2012 Annual Geotechnical Inspection – Lupin Mine Tailings Containment Area, Nunavut

Report Prepared for

Lupin Mines Incorporated

Report Prepared by

SRK Consulting (Canada) Inc.
1CL008.000
November 2012

2012 Annual Geotechnical Inspection – Lupin Mine Tailings Containment Area, Nunavut

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1 Introduction

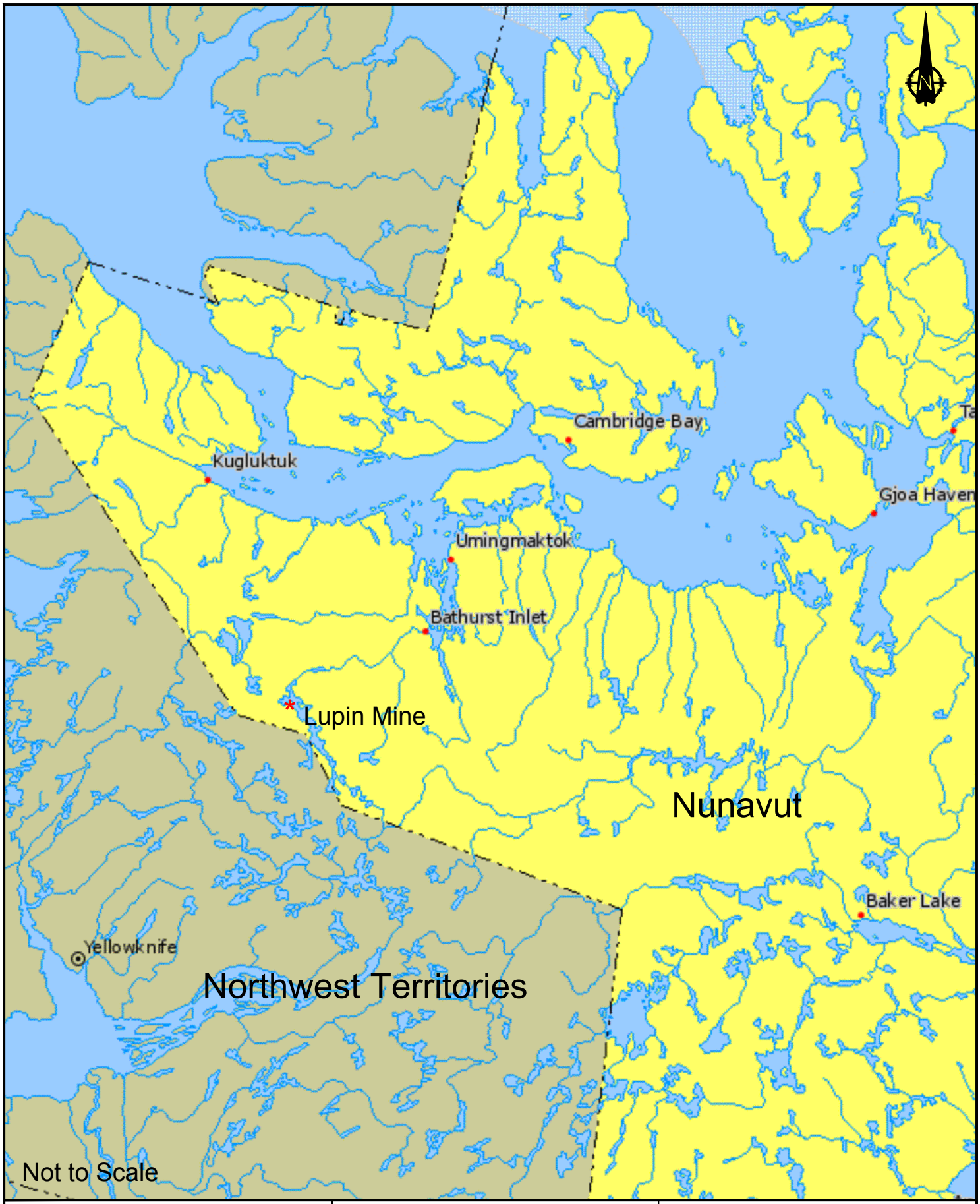
The Lupin Mine site is currently under care and maintenance status and operating under Nunavut Water Licence 2AM-LUP0914 (NWB 2009) by Lupin Mines Incorporated, a wholly-owned indirect subsidiary of Elgin Mine Inc. Elgin acquired LMI from MMG Resources Inc. in July 2011. The mine is located on the west shore of Contwoyto Lake, approximately 285 km southeast of Kugluktuk, Nunavut and 400 km northeast of Yellowknife (Figure 1.1). As a part of the Water Licence requirement, an annual geotechnical inspection is required for the tailings containment area (TCA) perimeter dams, TCA Covers, including an assessment of any seepage from the TCA (NWB 2009). In fulfillment of the regulatory requirements, Mr. David Vokey, Site Environmental Manager of LMI has retained SRK Consulting (Canada) Inc. to conduct the 2012 geotechnical site inspection. Part E Item 6 of Water Licence (NWB 2009) applies to the inspection and stipulates the following:

> "6. The TCA shall be constructed, operated and maintained to engineering standards such that:
>
> a. A freeboard limit of 1.0 m shall be maintain at all times or as recommended by a Geotechnical Engineer and as approved by the Nunavut Water Board (the Board) in writing;
> b. Seepage from the TCA is minimized;
> c. Any seepage that occurs is collected and returned immediately to the TCA;
> d. Erosion of constructed facilities is addressed immediately;
> e. The solids fraction of the mill Tailings shall be permanently contained within the TCA or underground as Backfill;
> f. Weekly inspections of the dam(s), Tailings line(s), and catchment basin(s) shall be carried out and records of these inspections shall be kept for review upon the request of an Inspector, or as otherwise approved by the Board. More frequent inspections shall be performed at the request of an Inspector; and
> g. An inspection of the TCA shall be carried out annually during ice free, open water conditions by a Geotechnical Engineer. The Engineer's report shall be submitted to the Board within sixty (60) days following the inspection and shall include a covering letter from the Licensee outlining an implementation plan to respond to the Engineer's recommendations."

This report summarizes SRK's observations of the mine's condition and our recommendations. Review of previous design, as-built and annual inspections reports made prior to 2012 were outside SRK's scope for this inspection. These included:

- Inspections from 2009 to 2011 by TBT Engineering Consulting Group,
- Inspections from 2000 to 2008 by BGC Engineering and Golder Associates,
- Earlier design, as-built and annual inspections reports by Geocon Inc., and
- The 2004 Dam Safety Review of the perimeter tailings dams performed by Golder Associates.

Generally, the 2012 inspection revealed the dams are in good condition with the exception of two interior dams. Minor erosion issues around all the dams were observed but none of major concern.



srk consulting	ELGIN MINING INC.	LUPIN MINE
		Location Plan
SRK JOB NO.: 1CL008.000	Lupin Mine Incorporated	DATE: October 2012 / APPROVED: / FIGURE: 1.1
FILE NAME: Lupin-SiteFacil-utm-12_ATedits_RevA-20121030.dwg		

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2 Site Conditions

2.1 History of the Lupin TCA

A brief summary of the development history of the TCA is listed in Table 2.1. A closure plan for the Tailings Containment Area (TCA) prepared by Holubec Consulting Inc. in 2005, provides a more detailed history of the TCA (Holubec 2005).

Table 2.1 – Lupin Mine TCA Development Historical Summary

Year	Comment
1960	Ore deposit discovered by Canadian Nickel Company Ltd.
1980	Property purchased by Echo Bay Mines Ltd.
1981	TCA developed by the construction of Dam 1A and Dam 2.
1982	Mining operations commenced in October and tailings slurry discharged from the northern edge of the TCA into future Cell 5. Dam 3 constructed.
1985	Tailings management strategy revised and tailings deposited within cells. Excess water from the cells is directed into two ponds in series within the TCA prior to discharge. Internal Dam 3C and Dam J constructed.
1990	Internal Dam K constructed and Cell 4 provides an additional clarification pond.
1992	Perimeter Dam 4, Dam 5 and Dam 6 and internal Dam L and Dam M constructed.
1997	Internal Dam N constructed.
1998	Production stopped and site placed on care and maintenance in January.
2000	Production resumed in April. Dam M raised.
2002	Echo Bay Mines Ltd., TVX Gold and Kinross Gold Corp. merged and Kinross assumed control of operations.
2003	Site placed on care and maintenance in August.
2004	Production resumed between March and December.
2005	Closure of operation announced in February and site placed on care and maintenance.
2006	Ownership is purchased by Lupin Mines Inorporated, a subsidiary of Wolfden Resources.
2007	Wolfden Resources acquired by Zinifex Ltd.
2008	Zinifex Ltd. merged with Oxiana Ltd. to form OZ Minerals Ltd.
2009	Canadian assets of OZ Minerals sold to China Minmetals Ltd. MMG Resources Inc., a wholly owned subsidiary of Minerals and Metals Group Ltd., was the Canadian operating company set up after that transaction to hold the Lupin Mine.
2011	Ownership of LMI purchased by Elgin Mine Inc. in July.

Covering the tailings with a gravelly sand esker commenced in 1998 with the covering of Cell 1A. In 1995, Cell 1 and part of Cell 2 were covered. In 2003, Cells 3A and 3B, two mini-cells in the westerly section of Cell 3, were covered. In 2004, the remainder of Cell 2 and part of Cell 3 were covered. In 2005, Cell 3, Cell 5 and the cell formed by Dam N were partially covered. About 75% of the tailings areas are covered with at least 1 m of sand/gravel (Holubec 2006). The winter supply road was closed prematurely to fuel deliveries in 2006; no cover program was undertaken that year. In 2007, ownership of the LMI was transferred. The property has remained in care and maintenance since 2005 and no tailings has been produce since then.

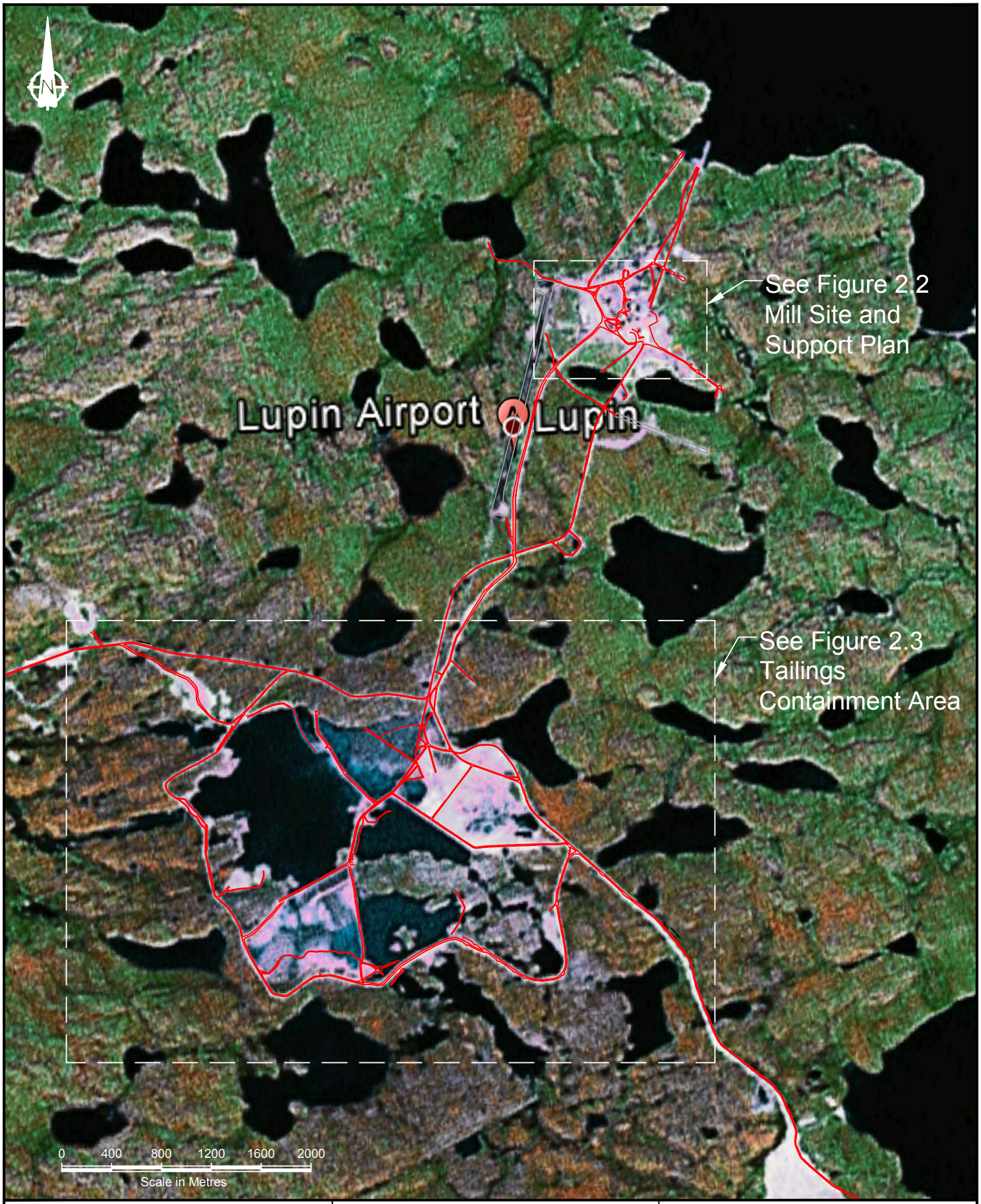
2.2 Site Infrastructures

Because of its isolated location, the mine site was constructed to be totally self-sufficient, with all (then) operation and (now) maintenance personnel living on site. The only year-round access to the site is via aircraft. Historically, the mine was annually resupplied in bulk via a 570 km ice-road from Tibbitt Lake during February and March.

The Lupin Mine site (Figure 2.1) consists of two major areas: an industrial complex and the TCA. The industrial complex consists of the administration buildings, mill, maintenance shops, fuel tank farms, camp buildings, and the airstrip (Figure 2.2).

The 2012 geotechnical inspection focused on the TCA as stipulated by the water licence (NWB 2009). The TCA is located approximately 6 km south of the industrial complex, and is divided into two main components: five solid retention cells and two settling ponds in series (Figure 2.3). The TCA is characterized by six main perimeter dams and nine internal dams for cell separation. The perimeter dams consist of Dam 1A, 1B, 1C, and Dams 2–6, and ranged from 1 to 8 m in height. The nine internal dams consist of 3C, 3D and 3E, J–N, and an unnamed dam between Cell 2 and Cell 5. Internal dams range from 5.7 to 11.2 m in height. All the dams are constructed from esker sands and gravels, with the perimeter dam including a liner for seepage control. All perimeter dams are frozen core structures founded on permafrost.

The care and maintenance procedures for water management at the TCA have runoff flowing from Cell 3 to Cell 4, where solids settle out prior to the water flowing to Pond 1. It is assumed water flows from Cell 4 to Pond 1, via a gated culvert and trench. Water in Pond 1 is then transferred by siphon to Pond 2 for clarification and settling and, if needed, treatment, prior to discharge into the environment. Prior to discharge by siphon from Pond 2 into the environment the quality of water is tested for pH, metals and toxicity to rainbow trout and *Daphnia* species. No tailings have been deposited since the cease of milling operations in 2006.



srk consulting

Lupin Mine Inc.

LUPIN MINE

General Site Plan

SRK JOB NO.: 1CL008.000

FILE NAME: Lupin-SiteFacil-utm-12_ATedits_RevA-20121030.dwg

Lupin Mine Incorporated

DATE:	APPROVED:	FIGURE:
October 2012		2.1

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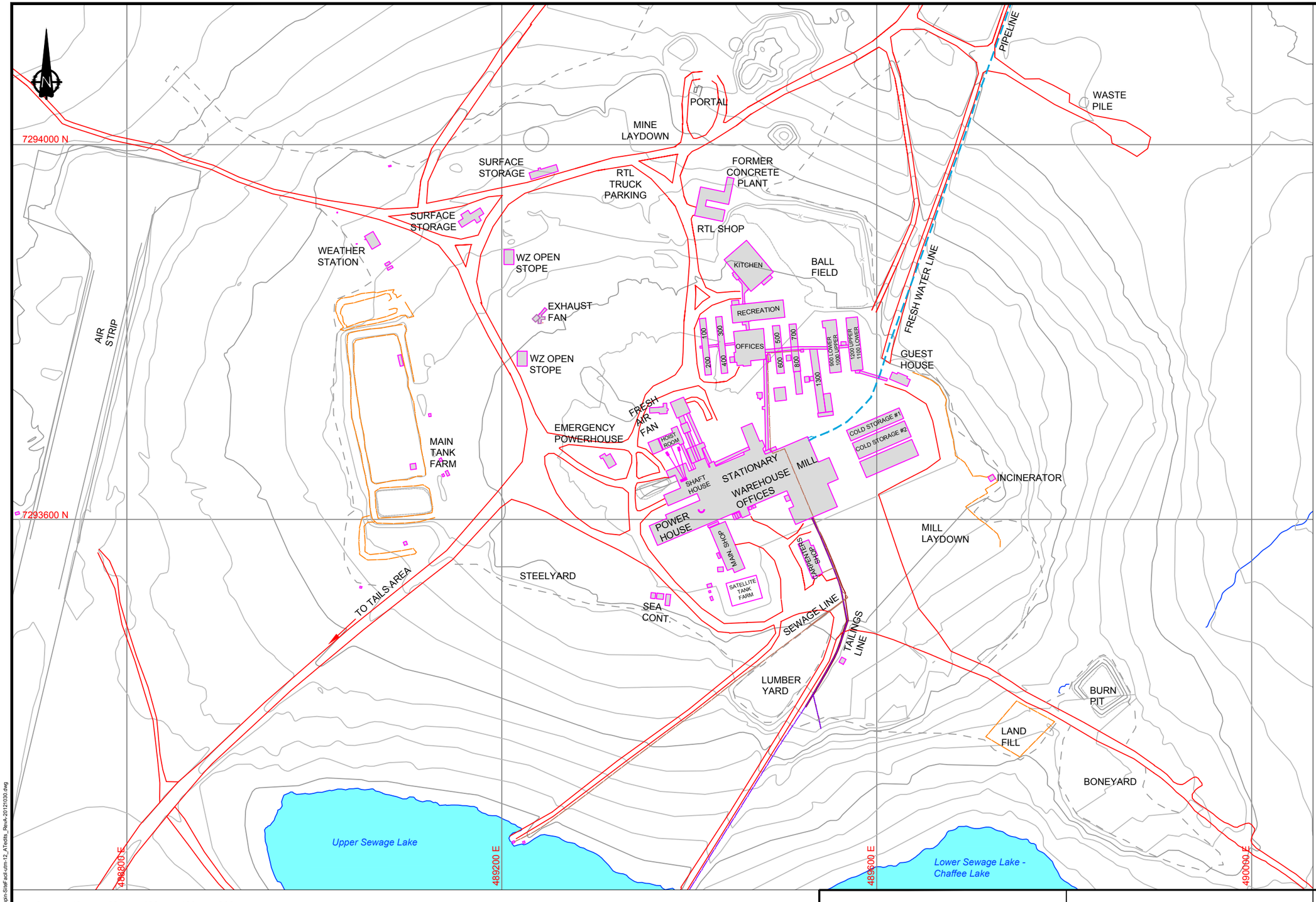

LEGEND

- Lake Pond
- Tank Farm Berm Outline
- Building
- Water Pipeline (8 in Diam) (Not in Use)
- Tailings Line Route (Not in Use)
- Sewage Pipeline (6 in Diam) (Not in Use)
- Lake Shore, Drainage
- Contour 1 m
- Contour 5 m
- Roads
- Site Features Miscellaneous
- Cleared Area
- Berm Area
- Slope Toe
- Slope Top
- Culvert
- Fence

NOTES

1. Topographic information and facilities outline provided by Lupin Mine Inc. on August 13, 2012.

0 40 80 120 160 200
Scale in Metres

Coordinate System: Nad_1983_UTM_Zone_12N
NTS Map Sheets 076E11 and 076E14

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SRK JOB NO.: 1CL008.000
FILE NAME: Lupin-SiteFacil-utm-12_ATedits_RevA-20121030.dwg

Lupin Mine Inc.

Lupin Mine Incorporated

LUPIN MINE

Mill Site and Support Facility Plan

DATE: October 2012 | APPROVED: | FIGURE: 2.2

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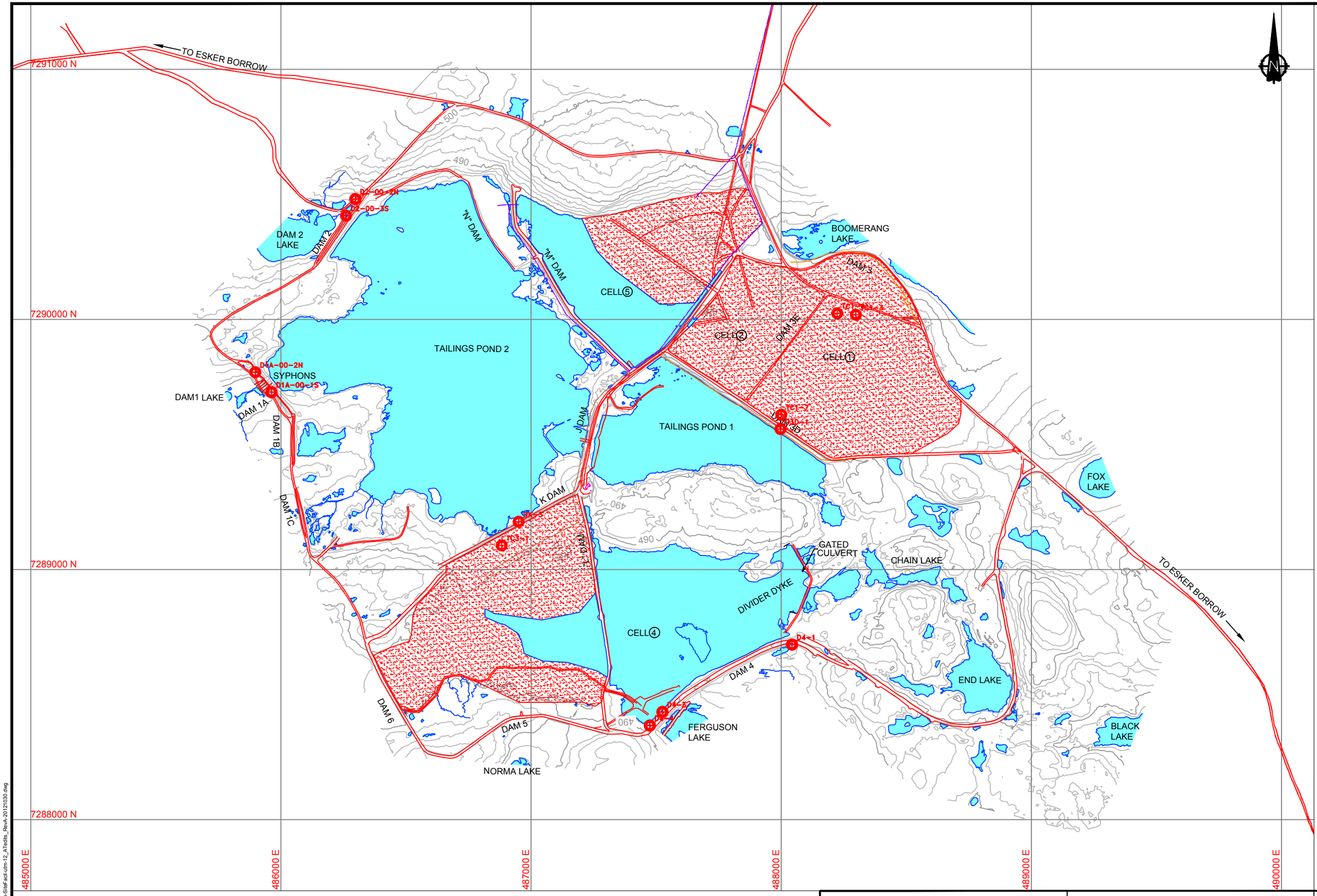

LEGEND

- Water Body
- Granular Tailings Cover
- Lake Shore, Drainage
- Tailings Line Route (Not in Use)
- Contour 1 m
- Contour 5 m
- Roads
- Berm Area
- Thermistor

NOTES

1. Topographic information and facilities outline provided by Lupin Mine Inc. on August 13, 2012.

0 100 200 300 400 500
Scale in Metres

Coordinate System: Nad_1983_UTM_Zone_12N
NTS Map Sheets 076E11 and 076E14

srk consulting

SRK JOB NO.: —

FILE NAME: Lupin–SiteFacil–utm–12_ATedits_RevA–20121030.dwg

Lupin Mine Inc.

Lupin Mine Incorporated

LUPIN MINE

Tailings Containment Area

DATE:	APPROVED:	FIGURE:
October 2012		2.3

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2.3 Climate

Climate conditions were recorded at the Lupin manned weather station until October 2006. An automated weather station known as Lupin (MAPS) (CWIJ) has recorded data intermittently at the site. Reviewing the data from the end of October 2006 to the present, the station has reported an arctic climate with a mean annual temperature of -9.8°C. Winter is considered to last from October to May and summer is considered to last from June to September. The summer daily temperature averaged at 6.8°C and winter daily temperature averaged at -18.5°C. There are persistent winds at an annual mean of 18.0 km/h and gusts up to 95 km/h. Measured site precipitation is reported at an annual mean of around 388 mm. The data does not breakdown the precipitation into rain and snow (WU 2012).

2.4 Site Geology

The Lupin gold deposit is situated in an Archean metaturbidite sequence of the Contwoyto Formation, part of the Yellowknife Supergroup of supracrustal metasedimentary and metavolcanic rocks of the Slave Geologic Province. The rocks have been subjected to both regional and contact metamorphism and to several phases of deformation and intrusion.

The Contwoyto Lake area lies within the Upland unit of the Kazan physiographic region of the Canadian Shield. The area was glaciated during the Pleistocene Epoch. Isostatic rebound after ice melt resulted in emergent landforms, and during this process all parts of the land were washed by runoff and lakes. The easily erodible glaciolacustrine sediment, till and glacio-fluvial sand and gravels were subsequently reworked by melts and runoff. This has resulted in the present day outcrops with thin soil veneers, abandoned beaches and esker formations (Kinross 2005).

Tailings are primarily composed of the gangue minerals amphibole and quartz, which account for over 80% of the volume. Pyrrhotite and arsenopyrite make up an additional 17% (Klohn-Crippen 1995). The tailings have been shown through various studies to be capable of generating acid upon oxidation (Kinross 2005).

2.5 Permafrost and Dam Geotechnical Conditions

The area is completely within Canada's cold continuous permafrost region. The active layer is somewhat variable between 1.3 m to 3.1m. There has been long-term discontinuous monitoring of the permafrost conditions in dams at the Lupin TCA since 1982 and since 1985 in the cover. The recordings are made by thermistors installed in various dam and cover locations. While a number of thermistors are defunct and others have suffered physical damages, some are read regularly during inspections. They still show the presence of permafrost through the dams and foundations. While there are some fluctuations in recorded ground temperature readings, no obvious thaw trend has been found.

3 TCA Inspection

3.1 General

Mr. Alvin Tong, P.Eng., a Senior Consultant with SRK, conducted the geotechnical inspection between September 12 and 14, 2012. After a general overview of the site via helicopter, the detailed site inspection was carried out using ground transportation with frequent stops for thorough visual inspections. Mr. Dave Vokey of LMI was on-site during the visit and was available for comment and discussion, but did not accompany SRK on the inspection.

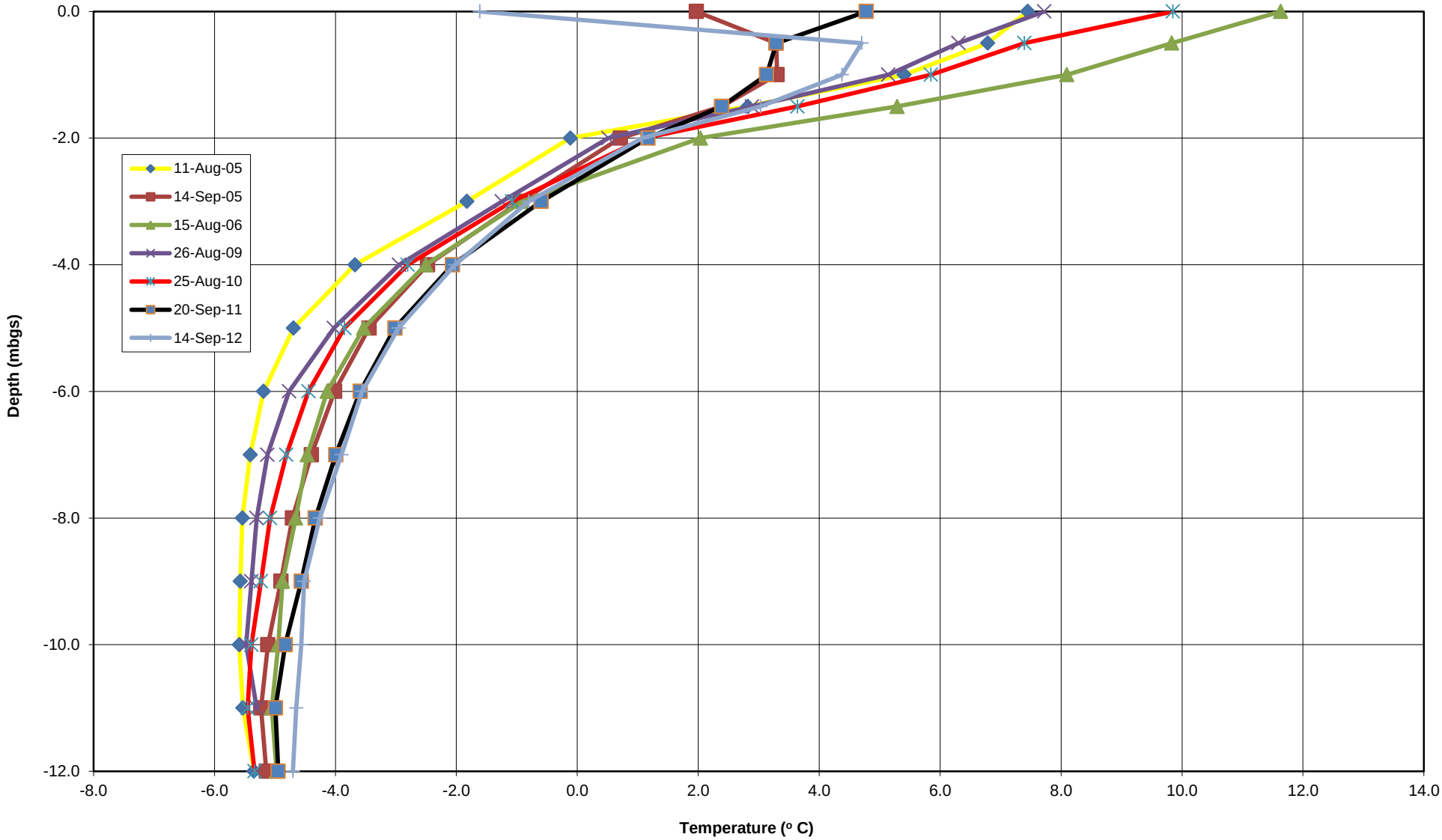
Weather conditions during the inspection were cool and sunny with periods of fog, high winds and rain. A detailed photographic log of the inspection is included in Appendix A.

Generally, the inspection revealed the dams are typically in good condition with two exceptions discussed below. There are minor erosion issues around all the dams but no major concerns were identified.

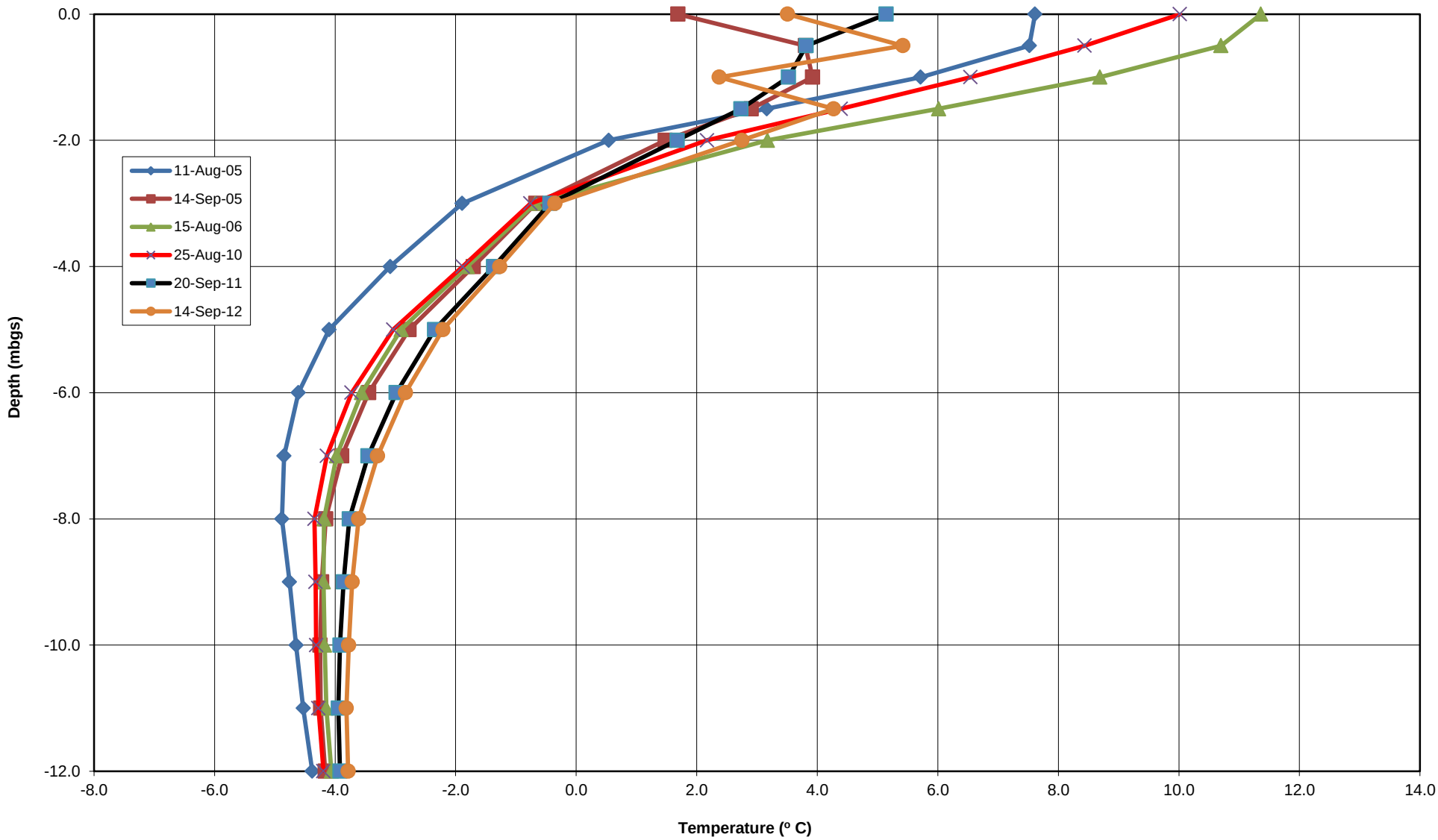
3.2 Thermistors

Figure 2.3 presents the locations of five functioning TCA thermistors that were installed between 1985 and 2000. In addition to the thermistor strings shown, there are a number of historical thermistor installations that are no longer functional. Furthermore, only thermistor data recorded after cease of production in 2005 are presented in this document, as this data best reflects the current care and maintenance status.

In the TCA, all five of the thermistors are less than 20 m deep. Based on the data since 2005, taking into account annual climatic variations, there is no trend showing permafrost degradation. The largest variation occurs in Dam 1A, of 3°C in the given data set, at approximately 5 m below dam crest. This variation occurs below -3°C; and the -1°C gradient occurs at approximately 3 m below the surface. This concurs with the regional active zone. These records indicate the frozen core in the dam is performing satisfactorily and the general trends support that permafrost is not degrading. Figure 3.1 to Figure 3.5 show the thermistor data read during summer periods from 2005 to present.



srk consulting	**Elgin Mining Inc.**	2012 Annual Geotechnical Inspection on Perimeter Dams
		Thermistor Reading D4-1
Job No: 1CL008.000 Filename: Lupin Annual Inspection_Figure 3.1_3.5.pptx	Lupin	Date: October 2012 / Approved: AT / Figure: **3.1**



srk consulting	**Elgin Mining Inc.**	2012 Annual Geotechnical Inspection on Perimeter Dams
		Thermistor Reading D4-3
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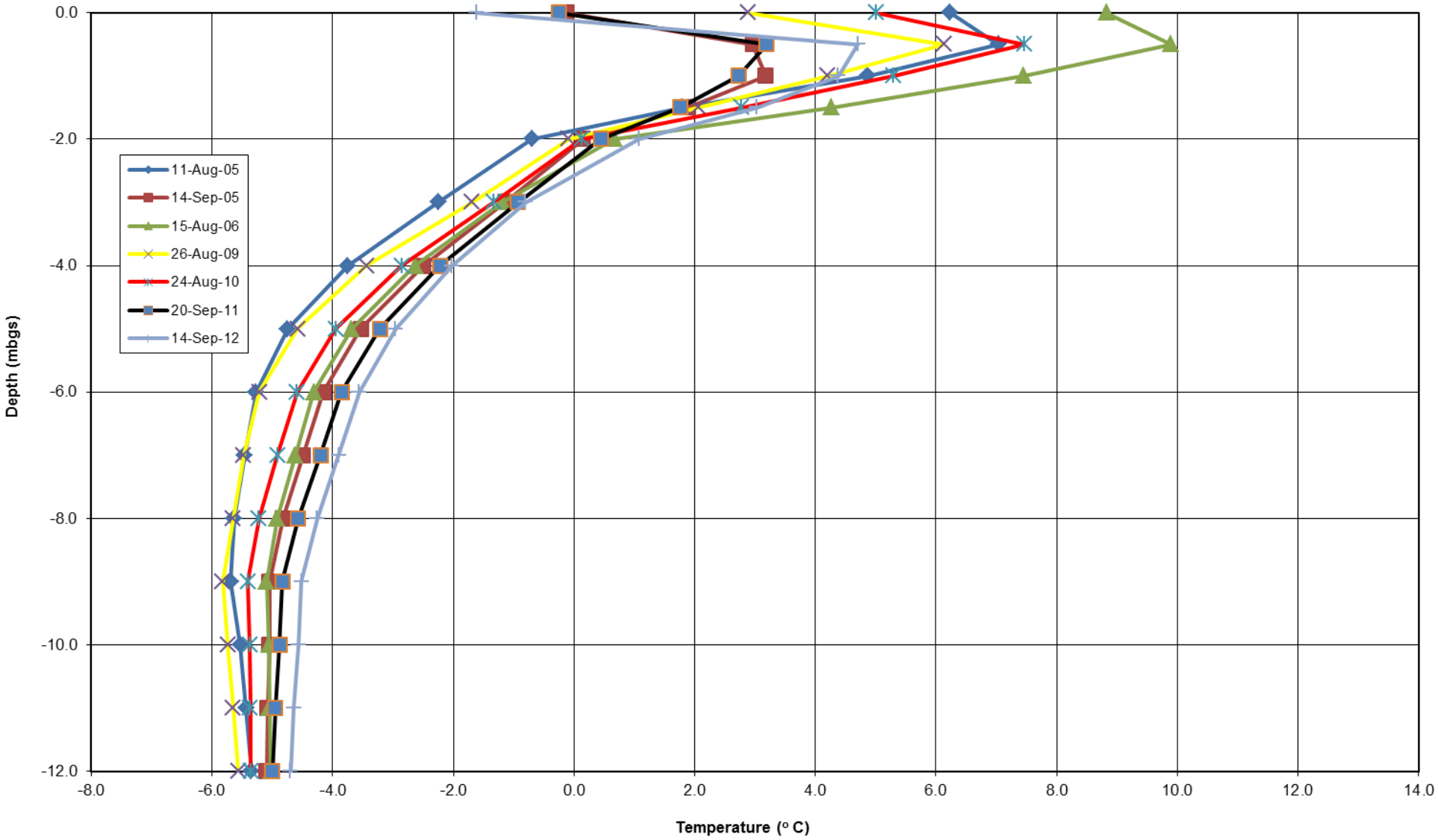

srk consulting	**Elgin Mining Inc.**	2012 Annual Geotechnical Inspection on Perimeter Dams
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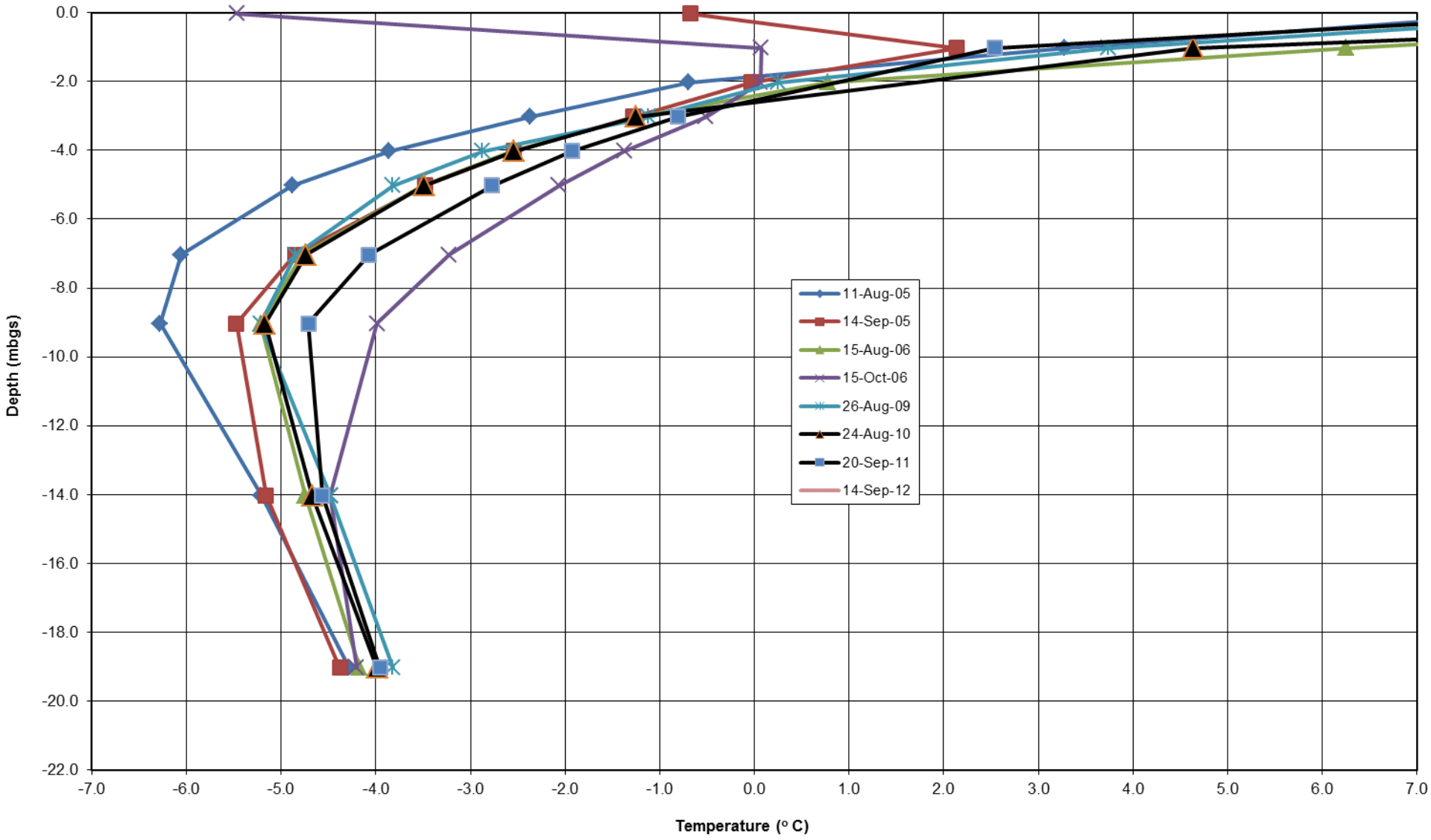

srk consulting	**Elgin Mining Inc.**	2012 Annual Geotechnical Inspection on Perimeter Dams
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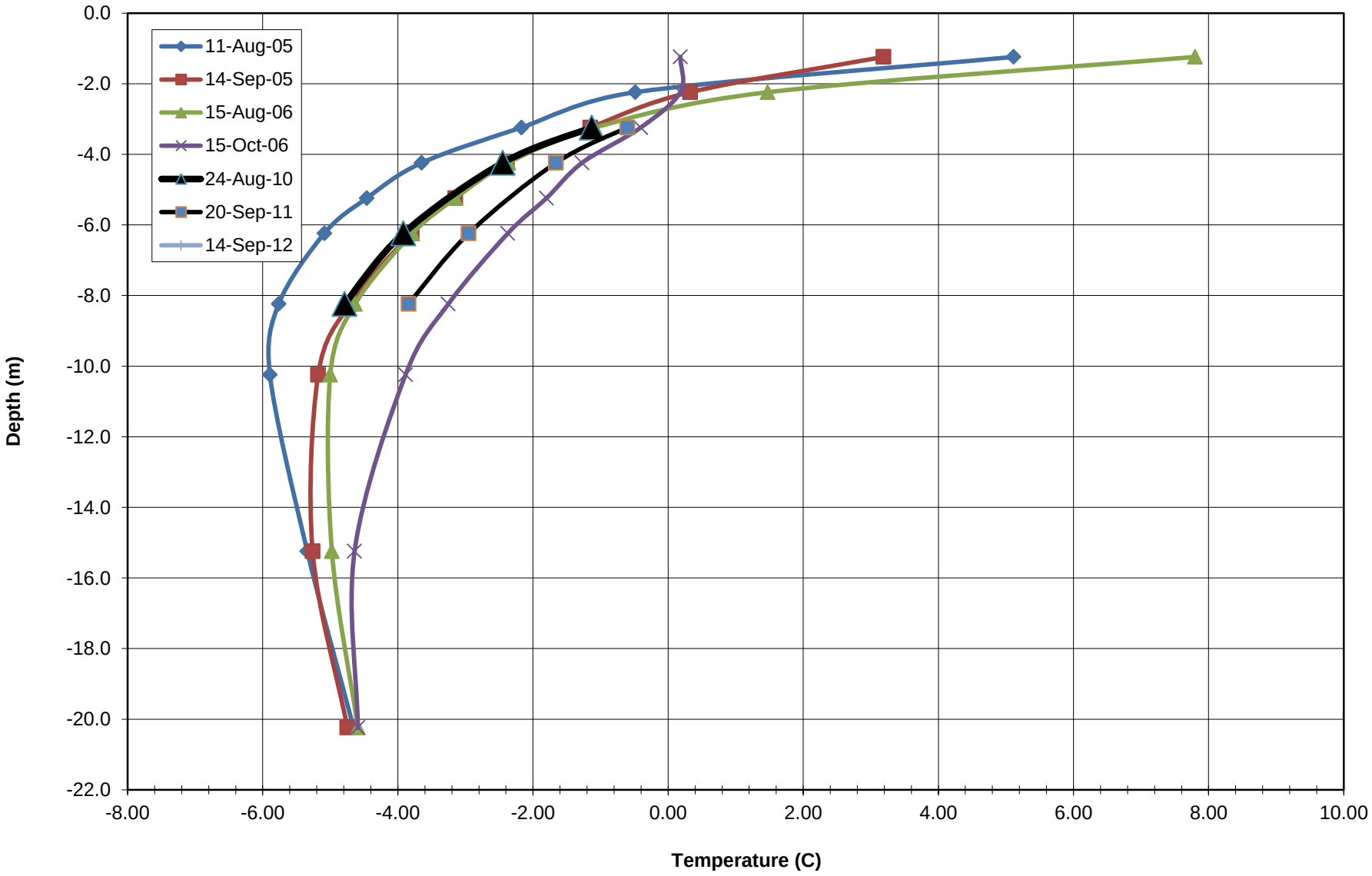

srk consulting	**Elgin Mining Inc.**	2012 Annual Geotechnical Inspection on Perimeter Dams
		Thermistor Reading D2-00-2
Job No: 1CL008.000 Filename: Lupin Annual Inspection_Figure 3.1_3.5.pptx	Lupin	Date: October 2012 / Approved: AT / Figure: **3.5**

3.3 TCA Perimeter Dams

The perimeter dams are generally in good condition in terms of stability and performance. There are minor erosion issues which are typically associated with sand and gravel construction material. These should be monitored and repaired as required to prevent continuous erosion that could worsen and impair the dam. While most of the erosion is minor, some along Dam 1A is more serious and should be addressed in 2013.

A previous annual inspection found seepage in the western buttress toe of Dam 4 into Ferguson Lake and the northern buttress toe of Dam 2 into Dam 2 Lake. The seepage has either stopped or reduced significantly; it was not observed during the current inspection. A cofferdam was placed at the toe of Dam 2 to collect seepage to be pumped back into Pond 2 when it pooled. The seepage reported at Dam 4 in 2011 (TBT 2011) was not observed. Additionally, the minor cracks in Dam 1C, which were noted last year, were not observed during this inspection. They were either repaired or filled in naturally with material over time.

The storm ditch built within top 2 m of Dam 3 was damaged somewhat in the 2012 freshet. The damage has since been repaired but it was observed that the ditch is not properly graded to allow the freshet runoff water to free drain. This appears to be the main cause of the previous damage. Because there is poor grading, the water pooled, froze, and created an ice dam; which in turn forced the freshet water to breach the ditch and a small portion of Dam 3.

The observed freeboard on the perimeter dams ranges from 2.5 m to 3 m depending on the individual perimeter dam elevations. The site has been treating and discharging water during and since the site inspection and the freeboard on the perimeter dams has increased.

3.4 Internal Dams

The internal dams are generally in good condition with the exception of Dam L and Dam M. The majority of the internal dams have typical erosion issues similar to the perimeter dams. Continued repair and maintenance can help prevent further damage.

During the inspection, a substantial erosion breach was observed at the south end of Dam L. It is assumed that the erosion was caused by the freshet where the water from the uncovered portion of Cell 3 breached into Cell 4. From physical observation and conversation with site staff, it appears that the Cell 3 water level has not been managed in recent years. This raised water level breached the lowest point in Dam L and discharged into Cell 4. Section 4 of this report provides recommendations to deal with the breached section in Dam L.

A significant series of tension cracks observed on Dam M are a cause for concern. Potentially, this failed portion of the dam could breach. Because of the severity of the cracks and potential breach, Mr. Dave Vokey was advised that all vehicle traffic should avoid this section for safety reasons and that regular monitoring should be carried to determine if the cracking is progressing. Section 4.1 provides recommendations to address the risks and potential for failure.

The observed freeboard during inspection on the internal dams ranged from 0.75 m to 5 m depending on individual internal dam elevations. Water was treated and discharged during and since the site inspection. Pond 1 and Pond 2 water levels have been reduced and the dams' freeboard has increased.

4 Recommendations

Table 4.1 summarizes observations and recommendations from the inspections performed in 2011 and 2012.

Table 4.1 – Inspection Observations and Recommendations

Inspection Item	2011 Inspection		2012 Inspection	
	Observations	**Recommendations**	**Observations**	**Recommendations**
Perimeter Dams				
Dam 1A	Widespread shallow erosion gullies along downstream slope, predominantly south of the siphon pipes.	Repair erosion gullies.	Minor erosion on series and some deep erosion gullies.	Repair deep erosion gullies.
Dam 1B	Minor erosion rills and gullies.	Consider maintenance of downstream surface erosion.	Minor surface erosions.	Consider surface maintenance.
Dam 1C	Minor erosion gullies and surface sloughing along the downstream slope.	Maintenance of cracking/sloughing condition along downstream slope.	Minor surface erosions. No cracks observed.	Consider surface maintenance.
Dam 2	Seepage estimated at a rate of 4 L/min. Erosion gullies and rills on the downstream slope.	Maintenance of erosion. Monitor to establish if seasonal seepage and erosion is occurring.	Minor surface erosion. Estimated seepage at the northern buttress is less than 0.5 L/min. Re-establish coffer dam to collect seepage.	Consider surface maintenance. Monitor regularly to pump the collected seepage back into Pond 2.
Dam 3	Surface erosion and loose material on dam crest. Ponding in the storm ditch.	Compact the loose material and maintain the surface erosion. Clean out and regrade, to remove accumulated material in storm ditch and permit flow.	Minor surface erosion. Despite repairs to the storm ditch, it does not yet have a free-draining grade.	Consider surface maintenance. Regrade ditch to minimize ponding and monitor during freshet to prevent ice blockages.
Dam 4	Erosion gullies and loose fill placed between dam and old coffer dam for seepage control.	Compact the loosely-placed material to improve resistance to erosion. Maintain deep erosion gullies.	Surface erosion with a number of deep erosion gullies. Exposed geogrid or similar synthetic reinforcements observed near the eastern downstream toe of the dam.	Repair the deep erosion gullies and maintain the surface. Monitor the exposed geogrid for erosion and water seepage.
Dam 5	Erosion and two small cracks on the downstream slope and shoulder.	N/A	Minor surface erosions.	Consider surface maintenance.

Inspection Item	2011 Inspection		2012 Inspection	
	Observations	**Recommendations**	**Observations**	**Recommendations**
Dam 6	Erosion gullies in downstream slope. Lower 0.5 m of downstream slope is saturated.	Backfill low areas and maintain erosion. Consider installing piezometer at crest to assess potential for seepage. If present, install a filter system.	Surface erosion with some gullies. No seepage or ponding.	Repair the deep erosion gullies and maintain surface. Monitor for potential seepage.
Internal Dams(1)				
Dam J			Reduced crest width due to erosion and placement of siphon pipes. Toe erosion likely due to wave action from Pond 2.	Repair eroded section and siphon pipes base. Rebuild crest width where possible. Place riprap above and below the Pond 2 water line to protect against erosion.
Dam K			Minor downstream slope surface erosion and some undercutting at toe; appears to be tailings material, from Pond 2 wave action.	Consider surface maintenance. Monitor regularly to ensure dam toe is not undercut. If so, place riprap there for protection.
Dam L			Minor slope surface erosions and some minor undercutting at toe. Breach at southern section of dam near buttress. Seepage observed at 0.5 L/min below breach.	Consider surface maintenance. Monitor regularly to ensure dam toe is not undercut. If so, place riprap at the problematic area for protection. Repair with compacted well-graded esker material. Monitor and manage water in Cell 3 to prevent freshet overflow.
Dam M			Slope surface erosion. Major tension crack observed over an approximate 15 m section near Dam N. Cracks are up to 6 m long and deeper than 30 cm.	Consider surface maintenance. Reference section 4.1 for detailed mitigation measures.

Note [1]: Dam 3C, 3D and 3E are considered closed as they have been intergraded with the tailings granular cover.

4.1 Mitigation for Tension Cracks on Dam M

Based on a visual inspection of the tension cracks in Dam M, possible causes could include pore water pressure from Cell 5, undercutting of the toe from wave action in Pond 2 and/or foundation “creep” (movement between the active layer and permafrost). To better understand the mechanism behind the tension cracks a detailed investigation would be required.

In the short term, all vehicles should avoid this section of the dam for safety reasons. SRK further recommends that a monitoring program be established as soon as possible to determine the rate of

movement. The program should include three pairs of monitoring monuments placed perpendicular to the cracks: one at each end and one in the middle of the failing section, each with a matching monitor on the stable section of the crest. Site personnel should measure and record the distances between each set of monuments on a weekly basis. Results should be compiled and reviewed each week.

In addition to the above, SRK recommends that LMI undertake a risk assessment of the consequences of failure of the Dam M into Pond 2. This assessment should be completed prior to the 2013 freshet. If the consequence of failure is deemed significant then remediation measures should be implemented. SRK recommends that one of these measures should involve the construction of a toe buttress with a minimum crest width of 3m. The buttress should be constructed of compacted, well-graded esker material, and placed with a downstream slope of 2H:1V (horizontal to vertical) and extend up to half the height to the existing dam crest. The buttress should extend a minimum of 5 m beyond the failing section at each end. Assuming remediation is required, LMI should make preparations for the placement of this buttress in 2013. If the monitoring program indicates no movement, the construction of the buttress can be delayed until just before the 2013 freshet. However if movement is detected, the buttress should be constructed as soon as possible.

4.2 General Recommendations

With the exception of Dam M, the majority of the dams were generally found to be performing well and stable. SRK recommends that the observed erosion on Dams 1A, 3, 4, 6, L and J be monitored and repaired as required to prevent the risk of instability.

Clause E.6.f of the Water Licence (NWB 2009) states that:

> "Weekly inspections of the dam(s), tailings line(s), and catchment basin(s) shall be carried out and records of these inspections shall be kept for review upon the request of an Inspector, or as otherwise approved by the Board."

SRK understands that compliance with this clause has proved to be practically difficult to do while the site under care and maintenance. LMI may wish to submit a request to the Nunavut Water Board for an amendment to the schedule. Given the lack of mining activities and loading, we suggest that a schedule consisting of weekly inspections during May and June (during freshet), and bi-weekly inspections for the remaining open water period July to October would be adequate. However, if water levels in the ponds are allowed to rise, then inspections should be carried out weekly. The inspections would specifically cover:

- Collection of and return of seepage in Dam 2,
- The water levels in Ponds 1 & 2 and Cells 3 & 5,
- General surface erosion and anomalies on dams, and
- The tension crack in Dam M.

Observations and findings from site inspections should be included in the annual inspection records.

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The opinions expressed in this report have been based on the information available to SRK at the time of preparation. SRK has exercised all due care in reviewing information supplied by others for use on this project. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information, except to the extent that SRK was hired to verify the data.

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Appendices

Appendix A
Photo Log

DS Slope of Dam 1A

Erosion Gully in Dam 1A

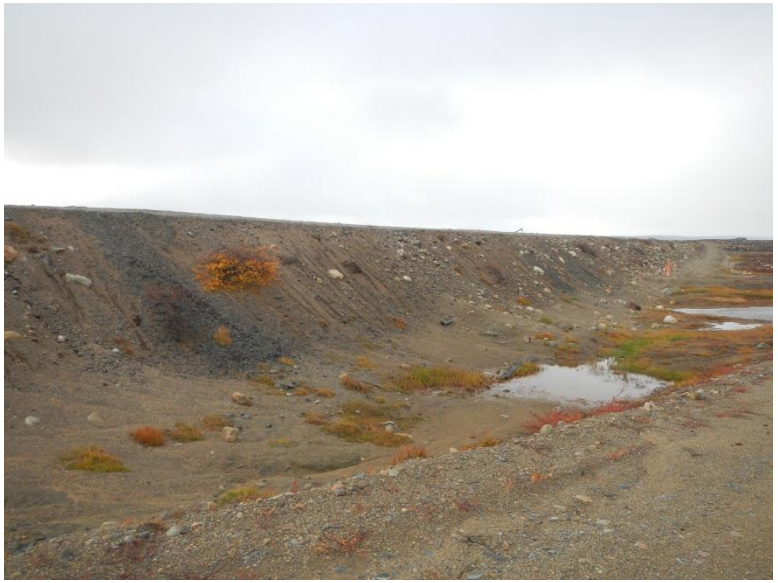
Erosion Gullies in Dam 1A

Erosion Gullies in Dam 1A

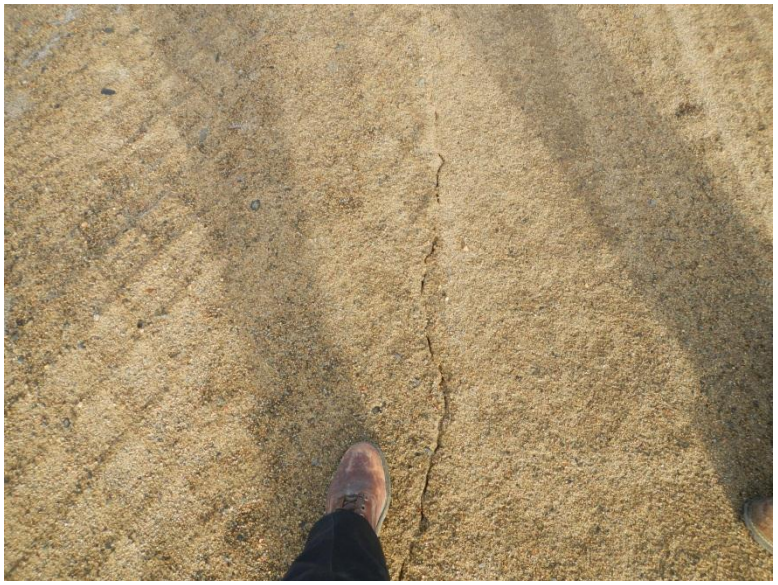
Dam 1B

Dam 1C

Seep at Dam 2



Seepage Collection at Dam 2



Minor Cracks in Dam 3

Minor Cracks in Dam 3

Storm Ditch in Dam 3

Storm Ditch in Dam 3

Dam 3D

Dam 3D

DS slope below Tension Crack in Dam 4

Erosion Gullies and Exposed Geogrid in Dam 4

Erosion Gullies in Dam 4

Dam 5

Dam 6

Dam J

Dam J

DS Slope of Dam K

Undercutting in Dam K

Dam L

Breach in Dam L

Breach in Dam L

Breach in Dam L

Tension Crack in Dam M

Tension Crack in Dam M

Tension Crack in Dam M

Tension Crack in Dam M