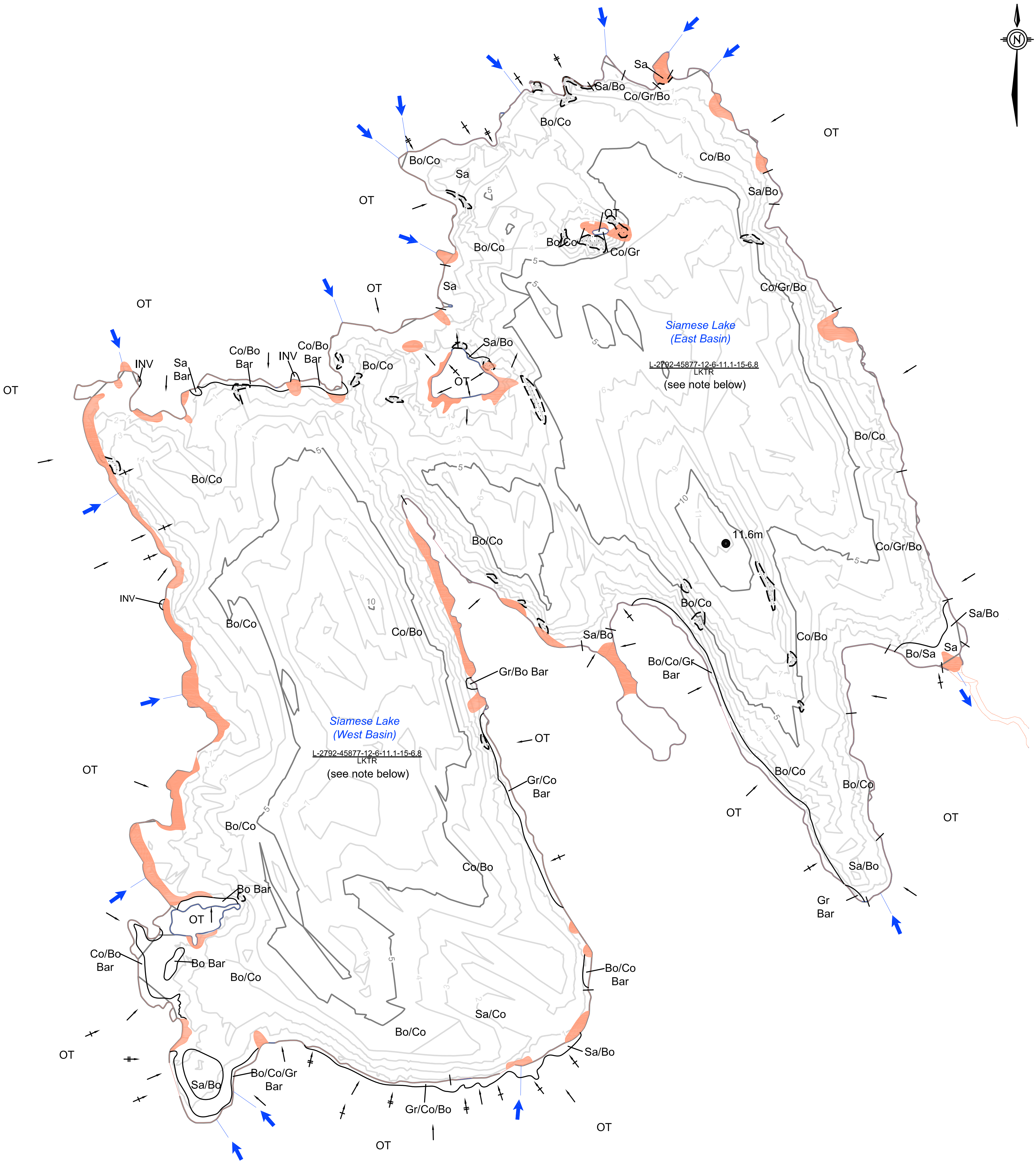

Statistics at Time of Survey	
Elevation	160 m
Maximum Length	8.7 km
Surface Area	27,921,900 sq. m.
Volume	114,648,400 cu.m.
Mean Depth	4.10 m
Maximum Depth	11.6 m
Perimeter, Main Shore	45,877 m
Perimeter, Islands	3,325 m

500 0 500
SCALE 1:30,000 METRES

Reference:
NTS Mapsheet 66A05

PROJECT
AREVA
KIGGAVIK
EVALUATION OF POTENTIAL
WATER SUPPLY LAKES

TITLE
SIAMESE LAKE
MODERATE TO HIGH SLOPE COBBLES

DRAFT

Golder Associates
Saskatoon, Saskatchewan

PROJECT	09-1362-0610	FILE No.	
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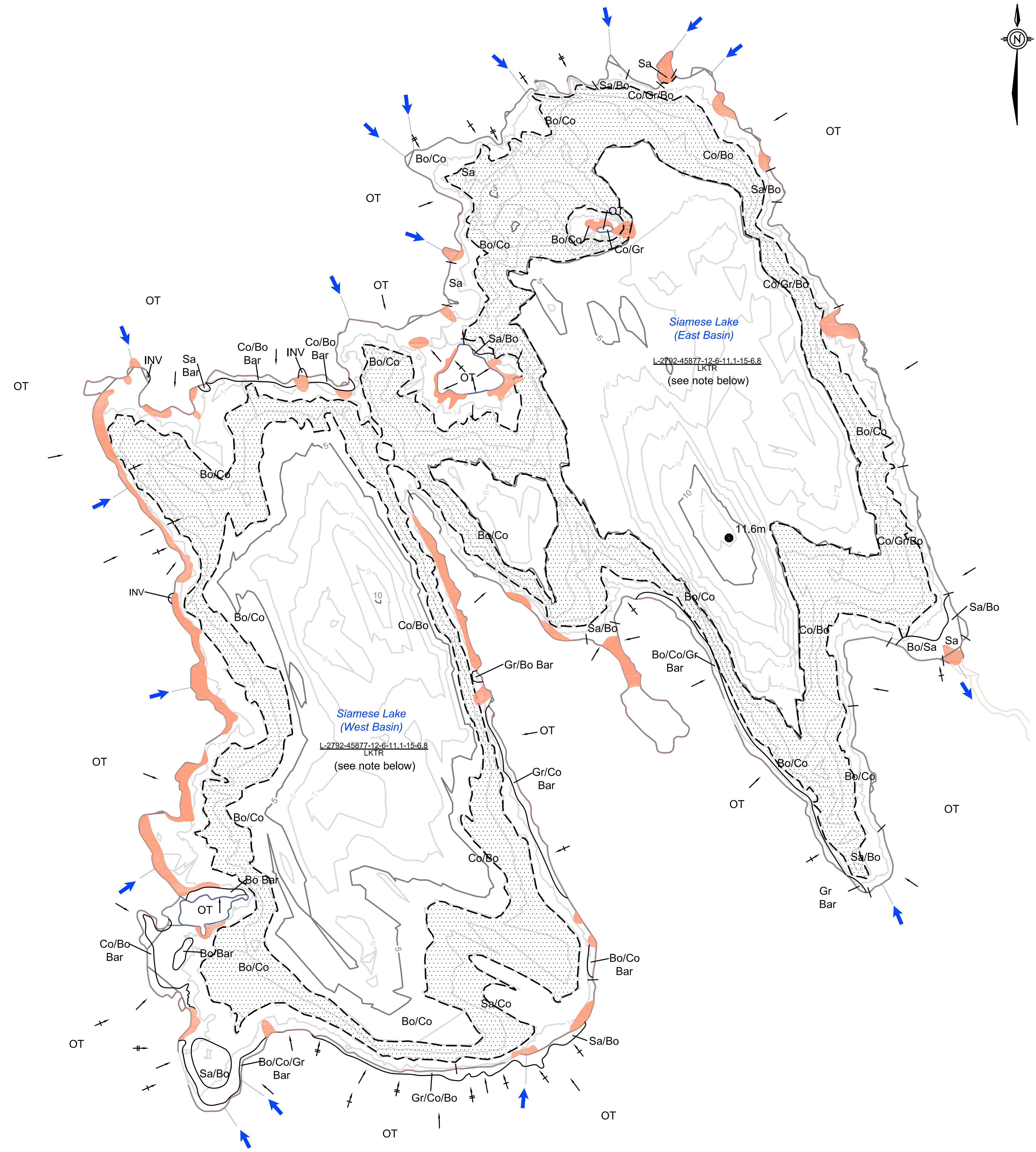
CADD	TAH/AKG 20/05/10	FIGURE: 1-2C	
CHECK			
REVIEW			



Statistics at Time of Survey	
Elevation	160 m
Maximum Length	8.7 km
Surface Area	27,921,900 sq. m.
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Mean Depth	4.10 m
Maximum Depth	11.6 m
Perimeter, Main Shore	45,877 m
Perimeter, Islands	3,325 m

Reference:
NTS Mapsheet 66A05

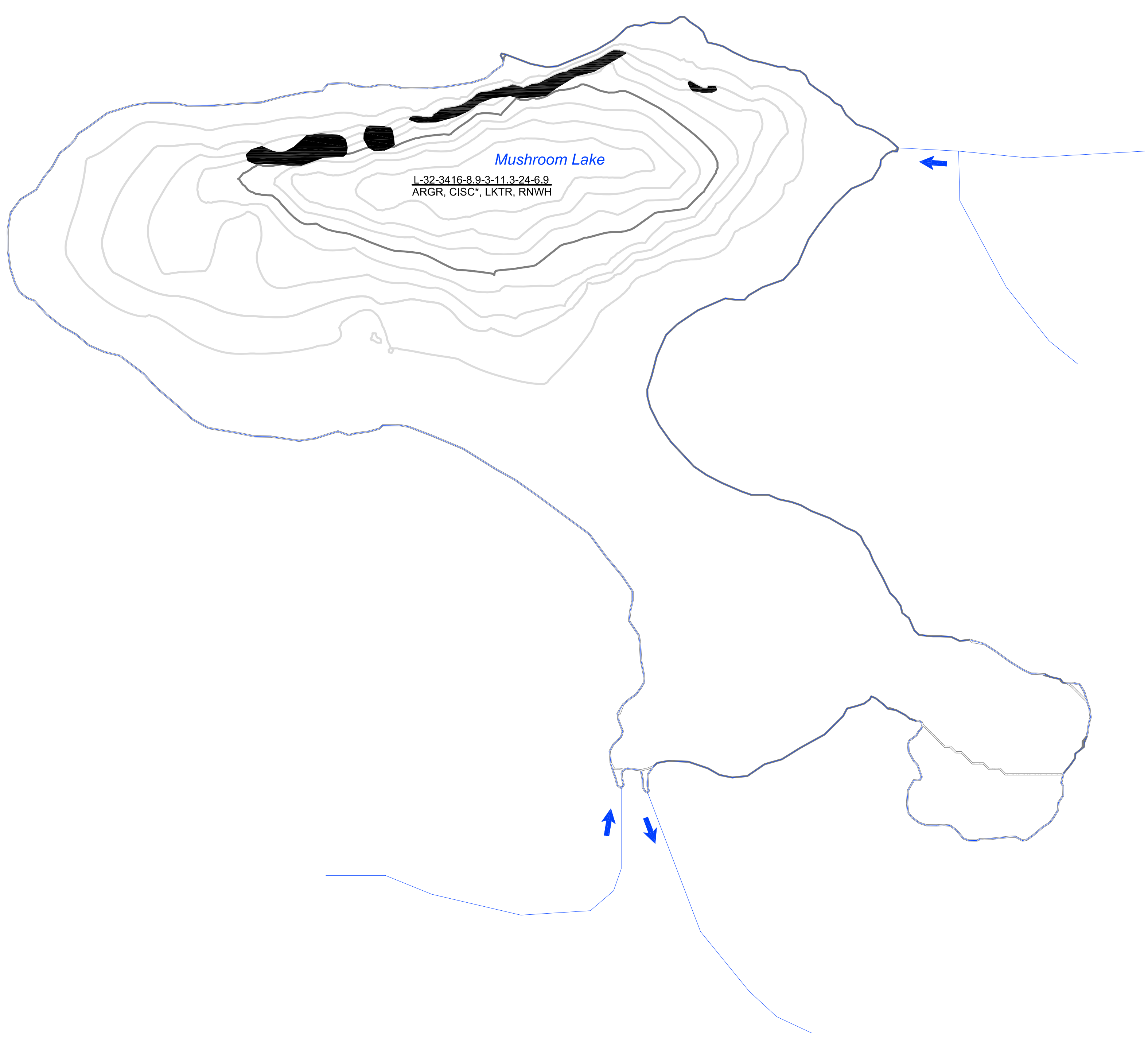
PROJECT
AREVA
KIGGAVIK
EVALUATION OF POTENTIAL
WATER SUPPLY LAKES

TITLE
SIAMESE LAKE
HIGH DISSOLVED OXYGEN

DRAFT

Golder Associates
Saskatoon, Saskatchewan

PROJECT	09-1362-0610	FILE No.	
DESIGN		SCALE AS SHOWN	REV. 0
CADD	TAH/AKG 20/05/10		
CHECK		**FIGURE: 1-2D**	
REVIEW			



Legend

- Potential Spawning Habitat
- Flow Arrow

Lake (L), Wetland (W) or Pond (P)
Surface Area (ha)
Main Shoreline Perimeter (m)
Max Depth (m)
Secchi Depth (m)
Dissolved Oxygen (mg/L)
Conductivity (µS/cm)
pH

Fish Species

Reference:
NTS Mapsheet 66A05

PROJECT

AREVA

KIGGAVIK
EVALUATION OF POTENTIAL
WATER SUPPLY LAKES

TITLE

MUSHROOM LAKE
POTENTIAL SPAWNING HABITAT

DRAFT

Golder Associates
Saskatoon, Saskatchewan

PROJECT	09-1362-0610		FILE No.	
DESIGN			SCALE AS SHOWN	REV. 0
CADD	AKG	08/06/10		
CHECK			**FIGURE: 1-3**	
REVIEW				

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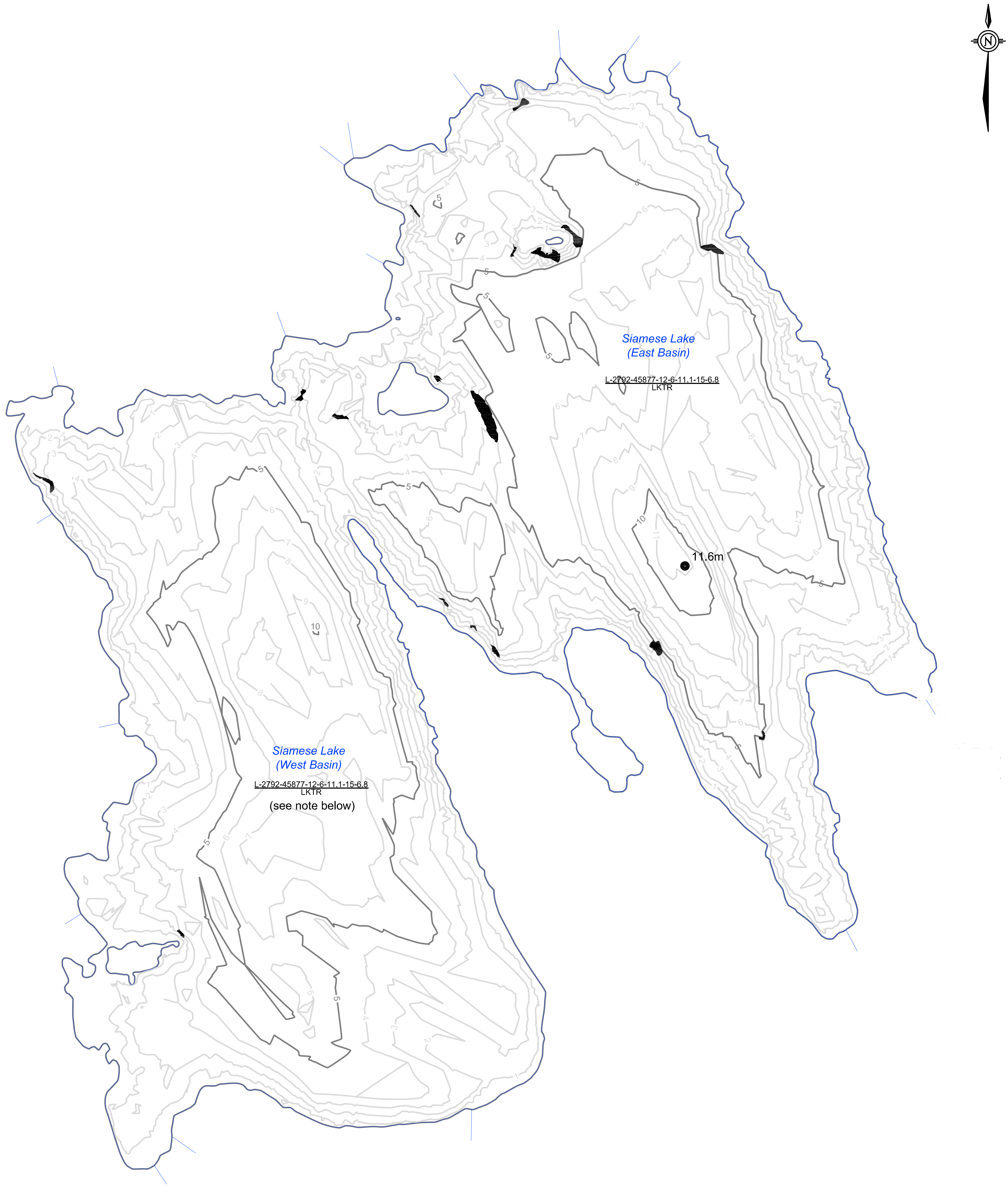

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SCALE 1:30,000 METRES

Legend
- Potential Spawning Habitat
- Flow Arrow

Lake (L), Wetland (W) or Pond (P)	Surface Area (ha)	Main Shoreline Perimeter (m)	Max Depth (m)	Secchi Depth (m)	Dissolved Oxygen (mg/L)	Conductivity (µS/cm)	pH

Fish Species

Reference:
NTS Mapsheet 66A05

PROJECT

AREVA

KIGGAVIK
EVALUATION OF POTENTIAL
WATER SUPPLY LAKES

TITLE

SIAMESE LAKE
POTENTIAL SPAWNING HABITAT

DRAFT

Golder Associates
Saskatoon, Saskatchewan

PROJECT	09-1362-0610		FILE No.			
DESIGN			SCALE	AS SHOWN	REV.	0
CADD	TAH/AKG	11/04/11	**FIGURE: 1-4**			
CHECK						
REVIEW						

2 Winter Access Road Water Withdrawal

2.1 Introduction

Golder Associates Ltd. (Golder) assessed the environmental impact of removing water from six potential sources of water (i.e., Siamese Lake, L2/20 km Lake, Long Lake, Audra Lake, four Unnamed Lakes, and Qinguq Bay of Baker Lake) located along the proposed winter access road. An estimated 75,000 m^3 of water will be required annually to maintain and flood the proposed winter road (EBA 2010). The purpose of this memo is to assess the potential impact of winter access road water withdrawal on fall spawning fish species, most specifically lake trout (*Salvelinus namaycush*), through the two following approaches:

- estimation of winter lake level reductions due to predicted annual water withdrawal volumes from each of the above identified lakes; followed by
- assessment of the suitability of lake trout spawning habitat for lakes with water level reductions considered to be of potential concern.

The methods used to assess the potential impact of winter access road water withdrawal on lake trout spawning habitat and success were all office based. Information available from the EBA Kiggavik Project Winter Road Report (EBA 2010) and from the Kiggavik Project, Environmental Impact Statement, Aquatic Baseline (Golder 2011) were used to complete a desktop study of the maximum annual water withdrawal volume available, predicted volumes required from selected waterbodies located along the winter access road, and to assess the potential effect of water withdrawals on lake trout spawning habitat.

2.2 Maximum Annual Water Withdrawal Volume Available and Required

Bathymetric data were required for each lake in order to determine maximum annual water withdrawal volumes available. Detailed bathymetric data were collected by Golder in 2008 for Siamese Lake and are available in the baseline report (Golder 2011). Because detailed bathymetric data were not available for the remaining waterbodies (i.e., L2/20 km Lake, Long Lake, Audra Lake, four unnamed lakes, and Qinguq Bay of Baker Lake), these data were estimated using the ground penetrating radar (GPR) transects collected by EBA (2010). The GPR transects were completed along lake crossing segments of the proposed winter road. Bathymetric data was synthesized for each lake by applying the observed basin slopes at the proposed crossing locations to the entire lake. From the synthesized bathymetric data, stage-storage volume-area curves were created. The estimated under-ice volumes were calculated as the volume of water below the 2 m contour.

Fisheries and Oceans Canada (DFO) protocol indicates that water withdrawal from lakes in Nunavut during one ice covered season must not exceed 10% of the under ice water volume (DFO 2005). Ten percent of the estimated under-ice volume was calculated for each waterbody identified as a potential source of water along the winter access road, and was used as the maximum potential withdrawal volume available for each waterbody (Table 2-1). Thus, approximately 12,239,968 m^3 of total water volume is available for withdrawal from lakes crossed by the proposed winter road.

EBA estimated a requirement of 75,000 m^3 of water to annually flood and maintain the proposed winter road. The relative percent length of winter access road covered by each lake was identified, and each lake was allocated that same percent of the total annually required water volume. These apportioned volumes were used for further assessments.

Table 2-1: Estimated Maximum Annual Water Withdrawal Volumes for Selected Waterbodies

Waterbody	Under-Ice Volume[a] (m^3)	Maximum Annual Water Withdrawal Volume		
		Maximum of 10% Allowed by DFO (m^3)	Required Volume[b] (m^3)	Required portion of Lake Under-Ice Volume (%)
Siamese Lake	65,821,284	6,582,128	7,275	0.01
L2 / 20 km Lake	21,215,910	2,121,591	7,275	0.03
Long Lake	1,573,164	157,316	8,850	0.56
Audra Lake	30,409,439	3,040,944	27,450	0.09
Four Unnamed Lakes	1,990,323	199,032	12,075	0.61
Qinguq Bay	1,389,562	138,956	12,075	0.87
Total	**122,399,682**	**12,239,968**	**75,000**	**0.06**

[a] Estimates based on EBA (2010) GPR data.
[b] Required volumes were allocated proportionally along the winter access road.
m^3 = cubic metres; % = percent; cm = centimetres.

The estimated decreases in lake levels over the winter were based upon subtraction of the volume required for winter road flooding and maintenance from the volume associated with the 2 m bathymetric depth contour. Linear interpolation of the curves was used to estimate the reduction in under-ice volume. Table 2-2 provides the maximum predicted winter water level reductions for all selected lakes.

2.3 Potential Impact of Removing Water

The percent of under-ice volume required to annually flood and maintain the proposed winter road ranged from 0.01% for Siamese Lake to 0.87% for Qinguq Bay of Baker Lake (Table 2-1). These volumes are substantially less than the maximum 10% volume allowed by DFO. Once converted to reductions in water level, they represent a drop of between 0.2 cm for Siamese and L2/20 km lakes and 0.8 cm for Audra Lake (Table 2-2). The small volume of water required to annually flood and maintain the proposed winter road should have an insignificant impact on lake trout spawning habitat in the affected lakes. However, Siamese Lake may be affected to a greater extent than the others, as the water volumes to be withdrawn for flooding and maintenance of the winter road are in addition to water withdrawals proposed for use at the Kiggavik mine and mill site (Table 2-2).

Table 2-2: Calculated Maximum Annual Water Level Fluctuations for Selected Waterbodies

Waterbody	Condition / Uses	Water Level Fluctuation
Siamese Lake (assuming no isolation between both basins)	Scenario 1: Sole water supply source for Kiggavik site(a); plus water supply for portion of winter access road.	5 cm + 0.2 cm = **5.2 cm decrease**
	Scenario 2: Water supply source for Kiggavik site in combination with water from the East Mine Pit(a); plus water supply for portion of winter access road.	3 cm + 0.2 cm = **3.2 cm decrease**
West Basin of Siamese Lake (assuming complete isolation from the east lobe for water source for Kiggavik Site, but equal water supply for the winter access road)	Scenario 3: Sole water supply source for Kiggavik site(a); plus water supply for portion of winter access road.	12 cm + 0.2 cm = **12.2 cm decrease**
	Scenario 4: Water supply source for Kiggavik site in combination with water from the East Mine Pit(a); plus water supply for portion of winter access road.	6 cm + 0.2 cm = **6.2 cm decrease**
East Basin of Siamese Lake (assuming complete isolation from the west basin for water source for Kiggavik Site, but equal water supply for the winter access road)	Scenario's 3 and 4 – Effect on East Basin: Water supply for portion of winter access road.	**0.2 cm decrease**
L2 / 20 km Lake	water supply for portion of winter access road	**0.2 cm decrease**
Long Lake	water supply for portion of winter access road	**0.5 cm decrease**
Audra Lake	water supply for portion of winter access road	**0.8 cm decrease**
Four Unnamed Ponds	water supply for portion of winter access road	**0.5 cm decrease**
Qinguq Bay	water supply for portion of winter access road	**0.5 cm decrease**

Modified from Table 10 (Golder 2010).
(a) According to Tech Memo (Golder 2010), Siamese Lake may be used as either the sole water supply source for the Kiggavik Site, or in combination with water from the East Mine Pit.
km = kilometres; cm = centimetres

2.4 Siamese Lake

Siamese Lake sustains a population of lake trout (Golder 2010, 2011). The potential for successful lake trout spawning was assessed based on information presented in a technical memorandum regarding potential water source lakes (Mushroom and Siamese lakes) (Golder 2010). Based on 12 factors potentially limiting lake trout spawning habitat selection, 17 potential lake trout spawning areas were identified that appear to meet optimal egg survival requirements (Figure 2-1; Golder 2010).

According to Fitzsimons (1994), stable water levels are not required for spawning; however, they are required for egg survival. During the fall and winter, incubating lake trout eggs are vulnerable to impacts from reservoir drawdown and fluctuating water levels (Ford et al. 1995). Effects of drawdown identified by Martin (1955, 1957, as cited by Ford et al. 1995) include spawning beds dewatered, eggs desiccated or frozen, and access to preferred spawning sites lost. Lake trout may also be forced to select spawning sites of lower qualities (i.e., sub optimal temperature, higher sediment loads, different substrate, and different depth; Martin 1955 and 1957, as cited by Ford et al. 1995).

In addition to providing water to annually flood and maintain the proposed winter road, water from Siamese Lake is proposed as the main water supply for the proposed mine and mill infrastructure located at the Kiggavik Site. Siamese Lake may be the sole source of water for the mine and mill, or Siamese Lake may be used in conjunction with water removed from the east mine pit. Golder estimates the accumulative winter water level reduction for Siamese Lake to be about 5.2 cm if it is the sole source of water (Scenario 1) or 3.2 cm if Siamese Lake water is used in conjunction with water from the East Mine Pit (Scenario 2; Table 2-2).

The maximum depth of the shallow region between the east and west basins of Siamese Lake was measured to be 2.5 m during the bathymetric survey conducted in 2008. Although it is unlikely that the two basins would become isolated from one another during the period of ice cover, an assessment of water withdrawal was conducted for the west basin, assuming complete isolation from the east basin. The estimated accumulative drop in winter water level in the west basin of Siamese Lake (assuming isolation) is 12.2 cm or 6.2 cm, depending on whether Siamese Lake is used as the sole source for the mine and mill water supply, or if it is supplemented by water from the East Mine Pit (Table 2-2). The estimated reduction in winter water level in the east basin of Siamese Lake (assuming isolation) attributable to provision of water for the purpose of winter road flooding and maintenance is 0.2 cm (Table 2-2).

Potential spawning habitat in Siamese Lake has been identified at depths between 2 m and 5 m (Figure 2-1). A 3.2 cm (Scenario 2) to 5.2 cm (Scenario 1) drop in the under-ice lake water level will slightly reduce the suitable area of nine identified potential lake trout spawning locations in Siamese Lake. However, there will still be habitat available in the deeper portions of the spawning areas. The largest potential lake trout spawning area (about 400 m long) is located between 3 m and 5 m deep and thus will not be affected by predicted water level reductions.

Only two potential lake trout spawning areas are located in the west basin of Siamese Lake (Figure 2-1). They are 75 and 200 m long, and are located at depths between 2 m and 3 m (Figure 2-1); their combined areas equal 275 m^2. In the event that the west lake basin becomes isolated from the east basin in late winter, and there is a 6.2 cm (Scenario 4) reduction in west basin water levels (Table 2-2), both spawning locations in the west basin will be slightly reduced (by approximately 17 m^2), however 258 m^2 of potential west basin lake trout spawning habitat will persist between depths of 2.062 m and 3 m deep.

In the event there is a 12.2 cm reduction (Scenario 3) in west basin water levels (Table 2-2); the west basin potential spawning locations will be reduced by a combined area of approximately 34 m^2. About 241 m^2 of potential lake trout spawning habitat will persist at depths between 2.122 m and 3 m. Therefore, reductions in under-ice water levels of 6.2 cm or 12.2 cm in the west basin of Siamese Lake will reduce the area of potential lake trout spawning areas by about 17 m^2 (Scenario 4) or 34 m^2 (Scenario 3), respectively.

The majority of potential lake trout spawning habitat is located in the east basin of Siamese Lake (Figure 2-1). The largest spawning area is located in the east basin between 3 m and 5 m deep (Figure 2-1). In the event that the two basins become isolated in the late winter, and there is a 0.2 cm reduction in east basin water levels due water withdrawals for winter road flooding and maintenance, the majority of potential lake trout spawning locations will be unaffected because they are located at depths below 3 m deep. Therefore, a reduction in under ice water levels by 0.2 cm in the east basin would not affect potential lake trout spawning areas.

2.5 Conclusion

Withdrawal of 75,000 m^3 of water annually from lakes along the route of the proposed Kiggavik winter road for road flooding and maintenance purposes is not expected to affect potential lake trout spawning habitat in most lakes due to the minimal water level reductions expected (0.2 to 0.8 cm). These lakes include L2/20 km Lake, Long Lake, Audra Lake, four Unnamed Lakes, and Qinguq Bay of Baker Lake.

Siamese Lake is the only lake where potential lake trout spawning habitat may possibly be affected. Water withdrawals from Siamese Lake for use on the proposed winter road would be in addition to planned water withdrawals associated with its proposed role as the primary water supply source for the Kiggavik mine and mill development. Under the most extreme circumstances (Scenario's 3 and 4), the combined water withdrawals from Siamese Lake, and resulting reduction in lake level, are expected to result in a minor loss of potential lake trout spawning habitat.

Potential lake trout spawning habitat losses associated with Scenario's 1 and 2 are expected to be negligible, as water level reductions are expected to be in the order of only 5.2 and 3.2 cm, respectively. Under these two scenarios, Siamese Lake would provide water for both the Kiggavik mine/mill infrastructure, and for flooding and maintenance of the winter road. Scenario 1 has all of the required water volumes coming from Siamese Lake, whereas Scenario 2 obtains supplemental water volumes from the East Mine Pit, thereby reducing the total volumes required from Siamese Lake. Scenario's 1 or 2 are the most likely scenarios.

Scenario's 3 and 4 are the least likely scenarios to occur, and are presented as "worst case" or "extreme" examples. Scenario 3 is based on the same initial assumptions as Scenario 1, except that additionally, it is assumed that the east and west basins of Siamese Lake become isolated from each other by ice freezing to the bottom in the shallow (2.5 m deep) narrows separating the two basins. All winter water withdrawals would therefore be taken from the west basin only. In similar fashion, Scenario 4 is based on Scenario 2, with the same additional assumption as Scenario 3 of winter ice thickness blocking water flows between the east and west basins, and all water being withdrawn from the west basin.

Under Scenario's 3 and 4, it is estimated that potential lake trout spawning habitat would be reduced by 34 m^2 or 17 m^2, respectively. This would be a very minor loss of potential spawning habitat, as it represents less than 0.05% of the identified potential lake trout spawning habitat in Siamese Lake.

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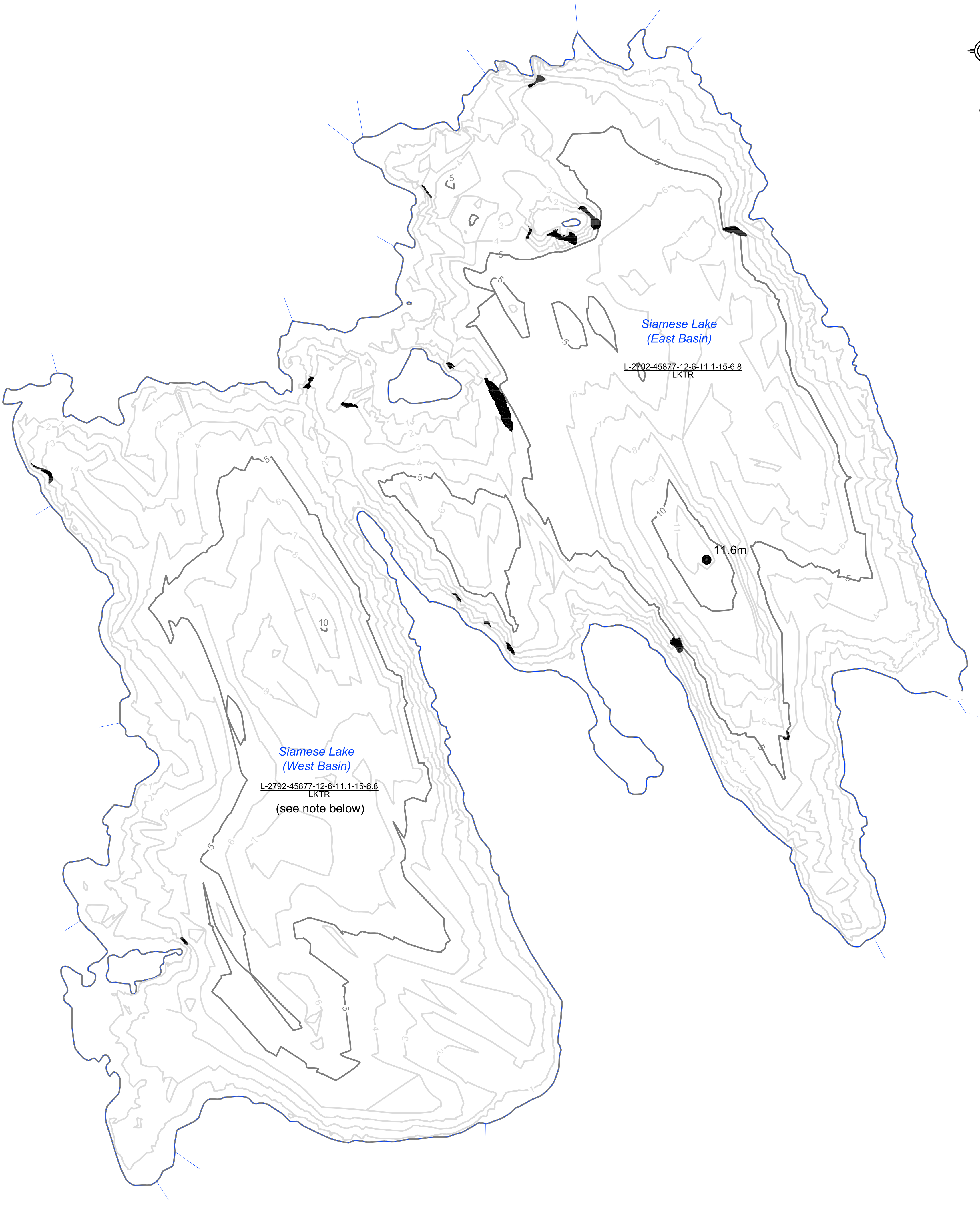

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SCALE 1:30,000 METRES

Legend
Potential Spawning Habitat
Flow Arrow

Lake (L), Wetland (W) or Pond (P)	Surface Area (ha)	Main Shoreline Perimeter (m)	Max Depth (m)	Secchi Depth (m)	Dissolved Oxygen (mg/L)	Conductivity (µS/cm)	pH

Fish Species

Reference:
NTS Mapsheet 66A05

PROJECT
AREVA
KIGGAVIK
EVALUATION OF POTENTIAL
WATER SUPPLY LAKES

TITLE
SIAMESE LAKE
POTENTIAL SPAWNING HABITAT

DRAFT

Golder Associates
Saskatoon, Saskatchewan

PROJECT	09-1362-0610		FILE No.	
DESIGN			SCALE AS SHOWN	REV. 0
CADD	TAH/AKG	11/04/11	FIGURE: 2-1	
CHECK				
REVIEW				

3 Baker Lake Potential Barge Dock Site Bathymetry and Fish Habitat Survey

3.1 Introduction

Golder Associates Ltd. collected bathymetric and fish habitat baseline data in the vicinity of four potential barge dock site locations on Baker Lake during late winter of 2011. The purpose of this memo is to present the bathymetry and fish habitat maps generated from the data collected, as well as to report the results of limnology profiles and lake and ice depth measurements taken.

The methods used to assess the water depth and fish habitat included:

- drilling up to 20 holes per potential barge dock site using a 10" diameter power ice auger;
- recording location with a global positioning system unit;
- measuring snow and ice with a metre stick, and lake depth with a weighted calibrated line; and
- recording under water video and photos of the lake bottom at each sampling hole.

A total of three limnology profiles were collected using a YSI 600QS-O-M water quality meter, two in shallow water and one in deeper water. In general, the holes were drilled as a grid of 20 holes on a 50 metre (m) spacing. The hole spacing was staggered such that the second and fourth lines of holes were spaced 25 m further into the lake than the first, third, and fifth lines. However, depending on the range of depths at each potential barge dock site location, the holes were often drilled less than 50 m from each other in order to obtain additional bathymetric and fish habitat details in the area between 2 m and 8 m deep. In this Technical Memo, lake depth or water depth refers to the distance measured between the lake bottom (substrate) and the frozen lake (ice) surface.

3.2 Results

A total of four potential barge dock site locations were assessed on Baker Lake between 26 and 29 April 2011 (Figure 3-1). Information for each site includes shoreline photos (when available), data map, bathymetry and fish habitat map, underwater photos of selected fish habitat, and limnology data (when available).

3.2.1 Site 1

Site 1 is located about 5 kilometres (km) east of the AREVA office in Baker Lake, Nunavut. The shoreline was covered with snow at the time of the survey, but the orthophoto obtained by AREVA when LiDAR data was collected shows two areas of exposed bedrock on either side of potential Site 1. According to the site photos, the shore slope was steep at the edges of the exposed bedrock and moderately steep at potential Site 1 (Photo 3-1).

Photo 3-1: Looking northeast toward potential Site 1 from waypoint 56. People are working at waypoint 54, which is about 50 m from potential Site 1. Note the steep edge of the exposed bedrock on the right side of the photo.

At the time of the survey, snow depth ranged from 0.0 m to 0.75 m; the ice depth ranged from 1.45 m to 2.0 m (Table 3-1). The water depths measured within the 22 holes ranged from 1.55 m to 18.9 m (Figure 3-2; Table 3-1). The average percent slope ranged from about 14% to 36% between the shoreline and the 9 m depth contour. The steepest average slope was located at the south end of the assessed area (Figure 3-3). The majority of the substrate available in the area was sand. The sand was either mixed with silt (occasional cobble and boulder), mixed with cobble and boulder (occasional gravel), or on its own (occasional cobble or boulder). Boulder substrate with occasional sand was found adjacent to the shore on the north-west portion of the site. Submergent vegetation was present over about 1/3 of the area. The majority of the submergent vegetation was observed on the mixed sand and silt substrates, and the sandy substrate. Some submergent vegetation was also found with the boulder substrate (Figure 3-3).

Cover for small fish was abundant in the boulder area (Photo 3-2), limited in the sand, cobble, and boulder area (Photo 3-3), and moderate in the submergent vegetation (Photo 3-4). Otherwise, occasional boulders and co

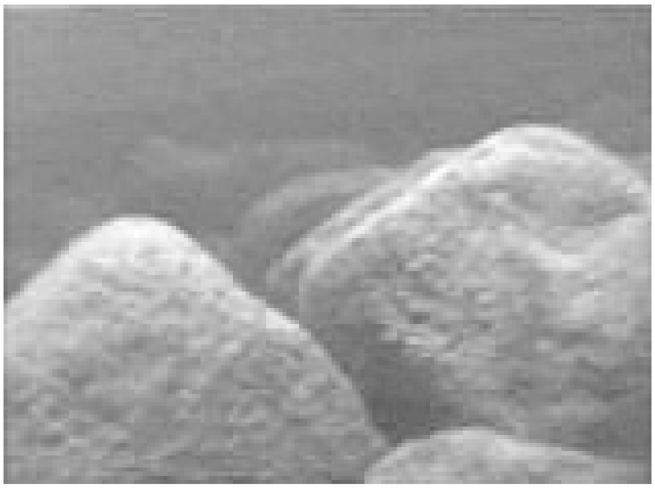

Photo 3-2: Abundant boulders observed in 2 m of water, at waypoint 109.

Photo 3-3: Sand, cobble, and boulder substrate observed in 5.5 m of water, at waypoint 58.

Photo 3-4: Submergent vegetation observed in 6 m of water, at waypoint 72.bbles were present with either sand and silt or sand substrate only (Figure 3-3).

The water quality in the shallow area (maximum depth: 3.2 m; profile depth: 2.5 m) at Site 1 was cold (0.58^{o}C); the water was well oxygenated (13.87 mg/L; Table 3-2).

3.2.2 Site 2

Site 2 is located about 8.5 km east of the AREVA office in Baker Lake. The shoreline was covered with snow at the time of the survey, but the orthophoto shows abundant exposed bedrock, as well as two small buildings northwest of the potential site. According to the site photos, the shore slope was intermediate and exposed bedrock was present (Photo 3-5).

At the time of the survey, snow depth ranged from 0.0 m to 0.6 m; the ice depth ranged from 1.3 m to 2.05 m (Table 3-1). Lake depths measured within the 20 holes ranged from 1.5 m to 11.6 m (Figure 3-4; Table 3-1). The average percent slope was fairly uniform and ranged from about 9% to 10% between the shoreline and the 9 m depth contour. The majority of the substrate available in the area was sand. Sand was either mixed with silt (occasional cobble), mixed with gravel (occasional cobble and boulder), or on its own (occasional cobble, boulder, and silt). A combined boulder and cobble substrate was also present adjacent to shore on the north west portion of the site (Figure3- 5). Submergent vegetation was present over about 1/3 of the area (Figure 3-5). The majority of the submergent vegetation was observed on all types of substrate available, except for the boulder and cobble substrate that was bare of vegetation (Figure 3-5).

Cover for small fish was abundant in the boulder and cobble area (Photo 3-6), and moderate in the submergent vegetation (Photo 3-7). Otherwise, occasional boulders and cobbles were present with the sand and gravel, and sand only substrates (Photo 3-8).

Photo 3-5: Looking east from the potential Site 2. Note the intermediate slope and the exposed bedrock on the left side of the photo.

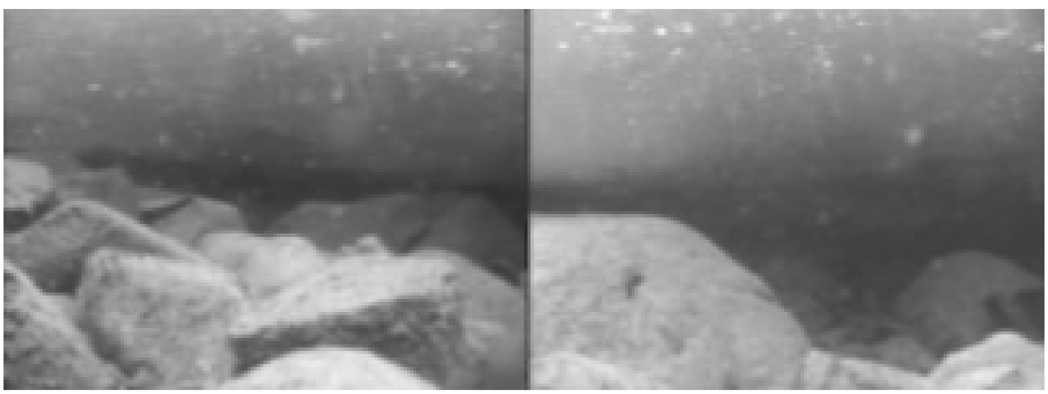

Photo 3-6: Abundant boulder and cobble substrate observed in 1.5 m of water, at waypoint 79.

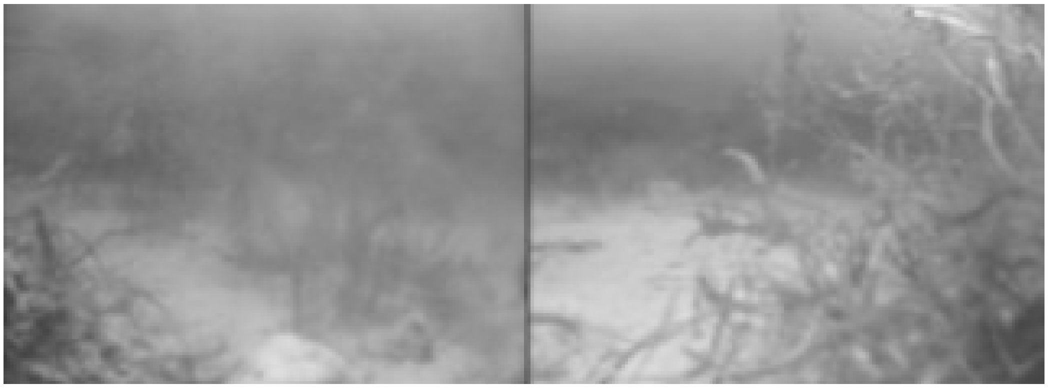

Photo 3-7: Abundant submergent vegetation observed in 2.25 m of water, at waypoint 75.

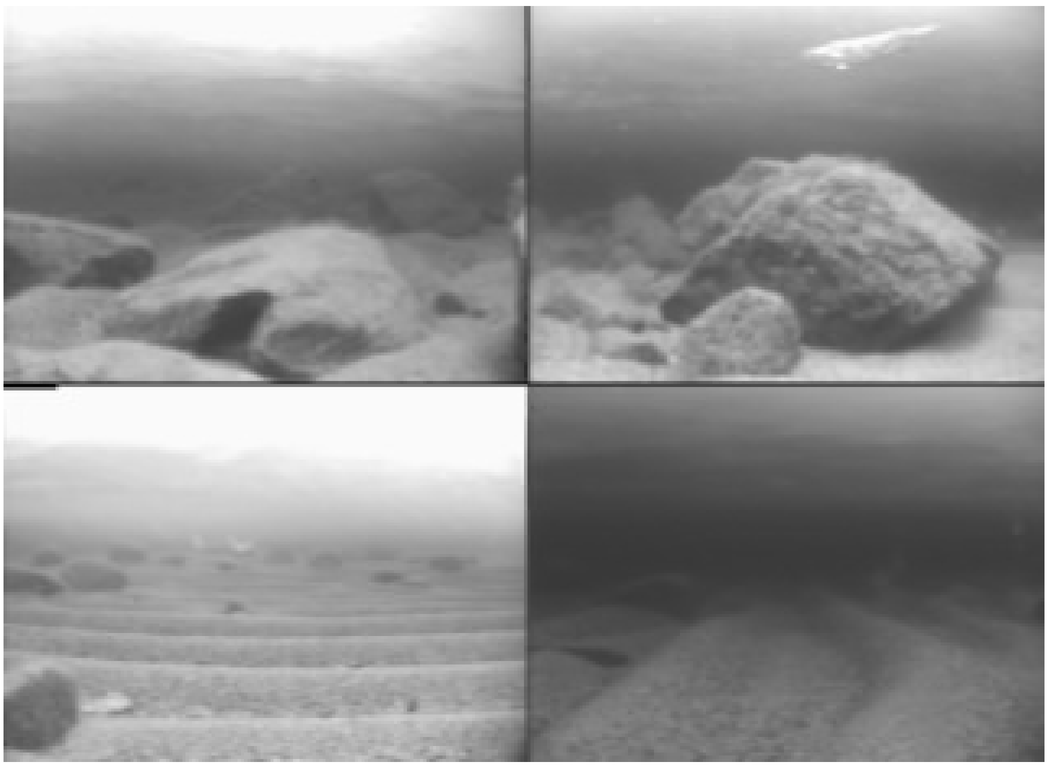

Photo 3-8: Boulder and cobble observed with unconsolidated sand and gravel substrate in 2.45 m of water, at waypoint 77.

3.2.3 Site 3

Site 3 is located about 9.5 km east of the AREVA office in Baker Lake. The shoreline was covered with snow at the time of the survey, but the orthophoto shows an area of exposed bedrock to the northeast side of potential Site 3. According to the site photos, the shore slope was steep at the edges of the exposed bedrock and intermediate at potential Site 3 (Photo 3-9).

At the time of the survey, snow depth ranged from 0.0 m to 0.5 m; the ice depth ranged from 1.6 m to 2.0 m (Table 3-1). Lake depths measured within the 23 holes ranged from 2.25 m to 14.7 m, while one hole frozen to the lake bottom was 0.85 m deep (Figure 3-6; Table 3-1). The average percent slope ranged from about 7% to 9% between the shoreline and the 9 m depth contour. The steepest average slope is located at the west end of the assessed area; however, the first 90 m from shore is rather flat, followed by a very steep slope (Figure 3-7; Photo 3-10). The majority of the substrate available in the area is sand. The sand substrate is either mixed with silt, mixed with gravel, or on its own; all substrate types having occasional cobble and boulders present. A small area of predominately boulder and cobble substrate (i.e., boulder, cobble, sand, and gravel) was also present (Figure 3-7). Submergent vegetation was limited at this site and observed only in the area of boulder, cobble, sand, and gravel substrate (Figure 3-7).

Cover for small fish was abundant in the boulder, cobble, sand, and gravel area, which was also the only area with submergent vegetation (Photo 3-11). Otherwise, occasional cobbles and boulders were present with the sand and silt, sand and gravel, and sand only substrates (Figure 3-7).

Photo 3-9: Looking northeast towards the potential Site 3, from waypoint 47. People are working at waypoint 26, which is about 50 m south from potential Site 3. Note the exposed bedrock on the right side of the photo.

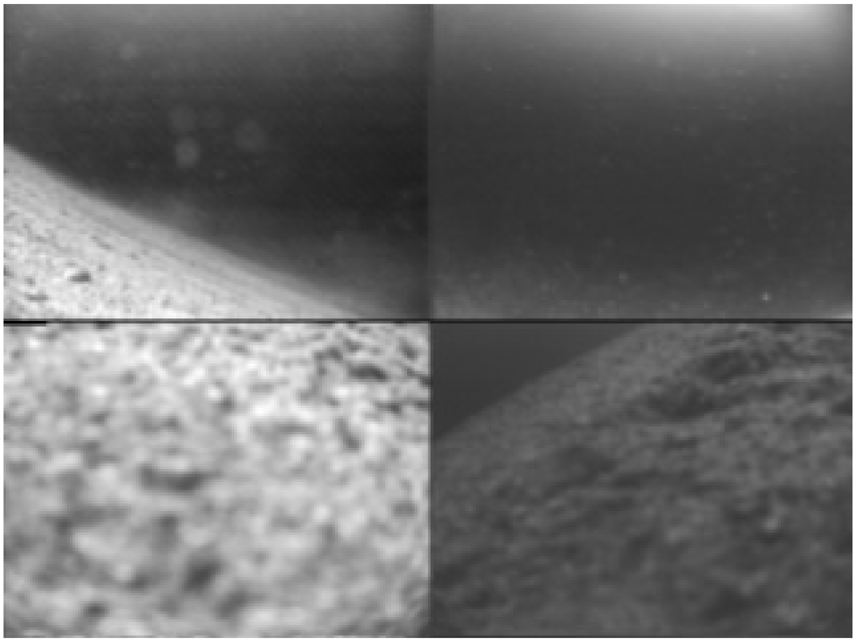

Photo 3-10: Very steep slope observed at waypoint 97.

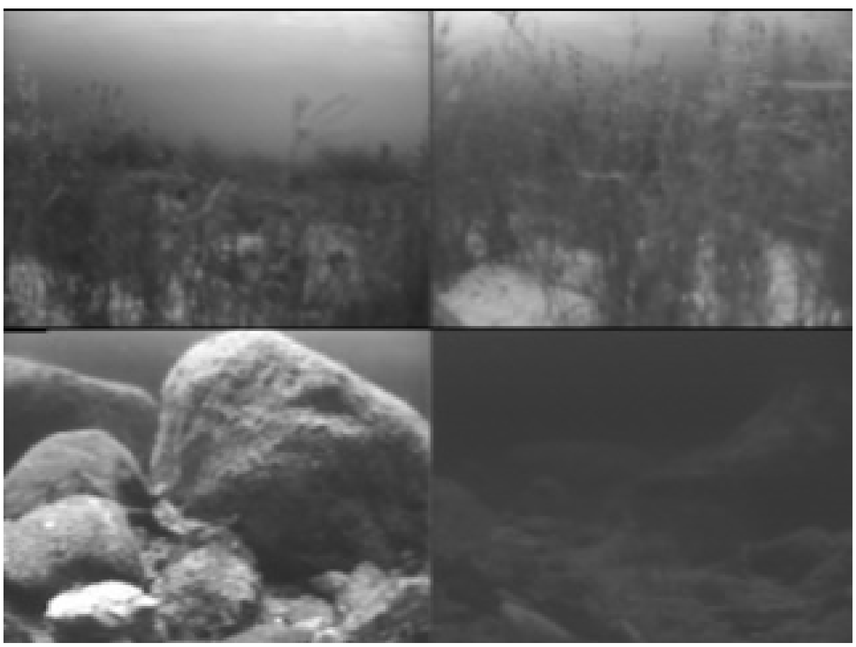

Photo 3-11: Boulder, cobble, and submergent vegetation observed in 2.5 m of water, at waypoint 35.

3.2.4 Site 4

Site 4 is located about 11.1 km east of the AREVA office in Baker Lake. The shoreline was covered with snow at the time of the survey, but the orthophoto shows a building to the west of potential Site 4. According to the site photos, the shore slope was intermediate at this location (Photo 3-12).

At the time of the survey, snow depth ranged from 0.02 m to 0.10 m; the ice depth ranged from 1.6 m to 2.0 m (Table 3-1). Within the 20 holes sampled at this location, Baker Lake ranged in depth from 1.6 m to 11.8 m; one hole frozen to the lake bottom was 1.15 m deep (Figure 3-8; Table 3-1). The average percent slope ranged from about 5% to 7% between the shoreline and the 9 m depth contour. The steepest average slope was located at the east end of the assessed area (Figure 3-9). The majority of the substrate available in the area was sand. Sand was either mixed with silt (occasional cobble and boulder), mixed with gravel (occasional boulder and cobble), mixed with boulder and cobble (occasional silt), or on its own (Figure 3-9). Submergent vegetation was only observed associated with the sand and silt substrate (Figure 3-9).

Cover for small fish was abundant in the submergent vegetation (Photo 3-13) and limited in the sand, boulder, and cobble area (Photo 3-14). Adult lake trout were observed at waypoints 8 and 23 at depths of 6.5 m and 9.8 m, respectively (Figure 3-8).

The limnology profile was collected between 3.0 m and 10.5 m in the deep area (maximum depth: 11.4 m). The temperature ranged from 0.15°C to 0.44°C; dissolved oxygen levels stayed high and ranged from 13.55 mg/L to 13.95 mg/L (Table 3-2). In the shallow area (maximum depth: 3.65 m; profile depth: 3.0 m) the water was cold (0.39°C), and the dissolved oxygen level was high (13.92 mg/L; Table 3-2).

Photo 3-12: Looking north towards the potential Site 4, from waypoint 5. People are working at waypoint 2, which is about 50 m south from potential Site 4.

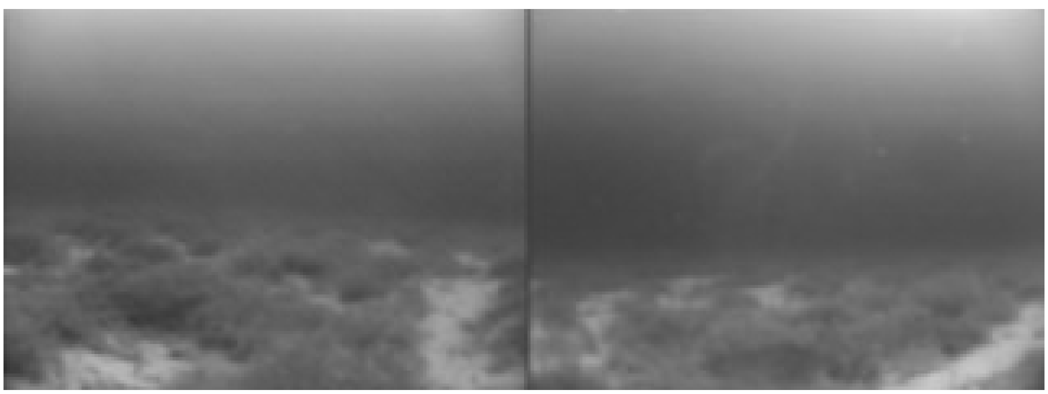

Photo 3-13: Submergent vegetation observed in 6.5 m of water, at waypoint 8.

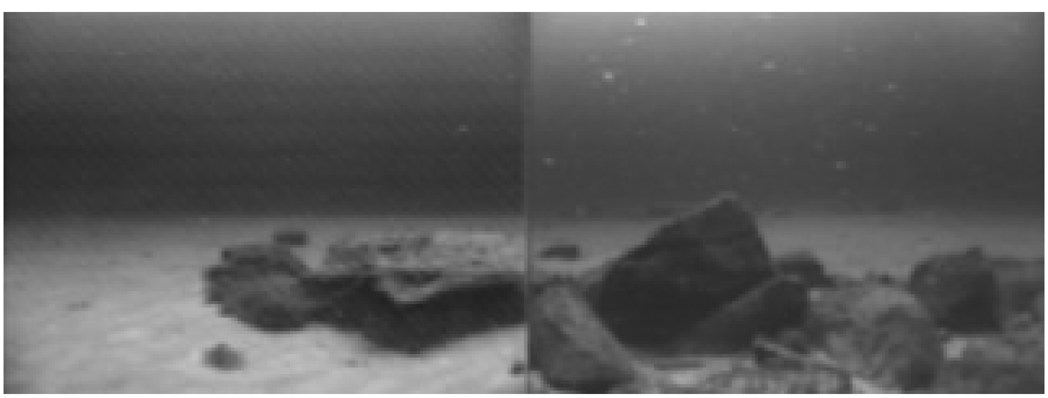

Photo 3-14: Sand, boulder, and cobble substrate observed in 9.5 m of water, at waypoint 5.

3.3 Summary

Potential Site 1 was the site with the steepest underwater slope. A depth of 9 m was present within about 30 m to 60 m from the shoreline depending on the location. The adjacent shore land had two steep exposed bedrock areas. The best quality fish habitat (i.e., boulder substrate) present in less than 5 m of water was concentrated at the north-west end of the assessed area.

At potential Site 2, the water reached depths of 3 m deep between 53 m and 62 m away from the shoreline. The water reached 9 m deep at around 105 m to 114 m from the shoreline depending on the location. The best quality fish habitats present in less than 5 m of water were concentrated at the west end (i.e., boulder and cobble) and the middle (i.e., submergent vegetation) of the assessed area.

At potential Site 3, the water reached 5 m in depth between 95 m and 105 m away from the shoreline. The water reached 9 m deep at around 105 m to 120 m from the shoreline depending on the location. The adjacent shore land had one exposed bedrock area. The best quality fish habitats (i.e., boulder and cobble, and submergent vegetation) present in less than 5 m of water were concentrated at the east end of the assessed area.

Potential Site 4 was the site with the flattest underwater slope. The water reached 3 m deep between 45 m and 99 m away from the shoreline. The water reached 9 m deep at around 140 m to 194 m from the shoreline depending on the location. The best quality fish habitat was not found at depths less than 5 m. It was mainly present in depths deeper than 5 m (i.e., submergent vegetation located between 5 m and 9 m; sand, cobble, and boulder located deeper than 9 m).