAKE-CONFEDERATION LAKE AREA; SHARPE, D R; RUSSELL, H A J. GEOLOGICAL SURVEYS OF CANADA, OPEN FILE 2876, 1996.
2. GROUND SURFACE: 22_GBear_DEM_1m_2023_08_22.tif PROVIDE BY KINROSS GOLD CORPORATION.

0 250 500
1:10,000 METRES

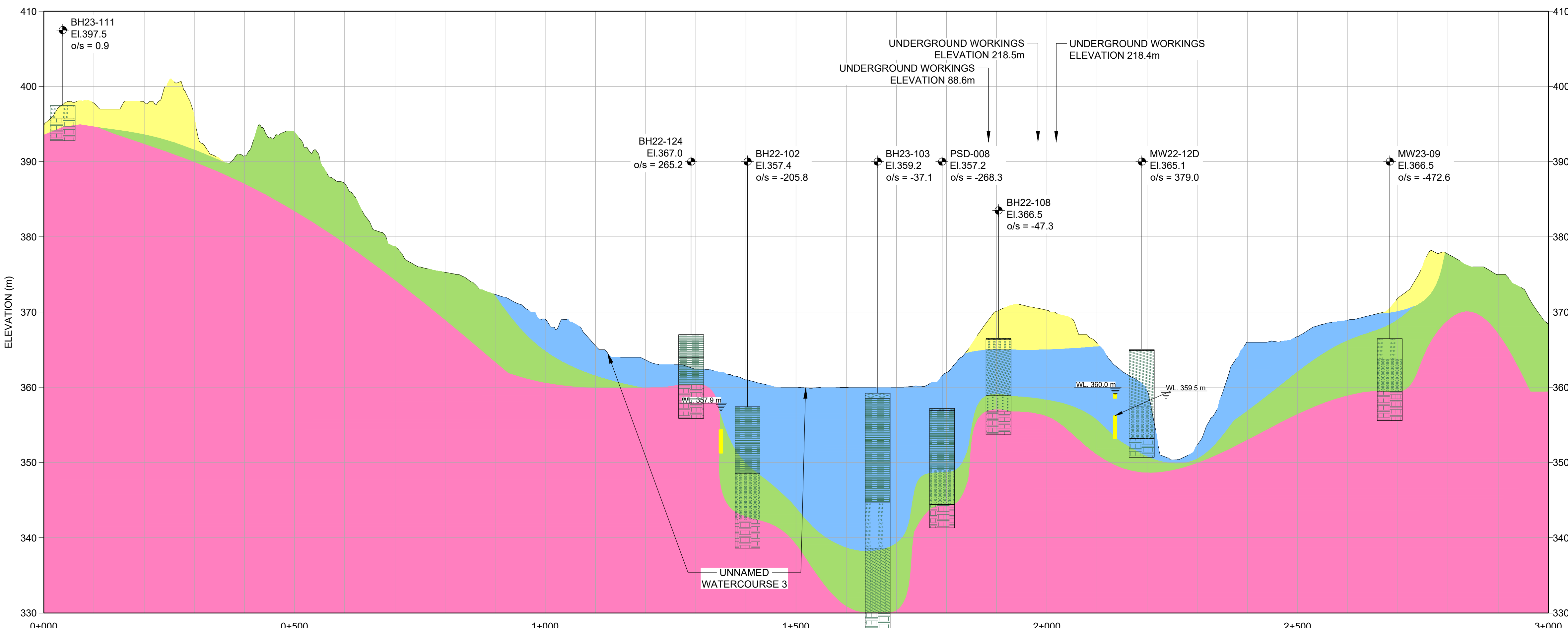
CLIENT	Great Bear Resources
PROJECT	GREAT BEAR PROJECT KINROSS GREAT BEAR Hydrogoelogy Baseline
CONSULTANT	wsp
YYYY-MM-DD	2024-11-07
DESIGNED	ES
PREPARED	KKJ
REVIEWED	
APPROVED	
TITLE	**INFERRED GEOLOGICAL PROFILE ALONG SECTION 8**
PROJECT NO.	CA0031269.9231
CONTROL	0001
REV.	A
FIGURE	E-8



PLAN VIEW
SCALE 1:10,000 m

STRATIGRAPHY LEGEND

- ORGANIC DEPOSITS
- GLACIOLACUSTRINE SHORELINE
- GLACIOLACUSTRINE DEEP WATER
- GLACIOLACUSTRINE UNDIFFERENTIATED
- GLACIOFLUVIAL
- ICE CONTACT GLACIOFLUVIAL
- GLACIAL TILL
- BEDROCK



SCALE 1:10,000 m 9 E-9 PROFILE 9-9'

BOREHOLE STRATIGRAPHY LEGEND

- TOPSOIL
- SILT
- SANDY SILT
- CLAYEY SILT
- CLAY
- SILTY CLAY
- SANDY SLT
- SAND
- TILL
- BEDROCK

NOTES

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2. o/s MEANS OFF SECTION.
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REFERENCES

1. QUATERNARY GEOLOGY: EXTRACTED FROM QUATERNARY GEOLOGY OF THE RED LAKE-CONFEDERATION LAKE AREA; SHARPE, D R; RUSSELL, H A J. GEOLOGICAL SURVEYS OF CANADA, OPEN FILE 2876, 1996.
2. GROUND SURFACE: 22_GBear_DEM_1m_2023_08_22.tif PROVIDE BY KINROSS GOLD CORPORATION.

0 250 500
1:10,000 METRES

CLIENT	Great Bear Resources
PROJECT	GREAT BEAR PROJECT GREAT BEAR Hydrogoelogy Baseline
CONSULTANT	wsp
YYYY-MM-DD	2024-11-07
DESIGNED	ES
PREPARED	KKJ
REVIEWED	
APPROVED	
TITLE	**INFERRED GEOLOGICAL PROFILE ALONG SECTION 9**
PROJECT NO.	CA0031269.9231
CONTROL	0001
REV.	A
FIGURE	E-9