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REPORT

2009 Annual Geotechnical Inspection - Meadowbank Gold Project, Nunavut

Submitted to:

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REPORT



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1.0 INTRODUCTION

Agnico-Eagle Mines Limited (AEM) Meadowbank Division requested Golder Associates Ltd. (Golder) conduct an annual geotechnical inspection, pursuant to the requirement of Water License Permit No. 2AM-MEA0815, Part I, Item 12 (page 23 and 24) for the Meadowbank Gold Project.

Under Part I, Item 12 of the Type-A Water License for the project, AEM is required to undertake an annual geotechnical inspection between the months of July and September, of the following facilities:

- Dewatering Dikes;
- Stormwater Dikes;
- Saddle Dams;
- Pit walls;
- Tailings Storage Facility;
- Shoreline protection at the location of the Wally Lake and Portage Lake Outfall Diffusers;
- Geotechnical instrumentation;
- All-Weather Private Access Road (AWPAR) and site roads in particular water course crossing;
- Quarries;
- Landfill;
- Landfarm;
- Bulk fuel storage facilities at the Meadowbank site and in Baker Lake (marshalling area);
- Attenuation Ponds;
- Reclaim Pond; and
- Sumps.

The mine is still under construction and as a result not all items listed are complete. An inspection was conducted by Fiona Esford of Golder between September 22nd and September 28th, 2009. The inspection was carried out prior to snowfall and at the time of year when the seasonal depth of thaw (active layer) would be expected to be at or near its maximum. Daily minimum temperatures were approximately between -2°C and 5°C and daily maximum temperatures were between 6°C and 15°C. Wind speed was variable with high winds and heavy rain occurring on the evening of September 24th and throughout the day on September 25th. At this time of year there is generally low to moderate surface water flow, however when the inspection of the AWPAR occurred on September 25th and 26th higher than average flows for this period were observed. Peak water flows occur during the spring thaw (mid-June through mid-July). An inspection of the following was conducted:



- East Dike, West Channel Dike, and South Channel Dike;
- Initial pit walls for the northern portion of the Portage Pit;
- Geotechnical instrumentation (East Dike and South Camp Dike);
- AWPAR and site roads, with particular attention paid to water crossings (bridges and culverts);
- Quarries;
- Landfill;
- Bulk fuel storage areas at Meadowbank and in Baker Lake; and
- Stormwater Pond 1 and Stormwater Pond 2 (attenuation ponds).

Figure 1 shows the mine site area. At the time of the inspection construction of Saddle Dam 1, Stormwater Dike, and Bay-Goose Dike were underway. Stage 1 construction of Saddle Dam 1 and Stormwater Dike are scheduled to be completed in 2009 which will provide the first phase of containment for the Tailings Storage Facility. The Tailings Storage Facility will be commissioned at the startup of the milling operation, estimated to be in the first quarter of 2010. Construction of subsequent portions of the Tailings Storage Facility will occur as additional containment is required. Construction of the Bay-Goose Dike is scheduled to be completed in 2011 with dewatering scheduled for the third quarter of 2011.

There is no current activity in the Vault Pit area. Diffusers are not in place at the Wally Lake and Portage Lake outfalls. Dewatering of the northwest arm of Second Portage Lake was not occurring at the time of the inspection and therefore no inspection of the discharge / outfall was conducted. The landfarm is scheduled to be constructed in 2010. The reclaim pond within the Tailings Storage Facility will form and begin operation upon plant startup and the initiation of tailings discharge. There are no current sumps within the open pit or elsewhere on site.

1.1 Limitations

The scope of the inspection was limited to geotechnical aspects for each of the facilities listed above. The inspection did not include structural, mechanical, environmental, or other assessments.

This report was prepared in a manner consistent with the level of care and skill ordinarily exercised by members of the engineering and science professions currently practicing in Nunavut, subject to the time limits and physical constraints applicable to this report. No warranty, expressed or implied is made. For additional information, reference should be made to the Study Limitations provided at the beginning of this report.



2.0 INSPECTION

The following subsections describe the geotechnical aspects of the areas inspected and present general observations and recommendations.

2.1 Dewatering Dikes

2.1.1 East Dike

East Dike was constructed in the summer of 2008 and grouting of the foundation and bedrock below the dike occurred in 2008 and during the first quarter of 2009. East Dike is located on the east side of the Portage Pit and in conjunction with West Channel Dike isolates the northwest arm of Second Portage Lake to allow dewatering and development of the Portage Pit and Tailings Storage Facility. East Dike also serves as a haulage road to connect the North Portage Pit, ore stockpiles and a crushing facility within the plant site. East Dike is approximately 800 meters in length. East Dike was constructed within Second Portage Lake, without any dewatering. It consists of a wide rockfill shell, with downstream filters and a soil-bentonite cutoff wall which was excavated to bedrock. The East Dike was constructed in water up to 5.7 meters deep. The cutoff wall is up to 8 meters below lake level. At the time of the inspection, a draft as-built report for the East Dike (Golder Doc. No. 900) and a preliminary draft Operation, Maintenance and Surveillance (OMS) Manual for the East Dike (Golder Doc. No. 571) were available for review. It is understood that AEM is completing the draft OMS Manual and will continue to review and update the document, as necessary. It is further understood that a final version of the as-built report is being prepared.

Instrumentation has been installed and monitored within the East Dike. Further discussion regarding the data obtained from the instrumentation is presented in Section 2.3.

Dewatering of the northwest arm of Second Portage Lake commenced in March and was temporarily suspended on July 10th, 2009 as a result of elevated turbidity levels within the discharge water. It is understood that dewatering will resume, once a water treatment plant is constructed and commissioned to treat water (remove suspended solids) prior to release to Third Portage Lake. Dewatering is expected to resume during the fall of 2009, however, no dewatering was occurring at the time of the inspection.

It is understood that during dewatering, water levels on the downstream side of the East Dike steadily decreased initially. Between May 17th and May 19th the outlet of Second Portage Lake to Tehek Lake, which had been frozen, released suddenly resulting in a rapid decrease of the upstream water level at the East Dike of approximately 0.7 meters. A response in the piezometers was also observed at this time. Dewatering was temporarily suspended and then re-initiated. Between May 19th and May 21st a relatively slow decrease in the downstream lake level was recorded, and responses were observed in piezometers and thermistor string data (in particular near Sta. 60+490), which lead to the belief that a potential leak through the East Dike could have developed. Flow meters were not installed in the dewatering pumps and therefore the rate of dewatering could not be used to verify the magnitude of the potential leak. In response to the concern over a potential leak and given the lack of available information regarding its location, extent and magnitude, the worst case scenario was assumed and planned for. Based on the estimated pumping rates and observed decrease in dewatering level, the leak rate was estimated to be as high as 0.5 m³/s. A contingency grouting program was developed and implemented. Contingency grouting activities in the area of concern occurred between May 25th and



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June 1st, 2009. By June 1st dewatering rates on the downstream side of East Dike were re-established and piezometers and thermistor readings normalized.

On July 21st, 2009 a sinkhole on the upstream side of the cutoff wall, at approximately Sta. 60+472 was observed by AEM staff. Coincidentally, representatives of Golder and the Meadowbank Dike Review Board (MDRB) members were on site. The sinkhole was inspected by representatives of Golder, AEM, and the MDRB. Seepage on the downstream side of the dike, in vicinity of the sinkhole area, had been observed several days prior. In response to the appearance of the sinkhole, a plan was developed and implemented by Golder and AEM that included:

- monitoring the surface expression of the sinkhole between July 21st and 31st;
- construction of a weir and then monitoring seepage rates between July 24th and September 6th when the weir became submerged as a result of the rising water level on the downstream side of the East Dike;
- visual inspection of the clarity of the seepage water;
- conducting tracer tests;
- excavation of the sinkhole area to further inspect the extent and nature of the sinkhole;
- planning and implementation of a cone penetration testing (CPT) program to investigate the integrity of the cutoff wall in the vicinity of the sinkhole;
- planning and procurement of supplies and equipment for additional emergency grouting;
- installation of additional piezometers;
- planning and implementation of a further geotechnical investigation program in the vicinity of the sinkhole; and
- planning and implementation of a surficial geophysical investigation program using ground penetrating radar.

When the sinkhole area was excavated a cavity of about 18m³ (1m high) under the frozen cap of the dike was discovered. The cavity extended about 0.5 m into the cutoff wall. Movement of materials had occurred in the sinkhole area and rapid localized settlement had resulted. It is anticipated that the observed movements on the surface are related to thawing phenomenon that induces progressive in-filling of the existing void under the frozen cap. When the cover material became either unfrozen or too thin to support (bridge) the void, the collapse occurred and the sinkhole appeared. Seepage monitoring at the weir indicated a stable flow between 8 and 15 L/s with no turbidity.

A Technical Memorandum entitled "Meadowbank East Dike Grouting Response Plan – Completed Works" (Golder Doc. No. 916) provides additional information as does Golder Doc. No. 961 East Dike Sinkhole Summary Report. It is understood that additional documents will be prepared to present the results of the other components of the East Dike investigation programs.



At the time of the site inspection and based on the instrumentation data, the condition of the East Dike appeared stable. No visual signs of slope instability or erosion were observed on the upstream and downstream rockfill slopes at the time of the inspection. No additional signs of tension cracks were observed along the cutoff wall alignment. The crest elevation of the dike was designed to be 137.1 m to provide 4 m of freeboard above the typical elevation of Second Portage Lake (133.1). At the time of the inspection, the dike crest elevation was approximately 136.5 m, approximately 0.5 m lower than the design. No visual signs of seepage on the downstream side of the dike were apparent at the time of the inspection. However, it is anticipated that the seepage previously observed and monitored by the weir persists, but cannot be seen as a result of the increased water level on the downstream side of the dike. Water is also in contact with additional portions of the dike toe, which prevent proper monitoring of any seepage, if it exists. No downstream seepage collection system currently exists, due to the presence of water in this area.

Appendix A1 contains a photographic log of the East Dike and the record of inspection form.

2.1.2 West Channel Dike

The West Channel Dike was constructed in the fall of 2008. It is located on the south side of the Portage Pit and in conjunction with the East Dike isolates the northwest arm of Second Portage Lake to allow dewatering and development of the northern portion of the Portage Pit and Tailings Storage Facility. It covers a narrow channel, approximately 80 meters in width, where water depths were about 0.5 meters. The West Channel Dike has a broad rockfill shell, with a wide till core. A downstream filter was placed between the native soils and the till core. Placement of the till core occurred under water and a surcharge load of rockfill was placed above the core.

Dewatering of the northwest arm of Second Portage Lake commenced in March and was temporarily suspended in July 2009 as a result of elevated turbidity levels within the discharge water. It is understood that dewatering will resume, once a water treatment plant is constructed and commissioned to treat water (remove suspended solids) prior to release to Third Portage Lake. Dewatering is expected to resume during the fall of 2009, however, no dewatering was occurring at the time of the inspection.

No evidence of erosion or instability of the upstream or downstream slopes was apparent at the time of the inspection. No instrumentation exists within the West Channel Dike.

Appendix A2 contains a photographic log of the West Channel Dike.

2.1.3 South Camp Dike

The South Camp Dike was constructed during the winter of 2009, prior to ice breakup. The thermal cap remains to be placed. It is anticipated that this work will be completed during the winter of 2010. It is located south of the plant area and in conjunction with the Bay Goose Dike isolates a portion of Third Portage Lake which will be dewatered in order to develop the Goose Island Pit and the southern portion of the Portage Pit. It covers a narrow channel, approximately 60 meters in width, where water depths were about 0.5 to 1 meter. The South Camp Dike has a broad rockfill shell with a bituminous geomembrane liner installed on the upstream side of the rockfill shell. Compacted granular material mixed with bentonite was placed above the toe of the liner.



The liner was founded on native frozen (permafrost) till material, in a trench approximately 3 to 5 meters below the lakebed surface.

At the time of the inspection, the South Camp Dike was used as an access road to connect the Bay-Goose Dike contractor's office and equipment area with the mine facilities. The downstream rockfill shell is used to provide the access road.

At the time of the inspection, dewatering downstream of the South Camp Dike had not commenced and is not planned to occur until the third quarter of 2011. No evidence of erosion or instability of the upstream or downstream slopes was apparent at the time of the inspection. A thermistor exists on the upstream side of the South Camp Dike. Temperature data obtained from the thermistor at this location shows that the foundation below elevation 131 meters remained frozen throughout the summer of 2009.

Appendix A3 contains a photographic log of the South Camp Dike.

2.2 North Portage Pit - Pit Walls

At the time of the inspection, only the very north wall of the North Portage Pit had been developed to its final slope and location and only a single bench existed with no further blasting below the first level. The height of the wall was between 6 and 8 meters. Scaling of the wall had not been performed; however, there were no signs of large scale instability. All other walls were temporary.

Blast vibration monitoring has been conducted at a single location located east of the North Portage Pit near Second Portage Lake.

Appendix B contains a photographic log of the north pit wall.

2.3 Geotechnical Instrumentation

Instrumentation within the East Dike was installed in the spring of 2009 to monitor the dike's performance following construction and during dewatering, operation, and into closure. Data was regularly collected and reviewed by AEM since the installation. Data has also been provided on a regular basis to Golder for review. The following section summarizes the data analyses for the period ending September 30th, 2009. Data plots for the instrumentation area contained in Appendix C along with a plan and cross section view showing the location of the instruments.

A single thermistor was also installed during the construction of South Camp Dike and was periodically monitored by AEM.

2.3.1 Piezometers

Three arrays of multi level vibrating wire piezometers (VWP) were installed in the South Channel (Sta. 60+190), North Channel (Sta. 60+490), and North Shallows (Sta. 60+700) portions of the East Dike in mid-March 2009. Multilevel piezometers were installed on the:



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- upstream side of the cutoff wall, approximately 2 m from the centerline;
- immediately downstream of the cutoff wall, approximately 2 m from the centerline; and
- further downstream of the cutoff wall, approximately 10 m from the centerline.

In addition, select locations had a single vibrating wire piezometer installed immediately downstream of the cutoff wall near the contact area (base of cutoff wall and top of bedrock surface) at Sta. 60+150, Sta. 60+240, Sta. 60+400, Sta. 60+450, Sta. 60+550, Sta. 60+600, Sta. 60+650, and Sta. 60+750.

Since March 2009, additional vibrating wire piezometers were installed by AEM. These were also single level piezometers installed in the area immediately downstream of the cutoff wall near the contact area (base of cutoff wall and top of bedrock surface) at Sta. 60+200, Sta. 60+420, Sta. 60+440, Sta. 60+460, Sta. 60+470, Sta. 60+480, Sta. 60+500, and Sta. 60+510.

Dewatering of northwest arm of Second Portage Lake, on the downstream side of the East Dike, began in March and was halted on July 10th, 2009 when turbidity levels within the discharge water exceeded permissible limits. During the dewatering, the phreatic level recorded at each piezometer location decreased until May. Between May 17th and 19th a drop in the phreatic level was observed in particular in the upstream "P3" piezometers, but was also observed at the other locations, which corresponds to the release in the ice blockage at the outlet from Second Portage Lake. Between May 19th and 21st, piezometer data, at 60+490, recorded a significant increase in water level, as discussed previously in the East Dike portion of the report (Section 2.1.1). Smaller changes were also observed at Sta. 60+400 and Sta. 60+450. After the contingency grouting, piezometer data at Sta. 60+490 and other locations normalized.

It was observed that from approximately July 11th to July 26th, the phreatic level indicated in the downstream piezometer at Sta. 60+700 P1-C (about 10 m downstream of the cutoff wall near the bedrock interface) increased by 1.1 m then decreased and stabilized at a level approximately 0.5 m higher than prior to July 11th. At this time of the year, ice would have been grounded on the lakebed surface and then melted. The instrument temperature indicates that it has constantly been in a frozen condition. Two additional downstream piezometers near the bedrock interface have also exhibited non-typical behaviour (Sta. 60+650 and Sta. 60+750).

After dewatering was stopped on July 10th, the elevation of the East Dike downstream pool rose from a low of approximately 126.5 m to 128 m, due to the following inflows:

- Transferring water from upstream side of Stormwater Dike (under construction) to the downstream side;
- Seepage through the East Dike and potentially through the West Channel Dike (although no seepage was observed);
- Runoff from the site; and
- Precipitation.



The increase in the downstream water level has been resulted in a small increase in the phreatic levels recorded in the downstream piezometers in the East Dike.

During dewatering small cycles in the recorded piezometric level are apparent at some locations. This may have been related to the pumping and the location of the dewatering pumps. In more recent data, some of the piezometric levels have shown small “blips” although the source or cause could not be confirmed with the information available.

The downstream water level has been below the lakebed surface elevation in shallow areas, at Sta. 60+150, Sta. 60+190, Sta. 60+200, Sta. 60+240, Sta. 60+400, Sta. 60+550, Sta. 60+600, Sta. 60+650, Sta. 60+700, and Sta. 60+750.

At the time of the inspection, no signs of significant seepage through East Dike were evident based on the piezometric data.

East Dike piezometric data is provided in Appendix C1.

2.3.2 Thermistors

From mid-April 2009 to the end of September 2009, readings of the thermistor strings were collected at regular intervals. It is noted that a full annual cycle of thermistor data has yet to be recorded as dike construction was completed in 2009.

The two thermistors installed at Sta. 60+842 and Sta. 60+092 of the East Dike showed that on the abutments, only the upper 0.8 to 1.6 m of the dike on the abutment thawed during the summer of 2009. The remaining portion of the cutoff wall and bedrock remained frozen. The temperature within the cutoff wall varied near the top from -13°C to 0°C and at the base of the wall from about -7.5°C to -2°C at these locations. As the depth increased less temperature variation was observed. Approximately 10 m into the bedrock the temperature variation was less than 1°C and stable at about -3°C (Sta. 60+842) and -5°C (Sta. 60+092).

The thermistor string installed in the South Channel at Sta. 60+185 (bedrock about 6 m below water, elevation 127 m) recorded the following temperature variations:

- The upper portion of the cap and cutoff wall remained frozen (about El. 132.5 to 136.1 m);
- A small portion of the cutoff wall (about 0.5 m) from El. 132 m to 132.5 m thawed during the summer of 2009 and was frozen during the winter. This is just below the water level in Second Portage Lake (133.1m). The temperature varied by approximately 1°C;
- The remaining portion of the wall (below elevation 132 to the base of the wall at 127 m) was thawed throughout the period, with a temperature variation of about 3°C. Initially the temperature within the wall cooled between April and July and then gradually warmed. The maximum recorded temperature was about 3.8°C; and
- Recorded temperatures within the bedrock indicate that this is also thawed. The seasonal variation in the temperature decreased with increasing depth. Near the bedrock surface, the temperature varied by approximately 2°C, and at 6 m into rock there was about a 0.5°C seasonal variation.



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Based on the thermistor data at this location, no signs of seepage are evident. Ongoing monitoring is required.

The thermistor string installed in the North Shallows at Sta. 60+695 (bedrock about 4 m below water, elevation 128.5 m) recorded the following temperature variations:

- The upper portion of the cap and cutoff wall thawed during the summer of 2009 and was frozen during the winter, from about El. 135 to 136.1 m;
- The cutoff wall from about El. 135 to 131.2 m, remained frozen throughout the monitoring period;
- A small portion of the cutoff wall about 0.5 m (El. 130.8 to 131.2 m) cycled from frozen to thawed. The temperature varied by about 1°C;
- The remaining portion of the cutoff wall from El. 130.8 to 128.5 m) remained thawed throughout the period. Temperature varied by up to 2.5°C; and
- The bedrock also remained thawed. The upper portion initially cooled and then increased in temperature with up to 2.5°C variation. The lower portion of the bedrock showed less than 0.5°C variation in the temperature, with a stable temperature of about 1°C.

Further monitoring is required to determine if the small thermal anomaly observed in the bedrock is a result of seepage in this area.

Thermistor at Sta. 60+485, within the North Channel (bedrock about El. 125 m, 8 m below lake level), indicated thawing and warming of the cutoff wall, between May 15th and May 30th (El. 131 to 125 m) which may have been influenced by the high seepage event of May 2009. Between mid-April and mid-July the thermistor string recorded the following temperature variations:

- The upper portion of the cap and cutoff wall was initially frozen and then thawed (El. 136.1 to 135.5 m);
- A portion of the cutoff wall (El. 135.5 m to 133.5 m) remained frozen;
- The portion of the cutoff wall between El. 135.5 and 131 m, initially was frozen and then thawed during the spring and early summer of 2009;
- The remaining portion of the cutoff wall (El. 131 m to 125 m) was thawed throughout the period; and
- The bedrock was also thawed.

After mid-July, data obtained from this thermistor string appears to be unreliable and reflects more the ambient air temperature. The seal around this instrument may have deteriorated. AEM should consider replacing this instrument.



Two thermistor strings also exist on the upstream side of the South Camp Dike. The following summarizes the observations regarding the thermal regime at these locations:

- The upper 2.5 to 4 m of the zone monitored was initially frozen and then thawed during the summer of 2009; and
- The remaining soil beneath the dike foundation remained frozen throughout the monitoring period (permafrost).

Plots of the thermistor data obtained from the East Dike and South Camp Dike are provided in Appendix C2.

2.3.3 Inclinerometers

From June 2009 to end of September 2009, minor displacements were observed at various depth in the three inclinometers installed at the East Dike. The displacements are referenced along Axis A and Axis B. The Axis A is aligned with the cutoff wall alignment (positive displacement are towards up chainage) for inclinometers installed at Sta. 60+495 and Sta. 60+705 and it is 28 degrees clockwise from the cutoff wall alignment (positive displacement are towards up chainage) for the inclinometer installed at Sta. 60+195. The Axis B is perpendicular to the Axis A.

Maximum cumulative displacements at the crest were observed in the inclinometer installed at Sta. 60+495. The cumulative displacement along the Axis A were about 5.7 mm and about 6.3 mm along the Axis B. Crest displacements recorded in the inclinometer at Sta. 60+195 were slightly less and displacements in inclinometer at Sta. 60+705 were almost nonexistent. Incremental displacements at the crest were about 2 mm.

Minor incremental displacements can be observed at various depths (smaller than 2.5 mm) and cumulative displacements were less than 3 mm.

Plots of the East Dike inclinometer data are provided in Appendix C3.

2.3.4 Survey Monuments

Survey monuments have been installed through the East Dike cutoff wall to measure settlement. Golder was not provided with any data at the time of the inspection. It is recommended that periodic surveying of these monuments be conducted.



2.3.5 Seismograph

At the time of the inspection, it is understood that no seismograph monitoring on the East Dike had occurred.

AEM has monitored blast vibrations from a single location located northeast of the East Dike, near the shore of Second Portage Lake this data was provided at the time of the inspection.

2.4 All-Weather Private Access Road (AWPAR)

The inspection of the All-Weather Private Access Road (AWPAR) was done by driving slowly along it and stopping to inspect each culvert, bridge, quarry, and any other areas of note. The AWPAR is generally in good condition and functioning well. The road design, as presented in Golder 2006 (06-1413-021 July 2006), is based on a general rockfill subbase with a crushed granular rockfill surfacing with a minimum 1 m thickness over thaw stable soil and minimum 1.2 m thickness over thaw susceptible soil. As-built thickness of the road fill was observed to be less than design in places, which is expected to result in additional ongoing maintenance requirements and potentially may result in thawing of the permafrost. No evidence of thermal degradation of the permafrost was observed during this inspection, however, based on the regular road maintenance performed by AEM visual evidence may not be observed. Evidence of on-going road maintenance was observed at the time of the inspection.

Due to the coarse nature of the rockfill that comprises the majority of the road, in general, the fill material provides no significant barrier to low gradient water flow. During the inspection, water was observed flowing through the rockfill in the following areas:

- Approach fill to Bridge 1 – R02 approximately at km 8+750;
- Culvert PC-17 at km 8+830;
- Near culvert R-04 at approximately km 11+950;
- Adjacent to culvert R-05A at km 15+645;
- Culvert PC-9 at km 35+690;
- Culvert R-14 at km 67+840;
- Approach fill to Bridge 7 – R16 approximately at km 73+800;
- Culvert R-17 at km 77+440;
- Near Quarry 18 at approximately km 80+400 (no culvert is present); and
- Right abutment approach fills of Bridge 9 – R19 approximately at km 83+150.

No erosion of the road fill material or sediment migration from the road was observed during the inspection.



In spring and early summer during higher flow and runoff periods it is expected that water may flow through additional portions of the road fill material. Regular and event based visual inspections of water crossing along the access road should continue to confirm the structural integrity and hydraulic function, confirm soil and permafrost stability, confirm the crossings have been adequately located with respect to the watercourses and to confirm minimal impact to fish habitat. The inspections should include monitoring of sedimentation and erosion rates at channel crossings. A draft copy of the "AWPAR Turbidity and Erosion Monitoring: 2009 Summary" document including results of the monitoring was provided to Golder for review at the time of the inspection. Records from these inspections should continue to be provided and reviewed by the geotechnical inspector in subsequent years.

As-built drawings indicated a total of thirty three culverts and nine bridges. Thirty-two culverts and nine bridges along the road were inspected. One culvert was not located (PC-16, km 55+048) and therefore was not inspected. Table 1 lists each structure along the AWPAP which was inspected, the designated name, and approximate location of each.

2.4.1 Culverts

In general, the culverts inspected were in good condition, were unobstructed, and showed uniform gradient through the culvert. A photographic log of the inspected culverts is provided in Appendix D1. Culverts in the following discussion and in the photographic log have been identified by name (e.g., R-24) consistent with those indicated on the as-built drawings provided by AEM and by the approximate kilometre location (e.g., km 98+250) along the road alignment.

At the time of the inspection, a few rocks and ice blocks were observed within some culverts, but are not of concern. Culvert R-00A at km 2+550 is a single 600 mm diameter corrugated steel pipe (CSP) culvert. The inlet is crushed to the extent that it would severely limit flow through the culvert. In addition there is a very thin layer of cover material over the culvert and a hole through the culvert on the road was evident. At the time of the inspection, following a heavy precipitation event, no channel or water flow was observed in the area of the culvert, this should be monitored during the spring freshet to determine whether this culvert accommodates flow.

At km 4+260, PC-14, there are two 600 mm diameter CSP culverts. The upstream end of the culvert closest to Baker Lake is damaged and would severely impede flow. The adjacent culvert is in good condition, with only minor crushing along the haunch evident. At this location, there is no apparent channel and at the time of the inspection no flow was evident through the culverts. The capacity for the single functional culvert to handle flows should continue to be monitored, especially during the spring freshet to ensure adequate drainage.

The only culvert where uniform gradient was not observed is culvert R-25 located at approximately km 102+050. There are two 600 mm diameter corrugated steel pipe (CSP) culverts at this location. The grade through one of these culverts was observed not to be constant, but rather dipped down and then back up towards the downstream end of the pipe. The change in gradient was observed to be impeding flow through this culvert. However, the other culvert at this location is functioning well. Drainage capacity at this location should continue to be monitored.



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At the following locations where multiple culverts have been installed, it was noted that the inlet elevations of the culverts are not equal:

- R-14, km 67+840;
- R-24, km 98+250; and
- R-25, km 102+050.

This may be beneficial to allow flow to occur in one culvert even if the other culvert is not flowing (e.g., frozen).

Some culverts are showing slight to some degree of crushing along the haunch of the culvert. Specifically, some damage or crushing was observed in:

- PC-14, km 4+260 – slight damage;
- R-04, km 12+050 – minor deflection;
- PC-13, km 12+745 – some damage on haunch and side near upstream end;
- PC-10, km 36+865 – minor deflection;
- PC-11, km 39+552 – minor deflection;
- R-14, km 67+840 – minor deflection in the haunch and side is evident in the central of the three culverts, and in the culvert closest to Baker Lake deflection of the invert is evident;
- R-18A, km 81+045 – two of the three culverts at this location have minor deflection along the haunch and the central culvert also has dents on the side and base;
- R-21, km 87+500 – both of the culverts at this location have dents on the base and side and minor deflection along the haunch;
- R-23, km 93+600 – moderate damage;
- R-24, km 98+250 – two culverts at this location, both have dents on the base and some damage along the haunch. Bedding material around the culverts appears to be larger diameter, angular gravel and cobbles; and
- R-26, km 104+710 – one of the three culverts shows minor damage.

There is an increase in the number of damaged culverts observed this year over last year. Some of the above noted damage may have occurred during the installation process. All of the above culverts remain functional. Annual monitoring by an engineer should continue to occur to detect if further crushing is occurring and to detect if the integrity of the culverts and/or their function is diminishing.



PC-3 at km 13+865 is a single 600 mm diameter CSP culvert. The culvert has been installed below the stream bed. High velocity flow through the culvert was observed at the time of the inspection. No erosion was evident; however, this should continue to be monitored especially during the freshet.

Two 1200 mm diameter CSP culverts are located at km 8+830, referred to as PC-17. A high volume of water was observed at the time of the inspection to be flowing through the culverts at a rapid rate. The high flow at the outlet of the culverts has the potential to cause erosion, which should continue to be monitored. Flow was also observed passing through the road fill material. No evidence of turbidity was observed. The capacity for the two culverts at this location should continue to be assessed, especially during the freshet.

At km 15+645, R-05A, there is a 1200 mm diameter CSP culvert. The culvert at this location was installed above the base of the stream bed or erosion has occurred below the base of the culvert. High flow at the culvert inlet was observed at the time of the inspection. Potential for further erosion at the inlet should continue to be monitored.

2.4.2 Bridges

Nine bridges are located along the AWPAP: 4 Acrow Panel bridges; and 5 Rapid Span bridges. All bridges in general are in good geotechnical condition. All embankments appeared to be in good geotechnical condition. A structural and/or mechanical assessment of the bridges was not conducted and is beyond the scope of this geotechnical inspection. A photographic log of the bridges is included in Appendix D2.

The bridges have been identified herein by their sequential number, increasing in number along the road from Baker Lake towards Meadowbank, (e.g., from Bridge 1 to Bridge 9) and name (e.g., R02), consistent with the as-built drawings provided by AEM of the AWPAP and by their approximate kilometre location (e.g., km 8+750).

Due to the general low lying terrain, water flow occurs in broad areas and not in well defined channels. As a result, the majority of water crossings spanned by bridges have increased channelization of flow beneath the bridges as embankment fill has encroached on the crossing. No visual signs of erosion of the embankments were observed at the time of the inspection. Embankments have generally been constructed with coarse rockfill and therefore little to no sediment load to the water course was observed to be occurring during the inspection as a result of the presence of the bridges, during the inspection.

The following observations were made at select bridge locations, during the inspection:

- Bridge 1, R02 at about km 8+750; some crushing of the rockfill containment structures on each embankment beneath the bridge structure was observed. Damage appears to have occurred during installation and is not impacting the geotechnical integrity of the bridge or embankments. Initial road on upstream side of bridge has assisted in concentrating flows beneath the current bridge structure. At the time of the inspection, flows were high, but no sign of erosion or turbidity was observed.
- Bridge 2, R05 at about km 17+600; some damage to the wooden decking likely from grader operation as part of ongoing road maintenance was observed. Also minor damage of the rock containment structures on the embankments, which appears to have occurred during construction, was observed. Neither observation impacts the geotechnical integrity of the bridge or embankments. Construction of the road and bridge has served to concentrate flows. Higher flows were observed along the left abutment, but no



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evidence of erosion was observed. The stream bed consists primarily of cobbles, some gravel and a few boulders and grasses towards the perimeter of the channel.

- Bridge 3, R06 at about km 23+100; construction of the bridge has concentrated flow in this area. Flow was observed to be occurring equally below the bridge and no signs of erosion or turbidity were observed at the time of the inspection.
- Bridge 4, R09 at approximately km 48+500; construction of initial road on upstream side of bridge has assisted in concentrating the flow from the two channels into a single channel, prior to reaching the bridge. No signs of erosion or turbidity were observed at the time of the inspection.
- Bridge 5, R13 at about km 62+060; all flow was observed to be passing beneath the bridge at the time of the inspection. Some deeper depressions in the base of the channel were observed beneath the bridge and on the downstream side of the bridge. The stream bed within the depressions consisted of cobbles and some boulders along with grasses. No sign of turbidity was apparent at the time of the inspection.
- Bridge 6, R15 at about km 69+200; no evidence of erosion or turbidity was observed at the time of the inspection.
- Bridge 7, R16 at about km 73+800; steel decking appeared to be of insufficient length. Road base fill was observed to be falling below the bridge onto the abutment and potentially could enter the water course as traffic passes over the bridge. Woven geotextile was observed to be hanging on each embankment. Construction of the bridge has served to concentrate flow in this area. Some flow was also observed to be flowing through the rockfill approaches to the bridge. However, no sign of erosion or turbidity was observed. None of the above observations are impacting the geotechnical integrity of the bridge or the embankments.
- Bridge 8, R18 at about km 79+500; steel decking appeared to be of insufficient length. Road base fill was observed to be falling below the bridge onto the abutments as traffic passes over the bridge. Woven geotextile was observed to be hanging on each embankment. The bridge spans a boulder field. No flow was observed passing beneath the bridge at the time of the inspection.
- Bridge 9, R18 at about km 80+200; steel plates with pipe anchors installed along both embankments of this bridge. Flow was observed to be passing through the right abutment road fill material as well as beneath the bridge. No turbidity was observed at the time of the inspection.

None of the above were observed to negatively impact the geotechnical condition of the bridges at the time of the inspection.



2.5 Meadowbank Site Roads

At the time of the inspection, many of the site roads were still temporary construction roads and subject to changes. Haul roads between the:

- North Portage Pit and the waste dump;
- North Portage Pit and the low grade ore stockpile (located at the north side of the East Dike); and
- North Portage Pit and the high grade ore stockpile (located at the west side of the West Channel Dike)

have been established and are in operation. These haul roads appeared to be of adequate width and had appropriate berms. No geotechnical concerns were identified with the site haul roads.

Temporary roads developed for construction purposes were not inspected.

2.6 Quarries

Twenty-two quarries were developed to provide material for construction of the AWP. One quarry was developed near the air strip at Meadowbank to provide additional construction materials. All quarries were inspected and a photographic log is contained in Appendix E. Quarries have been numbered sequentially from 1 to 22 starting near Baker Lake and increasing towards Meadowbank, as indicated on the as-built drawings and signage along the AWP. The air strip quarry is also referred to as Quarry 23.

At the time of the inspection, the majority of quarries were dry and contained small stockpiles of material for future use in maintaining the AWP. Some quarries are also being used for storage of other materials:

- Quarry 6 – contaminated soil. Drums and miscellaneous construction debris observed during the 2008 inspection were no longer present in this location, at the time of the inspection;
- Quarry 22 – includes some tires, construction debris, and contaminated soil; and
- Quarry 23 – open air heavy equipment assembly area.

The following additional observations were made at the following:

- Quarry 4 and Quarry 14 are flooded;
- Quarry 7, Quarry 13, Quarry 15, and Quarry 23 (Air Strip Quarry) contained some ponded water. Pools were approximately 30 cm deep; and
- Access road to Quarry 18 is showing signs of frost heave and thaw deformation likely as a result of degradation of the foundation conditions (permafrost).



It is understood that the Closure and Reclamation Plan prepared in accordance with the Water License 2AM-MEA0815 and 8BC-TEH0809 requires that all quarries and borrow sources developed during the construction of the AWPAR be reclaimed, following completion of use. The closure plan requires all quarry slopes to be left at an angle of 45 to 50 degrees. All twenty-two quarries will require some work to re-slope existing walls down to 45 to 50 degrees. It is recommended that AEM develop a plan to gradually close some quarries while maintaining others for storage of materials and to provide a supply of materials for ongoing road maintenance.

It is understood that AEM plans to transfer the contaminated soil observed at Quarry 6 and Quarry 22 to the landfarm when it is constructed.

Quarry 4 and Quarry 14 are flooded and therefore require development of appropriate methods (ditches or outlets) to eliminate as much as possible the ponding of water within these quarries, where possible providing water quality is suitable for release. Other quarries that contain some ponded water should be monitored to assess if ponding persists and, if necessary, ditches should be developed to facilitate the drainage of this water.

2.7 Landfill

The Meadowbank landfill is located on the northeast side of the Tailings Storage Facility and within the Portage Rock Storage Facility area. It is progressively being constructed and filled. Waste material is being dumped within a bermed area constructed using waste rock generated from the pre-stripping activities in the open pit. The waste is then covered with a thin layer of rockfill to reduce windblown debris. It is understood that waste is segregated and only those items approved for disposal are transported and placed in the landfill. No compaction of waste is occurring. At the time of the inspection, the area prepared for the landfill had reached its capacity and additional area was to be prepared. Appendix F contains photographs of the landfill.

2.8 Bulk Fuel Storage Facilities

2.8.1 Baker Lake Tank Farm

A photographic log of the Baker Lake Tank Farm is included in Appendix G1. The Baker Lake Tank Farm consists of four large capacity tanks (10 million litres each) that have been constructed within two bermed areas. The first two tanks constructed, Tank 1 and Tank 2, are within the first containment area which is located on the east side of the fuelling area. The second two tanks constructed, Tank 3 and Tank 4, are within the second containment area. A central berm is located between the two containment areas. Each containment area has been lined with a 1.5 mm high density polyethylene (HDPE) geomembrane to provide secondary containment. The liner has been covered with granular fill material, to provide protection, however this prevents a visual inspection of the liner. Access ramps into the bermed areas were observed.

A small amount of ponded fluid, likely rainwater, was observed within the tank farm, primarily in the southern corners of the first containment area and in the southwest area of the second. It appears that no sump has been constructed within the first bermed area to permit easy sampling and removal of accumulated fluid. However, as most of the fluid appears to collect in the southern portion of the area, sampling and removal is feasible. A sump



was observed in the southwest corner of the second containment area. It appeared that removal of fluid from within the containment areas had recently occurred.

The embankments around the south and western sides of the tank farm area appeared stable. The embankments have been constructed of coarse rockfill and therefore runoff from the area is not expected to contain sediment that could potentially enter the adjacent lake (Baker Lake). Along the north side of the tank farm there is a rock cut slope which also appeared stable. Sub-excavation occurred along the western side of the tank farm area to complete the impoundment. The slopes within the containment areas all appeared stable.

The capacity of the secondary containment areas was not verified as part of this inspection.

On the west side of the tank farm is a fuelling station that consists of two containers and a pumping system. The fuelling area is covered by granular road base material. AEM indicated that a geomembrane liner was installed below the refuelling area, although this could not be observed at the time of the inspection.

There is an above ground pipeline between the dock, located to the south of the tanks, and the tank farm, which appears to be used to transport fuel from barges at the dock into the tanks. The pipeline is located immediately adjacent to the access road that connects the dock and the tank farm. There are small orange flags adjacent to the pipeline, but no physical protection, such as a berm between the road and the pipeline. It is recognized that this is not a public road; however, it is recommended that AEM consider constructing a berm or similar structure to provide some protection / separation between the pipeline and road.

2.8.2 Meadowbank Tank Farm

Appendix G2 contains a photographic log of the Meadowbank Tank Farm. The Meadowbank Tank Farm consists of a single large capacity tank (8 million litres) constructed within an area that has been sub-excavated to provide a volume for secondary containment. The area has been lined with a 1.5 mm high HDPE geomembrane. The liner has been covered with granular fill material for protection; however, this prevents a visual inspection of the liner. An access ramp into the bermed area was observed.

Ponded fluid, likely rainwater, was observed within the tank farm, primarily in the north and northeast corner. It appears that no sump has been constructed within the bermed area to permit easy sampling and removal of accumulated fluid. However, as fluid is accumulating in one general area, this should facilitate its removal.

A fuelling station is located on the north side of the tank farm. The fuelling area is covered by granular road base material. AEM indicated that a geomembrane liner was installed below the refuelling area, although this could not be observed at the time of the inspection.

As the tank farm area has been sub-excavated, runoff from the tank farm is not anticipated to occur. The side slopes into the tank area are shallow and all appear stable.

The capacity of the secondary containment area was not verified as part of this inspection.



2.9 Stormwater Management Ponds

2.9.1 Stormwater Pond 1 (Teardrop Lake)

Teardrop Lake, also referred to as Stormwater Pond 1, located near the main camp is being used for storage of various site waters and sewage on an interim basis. Appendix H contains a photographic log of Stormwater Pond 1. No runoff from the pond was observed at the time of the inspection. If the banks of the pond were to overflow or there was a breach in the embankments, water would not be released into either Second Portage Lake or Third Portage Lake, but remain within the mine area.

2.9.2 Stormwater Pond 2

Stormwater Pond 2 is a natural pond with no outfall. It is located between the Tailings Storage Facility and Portage Rock Storage Facility. It will eventually become covered by the Rock Storage Facility. At the time of the inspection, AEM indicated that only a small amount of runoff / inflow from North Portage Pit discharged to this location, and only for a short period of time. At the time of the inspection, no discharges to the pond were occurring. If overflow was to occur, water would not flow into Second Portage Lake, but would remain within the mine area. Appendix H contains a photographic log of Stormwater Pond 2.

2.9.3 Other Ponds and Sumps

Adjacent to the airstrip, there are several small channels dug to divert water into small excavations or “ponds”. The channels and ponds are both unlined and the ponds have no designed outlet structure. In general, they would serve to collect water, allow some suspended sediments to settle out before the water would overflow into other vegetated areas and/or infiltrate, depending on the thermal state of the soils, thus limiting the amount of potential sediment movement. The area was dry at the time of the inspection. An evaluation of the effectiveness of these facilities in removing suspended sediment from the surface water runoff was outside the scope of this geotechnical inspection.

Sumps within the open pit had not been established at the time of the inspection.



3.0 SUMMARY OF RECOMMENDATIONS

The following presents a summary of the key findings of the geotechnical inspection:

East Dike

- Geotechnical issues related to a portion of the East Dike were previously identified. The condition of the dike is continuously being monitored by AEM and should continue (both visually and an assessment of the instrumentation data). Remedial measures to address the potential area of concern within the dike were undertaken and seepage through the dam currently appears to be at a reasonable rate. No turbidity of the ongoing seepage has been observed. A contingency / emergency grouting plan has been prepared and necessary equipment and supplies for such work are on site to assist with implementing the plan, if dike conditions necessitate. Investigations to better understand and characterize the current condition and mechanism that lead to the seepage event have been carried out and data is being analyzed.
- At the time of the inspection, the instrumentation data did not show any currently significant signs of seepage.
- At the time of the inspection, no geotechnical concerns related to the dike integrity were identified.
- The dike crest elevation is approximately 0.5 m less than required in the design. The elevation should be increased to the design level of 137.1 m.
- Once dewatering of the downstream side is complete a seepage collection and monitoring system should be established.
- Periodic surveying of the survey monuments should be conducted.
- Periodic seismograph monitoring on the dike crest should be implemented.

West Channel Dike and South Camp Dike

- At the time of the inspection, no geotechnical concerns related to the integrity of the dikes were identified.

Pit Walls – North Portage Pit

- At the time of the inspection, no geotechnical issues were related to the final north pit wall in the North Portage Pit. Only a very small portion of the final wall had been completed at the time of the inspection and scaling of the wall was still pending.
- Due to the limited level of pit development at the time of the inspection, no sumps had been established. It is recognized by AEM that as pit development progresses these will be required.



AWPAR

- No geotechnical issues were identified at the time of the inspection for the AWPAP related to thermal degradation of the permafrost, thaw settlement, erosion of the road materials, or sediment migration from the road into adjacent watercourses;
- No geotechnical issues were identified with any of the culverts inspected along the AWPAP, however, annual inspections should continue. Since the inspection in 2008, additional culverts showing minor signs of crushing along their haunch, sides and base were identified. The condition of the culverts should continue to be monitored;
- Regular and event based inspections along the AWPAP should continue to confirm the structural integrity and hydraulic function at the crossings, to confirm soil and permafrost stability, to confirm that crossings have been adequately located with respect to the watercourse, and to confirm minimal impact to fish habitat;
- The capacity of the single 600 mm diameter culvert, PC-3 (km 13+865), and of the two 1200 mm diameter culverts, PC-17 (km 8+830) should continue to be monitored to ensure they provide adequate capacity for drainage and that erosion is not occurring, especially during the freshet.
- No geotechnical issues were identified with any of the 9 bridges inspected or their embankments along the AWPAP.

Meadowbank Site Roads

- Haul roads currently in operation appear to be of adequate width, have appropriate berms, and some signs. Additional signage could serve to improve awareness of the intersections with limited visibility. No geotechnical concerns were identified with the haul roads observed during the inspection.

Quarries

- AEM should develop a plan for progressively closing the quarries along the AWPAP while maintaining others for storage of materials and to provide a supply of materials for ongoing road maintenance;
- Quarry 4 and Quarry 14 are flooded and a plan should be developed to drain the water, if possible;
- It is understood that the contaminated soil temporarily contained in Quarry 6 and Quarry 22 will be removed and treated in the landfarm when it is constructed;
- Miscellaneous other items contained in Quarry 22 should be transported and disposed of appropriately in the Meadowbank landfill or other appropriate location.



Landfill

- Expansion of the landfill is an ongoing process to ensure capacity. It is understood that during construction the quantity of waste generated is typically higher than during operation. Care should be taken to ensure there is capacity to ensure appropriate disposal is continuously occurring.
- Consideration should be provided to compacting waste as it is disposed to help reduce the area required for waste disposal.
- No geotechnical concerns related to the landfill were identified at the time of the inspection.

Bulk Fuel Storage Facilities

- Ongoing removal of fluids that accumulate within the secondary containment facilities should continue to be managed appropriately. The establishment of sumps within the first containment area in Baker Lake and at Meadowbank could aid in the removal of the fluids;
- The pipeline between the Baker Lake tank farm and barge unloading area should have a berm constructed between the road and the pipeline.

Stormwater Management Ponds

- No geotechnical issues regarding Stormwater Pond 1, Stormwater Pond 2, or other ponds near the airstrip were identified at the time of the inspection.



4.0 CLOSURE

This report was prepared to summarize the findings from the 2009 geotechnical inspection conducted between September 22nd and September 28th, 2009 of the existing Dewatering Dikes, initial pit walls of the northern portion of the Portage Pit, geotechnical instrumentation (East and South Camp dikes) All Weather Private Access Road (AWPAR), Quarries, Landfill, Baker Lake Tank Farm, Meadowbank Tank Farm, and Stormwater Management Structures at Meadowbank, to comply with the requirements of AEM's Type A Water License Permit No. 2AM-MEA0815, Part I, Item 12.

We trust the above information is sufficient for your current needs. Should you require additional information or further clarification, please do not hesitate to contact us.

Yours very truly,

GOLDER ASSOCIATES LTD.

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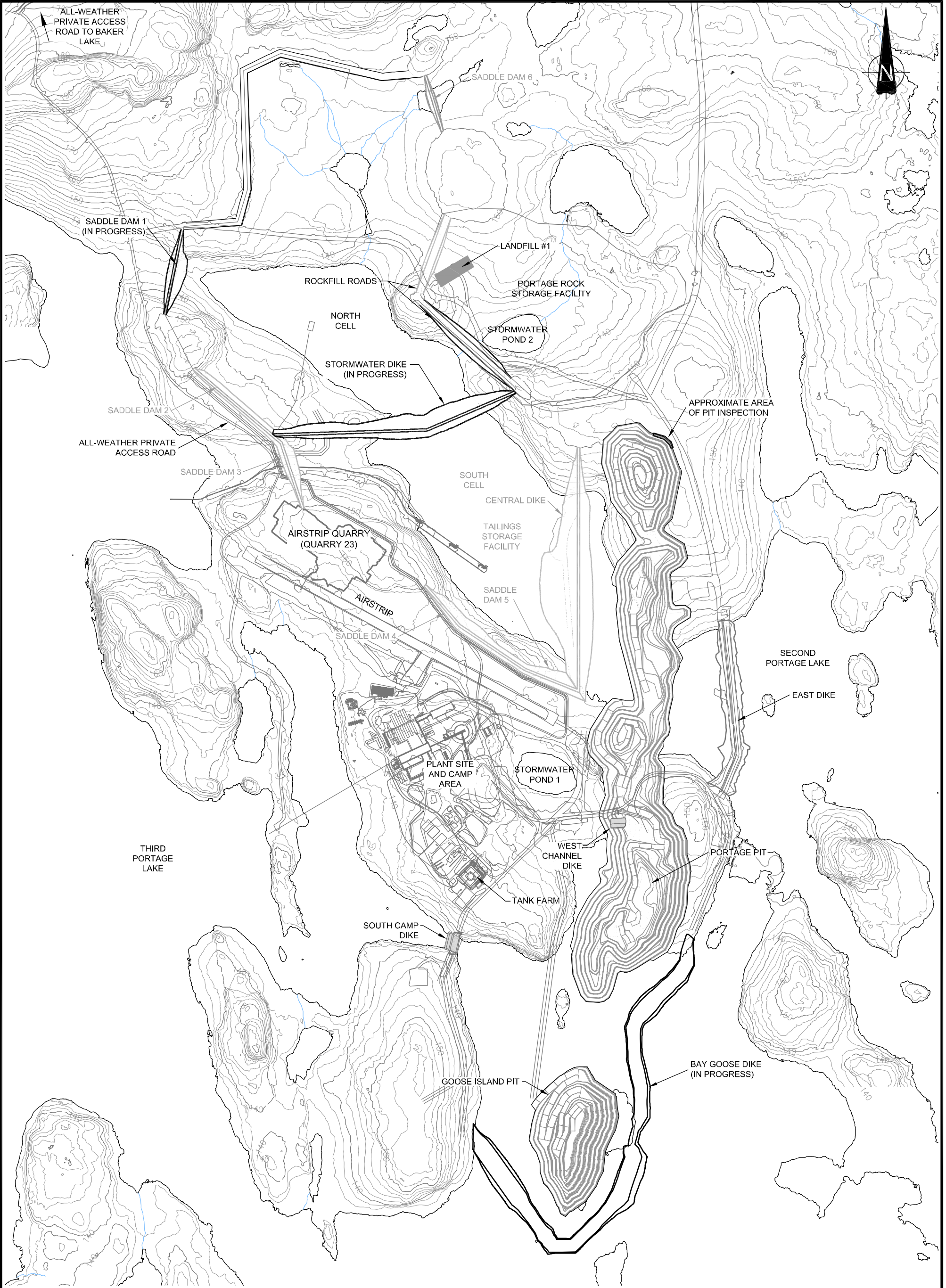
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TABLE 1
Facilities Along the All-Weather Private Access Road

STATION	NAME	STRUCTURE DESCRIPTION	COMMENTS
0+430	PRC1	1x600 mm CSP	
0+470	PRC2	2x600 mm CSP	
1+380	PRC3	1x600 mm CSP	
2+550	R-00A	1x600 mm CSP	
4+260	PC-14	2x600 mm CSP	
5+200	Quarry 1		
8+750	R02 Center Bridge	30m Acrow Panel Bridge	
8+830	PC-17	2x1200 mm CSP	
9+952	PC-1	1x600 mm CSP	
10+580	R-03	1x600 mm CSP	
12+050	R-04	1x1200 mm CSP	
12+745	PC-13	1x600 mm CSP	
13+250	Quarry 2		
13+405	PC-2	1x600 mm CSP	
13+685	PC-3	1x600 mm CSP	
14+910	PC-4	1x600 mm CSP	
15+645	R-05A	1x1200 mm CSP	
17+600	R05 Center Bridge	30m Acrow Panel Bridge	
18+280	PC-5	1x600 mm CSP	
19+075	PC-6	1x600 mm CSP	
20+505	PC-7	1x600 mm CSP	
23+100	R06 Center Bridge	30 m Acrow Panel Bridge	
23+700	Quarry 3		
25+900	R-07	1x1200 mm CSP	
29+785	PC-8	1x600 mm CSP	
31+300	Quarry 4		
34+650	Quarry 5		
?35+690	PC-9	1x600 mm CSP	
36+470	Quarry 6		
36+865	PC-10	1x600 mm CSP	
39+552	PC-11	1x600 mm CSP	
39+800	Quarry 7		
41+410	PC-12	1x600 mm CSP	
42+950	Quarry 8		
44+600	Quarry 9		
48+500	R09 Center Bridge	12m Rapid Span Bridge	
48+900	Quarry 10		
53+500	Quarry 11		
55+048	PC-16	1x600 mm CSP	not inspected, no photos
58+300	Quarry 12		
62+060	R13 Center Bridge	12 m Rapid Span Bridge	
62+350	Quarry 13		
65+700	Quarry 14		
67+600	Quarry 15		
67+840	R-14	3x1200 mm CSP	
69+200	R15 Center Bridge	30 m Acrow Panel Bridge	
70+400	Quarry 16		
72+800	Quarry 17		
73+800	R16 Center Bridge	12m Rapid Span Bridge	
77+440	R-17	1x1200 mm CSP	
79+500	R18 Center Bridge	12 m Rapid Span Bridge	
80+200	Quarry 18		
81+045	R-18A	3x1200 mm CSP	
83+150	R19 Center	12m Rapid Span Bridge	
84+300	Quarry 19		
85+490	R-20	1x1200 mm CSP	
87+500	R-21	2x1200 mm CSP	
89+550	Quarry 20		
93+400	Quarry 21		
93+600	R-23	1x1200 mm CSP	
98+250	R-24	2x1200 mm CSP	
99+200	Quarry 22		
102+050	R-25	2x600 mm CSP	
104+710	R-26	3x1200 mm CSP	

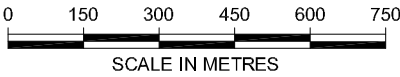


NOTES

- 1) TOPOGRAPHIC CONTOUR INTERVAL 2M.
- 2) GRID REFERENCE: NAD 83, UTM ZONE 14

REFERENCES

- 1) AMEC AMERICAS LTD., DRAWING NUMBER A1-131395-100-C-0001 (100- C-0001.DWG), MEADOWBANK FEASIBILITY STUDY, APRIL 2005.



PROJECT	 AGNICO-EAGLE MINES LIMITED	
TITLE	MEADOWBANK MINE SITE	
TAILINGS STORAGE FACILITY MAIN COMPONENTS		FIGURE 1



APPENDIX A

DEWATERING DIKES

**Appendix A1 - East Dike: Photographic Log and Record of
Inspection**

Appendix A2 - West Channel Dike: Photographic Log

Appendix A3 - South Camp Dike: Photographic Log



Appendix A1

East Dike: Photographic Log and Record of Inspection



PHOTOGRAPHS – EAST DIKE



PHOTOGRAPH 1 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2201

Description: RST instrument box used to record piezometric levels at St. 60+150.



PHOTOGRAPH 2 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2202

Description: View along upstream slope of dike looking north from approximately Sta. 60+200.



PHOTOGRAPHS – EAST DIKE



PHOTOGRAPH 3 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2203

Description: Settlement monitoring point.



PHOTOGRAPH 4 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2204

Description: Slope inclinometer at St. 60+195 and instrumentation cabin near upstream crest of the dike.



PHOTOGRAPHS – EAST DIKE



PHOTOGRAPH 5 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2205

Description: Instrument cabin.



PHOTOGRAPH 6 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2206 and IMG_2207

Description: Panoramic view of upstream side and dike crest, looking north towards North Portage Pit approximately from Sta. 60+250.



PHOTOGRAPHS – EAST DIKE



PHOTOGRAPH 7 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2208

Description: View along crest of dike, looking south towards Bay Goose from approximately Sta. 60+250.



PHOTOGRAPH 8 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2209

Description: Instrument settlement marker, looking north along dike crest towards North Portage Pit approximately from Sta. 60+325.



PHOTOGRAPHS – EAST DIKE



PHOTOGRAPH 9 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2210

Description: Haul truck edge of road not clearly defined on upstream side, photograph looking west.



PHOTOGRAPH 10 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2211

Description: Haul truck edge of road 7 to 8 m from cut-off wall. Tape in photograph is 4 m long.



PHOTOGRAPHS – EAST DIKE



PHOTOGRAPH 11 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2212

Description: View of dike crest looking north from approximately Sta. 60+350.



PHOTOGRAPH 12 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2215

Description: Instrumentation and remediation grouting configuration, looking north towards North Portage Pit along dike crest approximately from Sta. 60+400.



PHOTOGRAPHS – EAST DIKE



PHOTOGRAPH 13 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2216

Description: View of remediation grouting hole and CPT investigation holes near the sinkhole between Sta. 60+452 and Sta. 60+490. Settlement near downstream piezometer is evident.



PHOTOGRAPH 14 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2217

Description: Discharge pipes used during winter dewatering (inactive), upstream side.



PHOTOGRAPHS – EAST DIKE



PHOTOGRAPH 15 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2218

Description: Discharge pipes used during winter dewatering, inactive.



PHOTOGRAPH 16 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2219

Description: Settlement marker with pop-up around base, approximately 20 cm maximum.



PHOTOGRAPHS – EAST DIKE



PHOTOGRAPH 17 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2220

Description: Upstream view of abutment and dike from north abutment, looking south towards Bay Goose.



PHOTOGRAPH 18 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2221

Description: Downstream view of abutment and dike from north abutment, looking southeast.



PHOTOGRAPHS – EAST DIKE



PHOTOGRAPH 19 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2222

Description: Downstream view of toe of dike from north abutment, looking southeast at approximately Sta.60+750.



PHOTOGRAPH 200 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2226

Description: Downstream view of toe of dike, looking northeast, approximately from Sta.60+575.



PHOTOGRAPHS – EAST DIKE



PHOTOGRAPH 211 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2227

Description: Submerged weir near Sta. 60+500, previously used to monitor seepage on the downstream side of the dike.



PHOTOGRAPH 22 – East Dike

Date: September 23, 2009. **Photo Number:** STA_2228, STB_2229 and STC_2230

Description: Panoramic view of downstream toe of dike, looking west from crest of dike, approximately from Sta. 60+400 to Sta. 60+550.



PHOTOGRAPHS – EAST DIKE



PHOTOGRAPH 23 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2231

Description: View of downstream toe of dike, looking west from crest of dike, submerged weir is evident.



PHOTOGRAPH 24 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2232

Description: Downstream view of dike toe looking south, approximately from Sta. 60+350.



PHOTOGRAPHS – EAST DIKE



PHOTOGRAPH 25 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2233

Description: Downstream view from dike crest looking north at the dike toe, approximately from Sta. 60+450.



PHOTOGRAPH 26 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2234

Description: From dike crest looking at downstream toe of dike, towards the southwest from Sta. 60+250.



PHOTOGRAPHS – EAST DIKE



PHOTOGRAPH 27 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2236

Description: Downstream view of toe of dike from south abutment, looking north.



PHOTOGRAPH 27 – East Dike

Date: September 23, 2009. **Photo Number:** STA_2237, STB_2238, STC_2239 and STD_2240

Description: Downstream view of dike, looking northeast.



PHOTOGRAPHS – EAST DIKE



PHOTOGRAPH 289 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2241

Description: Downstream view of dike, looking northeast.



PHOTOGRAPH 29 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2242

Description: Downstream view of dike, looking east.



PHOTOGRAPHS – EAST DIKE



PHOTOGRAPH 30 – East Dike

Date: September 23, 2009. **Photo Number:** IMG_2243

Description: Downstream view of dike, looking east.



RECORD OF DAM INSPECTION

Client: AEM
Project: Meadowbank
Location: East Dike

By: Fiona Esford
Date: September 23, 2009
Reviewed: Michel Julien

GENERAL INFORMATION

Dam Type: Rockfill embankment with a soil bentonite cutoff wall

Weather Conditions:	Mostly overcast	Temp:	4°C to 6°C
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INSPECTION ITEM	OBSERVATIONS/ DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST			
1.1 Crest elevation	+/-136.5, cutoff 136.1m		Design 137.1m
1.2 Reservoir Level	133.03 upstream 128.00 downstream		
Freeboard	3.5 m		Dike crest. Design 4 m.
1.3 Distance To Tailings Pond (if applicable)	Not applicable		
1.4 Surface Cracking	None observed		At time of inspection, previously observed around sinkhole, Sta. 60+472 upstream of cutoff wall, parallel and perpendicular.
1.5 Unexpected Settlement	Not at time of inspection.		No measurements recorded. Sinkhole did exist (Sta. 60+472) and has been filled in.
1.6 Lateral Movement	Not apparent.		
1.7 Other Unusual Conditions			
2. UPSTREAM SLOPE			
2.1 Slope angle	Approx. 1.6H:1V		
2.2 Signs of Erosion	Stable		
2.3 Signs of Movement (Deformation)	None observed		



RECORD OF DAM INSPECTION

INSPECTION ITEM	OBSERVATIONS/ DATA	PHOTO	COMMENTS & OTHER DATA
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	Not applicable		
2.5 Other Unusual Conditions			
3. DOWNSTREAM SLOPE			
3.1 Slope angle	Approx. 1.6H:1V		
3.2 Signs of Erosion	None observed.		
3.3 Signs of Movement (Deformation)	None observed.		
3.4 Cracks	None observed.		
3.5 Seepage or Wet Areas	Not apparent.		
3.6 Vegetation Growth	None observed.		
3.7 Other Unusual Conditions			
4. DOWNSTREAM TOE AREA			
4.1 Seepage from Dam	Yes		Seepage downstream of Sta. 60+450, where weir was installed, currently submerged. Water on downstream side of dike in contact with the toe, as shown in photos between Sta. 60+175 and 60+250; 60+400 and 60+550, therefore unable to detect seepage.
4.2 Signs of Erosion	Not observed.		
4.2 Signs of Turbidity in Seepage Water	None observed.		
4.5 Discoloration/staining	Not observed.		
4.6 Outlet operating problem (if applicable)	Not applicable		
4.7 Other Unusual Conditions			
5. ABUTMENTS			
5.1 Seepage at contact zone	Not observed.		



RECORD OF DAM INSPECTION

INSPECTION ITEM	OBSERVATIONS/ DATA	PHOTO	COMMENTS & OTHER DATA
(abutment/embankment) 5.2 Signs of Erosion 5.3 Excessive Vegetation 5.4 Presence of Rodent Burrows 5.5 Other Unusual Conditions	Not observed. No. Not observed.		
5. RESERVOIR 5.1 Stability of Slopes 5.2 Distance to Nearest Slide (if applicable) 5.3 Estimate of Slide Volume (if applicable) 5.4 Floating debris 5.5 Other Unusual Conditions	Stable. None observed. Not applicable. None observed.		Low relief region, stable upstream and downstream of dike. Portage Pit will be developed on the downstream side of the dike, but development on downstream side has not begun yet.
8. EMERGENCY SPILLWAY/ OUTLET STRUCTURE 8.1 Surface Condition 8.2 Signs of Erosion 8.3 Signs of Movement (Deformation) 8.4 Cracks 8.5 Settlement 8.6 Presence of Debris or Blockage 8.7 Closure mechanism operational	No spillway or outlet structure exists.		



RECORD OF DAM INSPECTION

INSPECTION ITEM	OBSERVATIONS/ DATA	PHOTO	COMMENTS & OTHER DATA
8.8 Slope Protection 8.9 Instability of Side Slopes 8.10 Other Unusual Conditions			
9. INSTRUMENTATION 9.1 Piezometers 9.2 Settlement Cells 9.3 Thermistors 9.4 Settlement Monuments 9.5 Accelerograph 9.6 Inclinator 9.7 Weirs and Flow Monitors 9.8 Data logger(s) 9.9 Other	Yes No Yes Survey monuments No Yes Yes, submerged		See section 2.3.1 See section 2.3.2 No data received.
10. DOCUMENTATION 10.1 Operation, Maintenance and Surveillance (OMS) Plan 10.1.1 OMS Plan exists 10.1.2 OMS Plan reflects current dam conditions 10.1.3 Date of last revision 10.2 Emergency Preparedness Plan (EPP) 10.2.1 EPP exists 10.2.2 EPP reflects current conditions 10.2.3 Date of last revision	Yes Pending AEM update/completion Feb. 2009 Draft Yes (part of OMS) Pending AEM update/completion Feb. 2009 Draft		Plus Contingency Grouting Plan



RECORD OF DAM INSPECTION

11. NOTES

Dewatering suspended. To be resumed in fall 2009.

**Inspector's
Signature**

ORIGINAL SIGNED

Date:

\\bur1-s-filesrv2\final\2009\1428\09-1428-0018\doc 969 ver 0\appendix a1 - record of dam inspection - east dike rev 0.doc



Appendix A2

West Channel Dike: Photographic Log



PHOTOGRAPHS – West Channel Dike



PHOTOGRAPH 1 – West Channel Dike

Date: September 24, 2009. **Photo Number:** IMG_2292

Description: From east abutment looking towards the west abutment along the upstream side of the dike. Surcharge load placed over the till core is evident.



PHOTOGRAPH 2 – West Channel Dike

Date: September 24, 2009. **Photo Number:** IMG_2293

Description: From west abutment looking towards the east abutment along the upstream side of the dike. Surcharge load placed over the till core is evident.



PHOTOGRAPHS – West Channel Dike



PHOTOGRAPH 3 – West Channel Dike

Date: September 24, 2009. **Photo Number:** IMG_2294

Description: From west abutment looking east along the downstream side of the dike.



Appendix A3

South Camp Dike: Photographic Log



PHOTOGRAPHS – SOUTH CAMP DIKE



PHOTOGRAPH 1 – South Camp Dike

Date: September 24, 2009. **Photo Number:** IMG_2320

Description: Upstream side, looking towards the south abutment. Thermistor location evident.



PHOTOGRAPH 2 – South Camp Dike

Date: September 24, 2009. **Photo Number:** IMG_2321

Description: Upstream side, looking towards the north abutment.



PHOTOGRAPHS – SOUTH CAMP DIKE



PHOTOGRAPH 3 – South Camp Dike

Date: September 24, 2009. **Photo Number:** IMG_2322 and IMG_2323

Description: Downstream side looking east towards Bay-Goose Dike.



APPENDIX B

NORTH PORTAGE PIT – PIT WALL: PHOTOGRAPIC LOG



PHOTOGRAPHS – NORTH PORTAGE PIT



PHOTOGRAPH 1 – North Portage Pit

Date: September 23, 2009. **Photo Number:** STA_2257, STB_2258, STC_2259 and STD_2260

Description: Final northeast wall of North Portage Pit to first bench. Scaling has not been completed.



PHOTOGRAPH 2 – North Portage Pit

Date: September 23, 2009. **Photo Number:** IMG_2261 and IMG_2262

Description: Slope height 6 – 8 m.



PHOTOGRAPHS – NORTH PORTAGE PIT



PHOTOGRAPH 3 – North Portage Pit

Date: September 23, 2009. **Photo Number:** IMG_2263

Description: Looking north along northeast final wall of North Portage Pit.



PHOTOGRAPH 4 – North Portage Pit

Date: September 23, 2009. **Photo Number:** IMG_2264

Description: Looking east along northeast final wall of North Portage Pit. Cleaning of bench and scaling of slope to be completed.



APPENDIX C

GEOTECHNICAL INSTRUMENTATION DATA

Appendix C1 - East Dike: Piezometric Data

Appendix C2 - East Dike and South Camp Dike: Thermistor Data

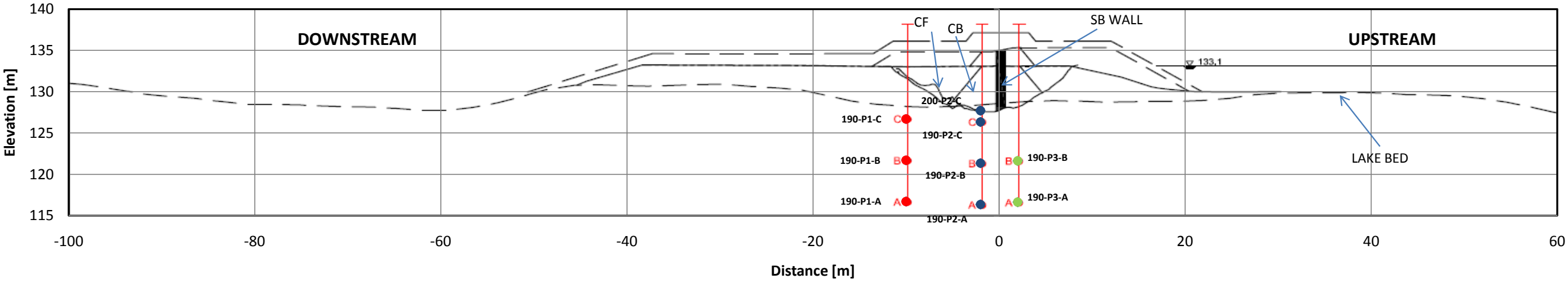
Appendix C3 - East Dike: Inclinator Data



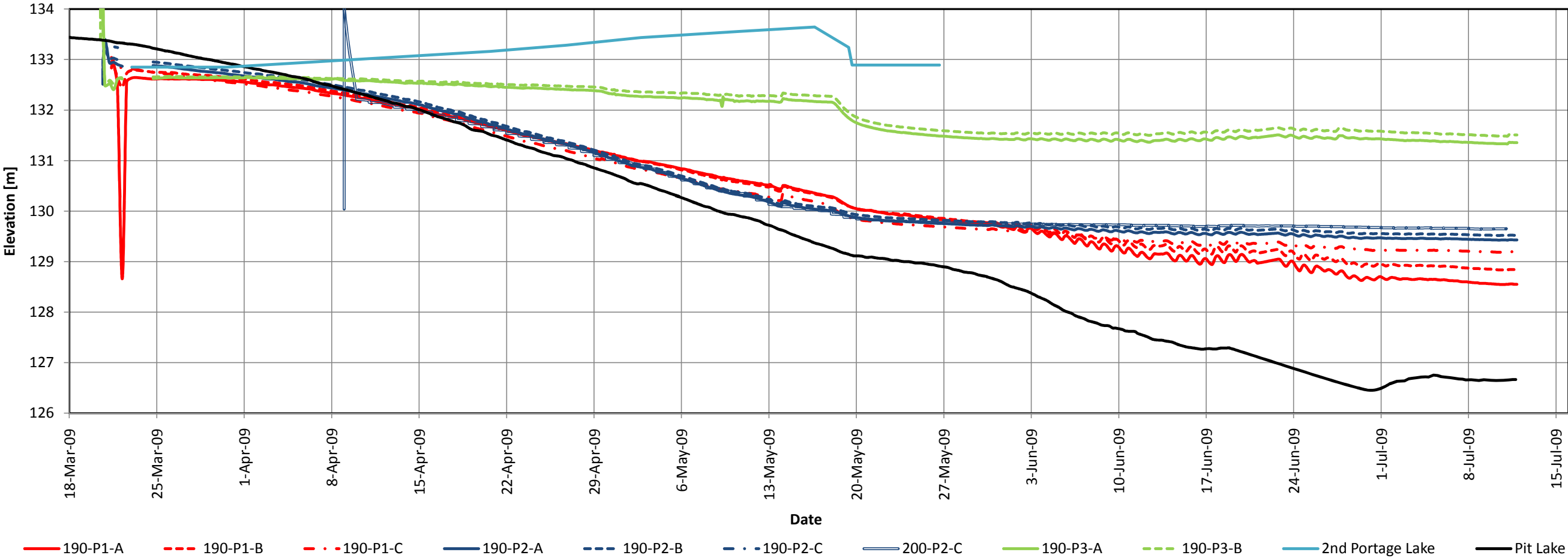
Appendix C1

East Dike: Piezometric Data

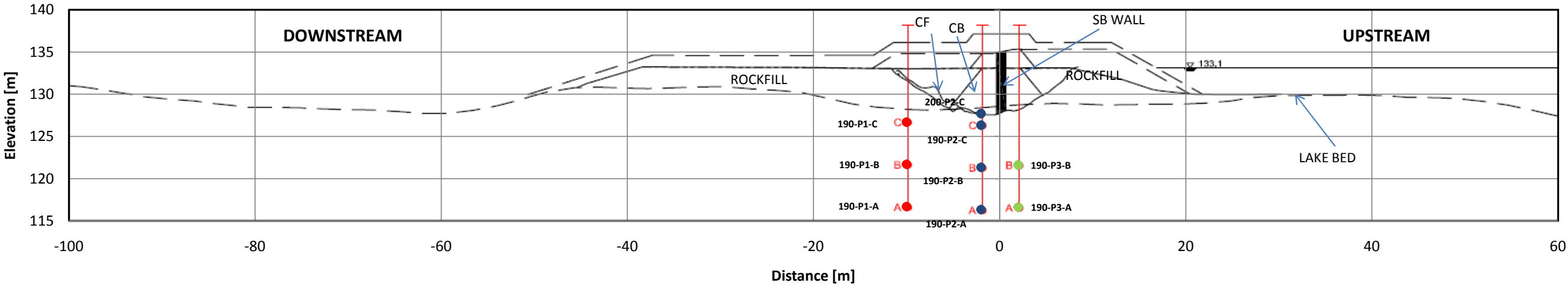
East Dike - Section 60+190
VW Piezometer Locations



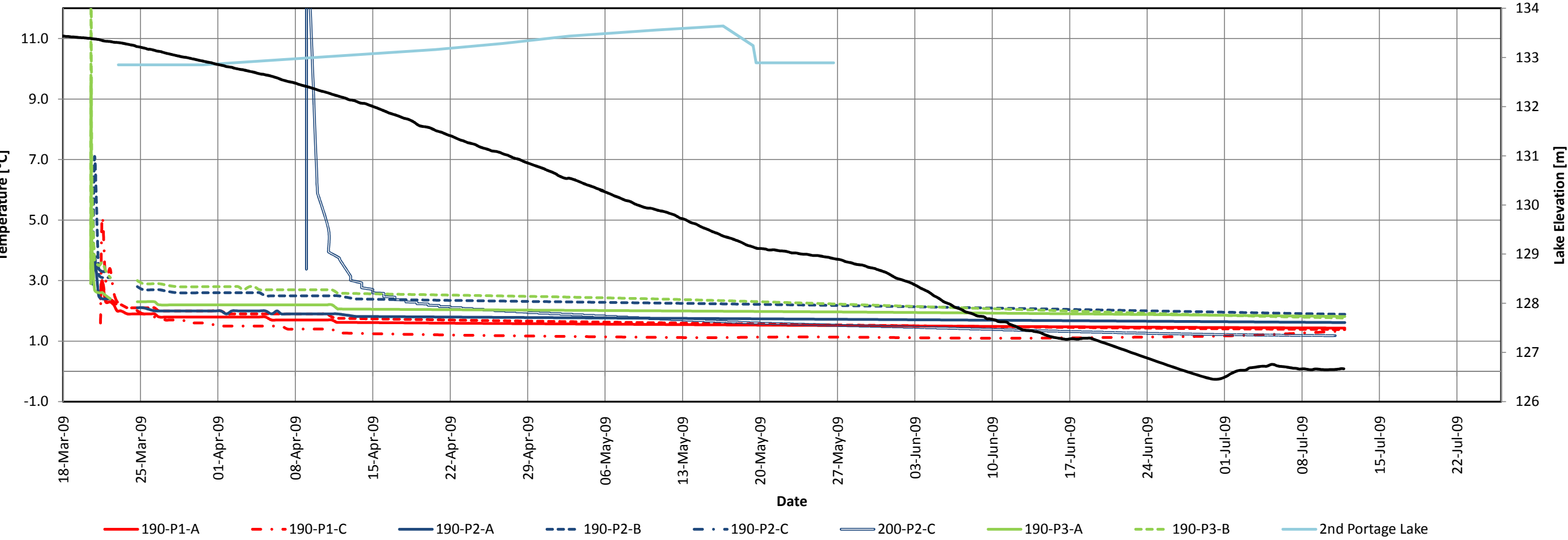
VW Piezometer - Total Head
During Dewatering Period



East Dike - Section 60+190
VW Piezometer Locations

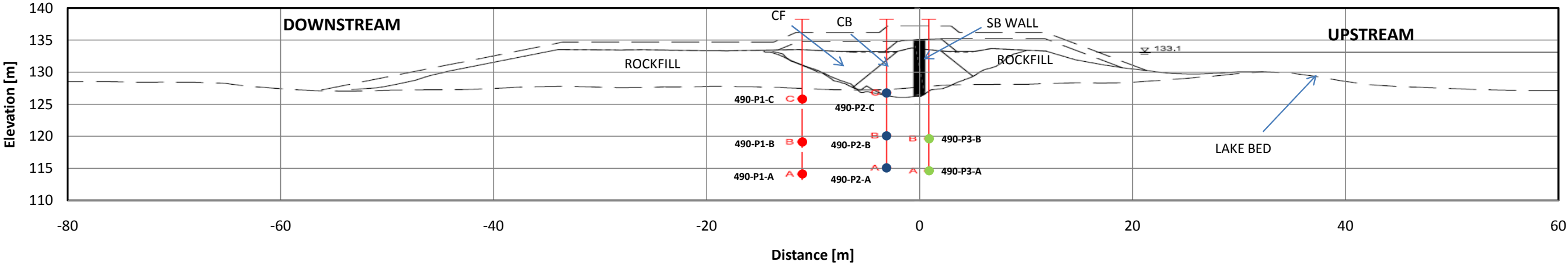


VW Piezometer - Temperature
During Dewatering Period

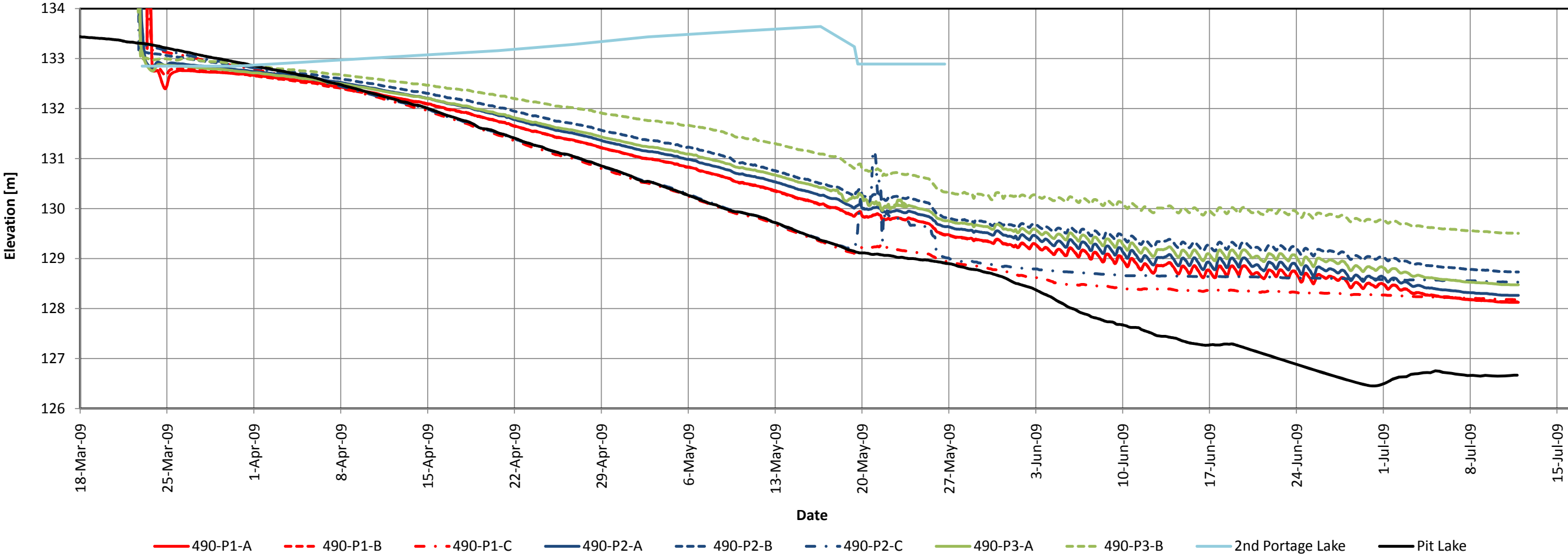


East Dike - Section 60+490

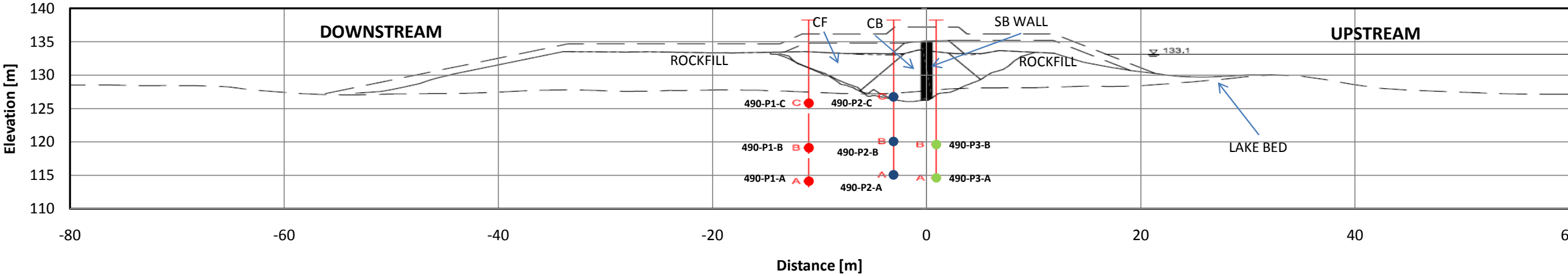
VW Piezometer Locations



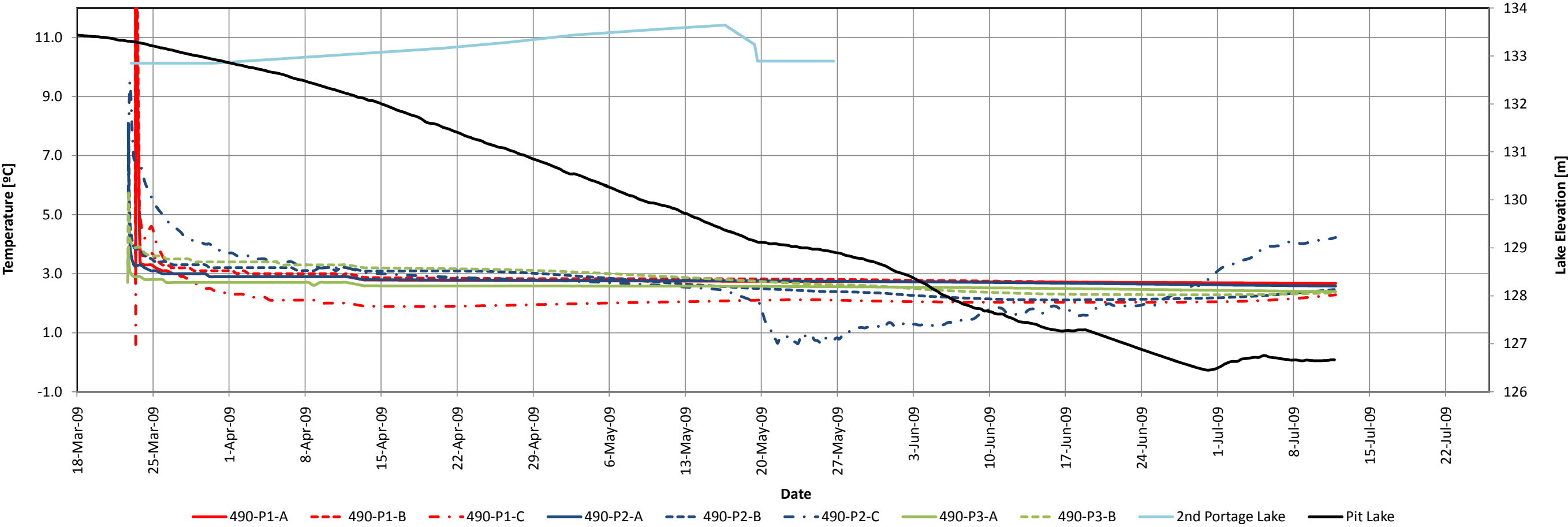
VW Piezometer - Total Head During Dewatering Period



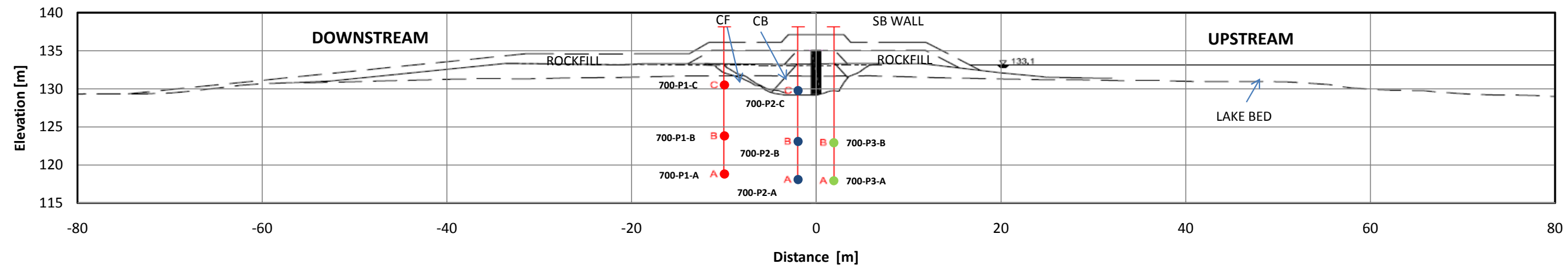
East Dike - Section 60+490
VW Piezometer Locations



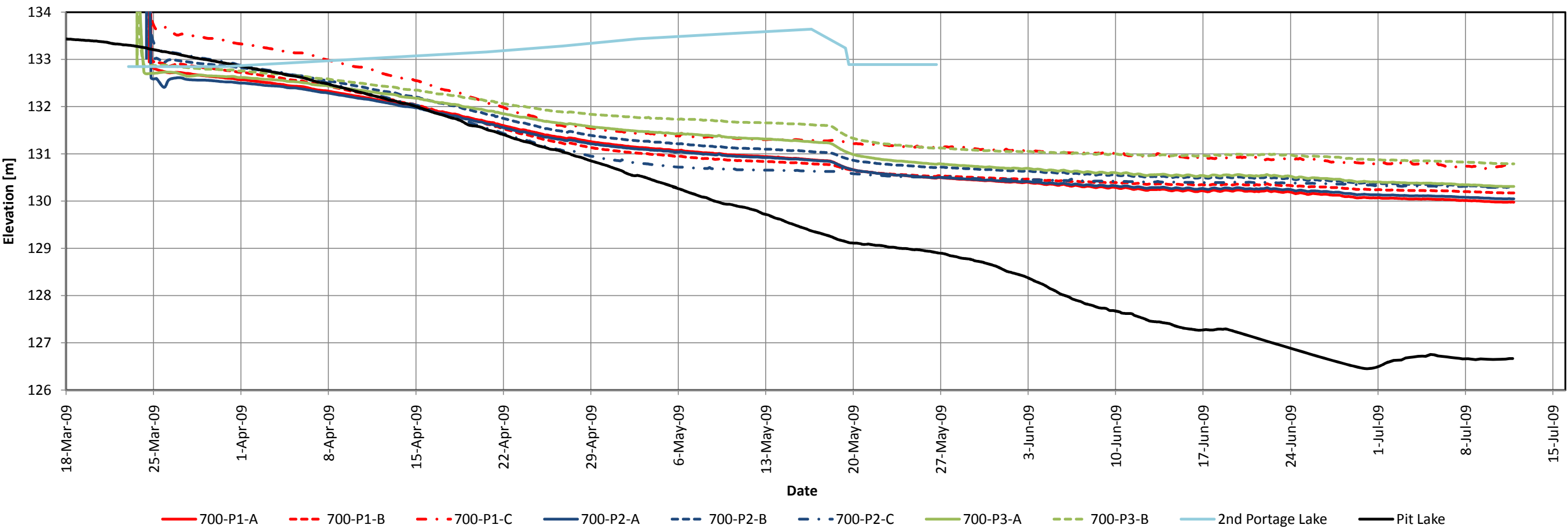
VW Piezometer - Temperature
During Dewatering Period



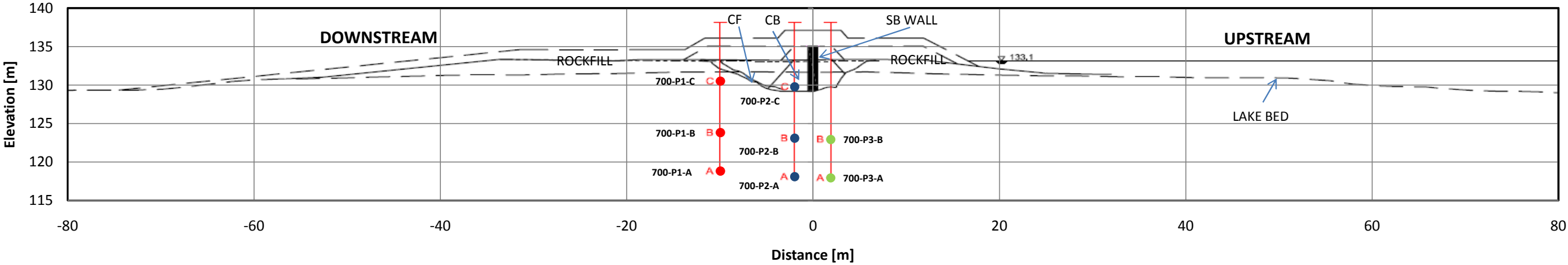
East Dike - Section 60+700
VW Piezometer Locations



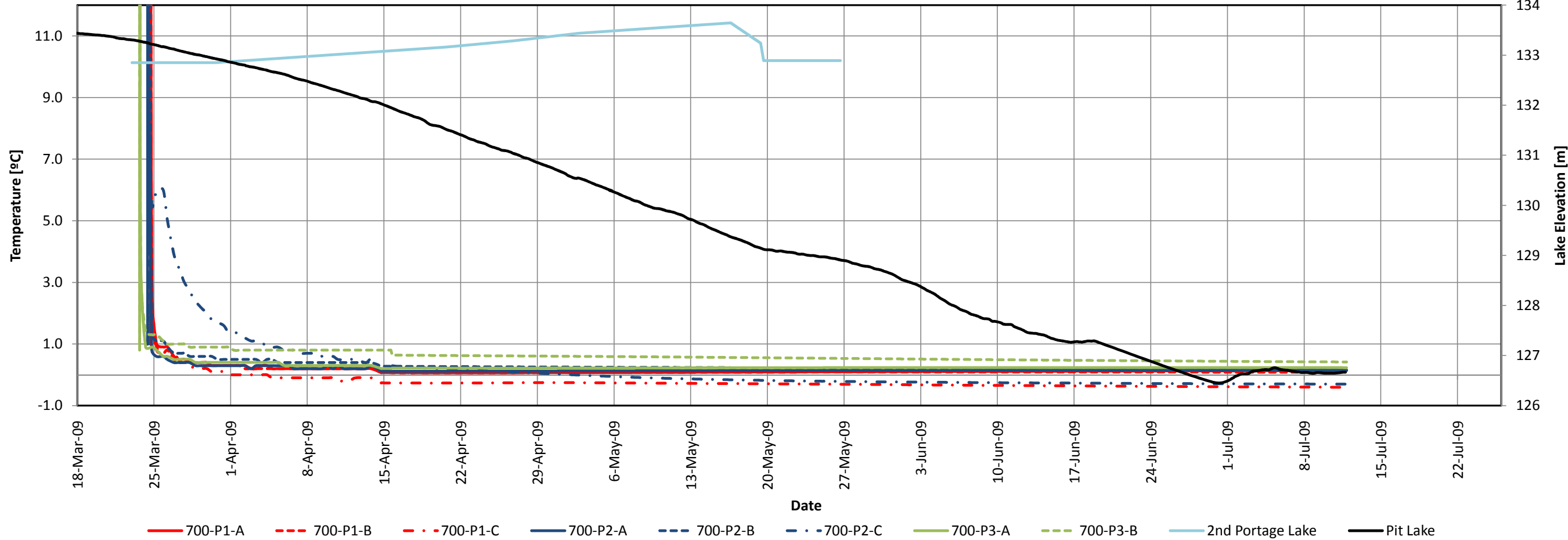
VW Piezometer - Total Head
During Dewatering Period



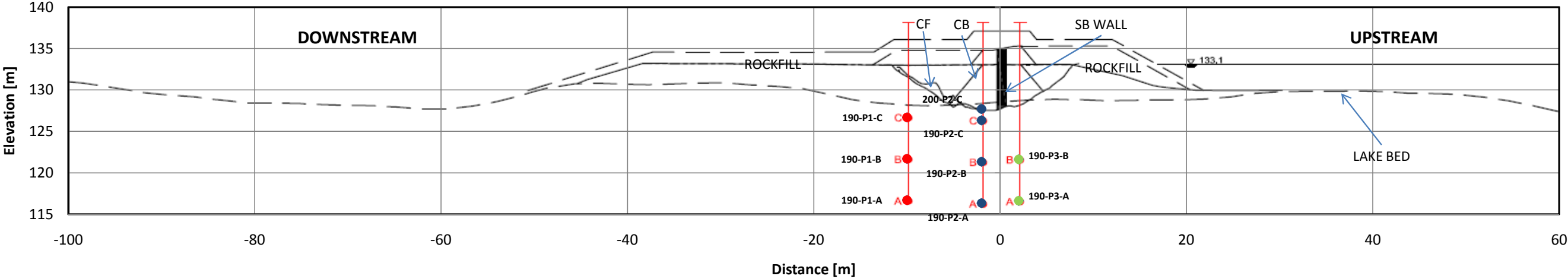
East Dike - Section 60+700
VW Piezometer Locations



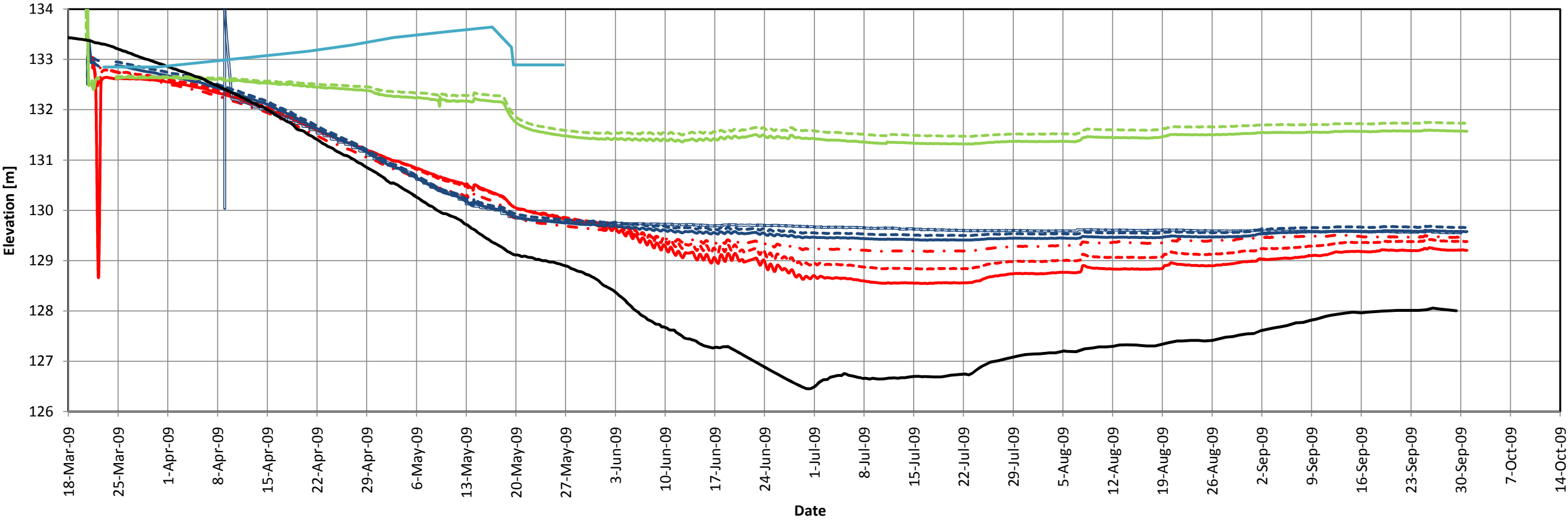
VW Piezometer - Temperature
During Dewatering Period



East Dike - Section 60+190
VW Piezometer Locations

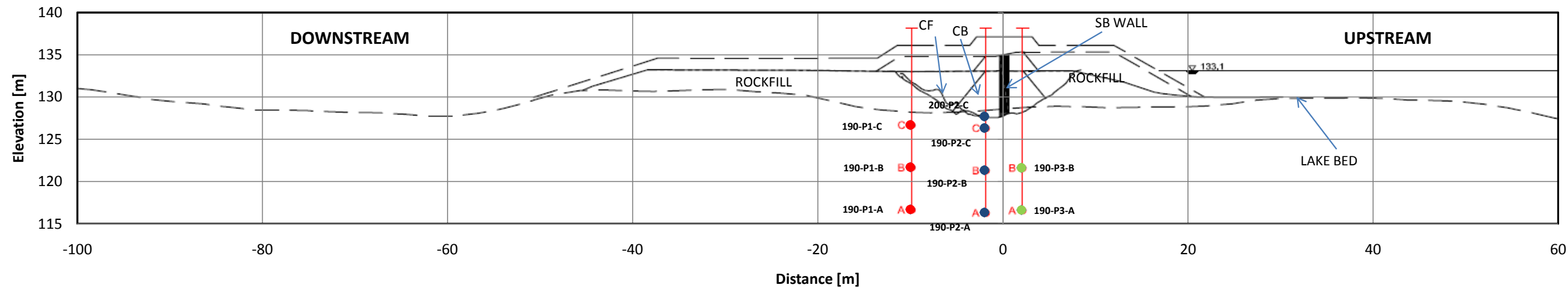


VW Piezometer - Total Head

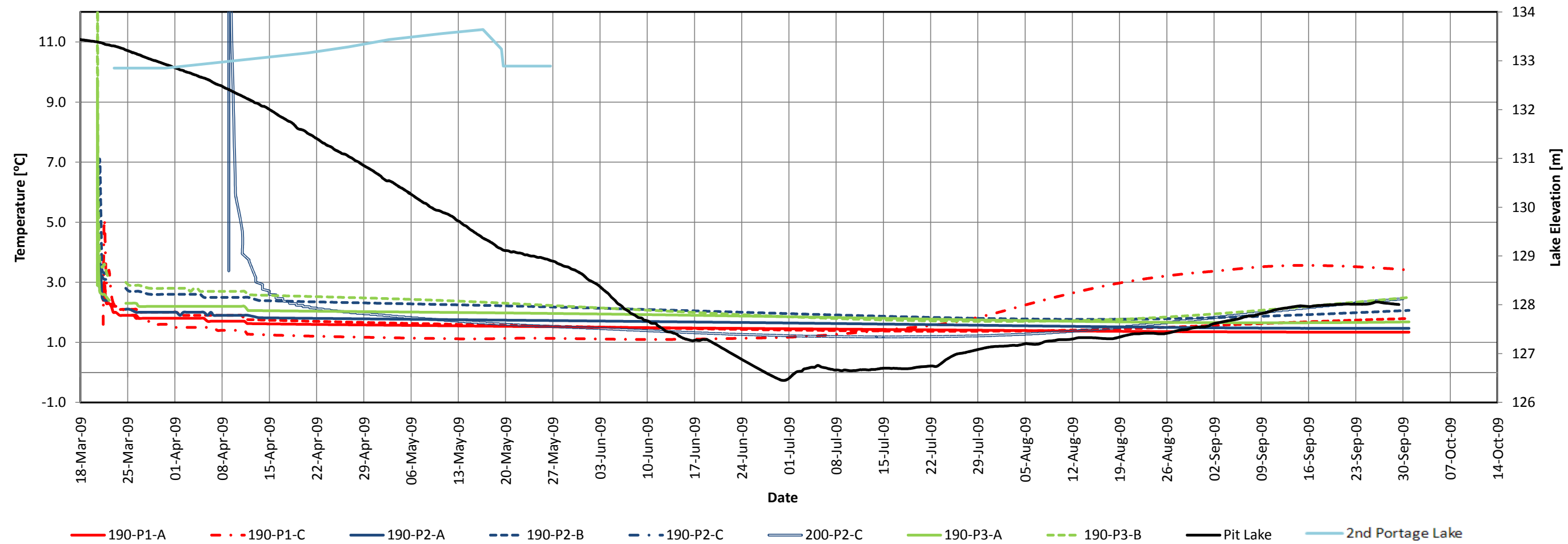


190-P1-A 190-P1-B 190-P1-C 190-P2-A 190-P2-B 190-P2-C 200-P2-C 190-P3-A 190-P3-B Pit Lake 2nd Portage Lake

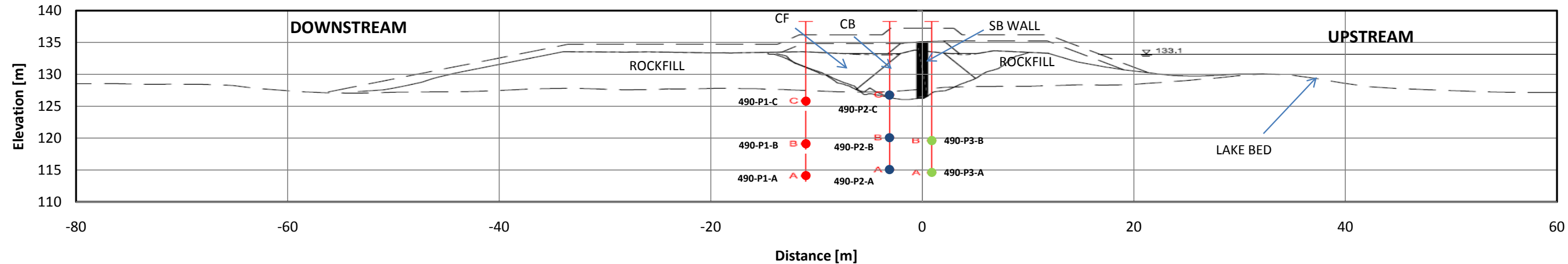
East Dike - Section 60+190
VW Piezometer Locations



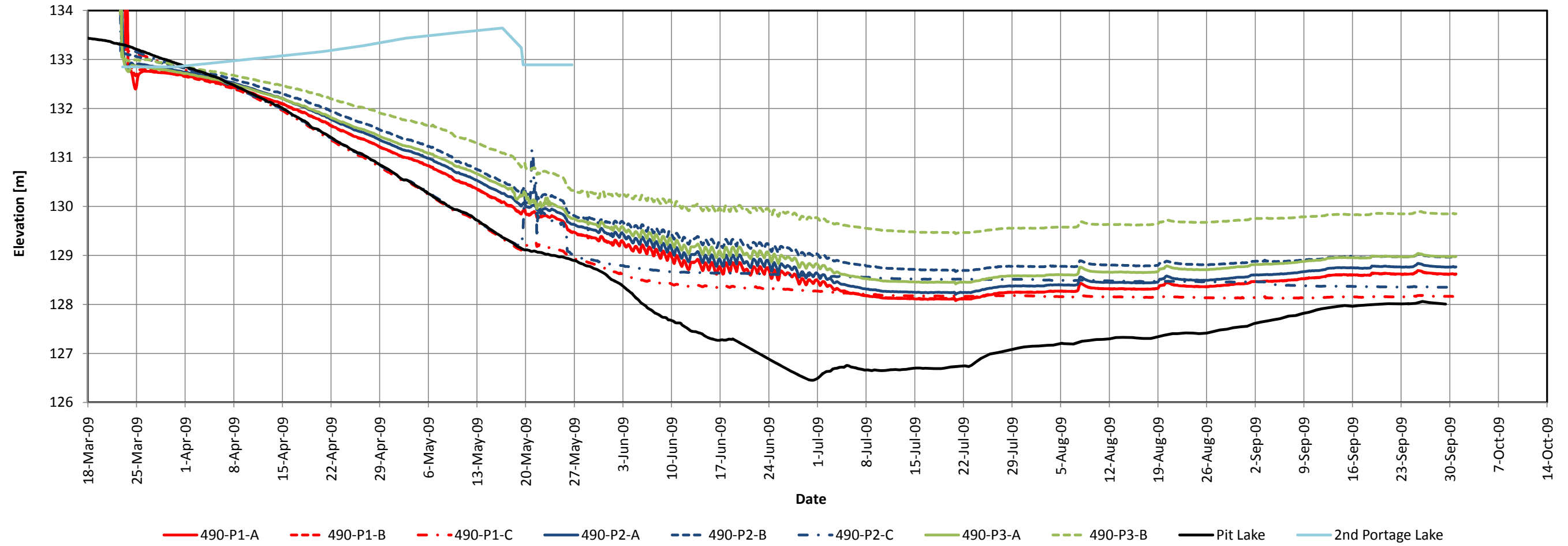
VW Piezometer - Temperature



East Dike - Section 60+490
VW Piezometer Locations

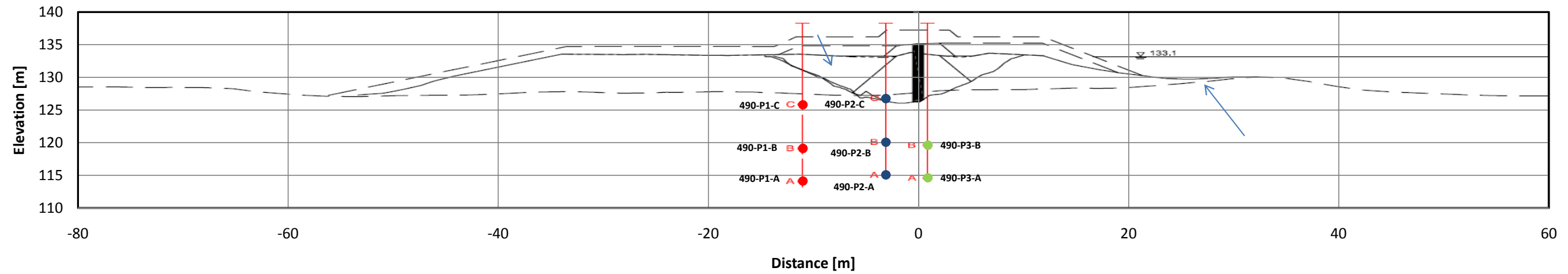


VW Piezometer - Total Head

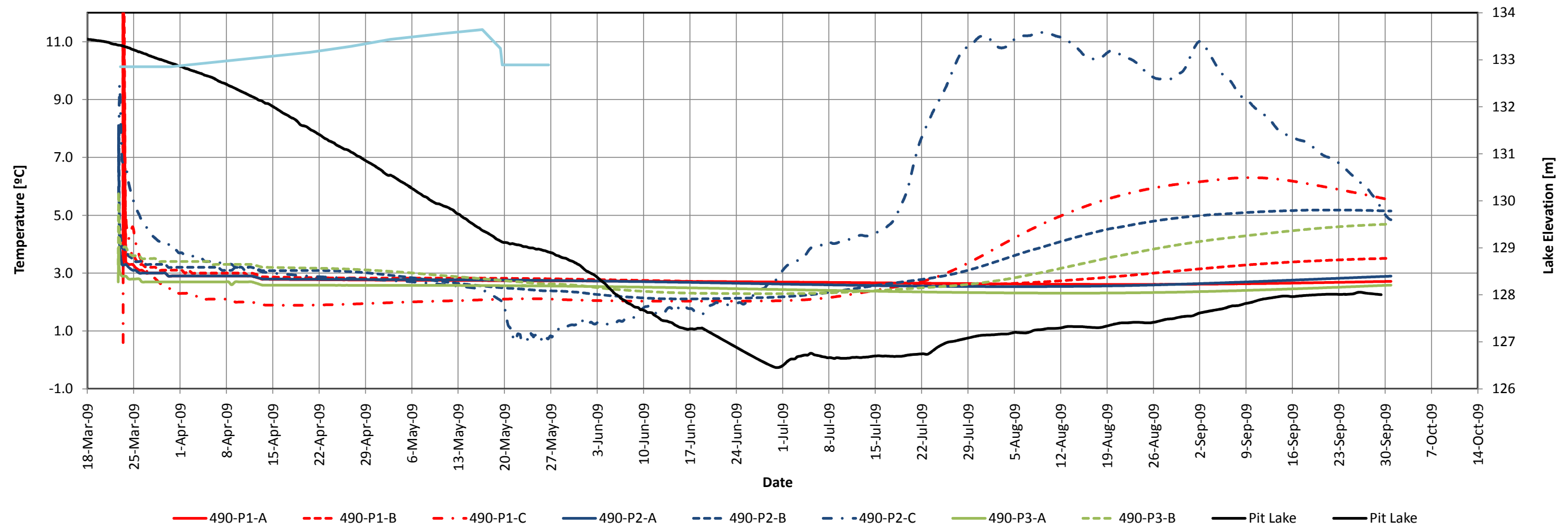


East Dike - Section 60+490

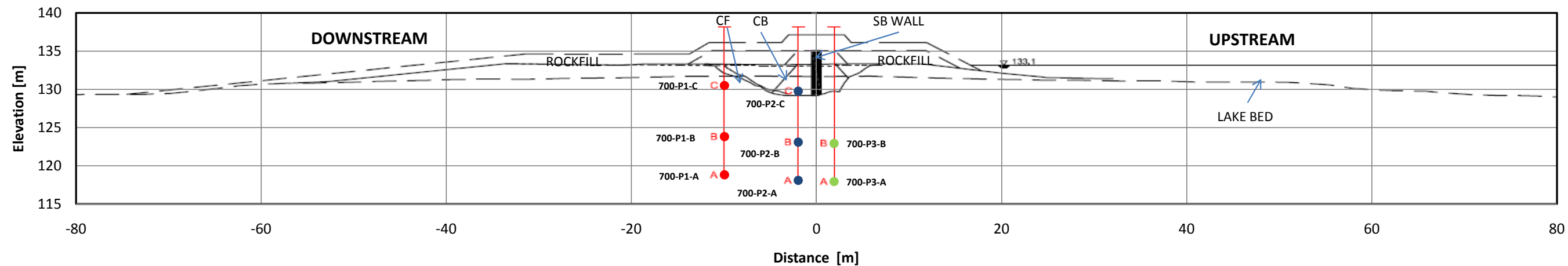
VW Piezometer Locations



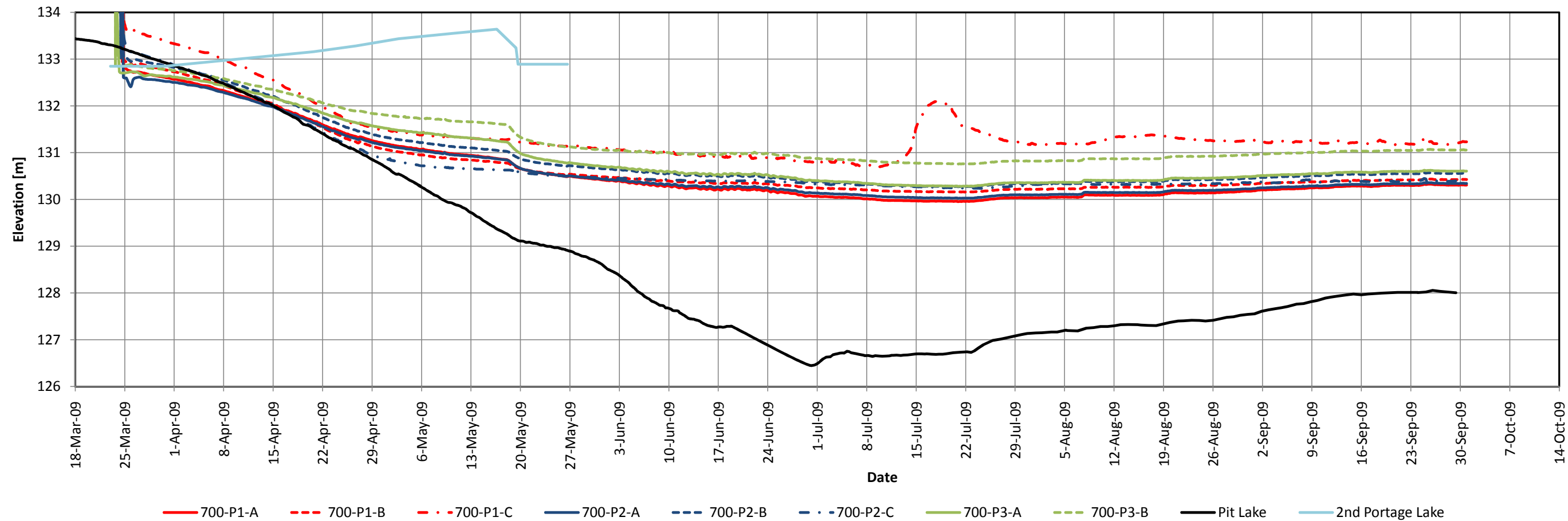
VW Piezometer - Temperature



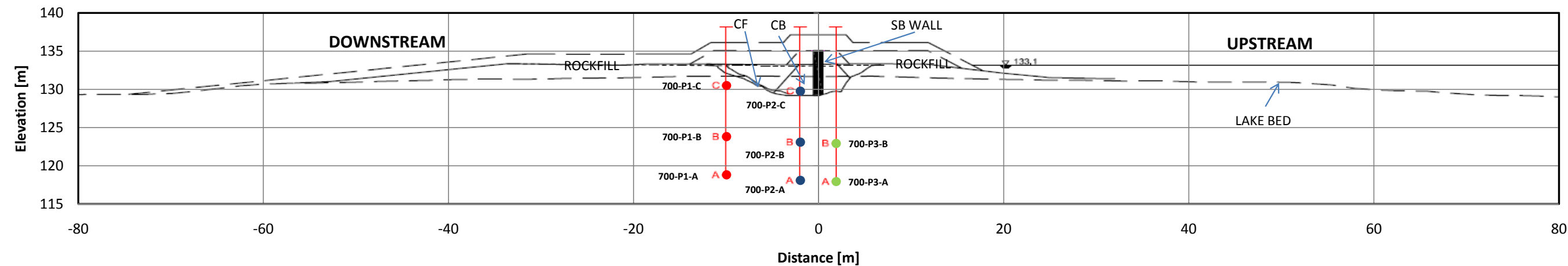
East Dike - Section 60+700
VW Piezometer Locations



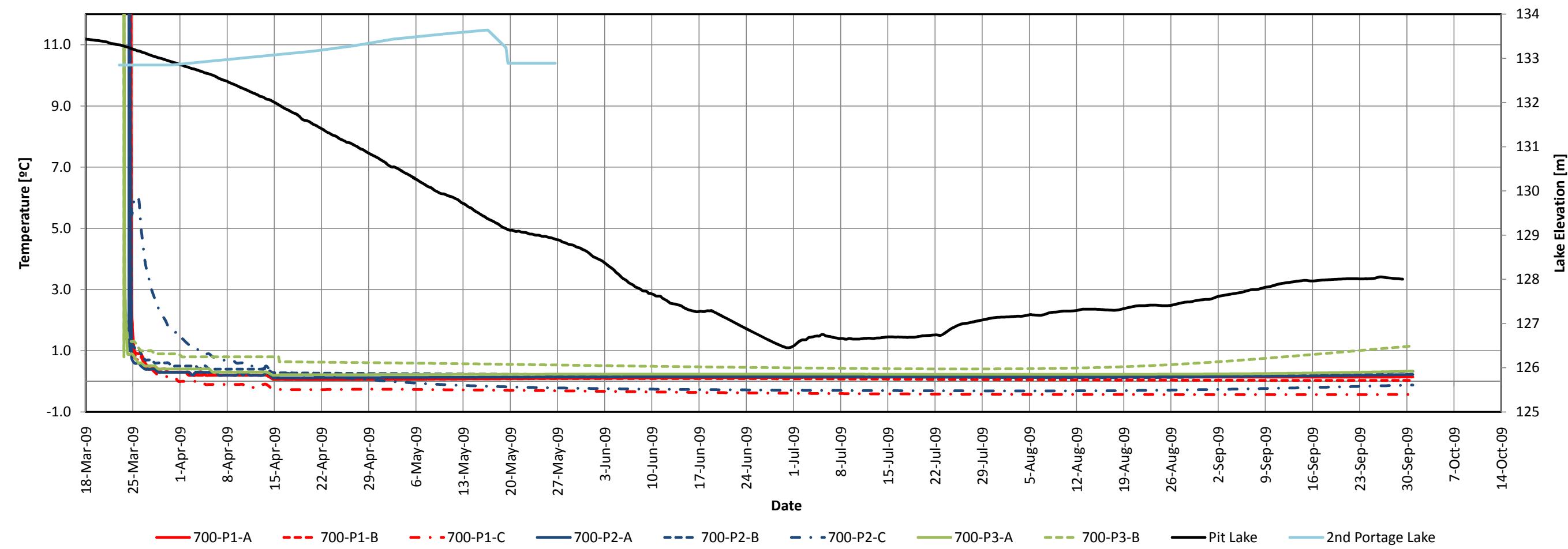
VW Piezometer - Total Head



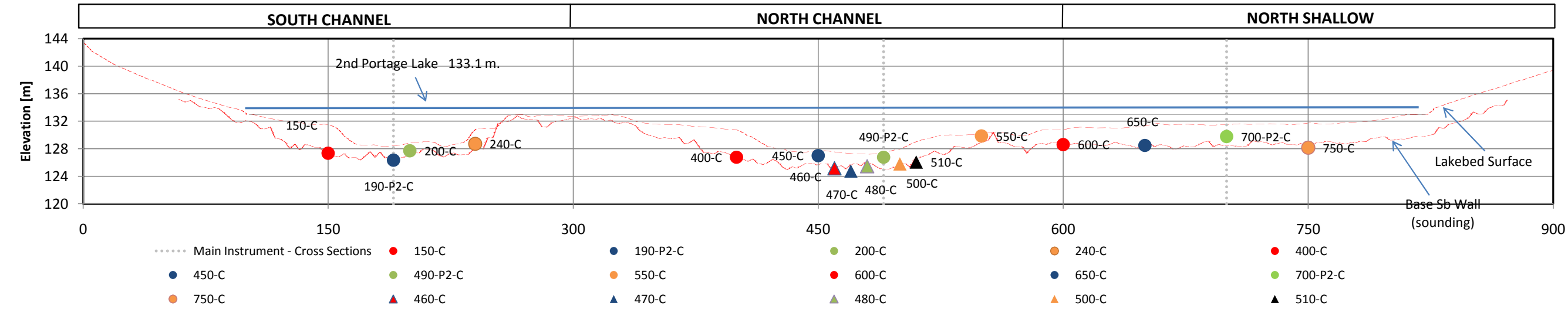
East Dike - Section 60+700
VW Piezometer Locations



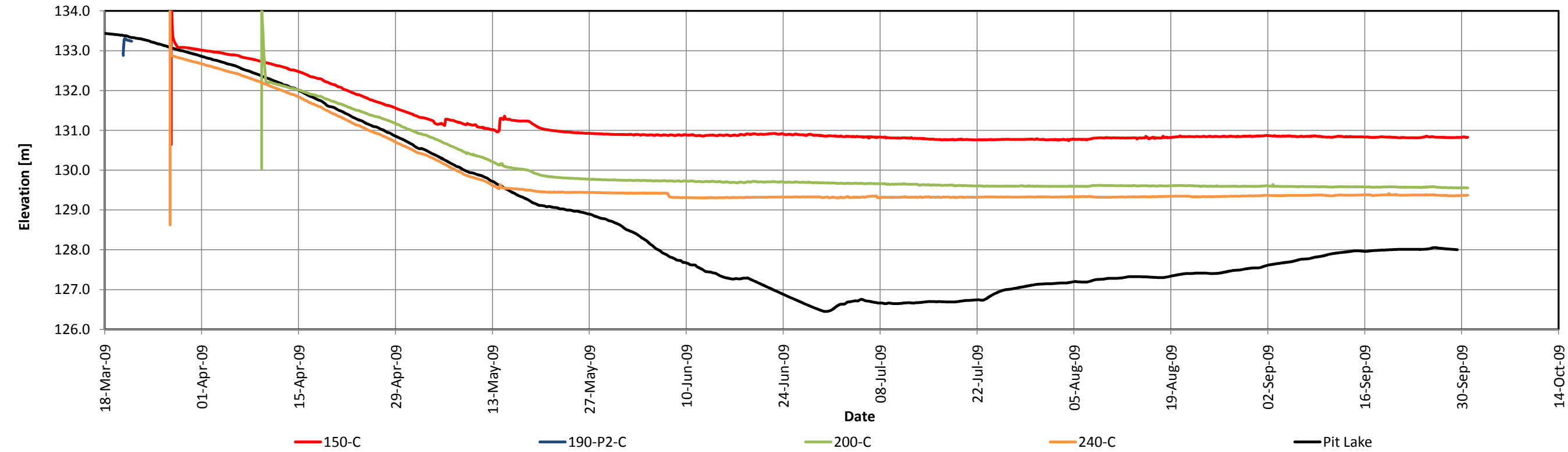
VW Piezometer - Temperature



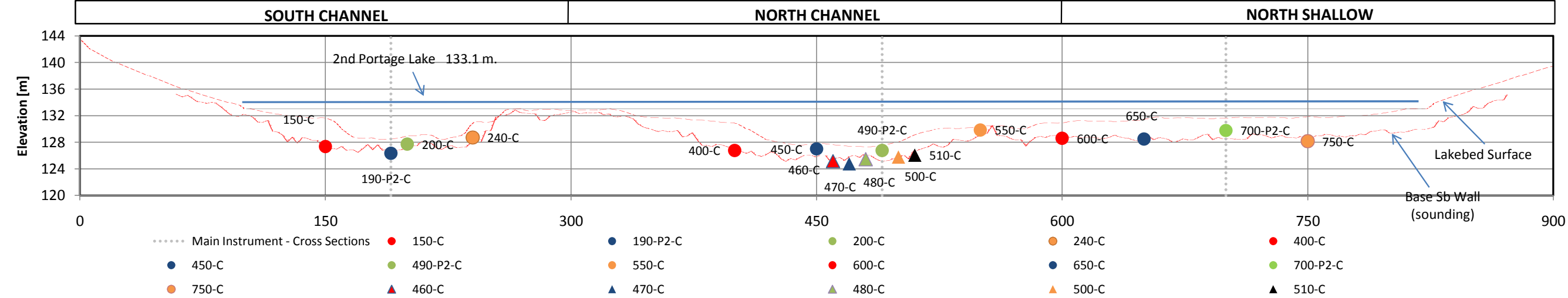
East Dike - Section Along Centerline
VW Piezometers - Total Head



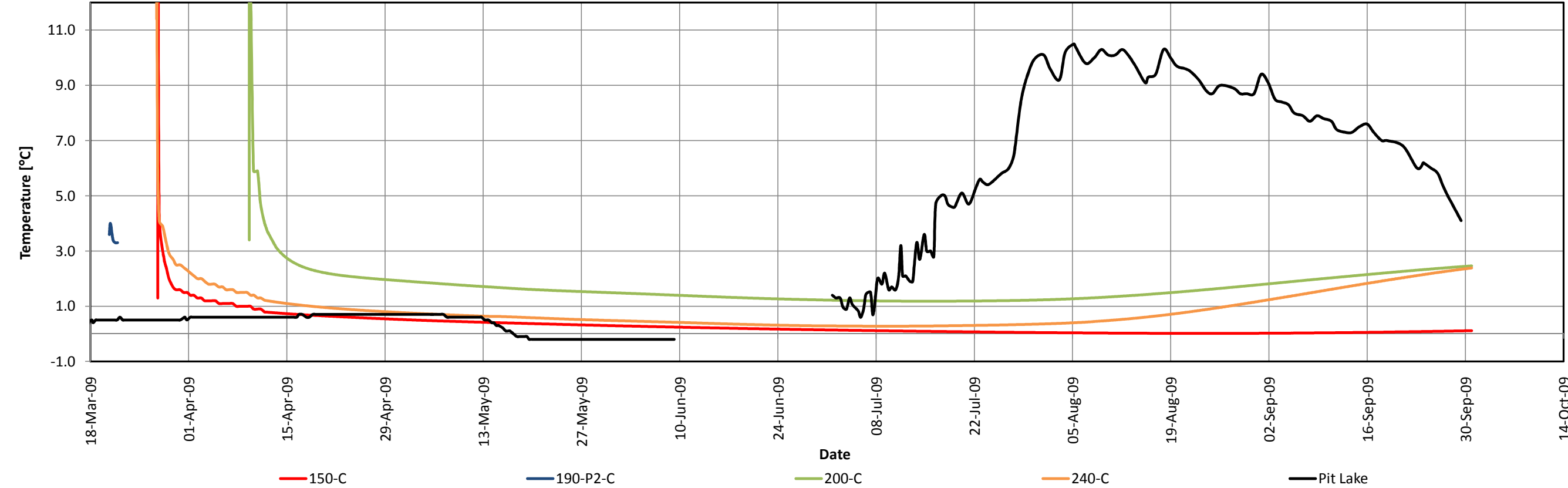
South Channel



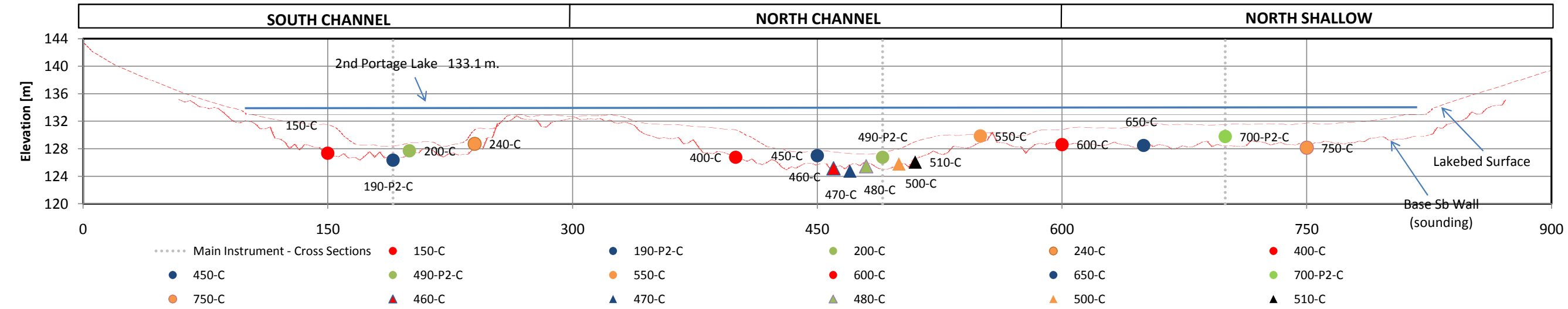
East Dike - Section Along Centerline
VW Piezometers - Temperature



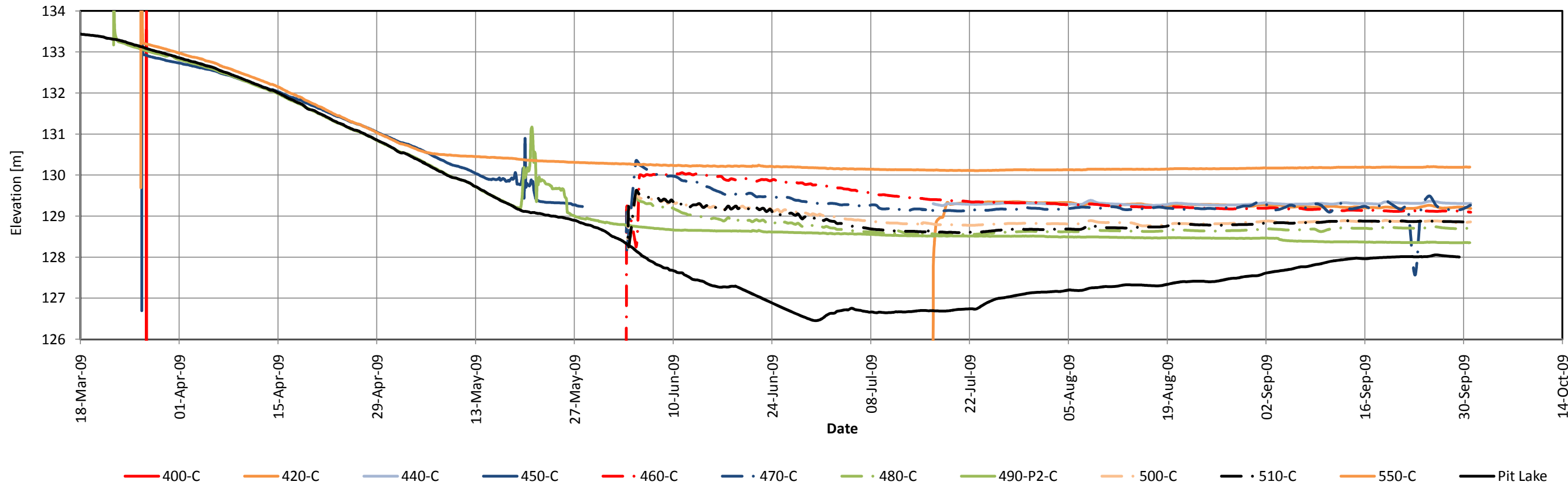
South Channel



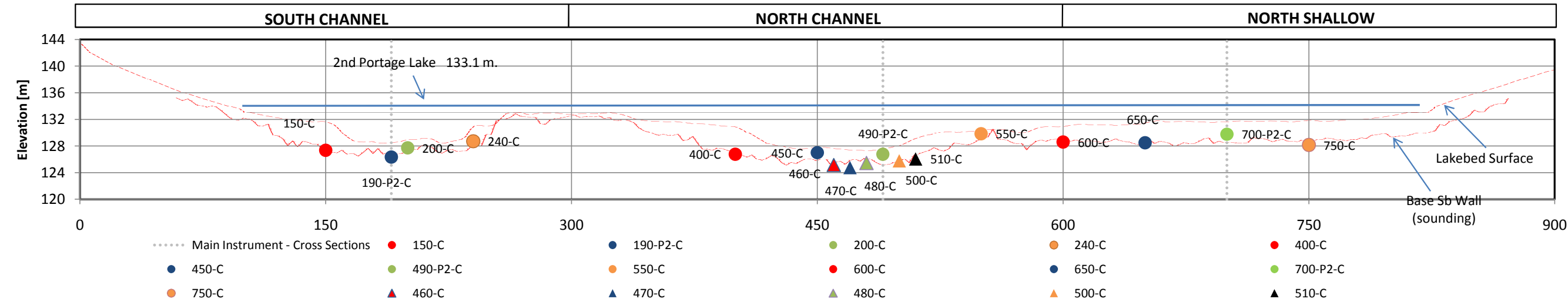
East Dike - Section Along Centerline
VW Piezometers - Total Head



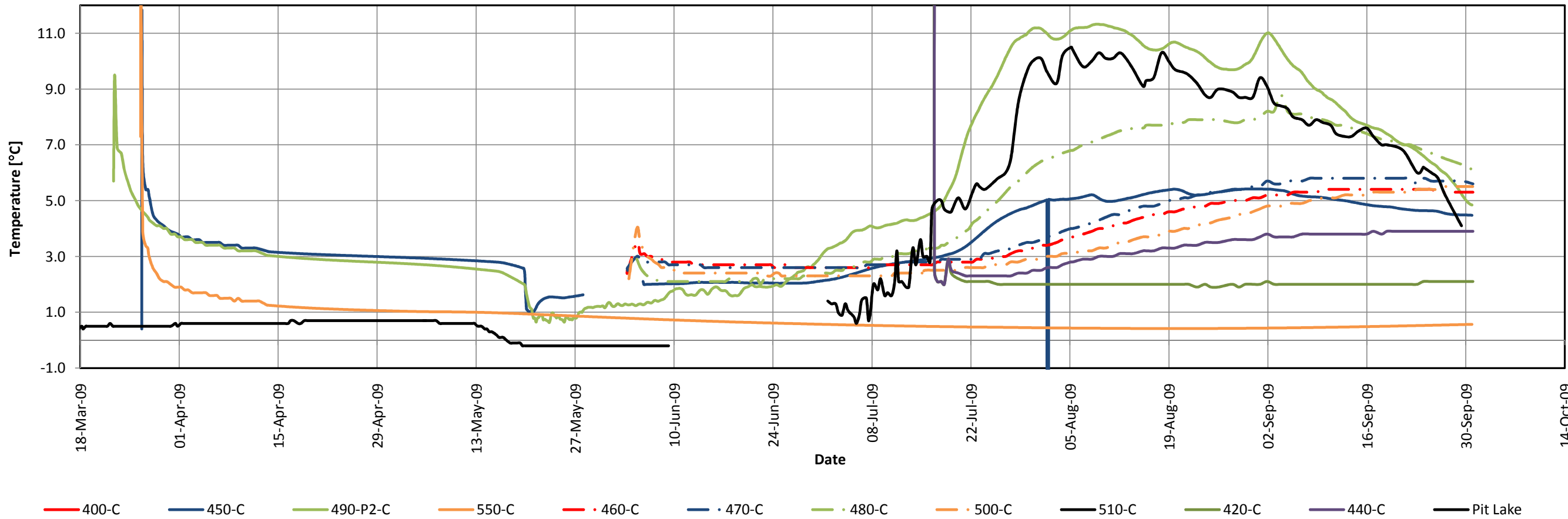
North Channel



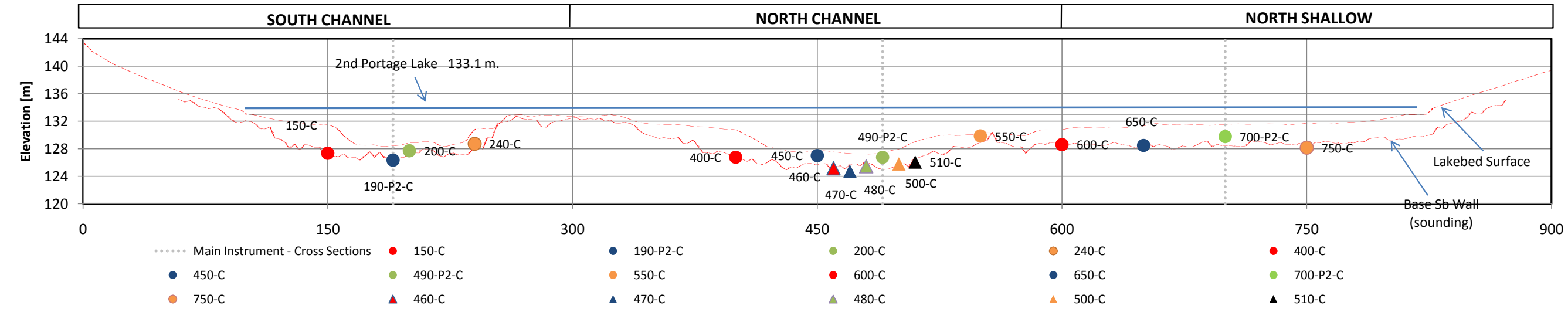
East Dike - Section Along Centerline
VW Piezometers - Temperature



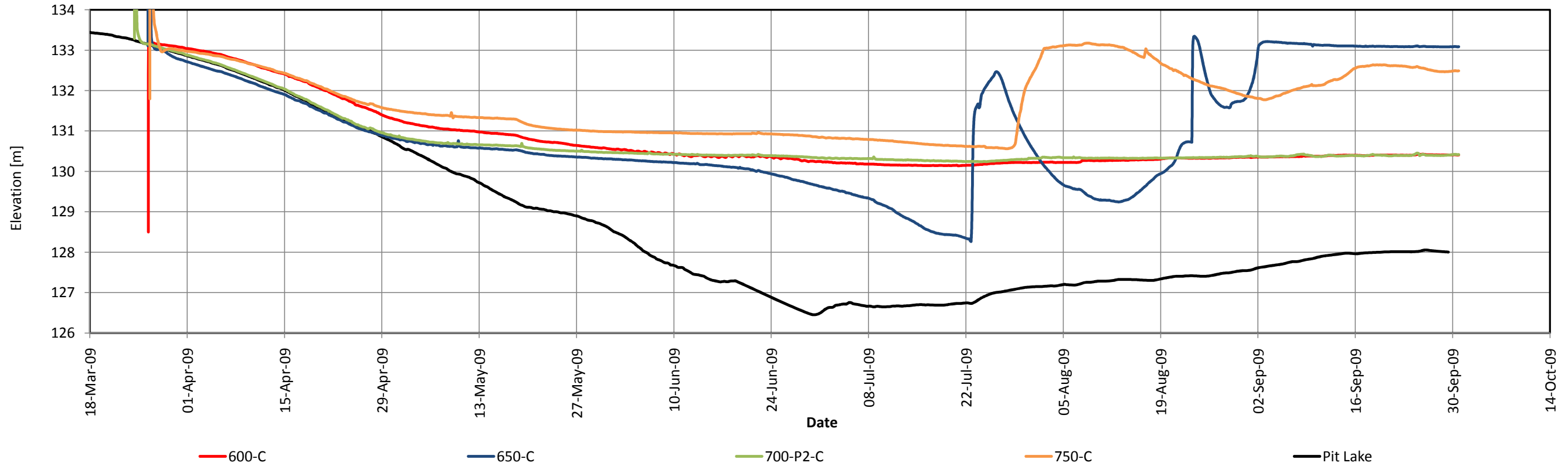
North Channel



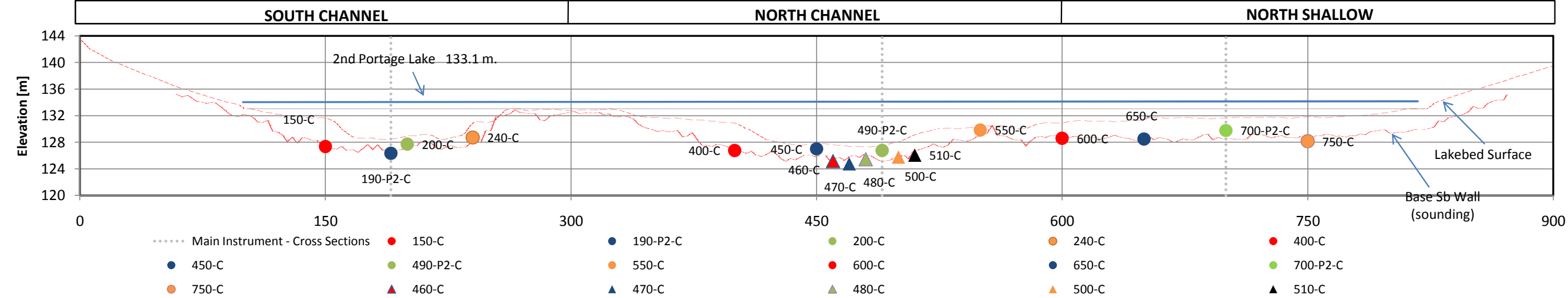
East Dike - Section Along Centerline
VW Piezometers - Total Head



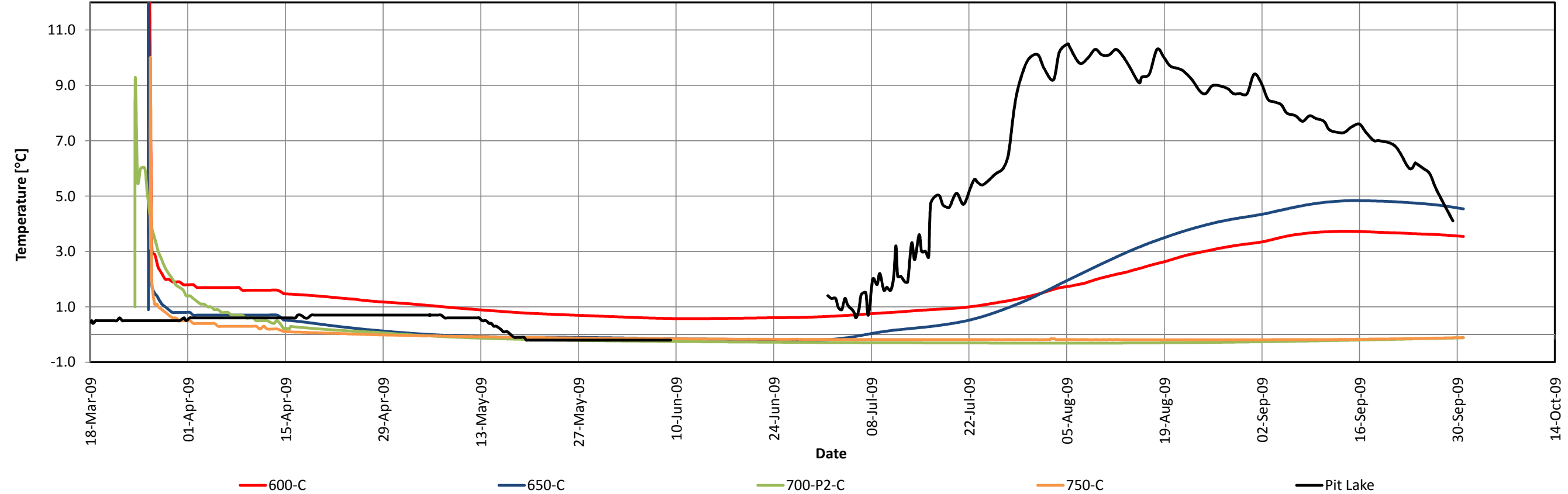
North Shallow



East Dike - Section Along Centerline
VW Piezometers - Temperature



North Shallow



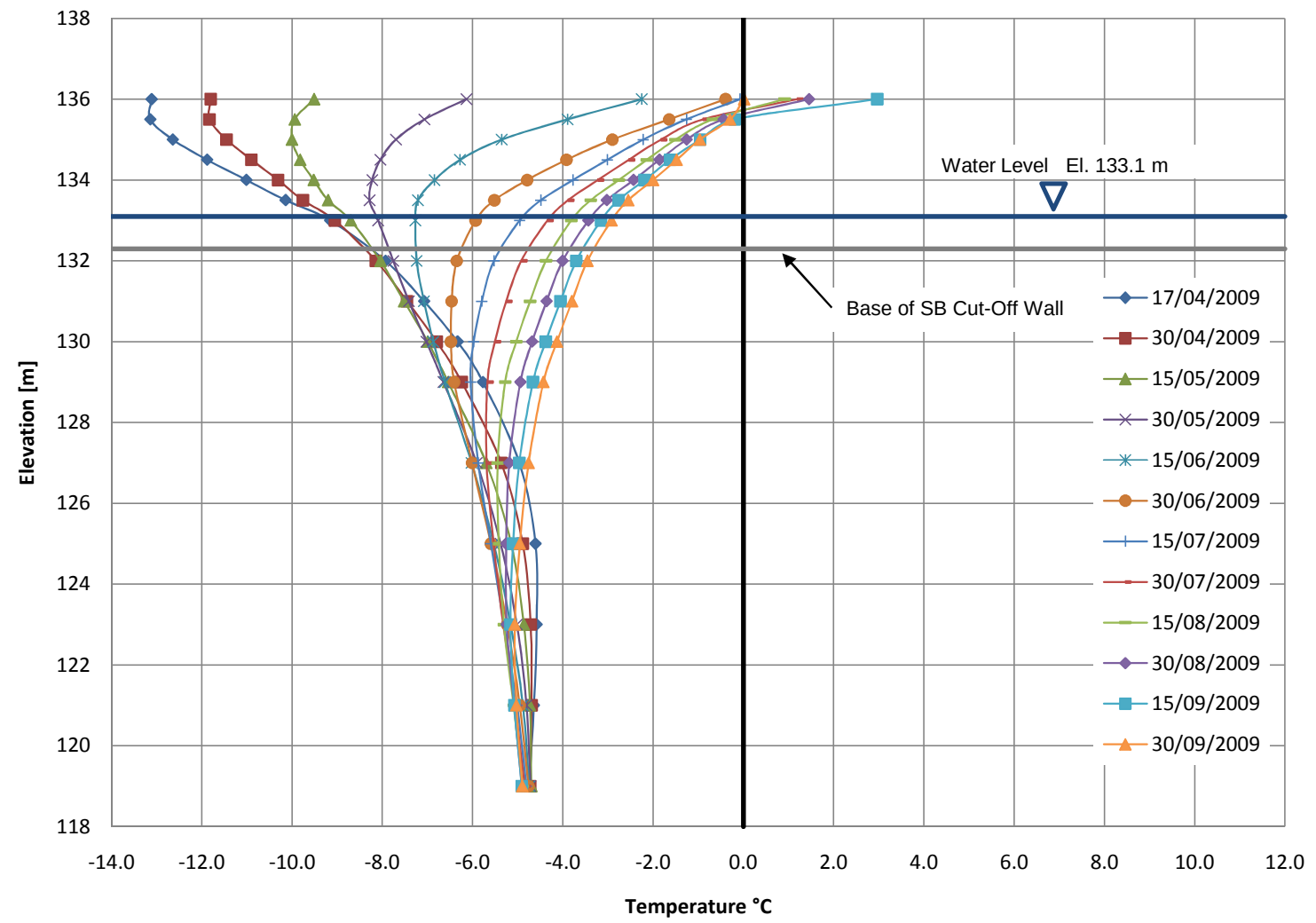


Appendix C2

East Dike and West Channel Dike: Thermistor Data

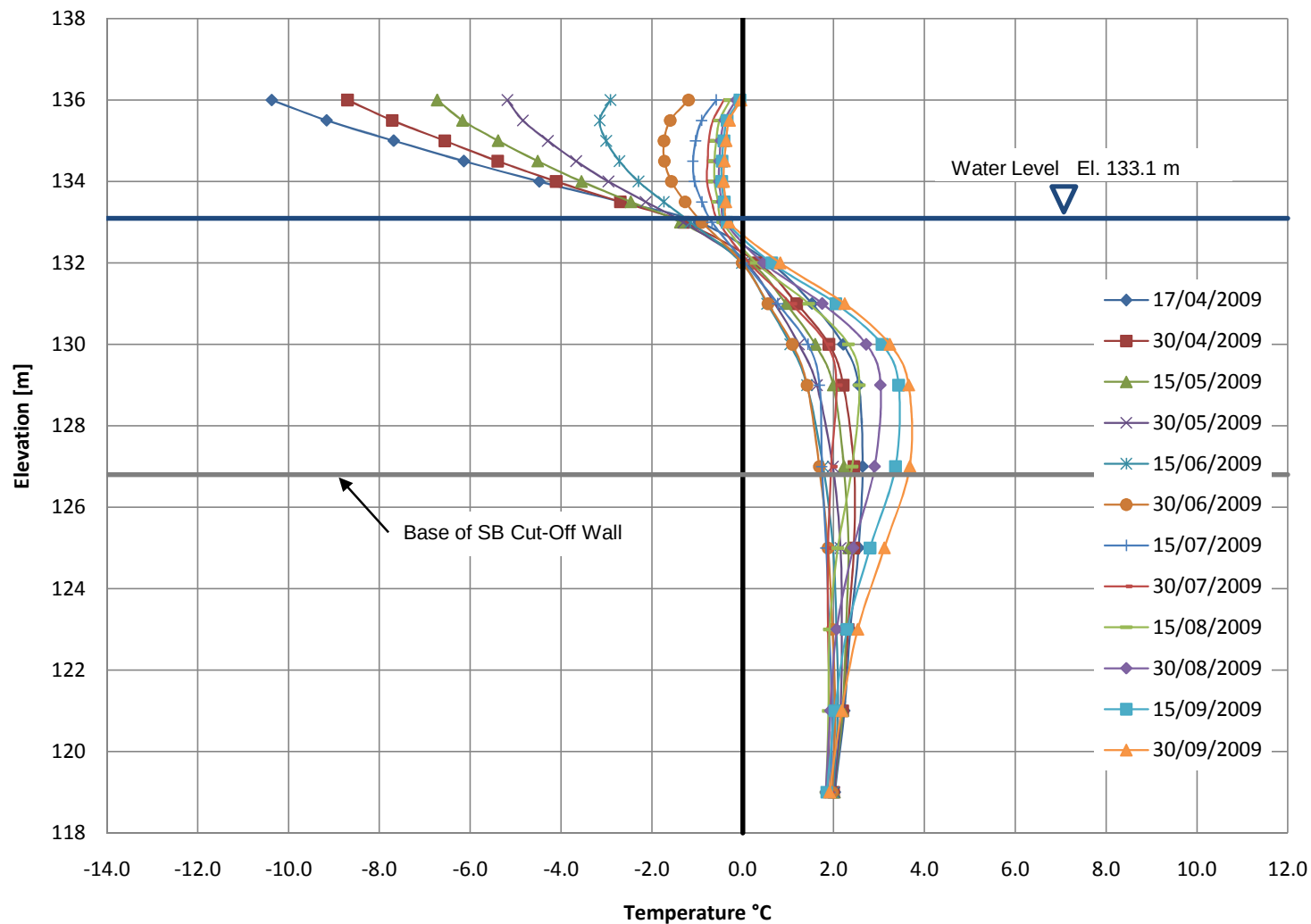
East Dike - TH92

Current Vertical Temperature



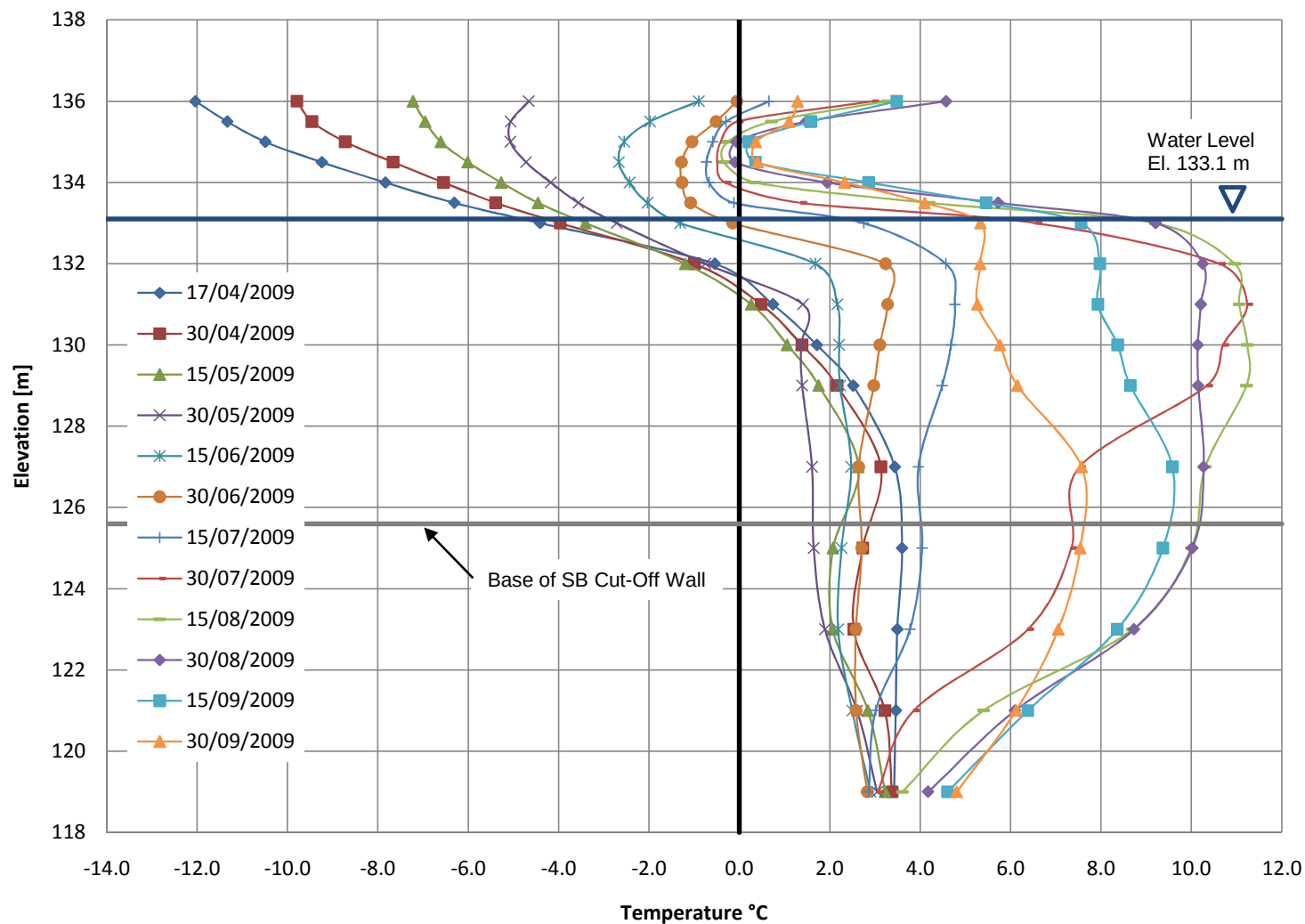
East Dike - TH185

Current Vertical Temperature



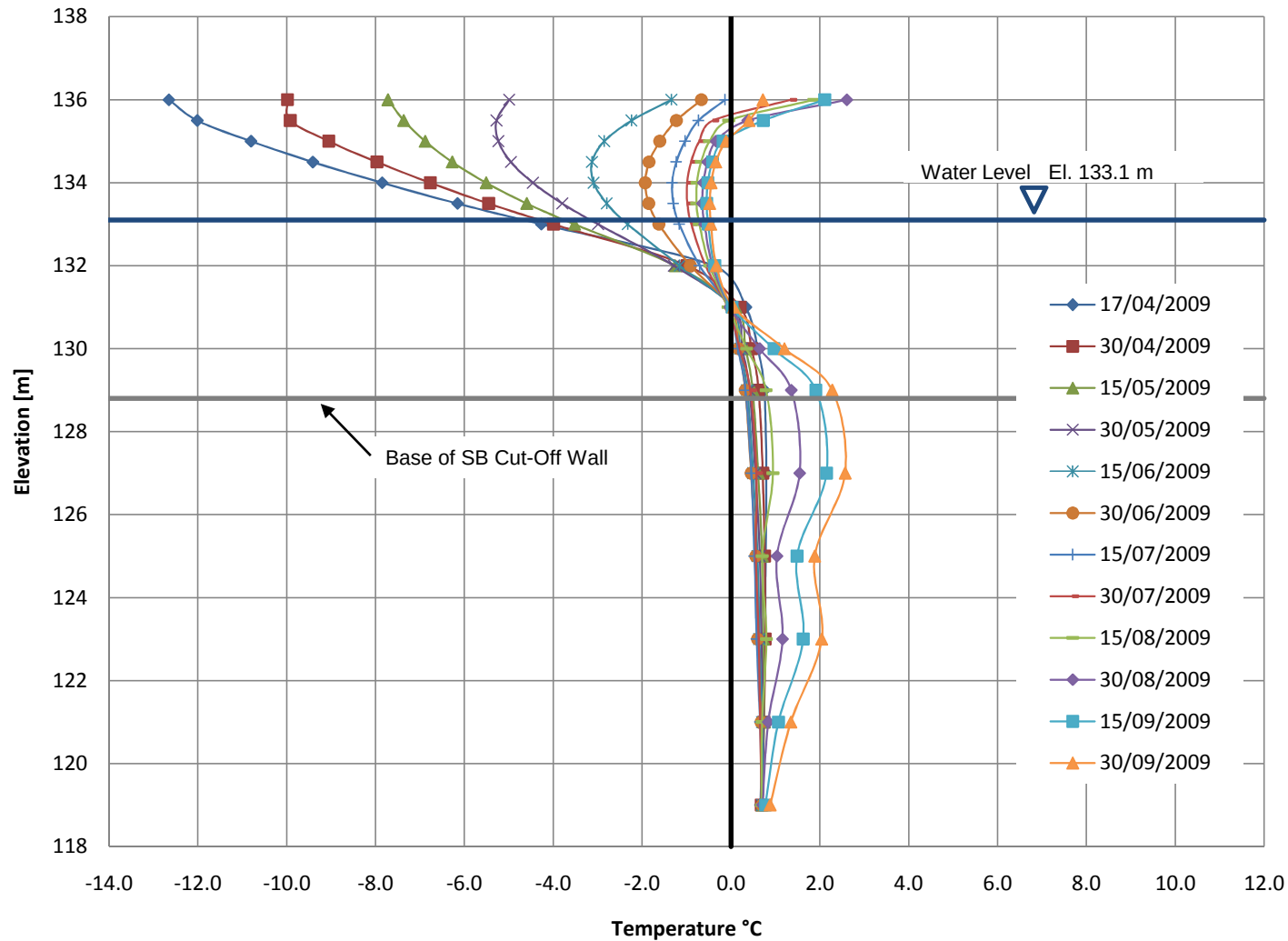
East Dike - TH485

Current Vertical Temperature



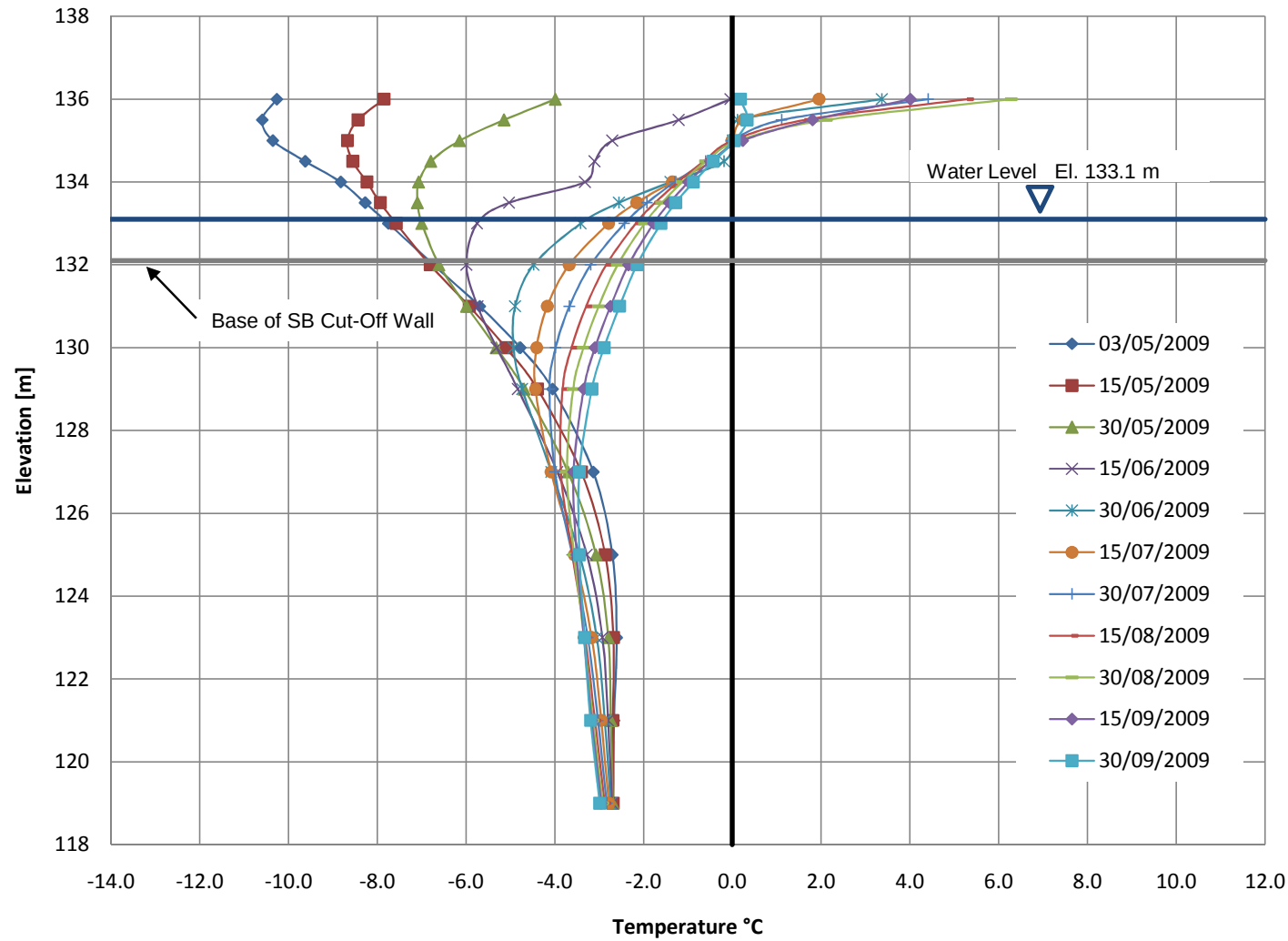
East Dike - TH695

Current Vertical Temperature



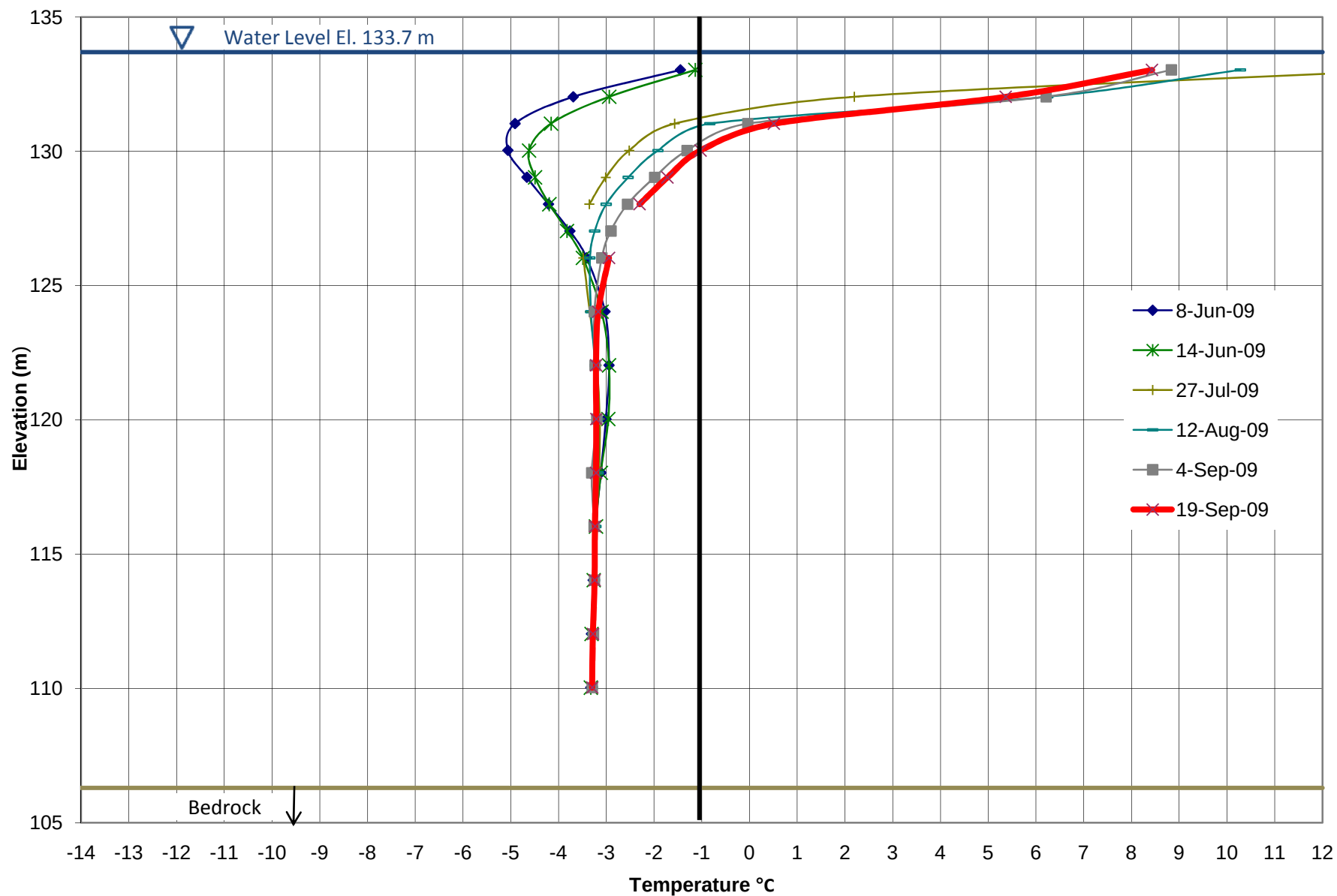
East Dike - TH842

Current Vertical Temperature

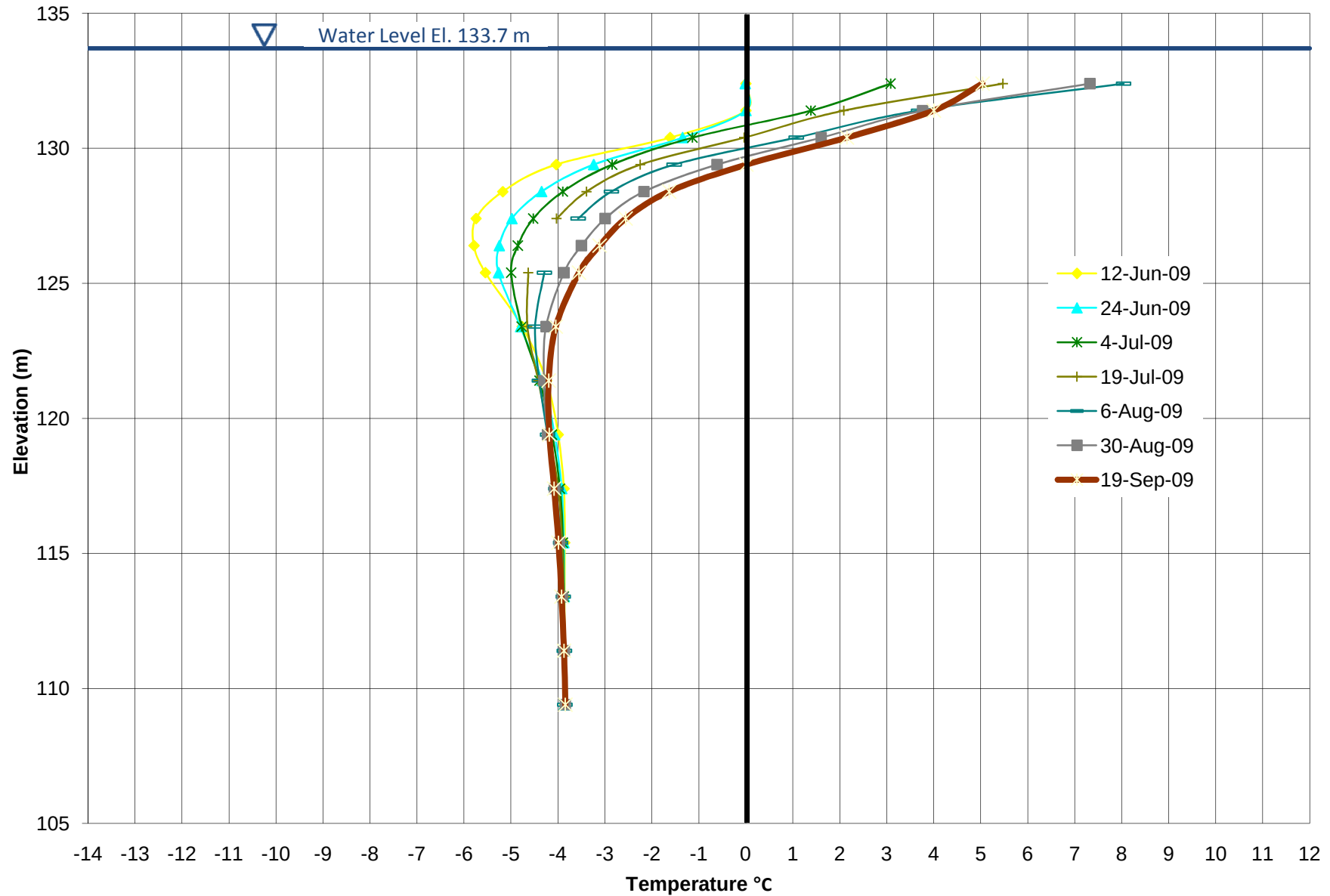


South Camp Dike - SD-09A

Current Vertical Temperature



South Camp Dike - SD-10 Current Vertical Temperature



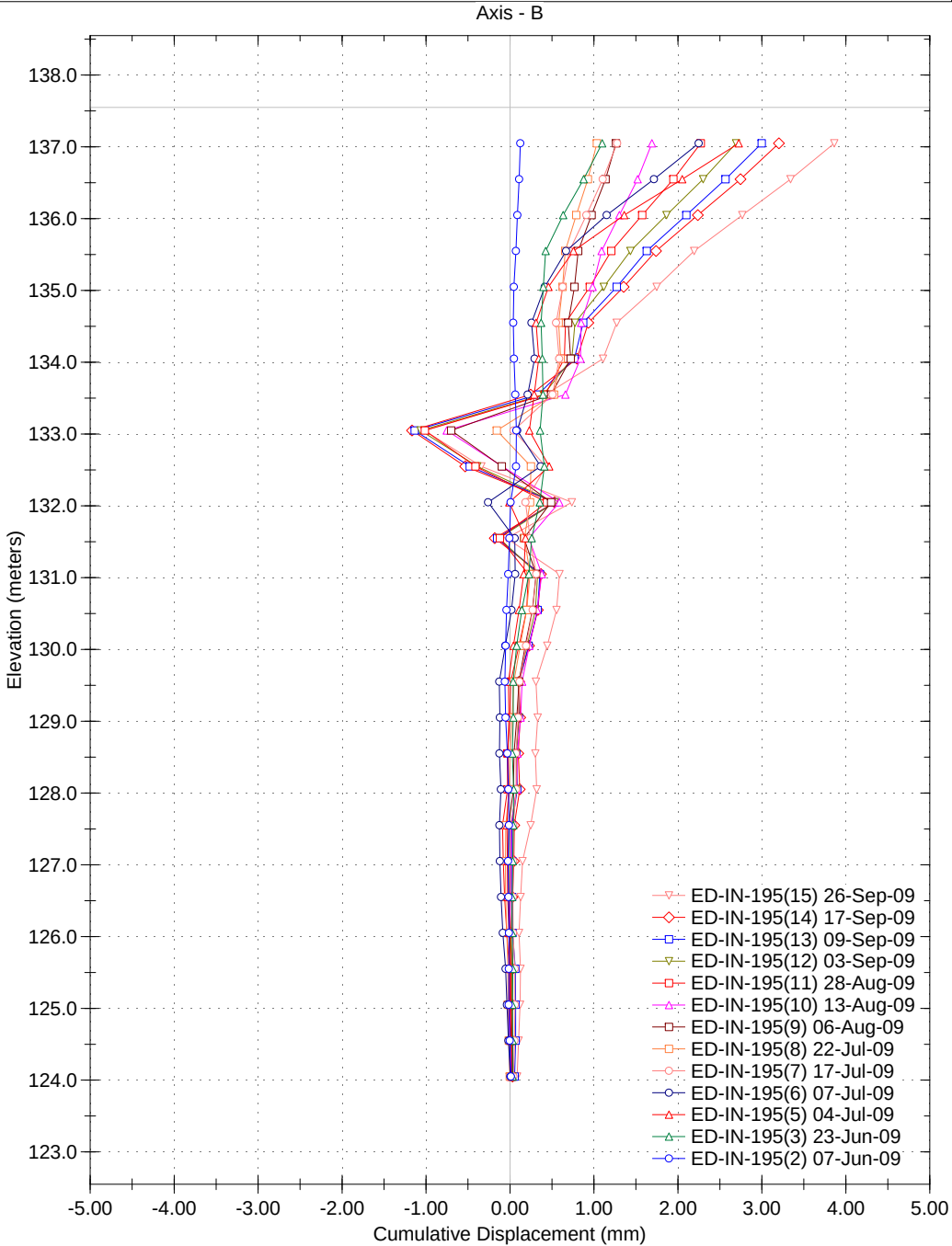
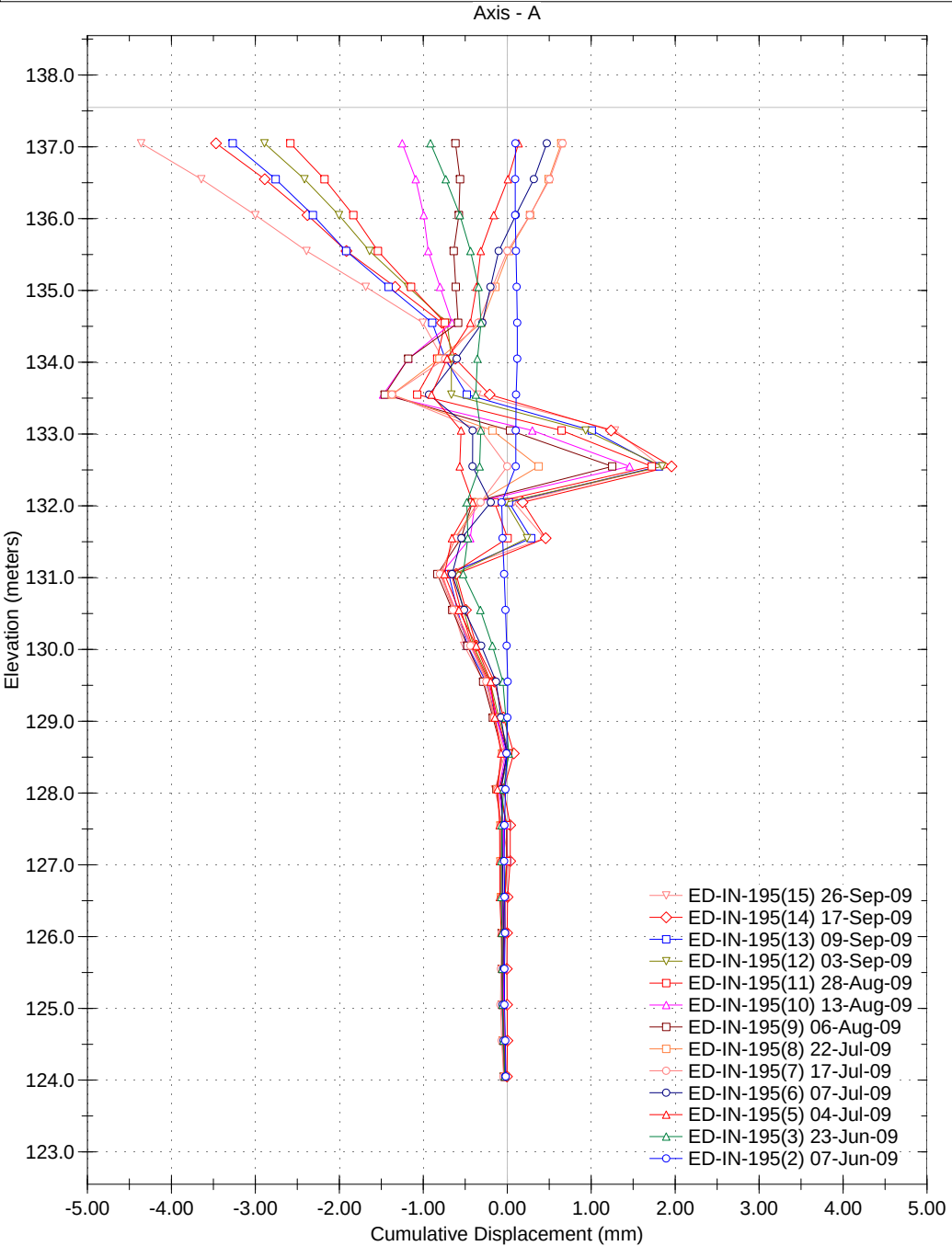


Appendix C3

East Dike: Inclinator Data

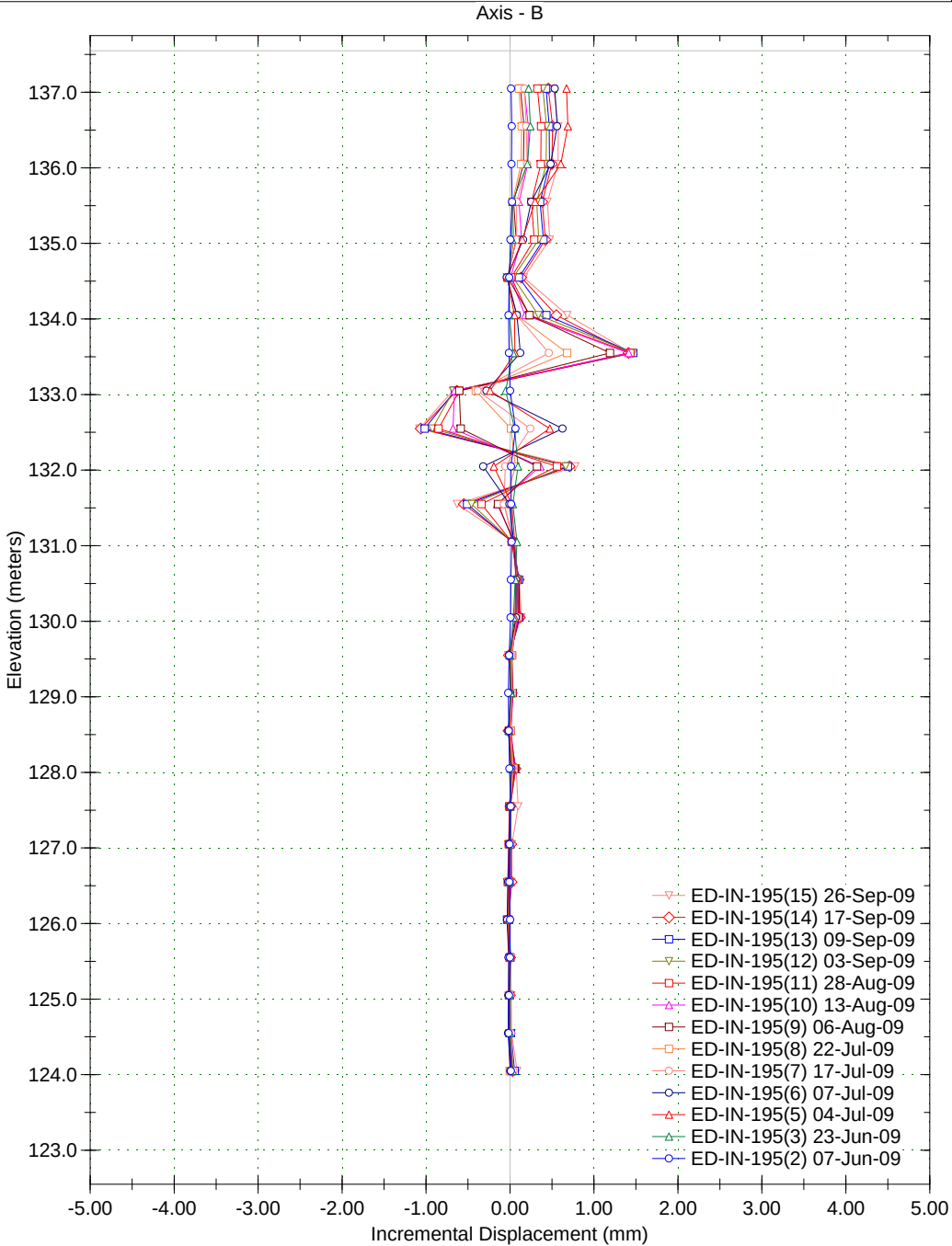
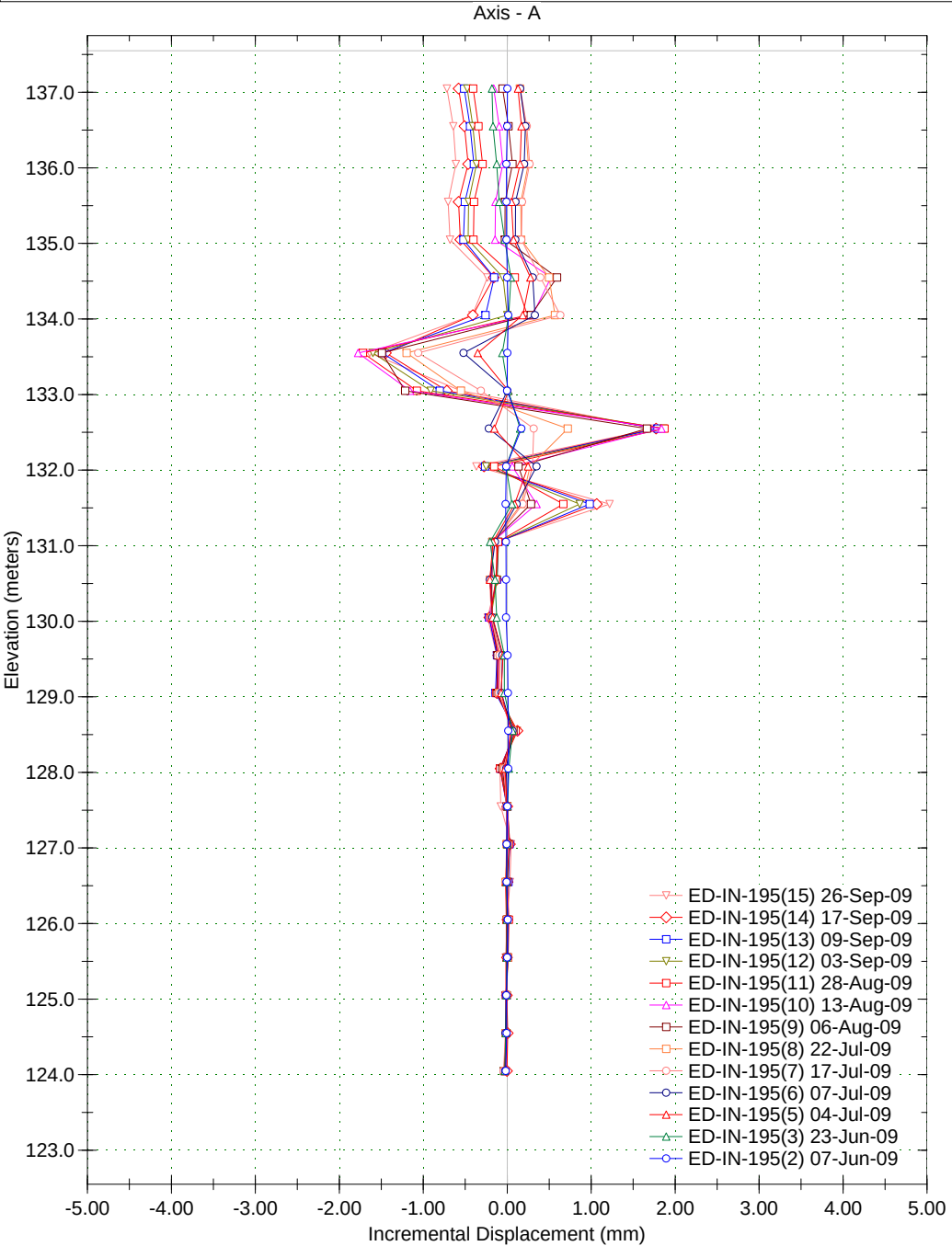
Borehole : ED-IN-195
Project : Meadowbank, Nunavut
Location : East Dike, ST. 60+194.69m O/S 0.05m
Northing : 7213857.341 mN
Easting : 639366.570 mE
Collar : 0.7m

Spiral Correction : N/A
Collar Elevation : 137.6 meters
Borehole Total Depth : 13.5 meters
North Groove Azimuth :
Base Reading : 2009 Jun 07 12:11
Axis A Azimuth : 0.0 degrees



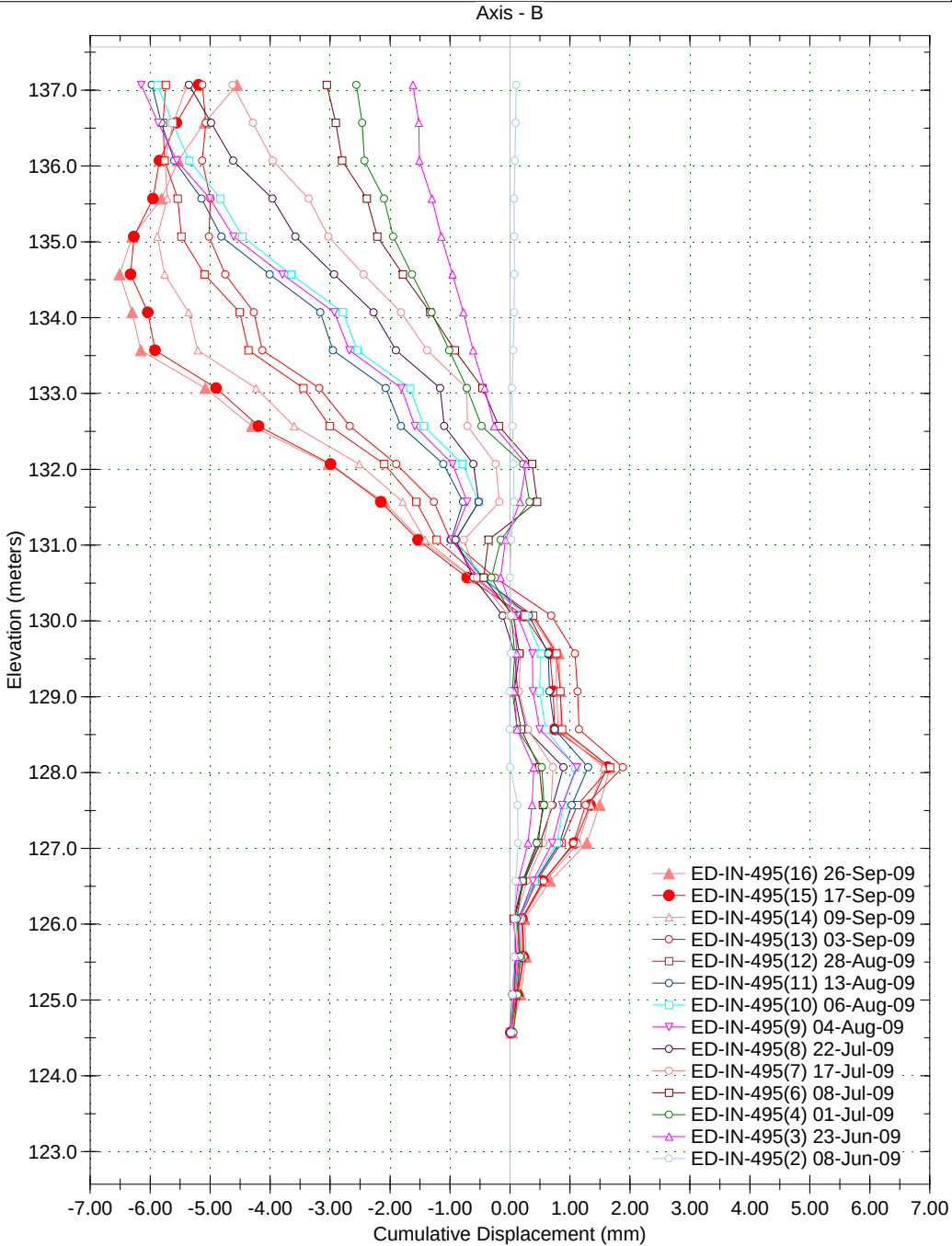
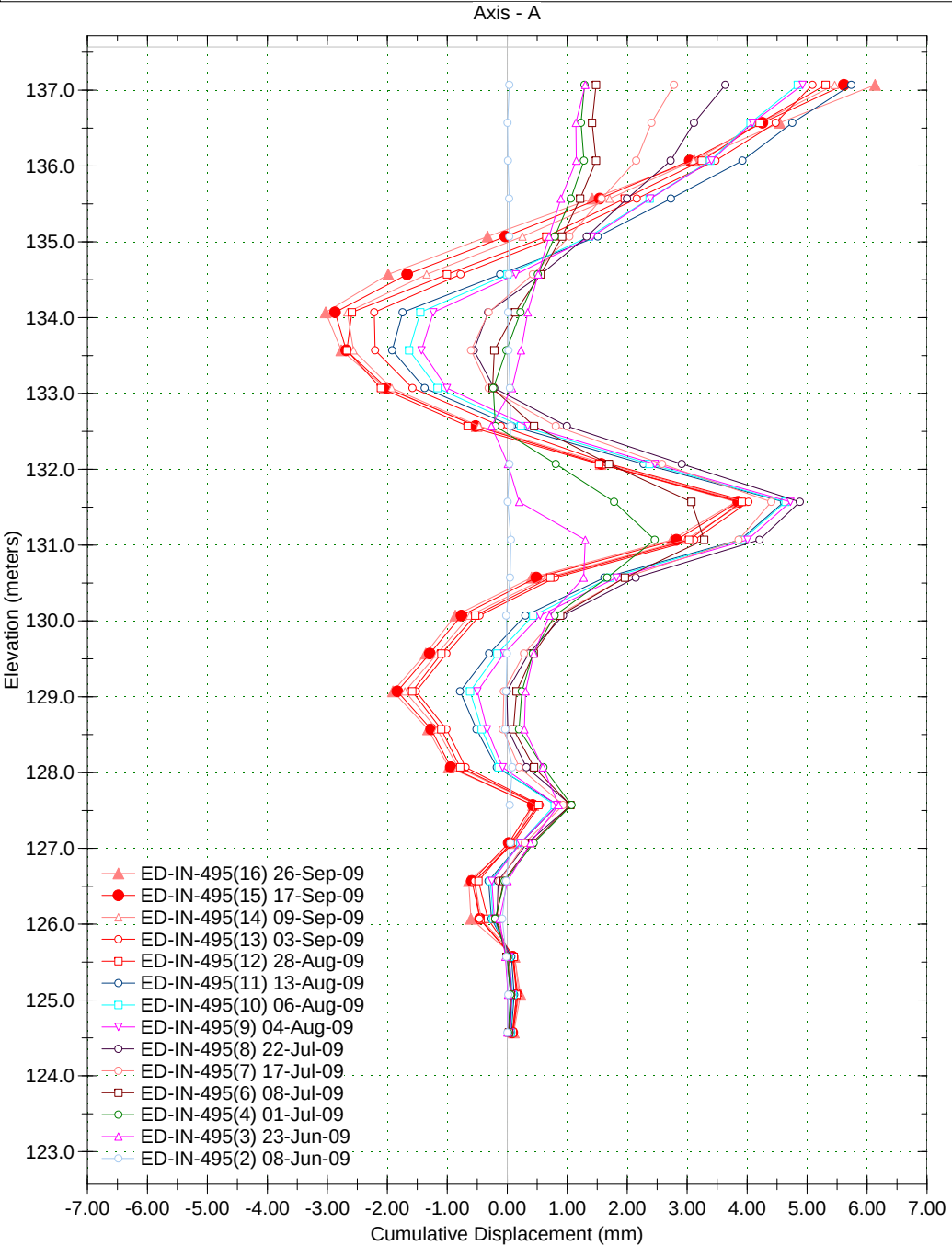
Borehole : ED-IN-195
Project : Meadowbank, Nunavut
Location : East Dike, ST. 60+194.69m O/S 0.05m
Northing : 7213857.341 mN
Easting : 639366.570 mE
Collar : 0.7m

Spiral Correction : N/A
Collar Elevation : 137.6 meters
Borehole Total Depth : 13.5 meters
North Groove Azimuth :
Base Reading : 2009 Jun 07 12:11
Axis A Azimuth : 0.0 degrees



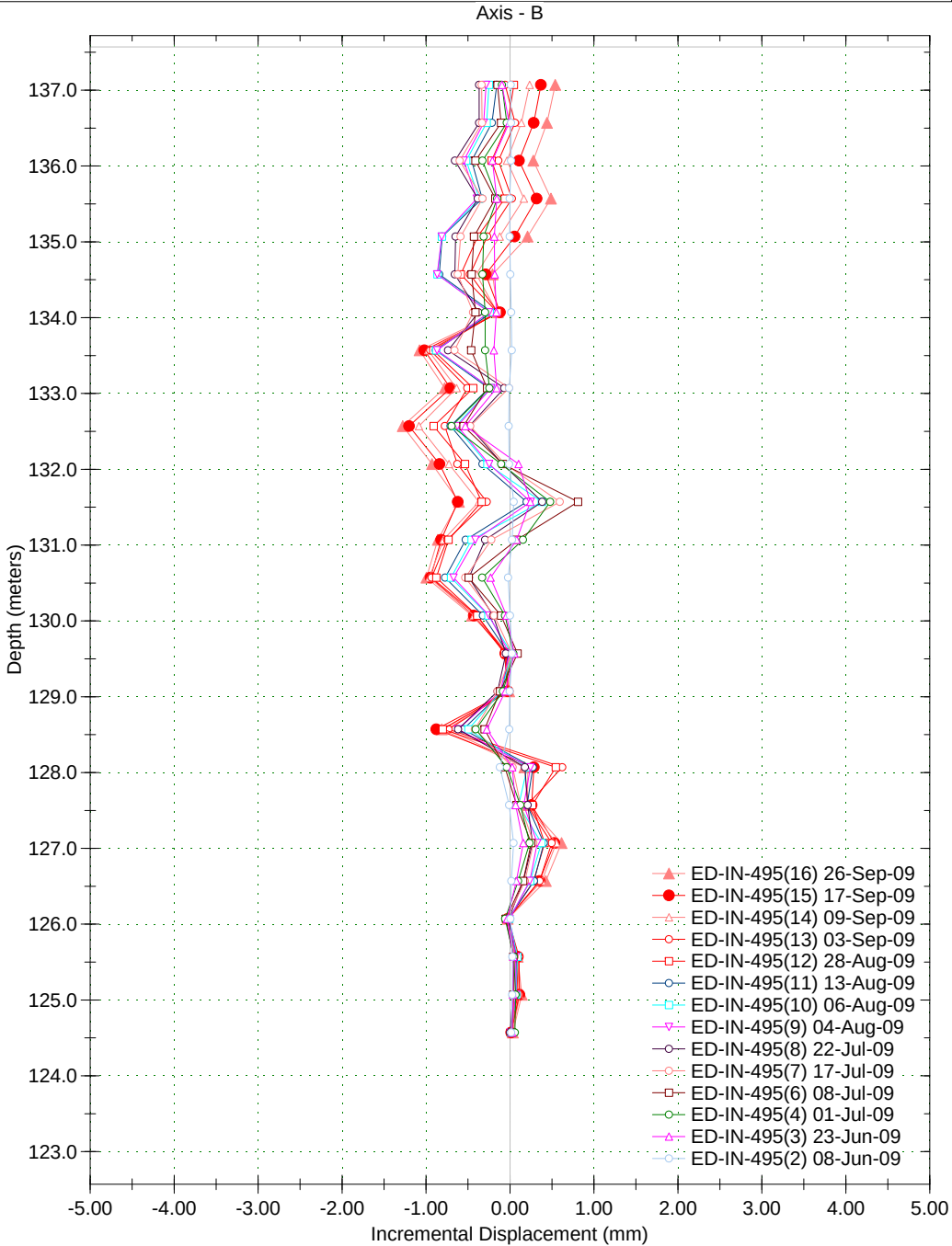
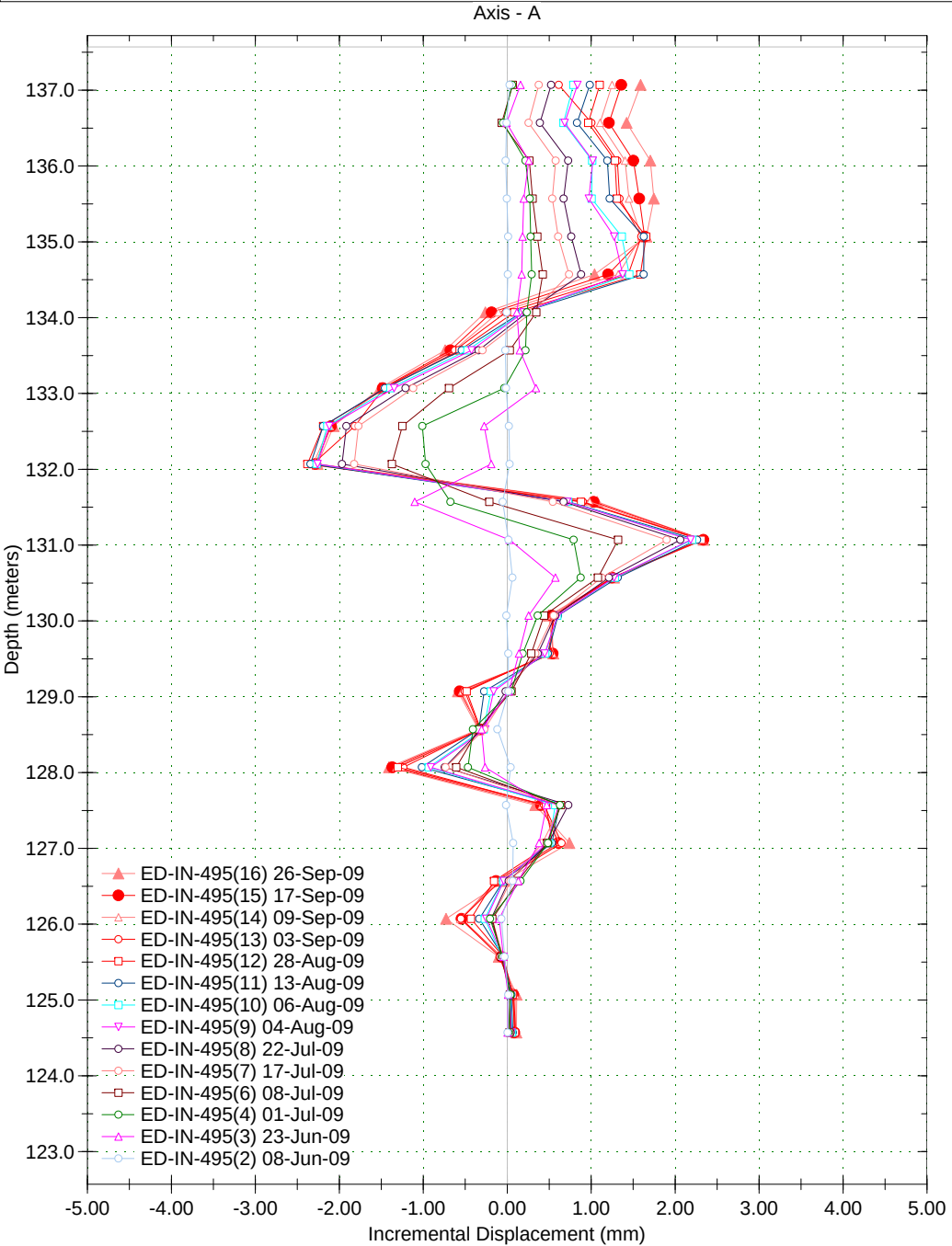
Borehole : ED-IN-495
Project : Meadowbank, Nunavut
Location : East Dike, ST. 60+704.83m O/S 0.09m
Northing : 7214359.571 mN
Easting : 639351.450 mE
Collar : 0.8m

Spiral Correction : N/A
Collar Elevation : 137.6 meters
Borehole Total Depth : 13.0 meters
North Groove Azimuth :
Base Reading : 2009 Jun 08 11:21
Axis A Azimuth : 0.0 degrees



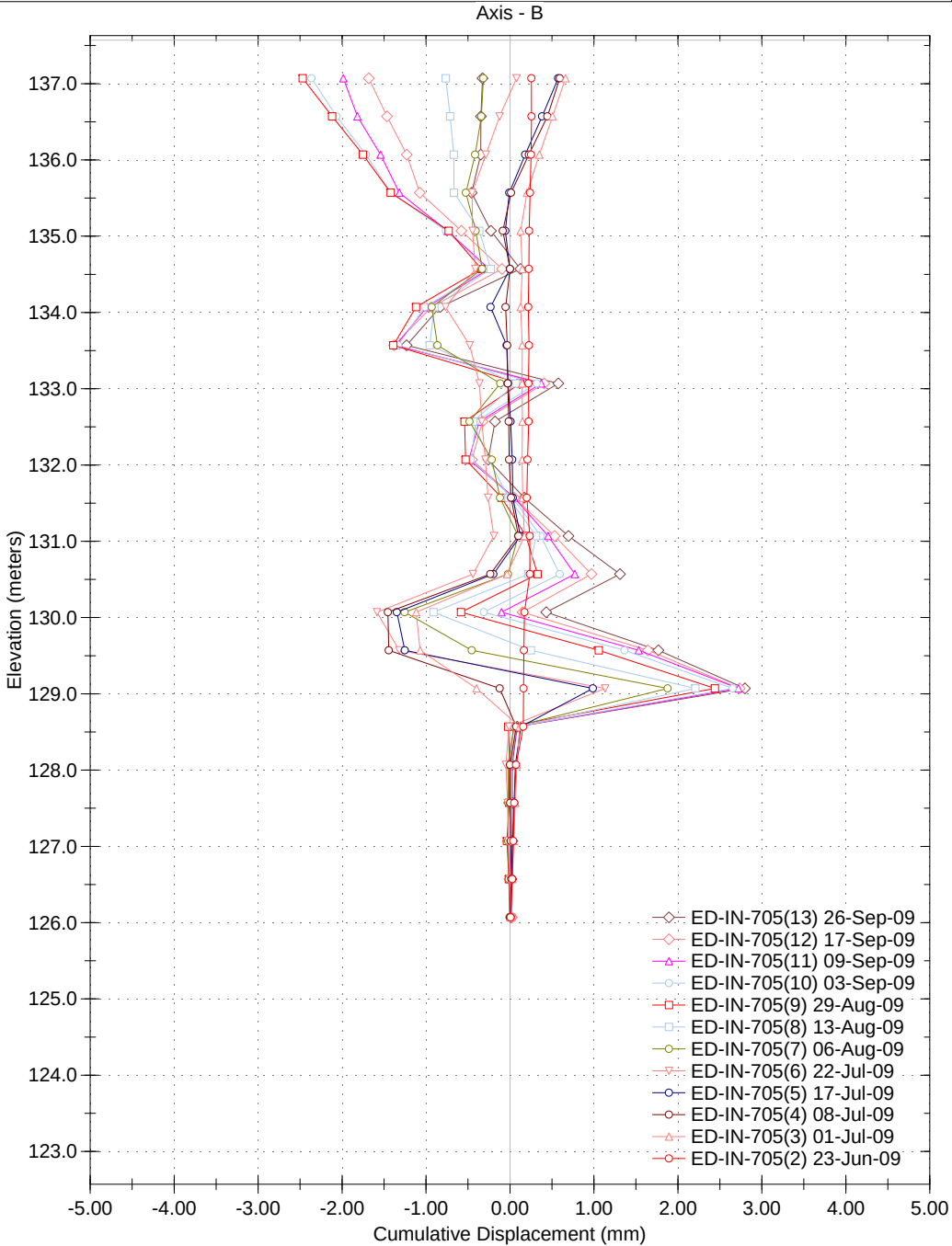
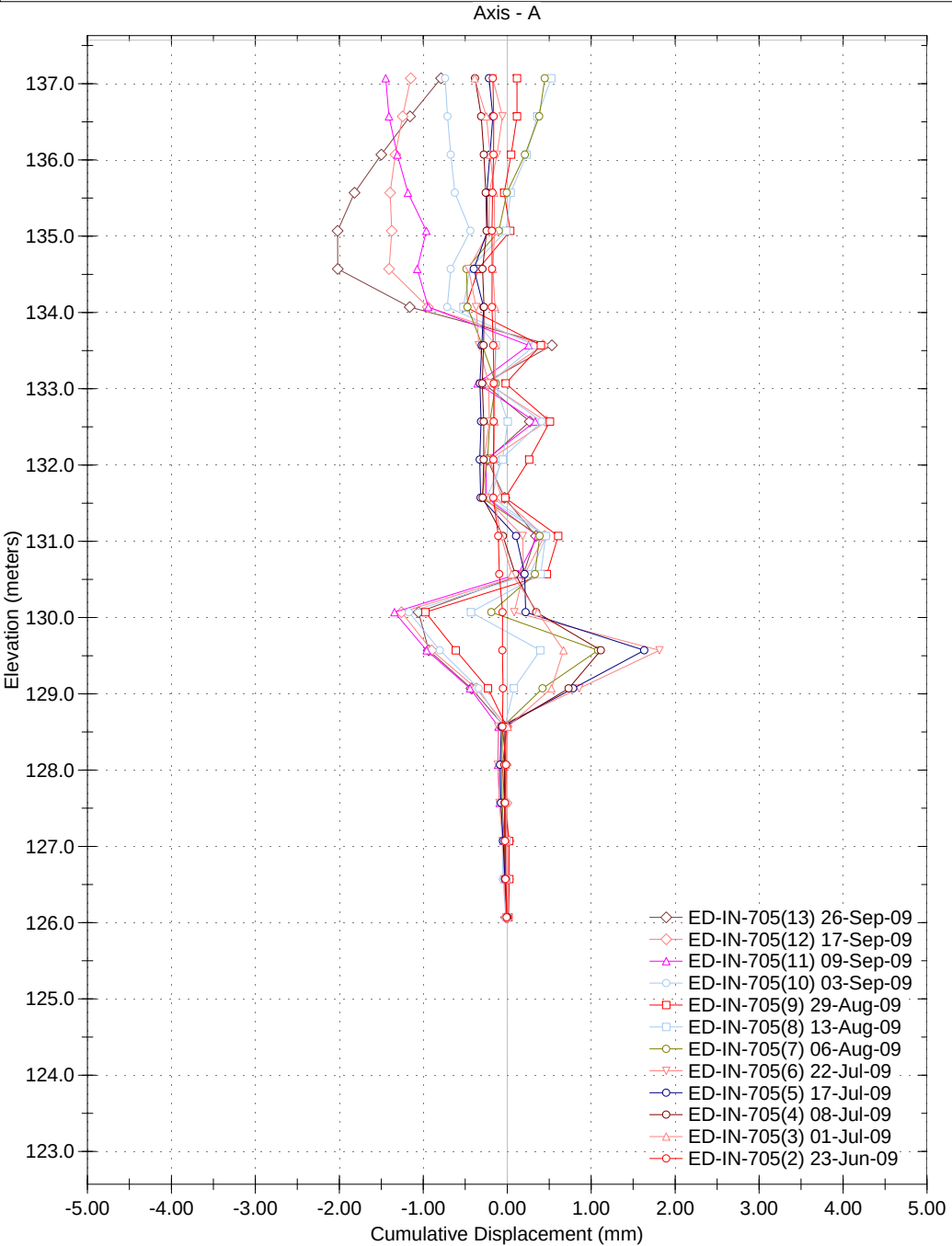
Borehole : ED-IN-495
Project : Meadowbank, Nunavut
Location : East Dike, ST. 60+704.83m O/S 0.09m
Northing : 7214359.571 mN
Easting : 639351.450 mE
Collar : 0.8m

Spiral Correction : N/A
Collar Elevation : 137.6 meters
Borehole Total Depth : 13.0 meters
North Groove Azimuth :
Base Reading : 2009 Jun 08 11:21
Axis A Azimuth : 0.0 degrees



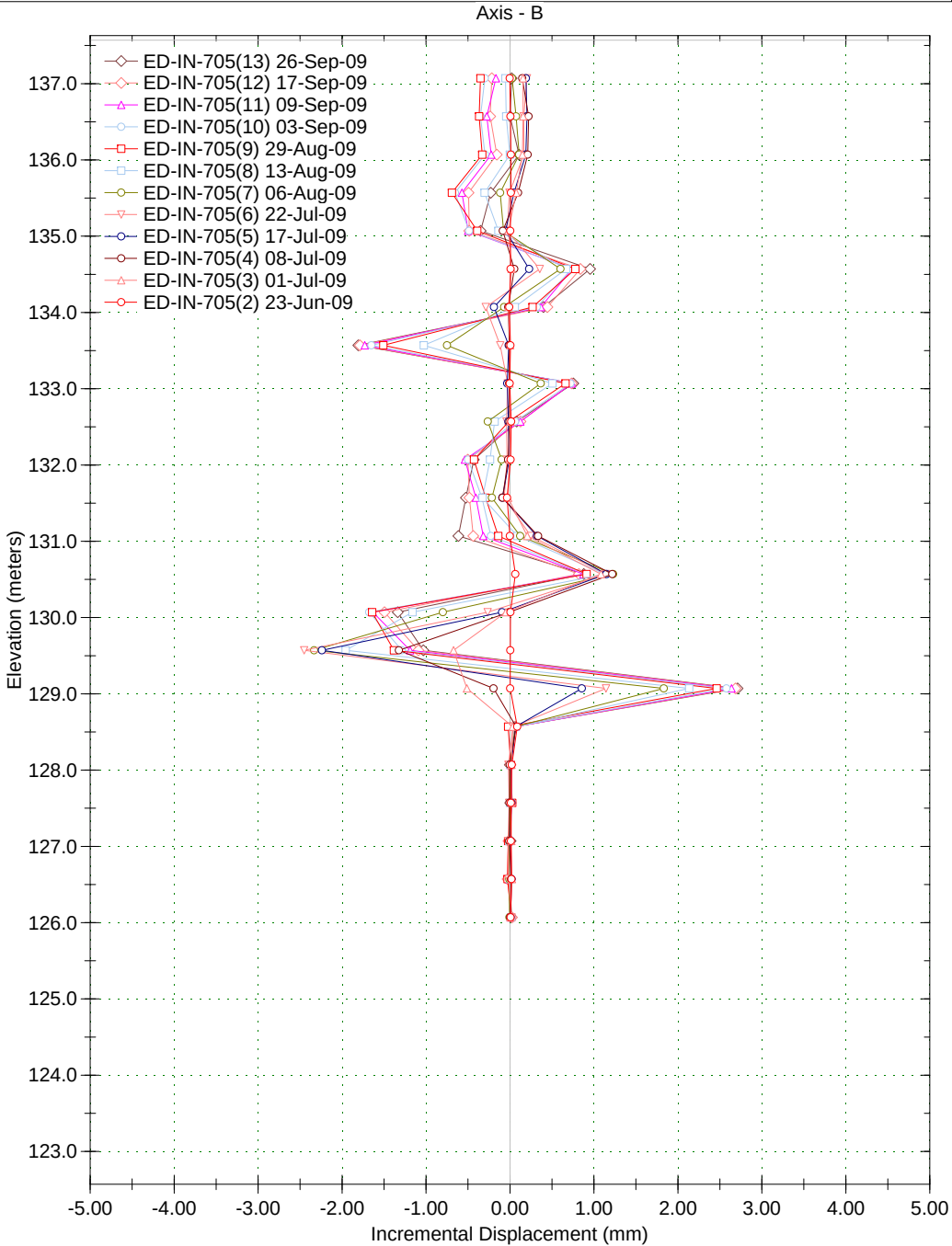
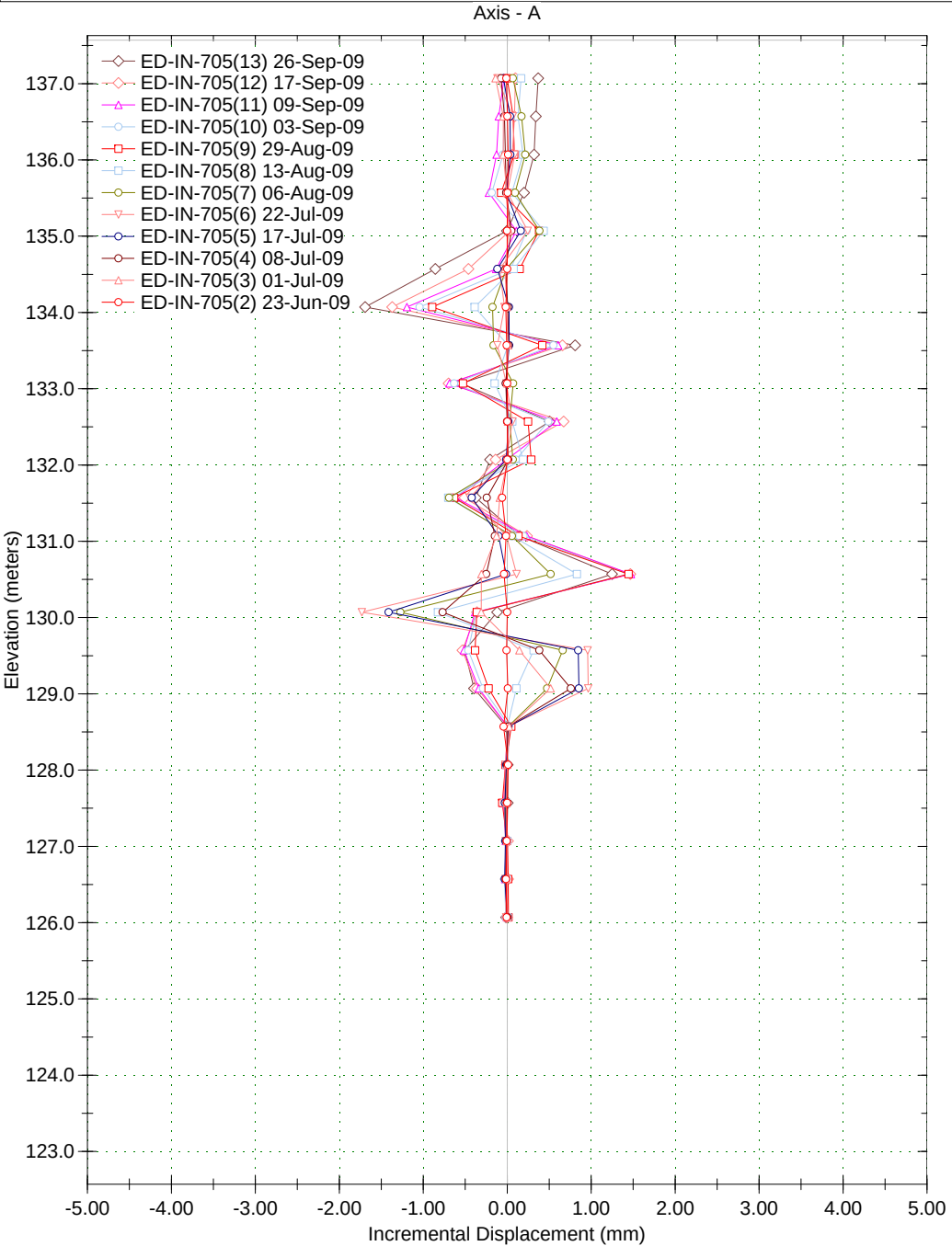
Borehole : ED-IN-705
Project : Meadowbank, Nunavut
Location : East Dike, ST. 60+704.83m O/S 0.09m
Northing : 7214359.571 mN
Easting : 639351.450 mE
Collar : 0.8m

Spiral Correction : N/A
Collar Elevation : 137.6 meters
Borehole Total Depth : 11.5 meters
North Groove Azimuth :
Base Reading : 2009 Jun 23 11:13
Axis A Azimuth : 0.0 degrees



Borehole : ED-IN-705
Project : Meadowbank, Nunavut
Location : East Dike, ST. 60+704.83m O/S 0.09m
Northing : 7214359.571 mN
Easting : 639351.450 mE
Collar : 0.8m

Spiral Correction : N/A
Collar Elevation : 137.6 meters
Borehole Total Depth : 11.5 meters
North Groove Azimuth :
Base Reading : 2009 Jun 23 11:13
Axis A Azimuth : 0.0 degrees





APPENDIX D

AWPAR

Appendix D1 - Culverts: Photographic Log

Appendix D2 - Bridges: Photographic Log



Appendix D1

Culverts: Photographic Log



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 1 – PRC-1, km 0+430

Date: September 26, 2009. **Photo Number:** IMG_2587

Description: Upstream view of culvert. Culvert is full, in good condition, uniform grade and no obstructions.



PHOTOGRAPH 2 – PRC-1, km 0+430

Date: September 26, 2009. **Photo Number:** IMG_2588

Description: Downstream view of culvert.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 3 – PRC-2, km 0+470

Date: September 26, 2009. **Photo Number:** IMG_2589

Description: Upstream view of culverts. Culverts are mostly full, in good condition, uniform grade, and no obstructions.



PHOTOGRAPH 4 – PRC-2, km 0+470

Date: September 26, 2009. **Photo Number:** IMG_2590

Description: Downstream view of culverts.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 5 – PRC-3, km 1+380

Date: September 26, 2009. **Photo Number:** IMG_2591

Description: Upstream view of culvert. Culvert is in good condition, uniform grade, and no obstructions.



PHOTOGRAPH 6 – PRC-3, km 1+380

Date: September 26, 2009. **Photo Number:** P9260012

Description: Downstream view of culvert.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 7 – R-00A, km 2+550

Date: September 26, 2009. **Photo Number:** P9260013

Description: Downstream view of culvert. No apparent channel, dry. Uniform grade.



PHOTOGRAPH 8 – R-00A, km 2+550

Date: September 26, 2009. **Photo Number:** P9260014

Description: Upstream view of culvert. Inlet crushed would impede flow, if flow existed.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 9 – R-00A, km 2+550

Date: September 26, 2009. **Photo Number:** P9260015

Description: View of upstream end of culvert. Culvert crushed on top.



PHOTOGRAPH 10 – R-00A, km 2+550

Date: September 26, 2009. **Photo Number:** P9260016

Description: View culvert exposed through road bed.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 11 – PC-14, km 4+260

Date: September 26, 2009. **Photo Number:** P9260017

Description: Upstream view of culverts. Culvert closer to Baker Lake is damaged on upstream side. Other culvert has minimal crushing on haunch of culvert near the center of the road. Uniform grade, no obstructions.



PHOTOGRAPH 12 – PC-14, km 4+260

Date: September 26, 2009. **Photo Number:** P9260018

Description: View through culvert from upstream to downstream.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 13 – PC-14, km 4+260

Date: September 26, 2009. **Photo Number:** P9260019

Description: Downstream view of culverts.



PHOTOGRAPH 14 – PC-17, km 8+830

Date: September 26, 2009. **Photo Number:** P9260030

Description: Upstream view of culverts.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 15 – PC-17, km 8+830

Date: September 26, 2009. **Photo Number:** P9260031

Description: Upstream view of culverts. Culverts in good condition.



PHOTOGRAPH 16 – PC-17, km 8+830

Date: September 26, 2009. **Photo Number:** P9260032

Description: Downstream view of culverts. Potentially erosive flow. High flow may be eroding a hole downstream of culverts, not definitive. Stream bed consists of cobbles and boulders. Potentially requires additional capacity.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 17 – PC-1, km 9+952

Date: September 26, 2009. **Photo Number:** P9260034

Description: Upstream view of culvert, in good condition, uniform grade and no obstructions.



PHOTOGRAPH 18 – PC-1, km 9+952

Date: September 26, 2009. **Photo Number:** P9260035

Description: Downstream view of culvert. No definitive channel.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 19 – R-03, km 10+580

Date: September 26, 2009. **Photo Number:** P9260036

Description: Upstream view of culvert. Culvert is in good condition, uniform grade, and no obstructions. Water flowing through culvert is orange, oxidized.



PHOTOGRAPH 20 – R-03, km 10+580

Date: September 26, 2009. **Photo Number:** P9260037

Description: Downstream view of culvert. Stream bed consists of cobbles, small boulders and grass.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 21 – R-04, km 12+050

Date: September 26, 2009. **Photo Number:** P9260038

Description: Upstream view of culvert. Culvert is in good condition, very minor deflection in haunch of culvert, uniform grade, and no obstructions. Stream bed consists of cobbles, boulders and grass. Very broad drainage area, no definitive channel.



PHOTOGRAPH 22 – R-04, km 12+050

Date: September 26, 2009. **Photo Number:** P9260039

Description: Downstream view of culvert.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 23 – PC-13, km 12+745

Date: September 26, 2009. **Photo Number:** P9260041

Description: Upstream view of culvert.



PHOTOGRAPH 24 – PC-13, km 12+745

Date: September 26, 2009. **Photo Number:** P9260042

Description: Downstream view of culvert. Stream bed consists of cobbles, boulders and grass.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 25 – PC-13, km 12+745

Date: September 26, 2009. **Photo Number:** P9260040

Description: View through culvert from upstream to downstream. Crushing and dent on side and haunch near upstream end of culvert. Likely damaged during installation, continue to monitor as road bed consists of gravel and some larger cobbles (angular), potential for condition to worsen. Uniform grade, no blockage evident.



PHOTOGRAPH 26 – PC-2, km 13+405

Date: September 26, 2009. **Photo Number:** P9260047

Description: Upstream view of culvert. Culvert is in good condition, uniform grade, and no obstructions. Stream bed consists of gravel and grass.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 27 – PC-2, km 13+405

Date: September 26, 2009. **Photo Number:** P9260048

Description: Downstream view of culvert.



PHOTOGRAPH 28 – PC-3, km 13+685

Date: September 26, 2009. **Photo Number:** P9260049

Description: Side view of culvert inlet looking towards Baker Lake. Culvert is in good condition, uniform grade, and no obstructions. Potential for erosion at mouth of culvert as set below streambed. Streambed consists of cobbles.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 29 – PC-3, km 13+685

Date: September 26, 2009. **Photo Number:** P9260050

Description: Upstream view of culvert.



PHOTOGRAPH 30 – PC-3, km 13+685

Date: September 26, 2009. **Photo Number:** P9260051

Description: Downstream view of culvert. Cut in top of culvert. Stream bed consists of cobbles, high energy outflow.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 31 – PC-4, km 14+910

Date: September 26, 2009. **Photo Number:** P9260052

Description: Upstream view of culvert, in good condition, uniform grade, no obstructions. Low flow observed through culvert at time of inspection.



PHOTOGRAPH 32 – PC-4, km 14+910

Date: September 26, 2009. **Photo Number:** P9260053

Description: Downstream view of culvert.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 33 – R-05A, km 15+645

Date: September 26, 2009. **Photo Number:** P9260054

Description: Upstream view of culvert. Culvert is in good condition, uniform grade, and no obstructions. Upstream end of culvert is set above bottom of stream or concentrated flow has eroded some material under the culvert. Stream bed consists of soil and grass. High flow was evident at the time of the inspection.



PHOTOGRAPH 34 – R-05A, km 15+645

Date: September 26, 2009. **Photo Number:** P9260055

Description: Upstream view of culvert.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 35 – R-05A, km 15+645

Date: September 26, 2009. **Photo Number:** P9260056

Description: Upstream view of culvert.



PHOTOGRAPH 36 – R-05A, km 15+645

Date: September 26, 2009. **Photo Number:** P9260057

Description: Downstream view of culvert. Concentrated flow. Adjacent to culvert, small flow evident passing through road, no visual evidence of turbidity observed.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 37 – R-05A, km 15+645

Date: September 26, 2009. **Photo Number:** P9260058

Description: Downstream view of culvert.



PHOTOGRAPH 38 – PC-5, km 18+280

Date: September 26, 2009. **Photo Number:** P9260066

Description: Upstream view of culvert. Culvert is in good condition, uniform grade, and no obstructions. Low gradient flow observed.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 39 – PC-5, km 18+280

Date: September 26, 2009. **Photo Number:** P9260069

Description: Downstream view of culvert. Broad valley, low gradient, no definitive channel observed.



PHOTOGRAPH 40 – PC-6, km 19+075

Date: September 26, 2009. **Photo Number:** P9260070

Description: Upstream view of culvert. Culvert is in good condition, and uniform grade. Few cobbles in culvert but do not obstruct the flow. Low gradient flow, no definitive channel observed.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 41 – PC-6, km 19+075

Date: September 26, 2009. **Photo Number:** P9260072

Description: Downstream view of culvert.



PHOTOGRAPH 42 – PC-7, km 20+505

Date: September 26, 2009. **Photo Number:** P9260073

Description: Upstream view of culvert. Culvert is in good condition, uniform grade, and no obstructions. Low gradient flow, very broad stream observed. Stream bed consists of cobbles, gravel and grass.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 43 – PC-7, km 20+505

Date: September 26, 2009. **Photo Number:** P9260074

Description: Downstream view of culvert.



PHOTOGRAPH 44 – R-07, km 25+900

Date: September 26, 2009. **Photo Number:** IMG_2602

Description: Upstream view of culvert. Culvert is in good condition, uniform grade, and no obstructions. Low gradient flow observed. Stream bed consists of soil and grass, some gravel.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 45 – R-07, km 25+900

Date: September 26, 2009. **Photo Number:** IMG_2603

Description: Downstream view of culvert.



PHOTOGRAPH 46 – PC-8, km 29+785

Date: September 26, 2009. **Photo Number:** IMG_2607

Description: Upstream view of culvert. Culvert is in good condition, uniform grade, and no obstructions.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 47 – PC-8, km 29+785

Date: September 26, 2009. **Photo Number:** IMG_2608

Description: Downstream view of culvert.



PHOTOGRAPH 48 – PC-9, km 35+690

Date: September 25, 2009. **Photo Number:** IMG_2546

Description: Downstream view of culvert and valley. Culvert is dry, flow is occurring through road and boulder field adjacent to culvert. No flow path, no turbidity evident. Culvert is in good condition, uniform grade, and no obstructions.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 49 – PC-9, km 35+690

Date: September 25, 2009. **Photo Number:** IMG_2547

Description: Upstream view of culvert and valley.



PHOTOGRAPH 50 – PC-10, km 36+865

Date: September 26, 2009. **Photo Number:** IMG_2612

Description: Upstream view of culvert (right side of road heading to Meadowbank). Culvert is in good condition, uniform grade, and no obstructions. Minor crushing along haunch of culvert observed. No sign of erosion and no turbidity. Stream bed consists of gravel and grass.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 51 – PC-10, km 36+865

Date: September 26, 2009. **Photo Number:** IMG_2613

Description: Downstream view of culvert.



PHOTOGRAPH 52 – PC-11, km 39+552

Date: September 25, 2009. **Photo Number:** IMG_2541

Description: Upstream view of culvert. Culvert is generally in good condition, uniform grade, no obstructions, slight bow (crushing) in haunch.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 53 – PC-11, km 39+552

Date: September 25, 2009. **Photo Number:** IMG_2542

Description: Downstream view of culvert. Water appears to be mostly ponded and not flowing, pool appears to have been created on downstream side during culvert installation.



PHOTOGRAPH 54 – PC-12, km 41+410

Date: September 25, 2009. **Photo Number:** IMG_2533

Description: Upstream view of culvert. Culvert is half full; water appears to be mostly ponded and not flowing. Culvert has a uniform grade and is in good condition.



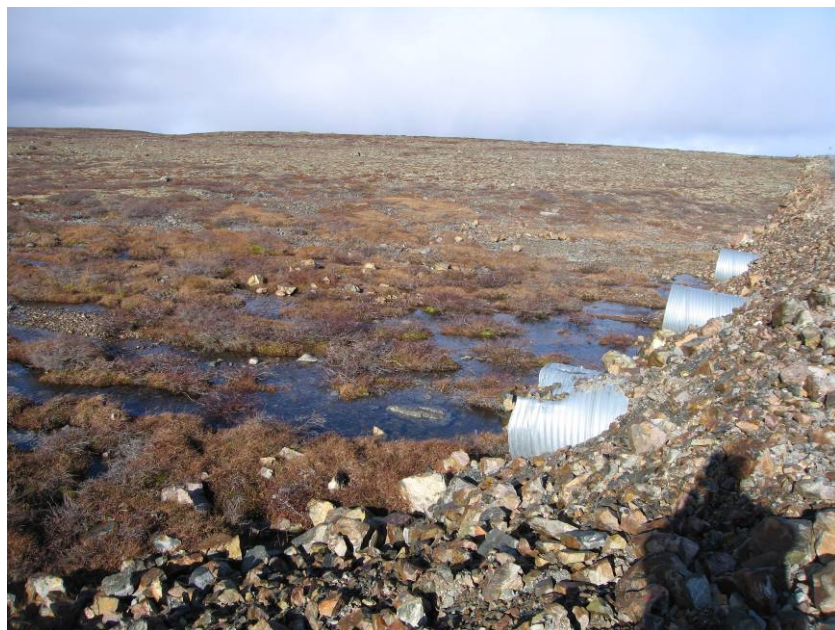
PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 55 – PC-12, km 41+410

Date: September 25, 2009. **Photo Number:** IMG_2534

Description: Downstream view of culvert.



PHOTOGRAPH 56 – R-14, km 67+840

Date: September 25, 2009. **Photo Number:** IMG_2466

Description: Upstream side view of culverts and valley. Broad, low gradient stream with gravel and grass covered streambed. Majority of flow passes through culverts. Culvert closer to Baker Lake (closer in photograph) is set at a higher elevation and is dry, no flow. Flow is passing through the other two culverts.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 57 – R-14, km 67+840

Date: September 25, 2009. **Photo Number:** IMG_2467

Description: Upstream view of culverts and valley.



PHOTOGRAPH 58 – R-14, km 67+840

Date: September 25, 2009. **Photo Number:** IMG_2468

Description: View of culverts from upstream.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 59 – R-14, km 67+840

Date: September 25, 2009. **Photo Number:** IMG_2469

Description: View of culverts from upstream side. Culvert closer to Baker Lake (closer in photograph) is set at a slightly higher elevation.



PHOTOGRAPH 60 – R-14, km 67+840

Date: September 25, 2009. **Photo Number:** IMG_2470

Description: View through central culverts from upstream to downstream. Culvert damaged on side and haunch crushing.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 61 – R-14, km 67+840

Date: September 25, 2009. **Photo Number:** IMG_2471

Description: View of downstream valley.



PHOTOGRAPH 62 – R-14, km 67+840

Date: September 25, 2009. **Photo Number:** IMG_2472

Description: View of culverts from downstream, looking from north (Meadowbank side) to south. One culvert is shorter than the other two culverts.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 63 – R-14, km 67+840

Date: September 25, 2009. **Photo Number:** IMG_2473

Description: View through central culverts from downstream to upstream. Culvert damaged on side and top, crushing is evident.



PHOTOGRAPH 64 – R-17, km 77+440

Date: September 25, 2009. **Photo Number:** IMG_2437

Description: Upstream view of culverts. No defined channel, cobbles and grass in stream base. Flow through road, no turbidity.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 65 – R-17, km 77+440

Date: September 25, 2009. **Photo Number:** IMG_2438

Description: Upstream side view of road. Flow through road, no turbidity.



PHOTOGRAPH 66 – R-17, km 77+440

Date: September 25, 2009. **Photo Number:** IMG_2439

Description: Downstream view of culverts. Culvert is in good condition, uniform grade, no obstructions.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 67 – R-18A, km 81+045

Date: September 25, 2009. **Photo Number:** IMG_2419

Description: Upstream side view of culverts. Northern most culvert (closest to Meadowbank) observed to have some minor crushing along haunch. Central culvert shows minor crushing of top and dents in base and sides likely damaged during construction. Southern most culvert (closest to Baker Lake) is in the best condition. There is minimal road cover over culverts. All culverts observed to have a constant grade and no obstructions. Grass in stream base, no turbidity observed.



PHOTOGRAPH 68 – R-18A, km 81+045

Date: September 25, 2009. **Photo Number:** IMG_2420

Description: Downstream side view of culverts.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 69 – R-20, km 85+490

Date: September 25, 2009. **Photo Number:** IMG_2403

Description: Downstream view of culvert, looking west. Culvert is in good condition, uniform grade, and no obstructions.



PHOTOGRAPH 70 – R-20, km 85+490

Date: September 25, 2009. **Photo Number:** IMG_2404

Description: Upstream view of culvert and valley.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 71 – R-20, km 85+490

Date: September 25, 2009. **Photo Number:** IMG_2405

Description: Upstream to downstream view through culvert.



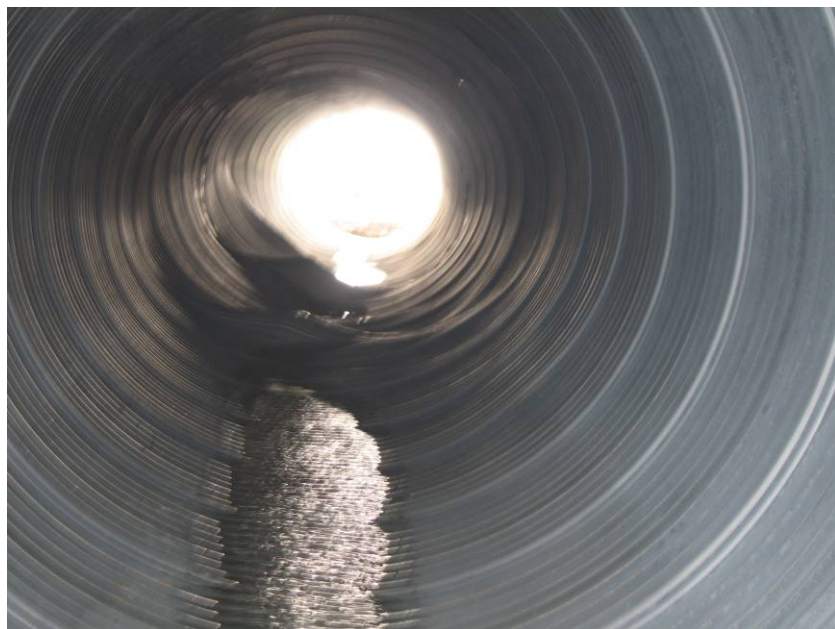
PHOTOGRAPH 72 – R-21, km 87+500

Date: September 25, 2009. **Photo Number:** IMG_2398

Description: Upstream view of culverts, looking north. Both culverts show some dents on base and sides likely damaged during installation. Minor crushing on crest of culverts also was evident. Uniform grade and no obstructions observed.



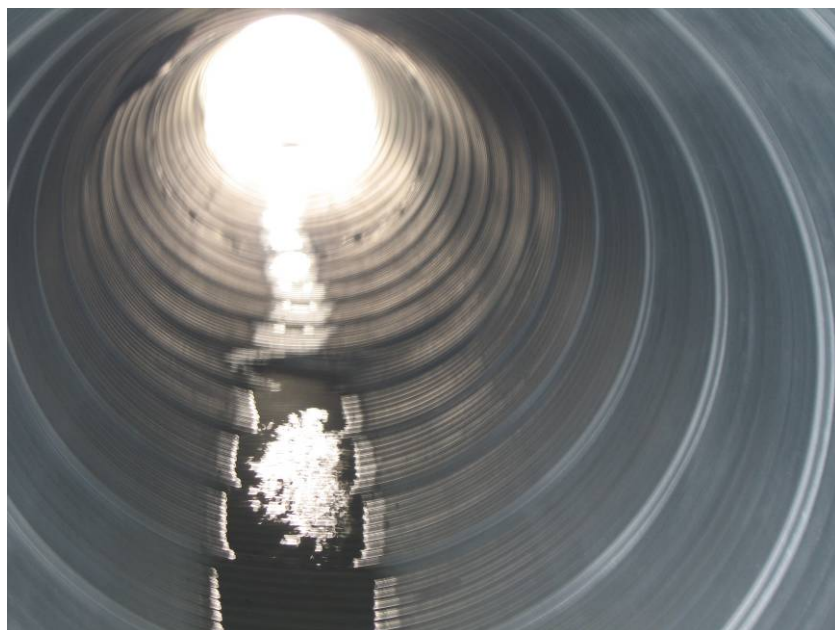
PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 73 – R-21, km 87+500

Date: September 25, 2009. **Photo Number:** IMG_2399

Description: View from upstream to downstream through eastern culvert (closest to Meadowbank) damage on base and sides evident. Grade is generally uniform and no blockages observed within culvert.



PHOTOGRAPH 74 – R-21, km 87+500

Date: September 25, 2009. **Photo Number:** IMG_2399

Description: View from upstream to downstream through western culvert (closest to Baker Lake) minor dents on side and base and slight crushing on haunch also evident. Uniform grade and no obstructions observed.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 75 – R-21, km 87+500

Date: September 25, 2009. **Photo Number:** IMG_2401

Description: Downstream view of culverts.



PHOTOGRAPH 76 – R-21, km 87+500

Date: September 25, 2009. **Photo Number:** IMG_2401

Description: Downstream side view of culverts, about 0.4 m diameter rock above culvert on the right side of the photograph.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 77 – R-23, km 93+600

Date: September 25, 2009. **Photo Number:** IMG_2382

Description: Upstream view of culvert and valley, looking northwest.



PHOTOGRAPH 78 – R-23, km 93+600

Date: September 25, 2009. **Photo Number:** IMG_2383

Description: Upstream view of culvert. Cover over culvert approximately 0.4m.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 79 – R-23, km 93+600

Date: September 25, 2009. **Photo Number:** IMG_2384

Description: Upstream to downstream view through culvert. Moderate crushing along haunch of culvert centerline, uniform grade, no blockages, and no sign of erosion observed.



PHOTOGRAPH 80 – R-23, km 93+600

Date: September 25, 2009. **Photo Number:** IMG_2385

Description: Downstream view of culvert and valley.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 81 – R-24, km 98+250

Date: September 25, 2009. **Photo Number:** IMG_2376

Description: Upstream view of culverts and valley, looking northwest. No sign of erosion.



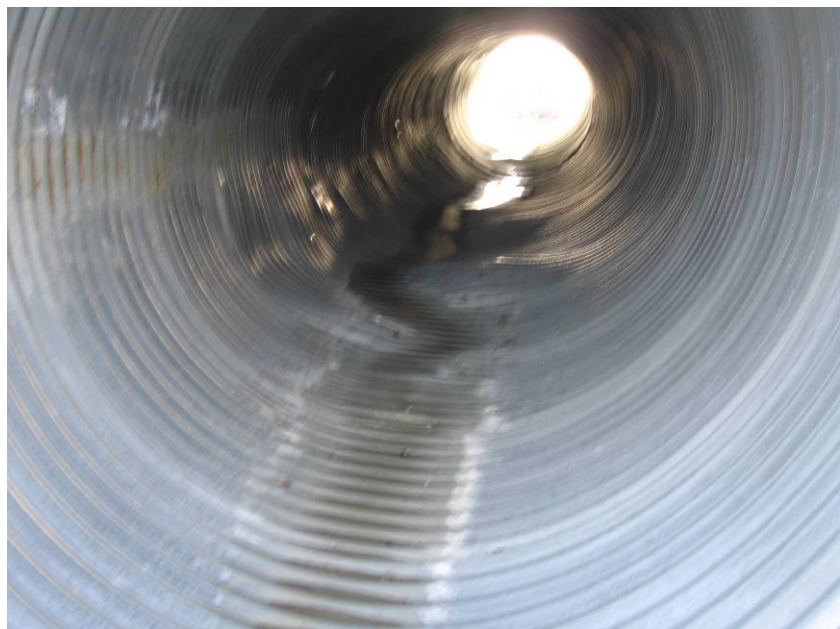
PHOTOGRAPH 82 – R-24, km 98+250

Date: September 25, 2009. **Photo Number:** IMG_2377

Description: Upstream to downstream view through culverts. Both culverts show some crushing along centerline (haunch) and some dents in base likely damaged during installation. Bedding appears to consist of larger diameter and sharper rocks.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 83 – R-24, km 98+250

Date: September 25, 2009. **Photo Number:** IMG_2378

Description: Upstream to downstream view through northern most culvert (closest to Meadowbank – left side in Photograph 82).



PHOTOGRAPH 84 – R-24, km 98+250

Date: September 25, 2009. **Photo Number:** IMG_2379

Description: Upstream to downstream view through right culvert on Photograph 82 (closest to Baker Lake).



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 85 – R-24, km 98+250

Date: September 25, 2009. **Photo Number:** IMG_2380

Description: Downstream view of culverts.



PHOTOGRAPH 86 – R-24, km 98+250

Date: September 25, 2009. **Photo Number:** IMG_2381

Description: Downstream view of culverts and road. Uniform grade and no blockages observed.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 87 – R-25, km 102+050

Date: September 25, 2009. **Photo Number:** IMG_2367

Description: Upstream view of culverts and valley, looking northeast.



PHOTOGRAPH 88 – R-25, km 102+050

Date: September 25, 2009. **Photo Number:** IMG_2368

Description: Downstream view, looking southwest.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 89 – R-25, km 102+050

Date: September 25, 2009. **Photo Number:** IMG_2369

Description: Downstream to upstream view through right culvert in Photograph 88. Culvert is bent in central area, non-uniform grade. No outflow and three-quarters full on upstream side.



PHOTOGRAPH 90 – R-25, km 102+050

Date: September 25, 2009. **Photo Number:** IMG_2371

Description: Downstream to upstream view through left culvert in Photograph 88. No signs of erosion upstream or downstream. Culvert is in good condition, uniform grade, no obstructions, and was approximately flowing at one-quarter full.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 91 – R-25, km 102+050

Date: September 25, 2009. **Photo Number:** IMG_2370

Description: Downstream view, culvert offset at discharge end.



PHOTOGRAPH 92 – R-26, km 104+710

Date: September 25, 2009. **Photo Number:** IMG_2366

Description: Downstream to upstream view through culverts. All culverts are in good condition, a uniform grade, and no signs of erosion upstream or downstream were observed.



PHOTOGRAPHS – CULVERTS



PHOTOGRAPH 93 – R-26, km 104+710

Date: September 25, 2009. **Photo Number:** IMG_2364

Description: Upstream view, looking east.



PHOTOGRAPH 94 – R-26, km 104+710

Date: September 25, 2009. **Photo Number:** IMG_2365

Description: Downstream view, looking west.



Appendix D2

Bridges: Photographic Log



PHOTOGRAPHS – BRIDGES



PHOTOGRAPH 1 – Bridge 1 - R02, km 8+750

Date: September 26, 2009. **Photo Number:** P9260033

Description: View of bridge looking across deck looking south west. Abutment supports slightly damaged, likely during construction.



PHOTOGRAPH 2 – Bridge 1 - R02, km 8+750

Date: September 26, 2009. **Photo Number:** P9260022

Description: Upstream view from deck, looking northwest.



PHOTOGRAPHS – BRIDGES



PHOTOGRAPH 3 – Bridge 1 - R02, km 8+750

Date: September 26, 2009. **Photo Number:** P9260023

Description: Downstream view from deck, looking southeast.



PHOTOGRAPH 4 – Bridge 1 - R02, km 8+750

Date: September 26, 2009. **Photo Number:** P9260024

Description: Upstream view of high flow and old road.



PHOTOGRAPHS – BRIDGES



PHOTOGRAPH 5 – Bridge 1 - R02, km 8+750

Date: September 26, 2009. **Photo Number:** P9260025

Description: View of crossing and valley.



PHOTOGRAPH 6 – Bridge 1 - R02, km 8+750

Date: September 26, 2009. **Photo Number:** P9260026

Description: View of abutment on southwest side.



PHOTOGRAPHS – BRIDGES



PHOTOGRAPH 7 – Bridge 1 - R02, km 8+750

Date: September 26, 2009. **Photo Number:** P9260027

Description: View of abutment on northeast side.



PHOTOGRAPH 8 – Bridge 1 - R02, km 8+750

Date: September 26, 2009. **Photo Number:** P9260028

Description: Downstream view of flow through road and abutment.



PHOTOGRAPHS – BRIDGES



PHOTOGRAPH 9 – Bridge 1 - R02, km 8+750

Date: September 26, 2009. **Photo Number:** P9260029

Description: Upstream view, looking southwest.



PHOTOGRAPH 10 – Bridge 2 - R05, km 17+600

Date: September 26, 2009. **Photo Number:** P9260059

Description: Upstream view from deck, looking west. Concentrated flow beneath bridge observed. Stream bed consists of cobbles, some gravel and a few boulders. Beyond main channel is primarily grass. The flow passes closer to abutment on left abutment (Meadowbank side).



PHOTOGRAPHS – BRIDGES



PHOTOGRAPH 11 – Bridge 2 - R05, km 17+600

Date: September 26, 2009. **Photo Number:** P9260060

Description: Downstream view from deck, looking east.



PHOTOGRAPH 12 – Bridge 2 - R05, km 17+600

Date: September 26, 2009. **Photo Number:** P9260061

Description: Upstream view of abutment on north side. Minor damage to abutment box, likely damaged during construction.



PHOTOGRAPHS – BRIDGES



PHOTOGRAPH 13 – Bridge 2 - R05, km 17+600

Date: September 26, 2009. **Photo Number:** P9260062

Description: Upstream view of abutment on south side. Minor damage to abutment box, likely damaged during construction.



PHOTOGRAPH 14 – Bridge 2 - R05, km 17+600

Date: September 26, 2009. **Photo Number:** P9260063

Description: Downstream view of abutment on south side.



PHOTOGRAPHS – BRIDGES



PHOTOGRAPH 15 – Bridge 2 - R05, km 17+600

Date: September 26, 2009. **Photo Number:** P9260064

Description: Upstream view of abutment on north side. Minor damage on deck, likely damaged when grading.



PHOTOGRAPH 16 – Bridge 2 - R05, km 17+600

Date: September 26, 2009. **Photo Number:** P9260065

Description: Upstream view from north abutment, concentrated flow.



PHOTOGRAPHS – BRIDGES



PHOTOGRAPH 17 – Bridge 3 - R06, km 23+100

Date: September 26, 2009. **Photo Number:** IMG_2592

Description: Upstream view from deck, looking west. Concentrated flow beneath the bridge. The flow passes equally beneath the bridge. No signs of erosion or turbidity.



PHOTOGRAPH 18 – Bridge 3 - R06, km 23+100

Date: September 26, 2009. **Photo Number:** IMG_2593

Description: Downstream view from deck, looking east.



PHOTOGRAPHS – BRIDGES



PHOTOGRAPH 19 – Bridge 3 - R06, km 23+100

Date: September 26, 2009. **Photo Number:** IMG_2594

Description: Upstream view of abutment on north side.



PHOTOGRAPH 20 – Bridge 3 - R06, km 23+100

Date: September 26, 2009. **Photo Number:** IMG_2595

Description: Upstream view of abutment on south side.



PHOTOGRAPHS – BRIDGES



PHOTOGRAPH 21 – Bridge 4 - R09, km 48+500

Date: September 25, 2009. **Photo Number:** IMG_2517

Description: Upstream view of bridge from south side.



PHOTOGRAPH 22 – Bridge 4 - R09, km 48+500

Date: September 25, 2009. **Photo Number:** IMG_2518

Description: Upstream view from deck, looking west. Old road on right side of photograph helps concentrate flow from two channels into one that then flows beneath the bridge. Gravel bar evident from old road.



PHOTOGRAPHS – BRIDGES



PHOTOGRAPH 23 – Bridge 4 - R09, km 48+500

Date: September 25, 2009. **Photo Number:** IMG_2519

Description: Downstream view from deck, looking east. Stream bed consists of cobbles and boulders with some grass.



PHOTOGRAPH 24 – Bridge 4 - R09, km 48+500

Date: September 25, 2009. **Photo Number:** IMG_2520

Description: View from upstream under the bridge, looking east. Good condition, no sign of erosion of abutments or stream bed. No turbidity.



PHOTOGRAPHS – BRIDGES



PHOTOGRAPH 25 – Bridge 4 - R09, km 48+500

Date: September 25, 2009. **Photo Number:** IMG_2521

Description: View of upstream flow channels and old road.



PHOTOGRAPH 26 – Bridge 4 - R09, km 48+500

Date: September 25, 2009. **Photo Number:** IMG_2522

Description: Upstream view of bridge and road, looking north.



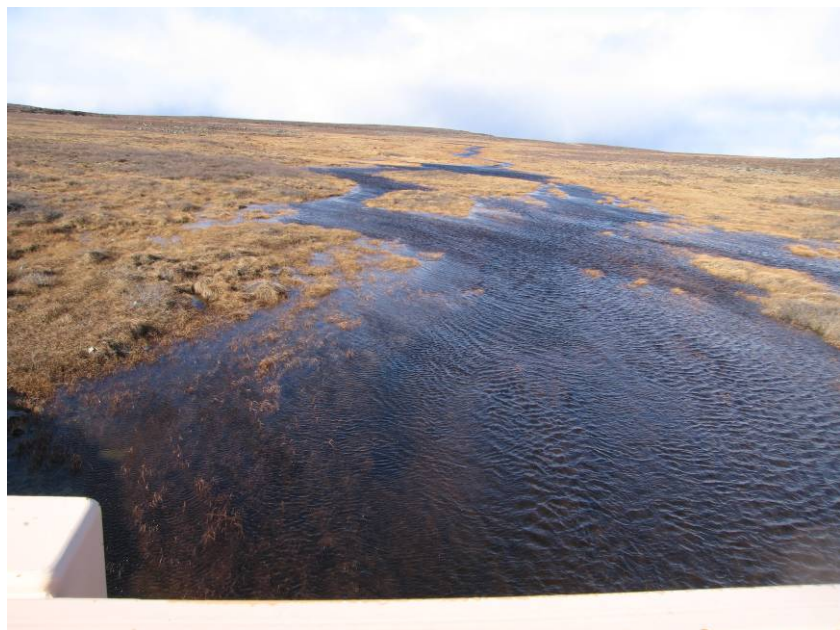
PHOTOGRAPHS – BRIDGES



PHOTOGRAPH 27 – Bridge 5 - R13, km 62+060

Date: September 25, 2009. **Photo Number:** IMG_2488

Description: View of bridge deck, looking northeast.



PHOTOGRAPH 28 – Bridge 5 - R13, km 62+060

Date: September 25, 2009. **Photo Number:** IMG_2489

Description: Upstream view from deck, looking northwest. All flow appears to be passing beneath the bridge. Stream bed consists of cobbles, gravel, and grass.



PHOTOGRAPHS – BRIDGES



PHOTOGRAPH 29 – Bridge 5 - R13, km 62+060

Date: September 25, 2009. **Photo Number:** IMG_2490

Description: Downstream view from deck, looking southeast. On downstream side, “hole” or depression evident and is surrounded by larger cobbles. No signs of turbidity.



PHOTOGRAPH 29 – Bridge 5 - R13, km 62+060

Date: September 25, 2009. **Photo Number:** IMG_2491

Description: View of road looking northeast.



PHOTOGRAPHS – BRIDGES



PHOTOGRAPH 30 – Bridge 5 - R13, km 62+060

Date: September 25, 2009. **Photo Number:** IMG_2492

Description: View of bridge and abutments from downstream, looking west. Abutments appeared to be in good condition.



PHOTOGRAPH 31 – Bridge 5 - R13, km 62+060

Date: September 25, 2009. **Photo Number:** IMG_2493

Description: View of bridge and abutments from upstream, looking east. Abutments appeared to be in good condition.



PHOTOGRAPHS – BRIDGES



PHOTOGRAPH 32 – Bridge 5 - R13, km 62+060

Date: September 25, 2009. **Photo Number:** IMG_2494

Description: Photo of boulders and deeper pockets (depressions) in stream bed on downstream side of bridge.



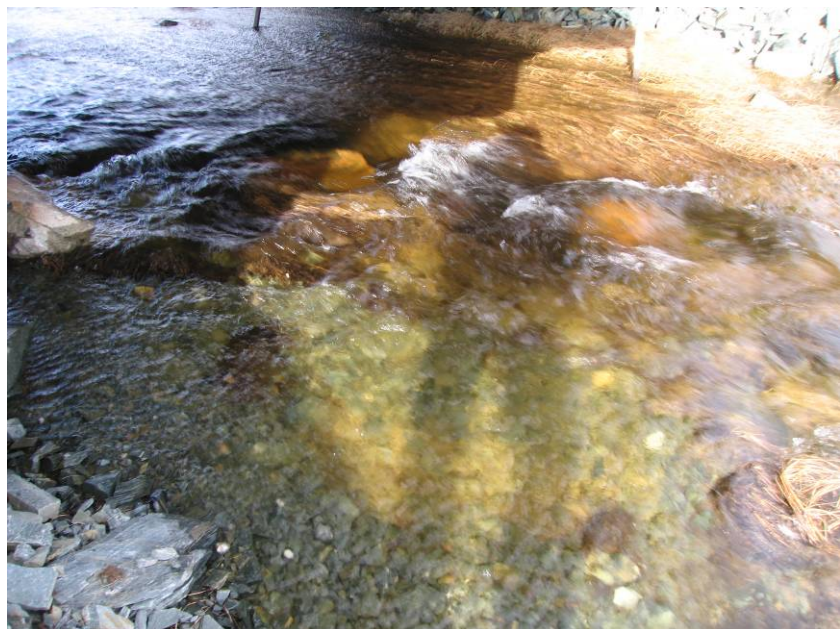
PHOTOGRAPH 33 – Bridge 5 - R13, km 62+060

Date: September 25, 2009. **Photo Number:** IMG_2496

Description: Photo of boulders and deeper pockets on downstream side of bridge.



PHOTOGRAPHS – BRIDGES



PHOTOGRAPH 34 – Bridge 5 - R13, km 62+060

Date: September 25, 2009. **Photo Number:** IMG_2495

Description: Photo of similar deeper pockets and boulders under bridge.



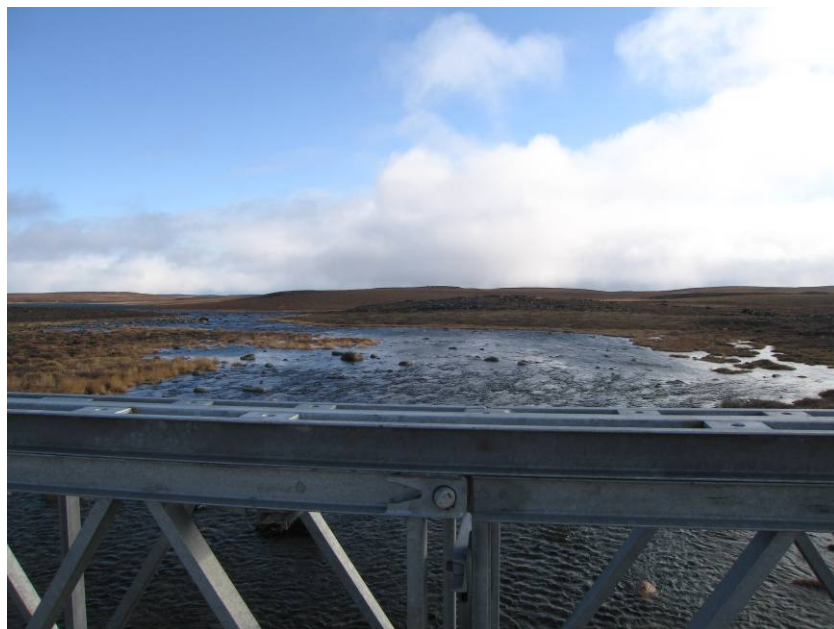
PHOTOGRAPH 35 – Bridge 6 - R15, km 69+200

Date: September 25, 2009. **Photo Number:** IMG_2461

Description: Upstream view from deck, looking northwest.



PHOTOGRAPHS – BRIDGES



PHOTOGRAPH 36 – Bridge 6 - R15, km 69+200

Date: September 25, 2009. **Photo Number:** IMG_2462

Description: Downstream view from deck, looking east.



PHOTOGRAPH 37 – Bridge 6 - R15, km 69+200

Date: September 25, 2009. **Photo Number:** IMG_2463

Description: View of bridge from upstream, looking south. Flow beneath bridge, no evidence of flow through road fill material.



PHOTOGRAPH 39 – Bridge 6 - R15, km 69+200

Date: September 25, 2009. **Photo Number:** IMG_2464

Description: View of left abutment containment/reinforcement looking from upstream, in good condition.



PHOTOGRAPH 38 – Bridge 6 - R15, km 69+200

Date: September 25, 2009. **Photo Number:** IMG_2464

Description: View of downstream side of bridge looking southwest.



PHOTOGRAPHS – BRIDGES



PHOTOGRAPH 39 – Bridge 7 - R16, km 73+800

Date: September 25, 2009. **Photo Number:** IMG_2440 to IMG_2442

Description: Upstream view from deck of Rapid Span Bridge. Broad valley, some flow through abutments and no sign of turbidity.



PHOTOGRAPH 40 – Bridge 7 - R16, km 73+800

Date: September 25, 2009. **Photo Number:** IMG_2443

Description: Downstream view from deck of rapid span bridge.



PHOTOGRAPHS – BRIDGES



PHOTOGRAPH 41 – Bridge 7 - R16, km 73+800

Date: September 25, 2009. **Photo Number:** IMG_2444

Description: View of deck surface with hole.



PHOTOGRAPH 42 – Bridge 7 - R16, km 73+800

Date: September 25, 2009. **Photo Number:** IMG_2447

Description: View beneath deck from upstream to downstream. Grass and cobbles in stream bed. Geotextile on abutments is damaged, some granular road bed falling below deck.



PHOTOGRAPH 43 – Bridge 7 - R16, km 73+800

Date: September 25, 2009. **Photo Number:** IMG_2445

Description: View of left abutment from upstream to downstream.



PHOTOGRAPH 44 – Bridge 7 - R16, km 73+800

Date: September 25, 2009. **Photo Number:** IMG_2446

Description: View of right abutment from upstream to downstream.



PHOTOGRAPHS – BRIDGES



PHOTOGRAPH 45 – Bridge 8 - R18, km 79+500

Date: September 25, 2009. **Photo Number:** IMG_2430

Description: Upstream view from deck of bridge. Boulder field valley, boulder diameter typically about 0.5 m, and virtually no flow. Heavier vegetation of shrubs and moss observed.



PHOTOGRAPH 46 – Bridge 8 - R18, km 79+500

Date: September 25, 2009. **Photo Number:** IMG_2431

Description: Downstream view from deck of bridge.



PHOTOGRAPHS – BRIDGES



PHOTOGRAPH 47 – Bridge 8 - R18, km 79+500

Date: September 25, 2009. **Photo Number:** IMG_2432

Description: View of left abutment from upstream to downstream. Geotextile beneath abutment, small amount of road base observed to have fallen below the bridge deck.



PHOTOGRAPH 48 – Bridge 8 - R18, km 79+500

Date: September 25, 2009. **Photo Number:** IMG_2434

Description: Close up of abutment on northeast side, granular road bed falling below deck.



PHOTOGRAPH 49 – Bridge 8 - R18, km 79+500

Date: September 25, 2009. **Photo Number:** IMG_2433

Description: View of right abutment from upstream to downstream. Damaged geotextile beneath abutment, blowing in the wind.



PHOTOGRAPH 50 – Bridge 8 - R18, km 79+500

Date: September 25, 2009. **Photo Number:** IMG_2435

Description: View of bridge from downstream to upstream.



PHOTOGRAPHS – BRIDGES



PHOTOGRAPH 51 – Bridge 9 - R19, km 83+100

Date: September 25, 2009. **Photo Number:** IMG_2411

Description: Upstream view from deck of Rapid Span Bridge, looking northeast.



PHOTOGRAPH 52 – Bridge 9 - R19, km 83+100

Date: September 25, 2009. **Photo Number:** IMG_2412

Description: Upstream side looking down at northwest side of bridge.



PHOTOGRAPHS – BRIDGES



PHOTOGRAPH 53 – Bridge 9 - R19, km 83+100

Date: September 25, 2009. **Photo Number:** IMG_2413

Description: Downstream view from deck of Rapid Span Bridge, looking south.



PHOTOGRAPH 54 – Bridge 9 - R19, km 83+100

Date: September 25, 2009. **Photo Number:** IMG_2414

Description: Downstream view of southeast abutment looking east. Sheet walls with steel pipes for anchors beneath bridge on both abutments observed.



PHOTOGRAPHS – BRIDGES



PHOTOGRAPH 55 – Bridge 9 - R19, km 83+100

Date: September 25, 2009. **Photo Number:** IMG_2415

Description: Upstream view from southeast abutment looking west. Steel pipes show some damage, bent.



PHOTOGRAPH 56 – Bridge 9 - R19, km 83+100

Date: September 25, 2009. **Photo Number:** IMG_2416

Description: Upstream view, looking north, high flow due to overnight rain (~20 mm).



PHOTOGRAPHS – BRIDGES



PHOTOGRAPH 59 – Bridge 9 - R19, km 83+100

Date: September 25, 2009. **Photo Number:** IMG_2417

Description: View of upstream side of northwest abutment. Flow passing through road.



PHOTOGRAPH 57 – Bridge 9 - R19, km 83+100

Date: September 25, 2009. **Photo Number:** IMG_2418

Description: View of downstream side of northwest abutment. Flow passing through road, no evidence of turbidity. Grass and cobbles in stream bed.



APPENDIX E

QUARRIES: PHOTOGRAPHIC LOG



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 1 – Quarry 1

Date: September 26, 2009. **Photo Number:** P9260020

Description: View of north wall of quarry, looking northwest. Walls about 6 to 7 m high.



PHOTOGRAPH 2 – Quarry 1

Date: September 26, 2009. **Photo Number:** P9260021

Description: View of west wall, looking southwest.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 3 – Quarry 2

Date: September 26, 2009. **Photo Number:** P9260043

Description: View of north wall, looking northwest. Pile of rocks, less than 1 m in diameter, typically.



PHOTOGRAPH 4 – Quarry 2

Date: September 26, 2009. **Photo Number:** P9260044

Description: View of west wall and gravel stockpiles, looking west.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 5 – Quarry 2

Date: September 26, 2009. **Photo Number:** P9260045

Description: View of west wall and road base stockpile, looking southwest.



PHOTOGRAPH 6 – Quarry 2

Date: September 26, 2009. **Photo Number:** P9260046

Description: View of south wall, looking southwest.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 7 – Quarry 3

Date: September 26, 2009. **Photo Number:** IMG_2596

Description: View of west wall. High cut wall, jointed and fractured, ravelling.



PHOTOGRAPH 8 – Quarry 3

Date: September 26, 2009. **Photo Number:** IMG_2597

Description: View of east wall. High cut wall, highly jointed and fractured, ravelling.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 9 – Quarry 3

Date: September 26, 2009. **Photo Number:** IMG_2598

Description: View of southeast wall quarry and pile of rock in front of cut wall.



PHOTOGRAPH 10 – Quarry 3

Date: September 26, 2009. **Photo Number:** IMG_2599_2600_2601

Description: View of west wall and stockpiles of rock in front of cut wall, looking southwest.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 11 – Quarry 4

Date: September 25, 2009. **Photo Number:** IMG_2552

Description: View of east and south side of the quarry. Quarry is flooded.



PHOTOGRAPH 12 – Quarry 4

Date: September 25, 2009. **Photo Number:** IMG_2553

Description: View of south and east walls of quarry. Quarry is flooded.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 13 – Quarry 5

Date: September 25, 2009. **Photo Number:** IMG_2548

Description: View of east wall, looking southeast. Near vertical wall about 8 m high, some ravelling.



PHOTOGRAPH 14 – Quarry 5

Date: September 25, 2009. **Photo Number:** IMG_2549

Description: View of northeast wall, looking north.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 15 – Quarry 5

Date: September 25, 2009. **Photo Number:** IMG_2550

Description: View of north wall.



PHOTOGRAPH 16 – Quarry 5

Date: September 25, 2009. **Photo Number:** IMG_2551

Description: View of west wall.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 17 – Quarry 6

Date: September 25, 2009. **Photo Number:** IMG_2544

Description: View of southwest wall. Drums of material noted in 2008 inspection have been removed. Center of quarry temporarily contains piles of contaminated soil.



PHOTOGRAPH 18 – Quarry 6

Date: September 25, 2009. **Photo Number:** IMG_2545

Description: View of south wall, looking southeast.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 199 – Quarry 7

Date: September 25, 2009. **Photo Number:** IMG_2537

Description: View of west wall. Near vertical wall, about 10 m high, majority fractured and jointed, block size pieces (0.2 to 0.5 m) and smaller ravelling. Some ponded water, less than 20 cm deep.



PHOTOGRAPH 20 – Quarry 7

Date: September 25, 2009. **Photo Number:** IMG_2538

Description: View of northwest wall of the quarry, looking west.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 21 – Quarry 7

Date: September 25, 2009. **Photo Number:** IMG_2539

Description: View of north wall, looking northwest. Some ponded water, about 20 cm deep.



PHOTOGRAPH 22 – Quarry 7

Date: September 25, 2009. **Photo Number:** IMG_2540

Description: View of northeast wall.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 23 – Quarry 8

Date: September 25, 2009. **Photo Number:** IMG_2528

Description: View of north wall, looking northwest. Wall about 8 to 10 m high, lightly fractured and jointed, ravelling prevalent.



PHOTOGRAPH 24 – Quarry 8

Date: September 25, 2009. **Photo Number:** IMG_2529

Description: View of south wall.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 25 – Quarry 8

Date: September 25, 2009. **Photo Number:** IMG_2530

Description: View of west wall, looking southwest.



PHOTOGRAPH 26 – Quarry 9

Date: September 25, 2009. **Photo Number:** IMG_2524

Description: View of northeast wall of quarry, looking north. Wall 4 to 8 m high, highly fractured, raveling, some large blocks have fallen. Higher slopes are about 75°.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 27 – Quarry 9

Date: September 25, 2009. **Photo Number:** IMG_2525

Description: View of north wall.



PHOTOGRAPH 28 – Quarry 9

Date: September 25, 2009. **Photo Number:** IMG_2526

Description: View of northwest wall.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 29 – Quarry 9

Date: September 25, 2009. **Photo Number:** IMG_2527

Description: View of south wall.



PHOTOGRAPH 30 – Quarry 10

Date: September 25, 2009. **Photo Number:** IMG_2509

Description: View of south wall. Wall highly fractured and ravelling.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 31 – Quarry 10

Date: September 25, 2009. **Photo Number:** IMG_2510

Description: View of west wall. Wall highly fractured and ravelling.



PHOTOGRAPH 32 – Quarry 10

Date: September 25, 2009. **Photo Number:** IMG_2511

Description: View along northwest wall.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 33 – Quarry 10

Date: September 25, 2009. **Photo Number:** IMG_2512

Description: View of north portion of pit and granular stockpiled material.



PHOTOGRAPH 34 – Quarry 10

Date: September 25, 2009. **Photo Number:** IMG_2513

Description: View of east wall. Wall highly fractured, ravelling, slope angle about 60°.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 35 – Quarry 11

Date: September 25, 2009. **Photo Number:** IMG_2502_2503

Description: View of southern portion of the eastern wall. Stockpile of rock and crush in front of quarry wall. Vertical wall highly fractured, thin planar surfaces, ravelling.



PHOTOGRAPH 36 – Quarry 11

Date: September 25, 2009. **Photo Number:** IMG_2504

Description: View of northern portion of the eastern wall.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 37 – Quarry 11

Date: September 25, 2009. **Photo Number:** IMG_2505

Description: View of northeast wall of quarry and pile of fractured, fine rock (left side of photograph), looking north.



PHOTOGRAPH 38 – Quarry 11

Date: September 25, 2009. **Photo Number:** IMG_2506_2507_2508

Description: View of right back of quarry and pile of fractured, fine rock (right side of photograph), looking west.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 39 – Quarry 12

Date: September 25, 2009. **Photo Number:** IMG_2497_2498

Description: General view, looking southwest. Walls about 8 m high, highly jointed, raveling.



PHOTOGRAPH 39 – Quarry 12

Date: September 25, 2009. **Photo Number:** IMG_2499

Description: View of southern wall of quarry. Small amount of ponded water due to rain overnight.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 40 – Quarry 12

Date: September 25, 2009. **Photo Number:** IMG_2500

Description: View of southeastern portion of the quarry.



PHOTOGRAPH 41 – Quarry 12

Date: September 25, 2009. **Photo Number:** IMG_2501

Description: View of west wall.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 42 – Quarry 13

Date: September 25, 2009. **Photo Number:** IMG_2481_2482

Description: View of the northwest side of the quarry. Ravelling, about 60° slopes, and about 5 m high. Ponded water less than 0.3 m deep.



PHOTOGRAPH 43 – Quarry 13

Date: September 25, 2009. **Photo Number:** IMG_2483

Description: View of northeast portion of the quarry, looking east.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 44 – Quarry 13

Date: September 25, 2009. **Photo Number:** IMG_2484

Description: General looking east.



PHOTOGRAPH 45 – Quarry 13

Date: September 25, 2009. **Photo Number:** IMG_2485_2486

Description: View of southeastern quarry wall.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 46 – Quarry 13

Date: September 25, 2009. **Photo Number:** IMG_2487

Description: General view looking northwest.



PHOTOGRAPH 47 – Quarry 14

Date: September 25, 2009. **Photo Number:** IMG_2477_2478_2479

Description: View looking southwest. Walls estimated to be about 6 m high. Quarry is flooded.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 48 – Quarry 14

Date: September 25, 2009. **Photo Number:** IMG_2480

Description: View looking northwest. Mostly vertical wall, less ravelling. Quarry is flooded.



PHOTOGRAPH 49 – Quarry 15

Date: September 25, 2009. **Photo Number:** IMG_2474

Description: View looking northeast. Small ravelling and very jointed rock.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 50 – Quarry 15

Date: September 25, 2009. **Photo Number:** IMG_2475

Description: Looking southwest. Vertical wall 4 to 6 m high.



PHOTOGRAPH 51 – Quarry 15

Date: September 25, 2009. **Photo Number:** IMG_2476

Description: Looking northwest. Vertical wall 4 to 6 m high. Small amount of ponded water at entrance of quarry, due to rain overnight, not an issue.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 52 – Quarry 16

Date: September 25, 2009. **Photo Number:** IMG_2452

Description: North view, with slide of large blocks. Vertical wall about 8 to 10 m high.



PHOTOGRAPH 53 – Quarry 16

Date: September 25, 2009. **Photo Number:** IMG_2453_2454

Description: Looking northeast.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 54 – Quarry 16

Date: September 25, 2009.

Photo Number: IMG_2455

Description: Looking south.



PHOTOGRAPH 55 – Quarry 16

Date: September 25, 2009.

Photo Number: IMG_2456_2457

Description: Looking south.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 56 – Quarry 16

Date: September 25, 2009. **Photo Number:** IMG_2458

Description: Looking north. Vertical wall about 8 to 10 m high, ravelling of small blocks.



PHOTOGRAPH 57 – Quarry 16

Date: September 25, 2009. **Photo Number:** IMG_2459

Description: Looking north. Ravelling of small blocks.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 58 – Quarry 17

Date: September 25, 2009. **Photo Number:** IMG_2448_2449

Description: Looking northwest. Vertical wall 4 to 6 m high.



PHOTOGRAPH 59 – Quarry 17

Date: September 25, 2009. **Photo Number:** IMG_2450

Description: Looking east.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 60 – Quarry 17

Date: September 25, 2009. **Photo Number:** IMG_2451

Description: General view of quarry, looking north.



PHOTOGRAPH 612 – Quarry 18

Date: September 25, 2009. **Photo Number:** IMG_2421

Description: View of frost heave and thaw settlement at entrance of quarry.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 62 – Quarry 18

Date: September 25, 2009. **Photo Number:** IMG_2422

Description: View of frost heave and thaw settlement at entrance of quarry, looking northeast.



PHOTOGRAPH 63 – Quarry 18

Date: September 25, 2009. **Photo Number:** IMG_2423

Description: Looking west. Some ravelling of blocks.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 64 – Quarry 18

Date: September 25, 2009. **Photo Number:** IMG_2424 to IMG_2426

Description: Panoramic view of central area of quarry, looking south. Vertical wall 10 to 12 m high. Some ravelling and blocking, larger unstable blocks near crest (top left corner of photograph).



PHOTOGRAPH 65 – Quarry 19

Date: September 25, 2009. **Photo Number:** IMG_2406

Description: General view of left side of quarry, looking northwest. Vertical wall, area with most ravelling of small blocks (on right side of photo).



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 66 – Quarry 19

Date: September 25, 2009. **Photo Number:** IMG_2407

Description: Looking north. Vertical wall, some ravelling of small blocks.



PHOTOGRAPH 67 – Quarry 20

Date: September 25, 2009. **Photo Number:** IMG_2394

Description: Looking east. Ravelling of small blocks.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 68 – Quarry 20

Date: September 25, 2009. **Photo Number:** IMG_2395

Description: Looking northeast.



PHOTOGRAPH 69 – Quarry 20

Date: September 25, 2009. **Photo Number:** IMG_2396

Description: General view of road to Baker Lake from quarry, looking south.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 70 – Quarry 21

Date: September 25, 2009. **Photo Number:** IMG_2386

Description: Looking south. Vertical walls 6 to 8 m high decreasing towards the AWPAP. Some ravelling of small blocks. Small inflow / seepage observed but no ponded water.



PHOTOGRAPH 71 – Quarry 21

Date: September 25, 2009. **Photo Number:** IMG_2387

Description: Close up view of seepage inflow about 2 m above the base of the quarry.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 723 – Quarry 21

Date: September 25, 2009. **Photo Number:** IMG_2388

Description: Looking south. Vertical walls 7 to 8 m high. Some raveling of small blocks.



PHOTOGRAPH 73 – Quarry 21

Date: September 25, 2009. **Photo Number:** IMG_2389

Description: Looking west. Vertical walls 7 to 8 m high. Minor raveling of small blocks.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 74 – Quarry 21

Date: September 25, 2009. **Photo Number:** IMG_2390

Description: General view looking northeast. Wall sloped by natural processes, ravelling. Wall height decreases towards AWPAR.



PHOTOGRAPH 75 – Quarry 22

Date: September 25, 2009. **Photo Number:** IMG_2372

Description: General view of quarry looking northwest with pile of tires (right background) and contaminated soil (left). Vertical walls 8 to 10 m high decreasing towards the AWPAR. No ponded water.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 76 – Quarry 22

Date: September 25, 2009. **Photo Number:** IMG_2373

Description: Pile of tires at right back corner of quarry. Vertical walls 8 to 10 m high.



PHOTOGRAPH 77 – Quarry 22

Date: September 25, 2009. **Photo Number:** IMG_2374

Description: Miscellaneous refuse temporarily stored in the quarry.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 78 – Quarry 22

Date: September 25, 2009. **Photo Number:** IMG_2375

Description: Miscellaneous refuse at left back corner of quarry, looking northwest.



PHOTOGRAPH 79 – Quarry 23 (Air strip quarry)

Date: September 23, 2009. **Photo Number:** IMG_2265

Description: Looking south, at south wall of quarry, small amount of ponded water.



PHOTOGRAPHS – QUARRIES



PHOTOGRAPH 80 – Quarry 23 (Air strip quarry)

Date: September 23, 2009. **Photo Number:** IMG_2266 and IMG_2267

Description: Looking southeast, at eastern wall.



PHOTOGRAPH 81 – Quarry 23 (Air strip quarry)

Date: September 23, 2009. **Photo Number:** IMG_2266 and IMG_2267

Description: North wall of quarry.

PHOTOS 0020 to 0021

Quarry 1
(blasted boundaries)

95 Bench

N:7140229
E:644646

Area 11

Area 10

Inukshuk

101 Bench

N:7140167
E:644722

GATE

TO BAKER
LAKE

Quarry 1 - 1m contour intervals				
Bench Elevation	Design Volume Excavated m3	Crest surface Area m2	Toe surface area m2	Survey Date
95 & 101	93,260	Not Available	Not Available	April 3, 2007

PHOTOS 0043 to 0046



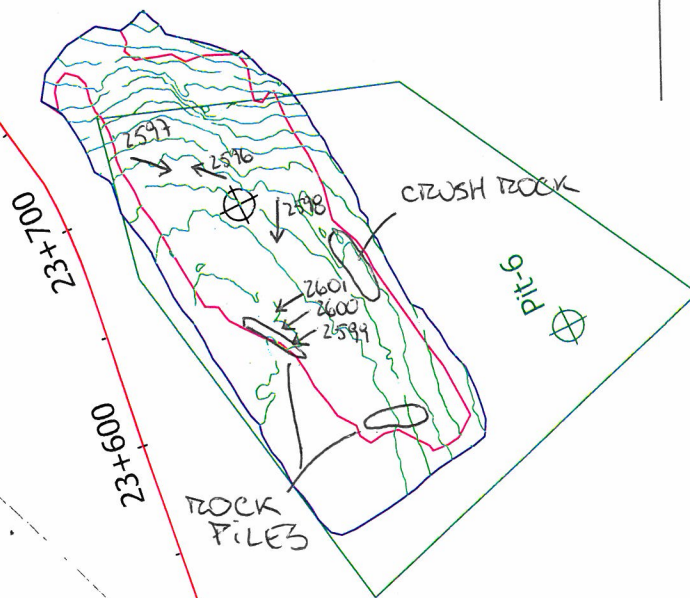
Quarry 2
N:7147611
E:642097

Quarry 2 - 1m contour intervals				
Bench Elevation	BCM Excavated m3	Crest surface Area m2	Toe surface area m2	Survey Date
86	94,047	16,743	12,112	Oct. 22, 2007

TO BAKER
LAKE

PHOTOS 2596 to 2601

Quarry 3
N:7156420
E:638006



Quarry 3 - 1m contour intervals				
Bench Elevation	BCM Excavated m3	Crest surface Area m2	Toe surface area m2	Survey Date
90	126,791	20,507	13,127	Oct. 21, 2007

PHOTOS 2552 to 2553

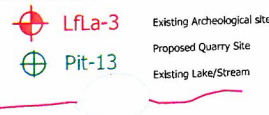
Quarry 4
N:7162510
E:633883



Quarry 4 - 1m contour intervals				
Bench Elevation	BCM Excavated m3	Crest surface Area m2	Toe surface area m2	Survey Date
119	25,315	6,437	4,935	Jun. 3, 2007

TO BAKER
LAKE

GOLDER DATA



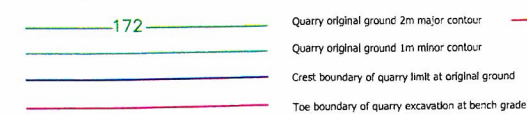
R02

-120-

-1+000-

River crossing (crossing structure and dimension)
Existing major contour (10m Topo)
Existing minor contour (interpreted)
Proposed centerline of road

AS CONSTRUCTED DATA



NOTES:

Quarry Data Summarized in Table 1
100m stations are referenced to 0+000 N 7135821.224 E 646026.187

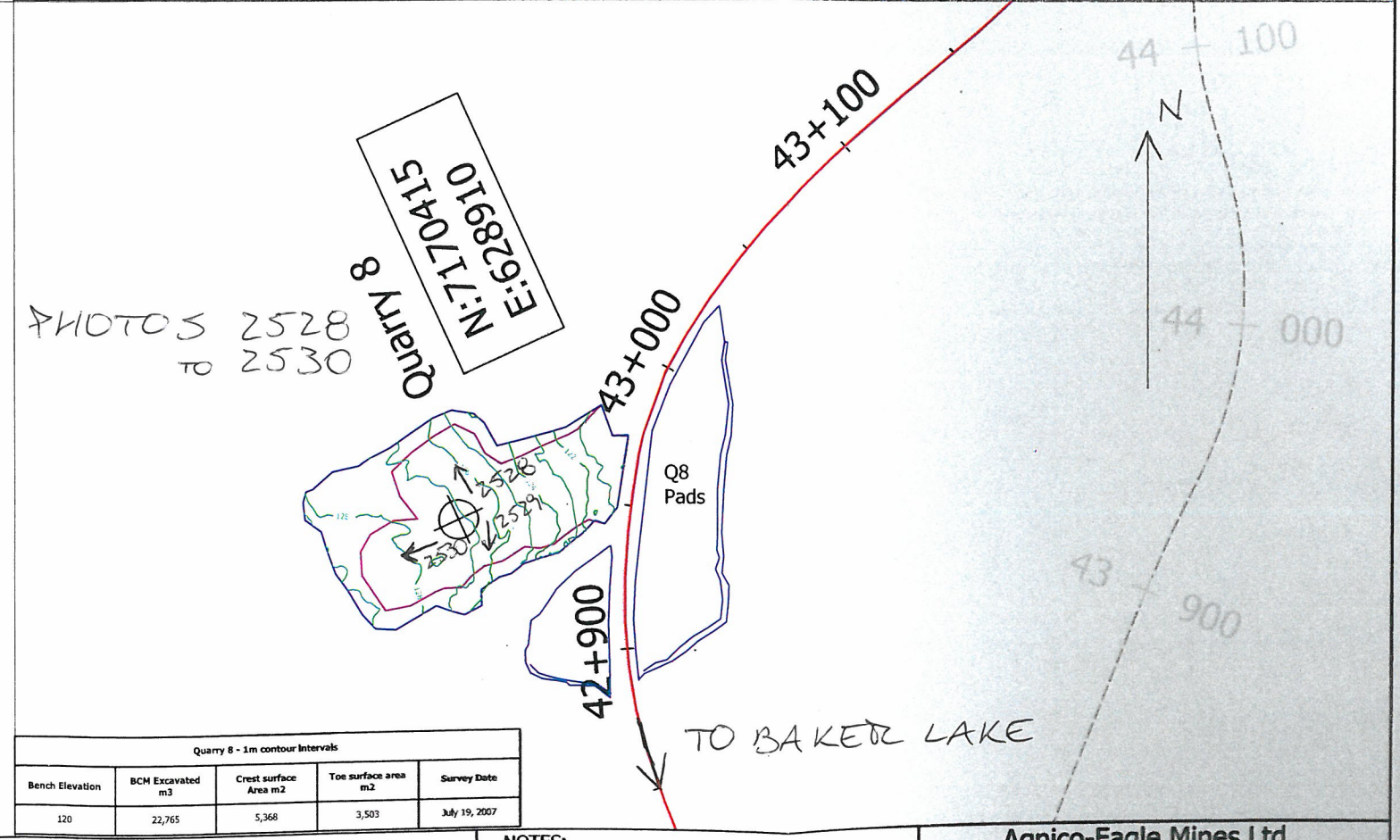
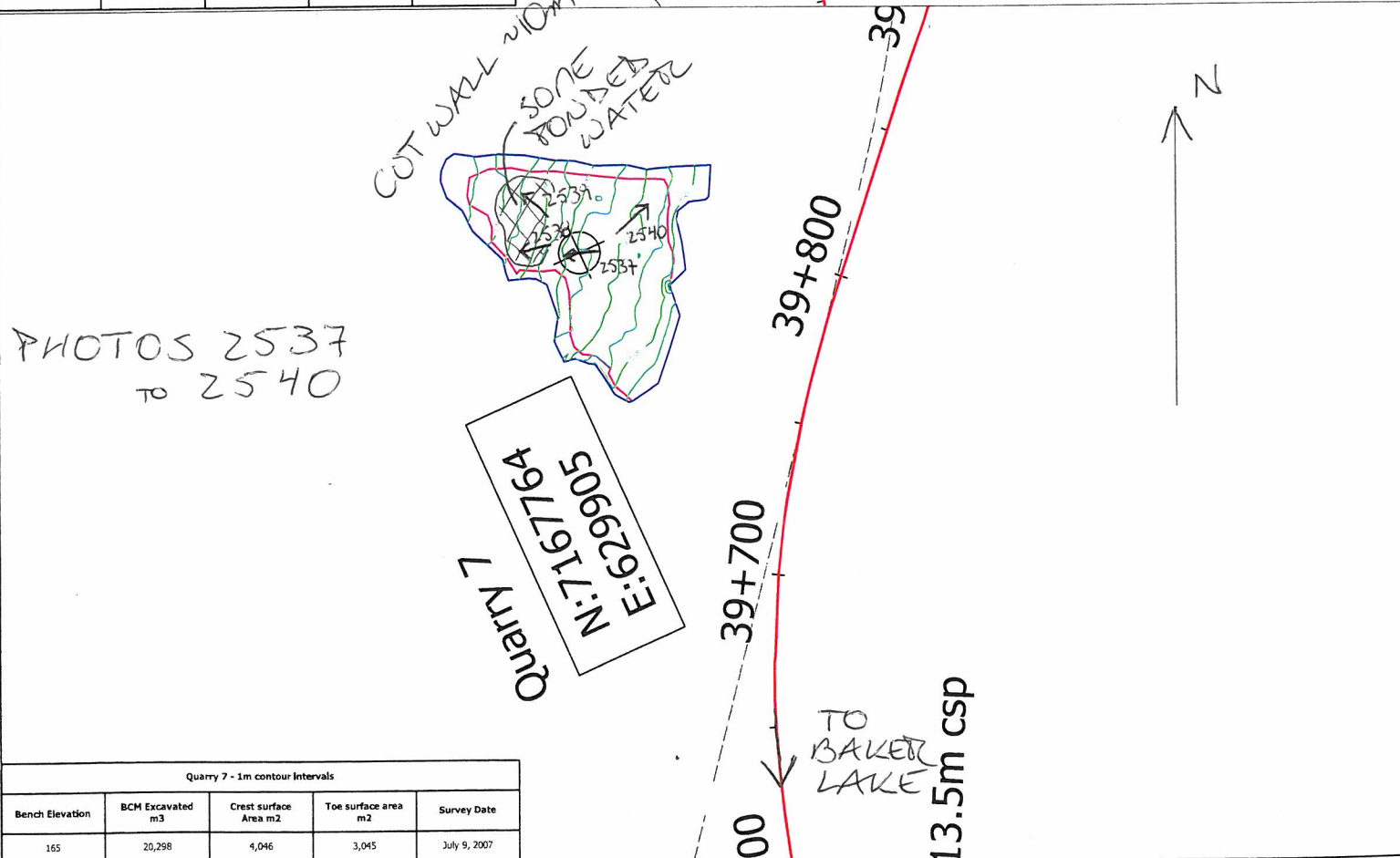
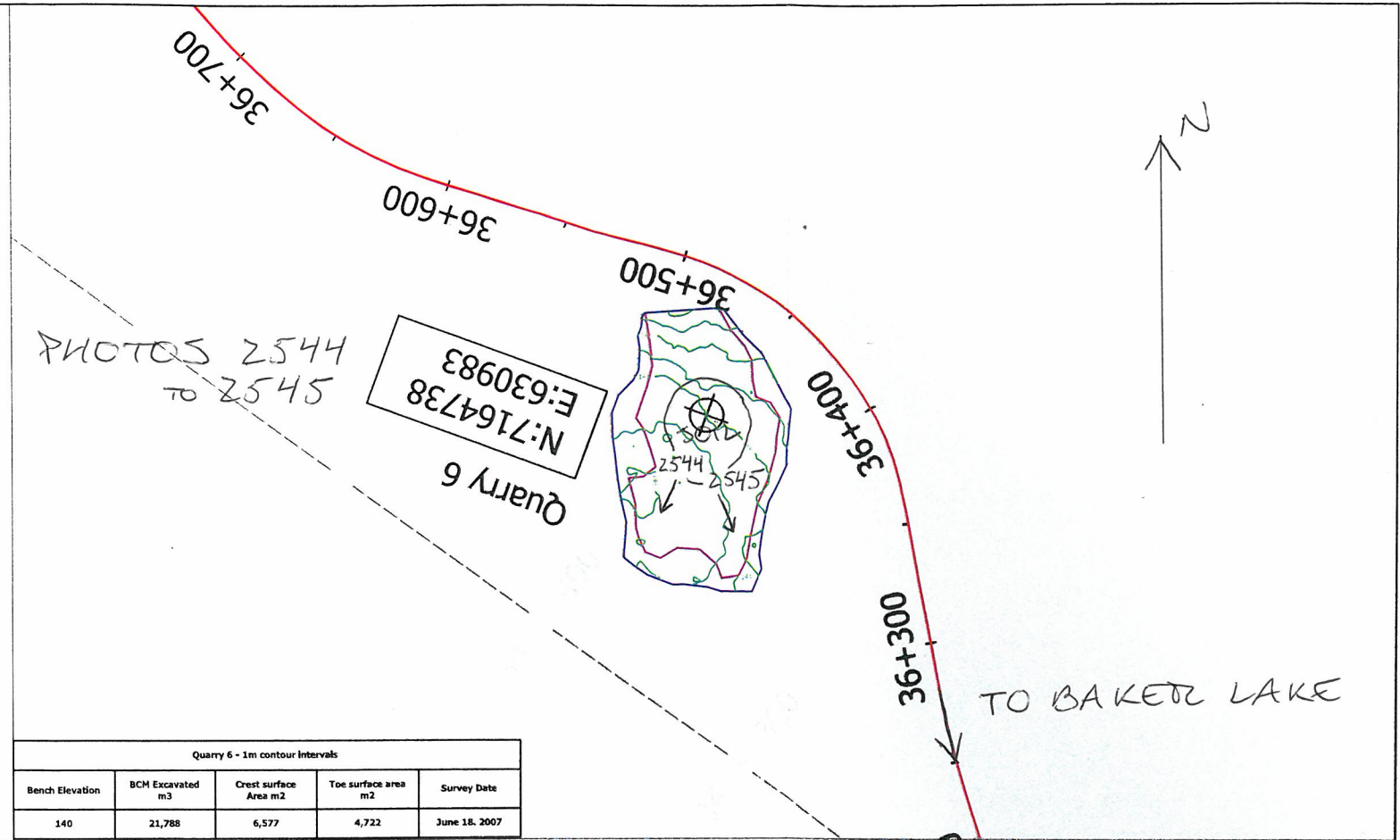
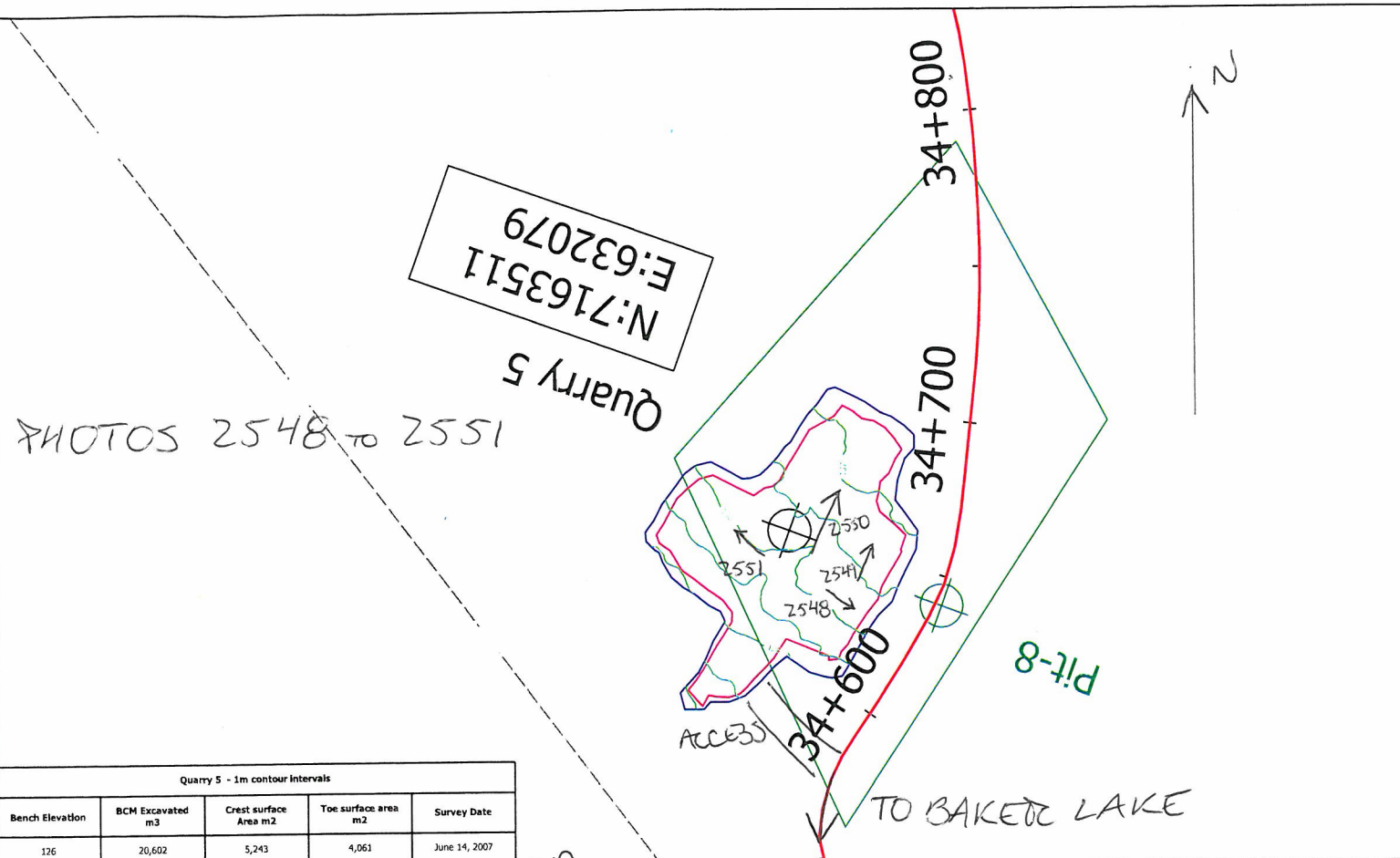
Agnico-Eagle Mines Ltd

Meadowbank Gold Project
Tehok Access Road Construction

As constructed Quarry Drawing Figure 1

Quarry 1 to Quarry 4

NTS	MC	CG/HB	March 31, 2008
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GOLDER DATA

- Existing Archeological site
- Proposed Quarry Site
- Existing Lake/Stream

AS CONSTRUCTED DATA

- Quarry original ground 2m major contour
- Quarry original ground 1m minor contour
- Crest boundary of quarry limit at original ground
- Toe boundary of quarry excavation at bench grade

NOTES:

Quarry Data Summarized in Table 1
100m stations are referenced to 0+000 N 7135821.224 E 646026.187

Legend:

- R02
- 120
- 1+000

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Meadowbank Gold Project
Tehek Access Road Construction

As constructed Quarry Drawing Figure 2
Quarry 5 to Quarry 8

March 31, 2008

PHOTOS 2524 to 2527

Quarry 9
N:7171846
E:628553

Quarry 9 - 1m contour intervals				
Bench Elevation	BCM Excavated m3	Crest surface Area m2	Toe surface area m2	Survey Date
120	57,917	9,487	7,176	Aug. 7, 2007

TO BAKER LAKE

PHOTOS 2509 to 2513

Quarry 10
N:7174192
E:625578

Quarry 10 - 1m contour intervals				
Bench Elevation	BCM Excavated m3	Crest surface Area m2	Toe surface area m2	Survey Date
97	31,663	7,235	5,201	July 26, 2007

TO BAKER LAKE

PHOTOS 2502 to 2508

Quarry 11
N:7178687
E:625321

Quarry 11 - 1m contour intervals				
Bench Elevation	BCM Excavated m3	Crest surface Area m2	Toe surface area m2	Survey Date
114	63,671	13,744	11,341	Oct. 6, 2007

TO BAKER LAKE

PHOTOS 2498 to 2501

Quarry 12
N:7182277
E:625893

Quarry 12 - 1m contour intervals				
Bench Elevation	BCM Excavated m3	Crest surface Area m2	Toe surface area m2	Survey Date
127	48,347	11,987	10,158	Aug. 25, 2007

TO BAKER LAKE

GOLDER DATA

- LfLa-3 Existing Archeological site
- Pit-13 Proposed Quarry Site
- Existing Lake/Stream

R02

River crossing (crossing structure and dimension)

120

Existing major contour (10m Topo)

1+000

Existing minor contour (Interpreted)

Proposed centerline of road

AS CONSTRUCTED DATA

- 172 Quarry original ground 2m major contour
- Quarry original ground 1m minor contour
- Crest boundary of quarry limit at original ground
- Toe boundary of quarry excavation at bench grade

1+200

Centerline of road with 100m stations

R20

River crossing-culvert 600mm/1200mm dia

PC-1

River Crossing-12m30m bridges

NOTES:

Quarry Data Summarized in Table 1
100m stations are referenced to 0+000 N 7135821.224 E 646026.187

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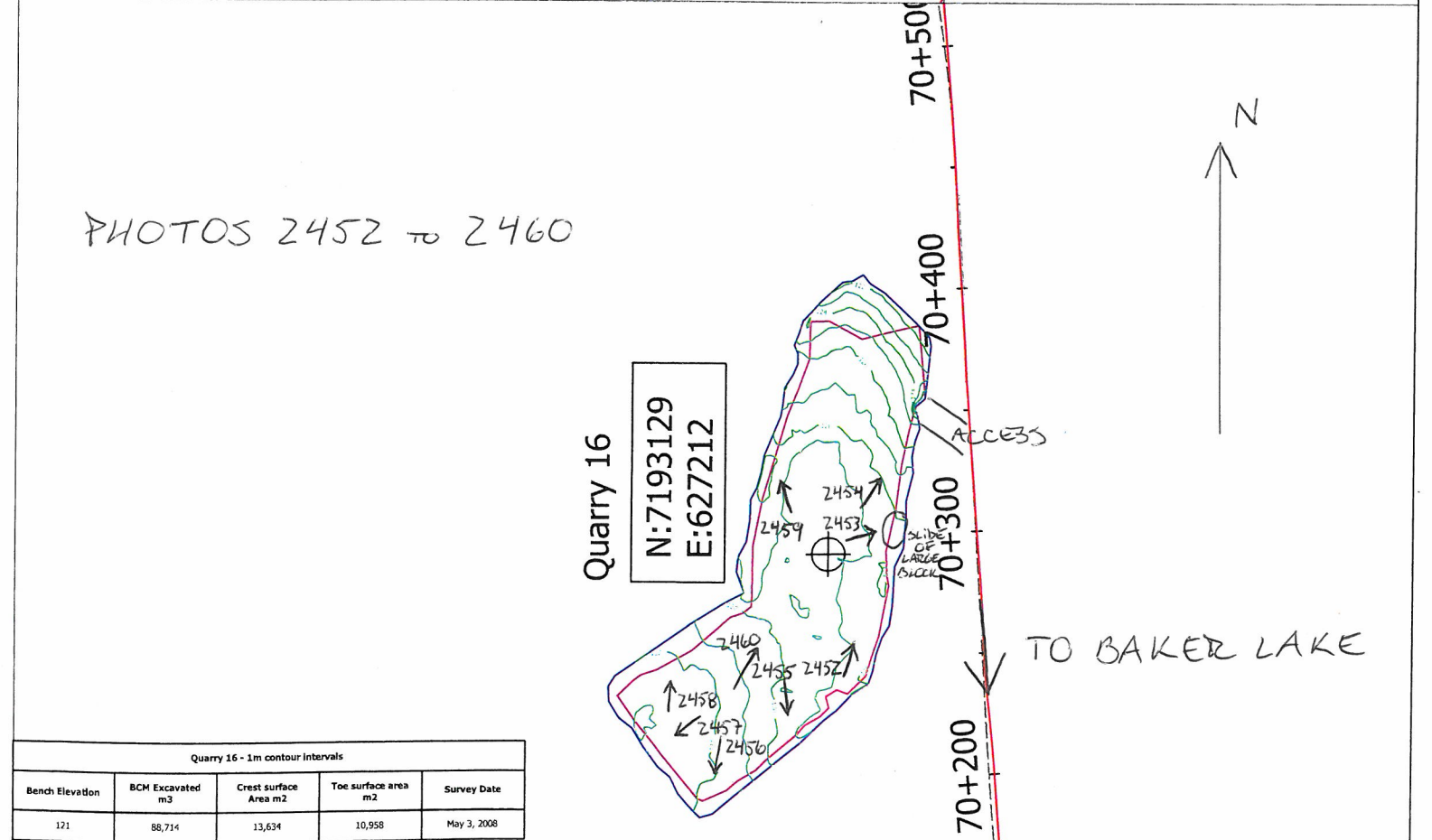
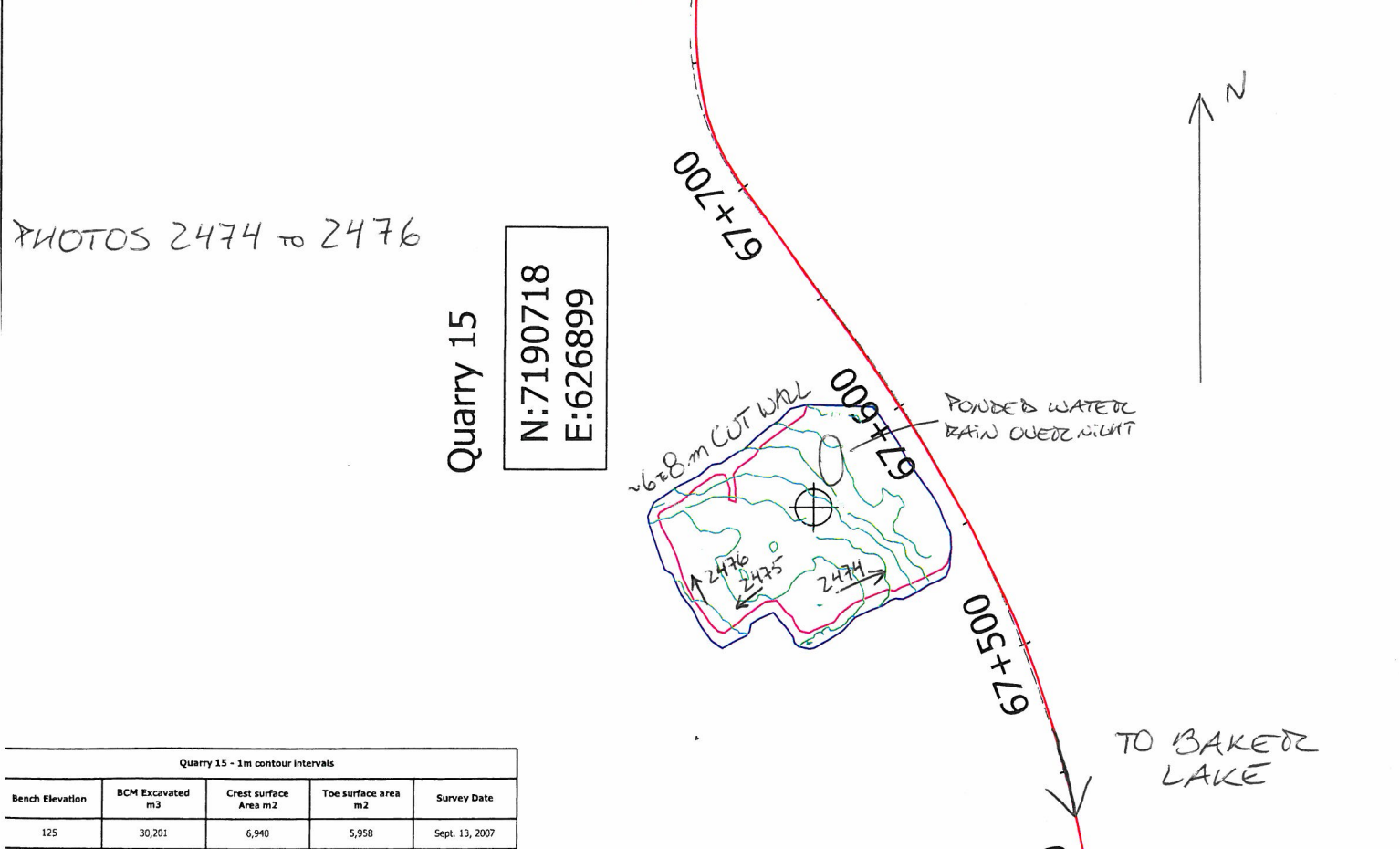
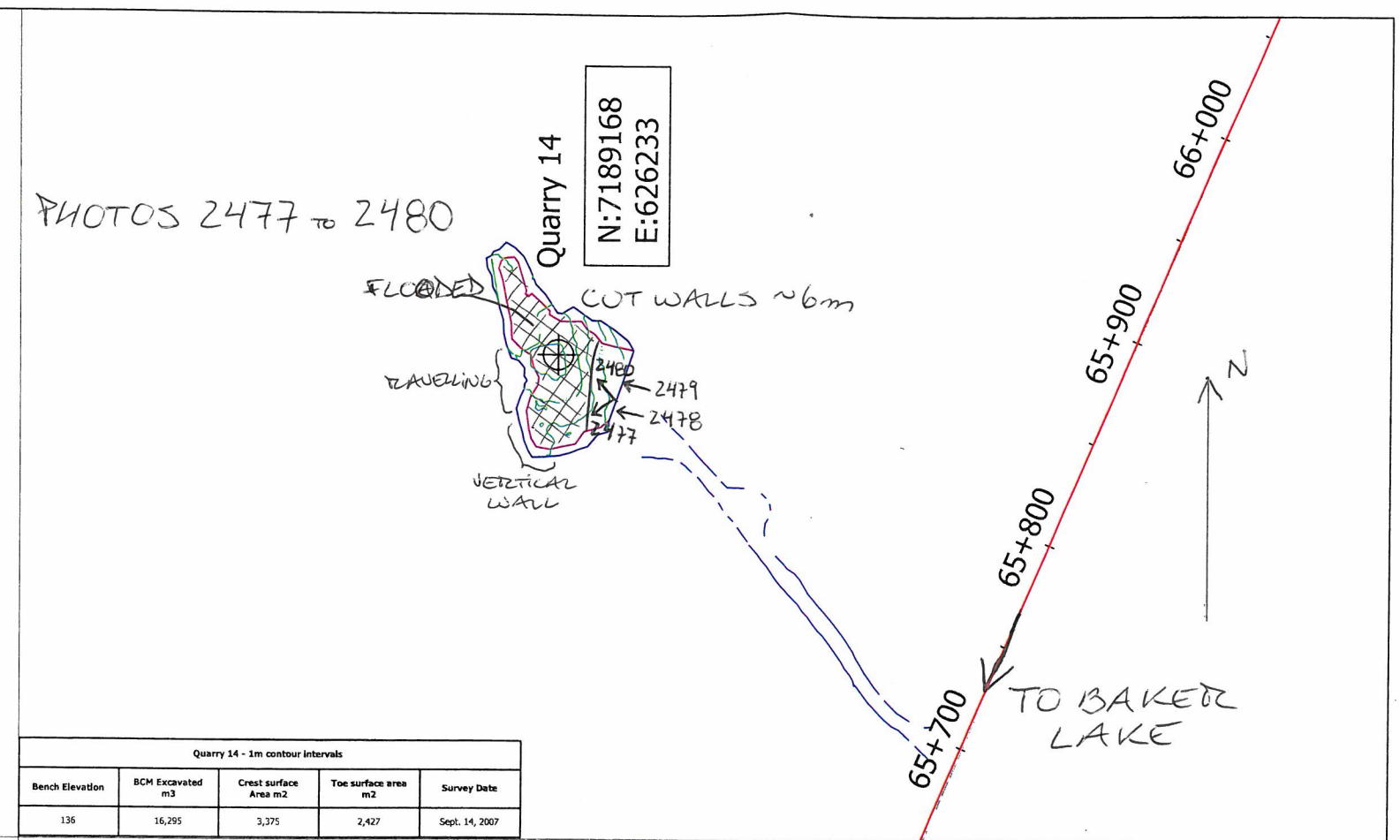
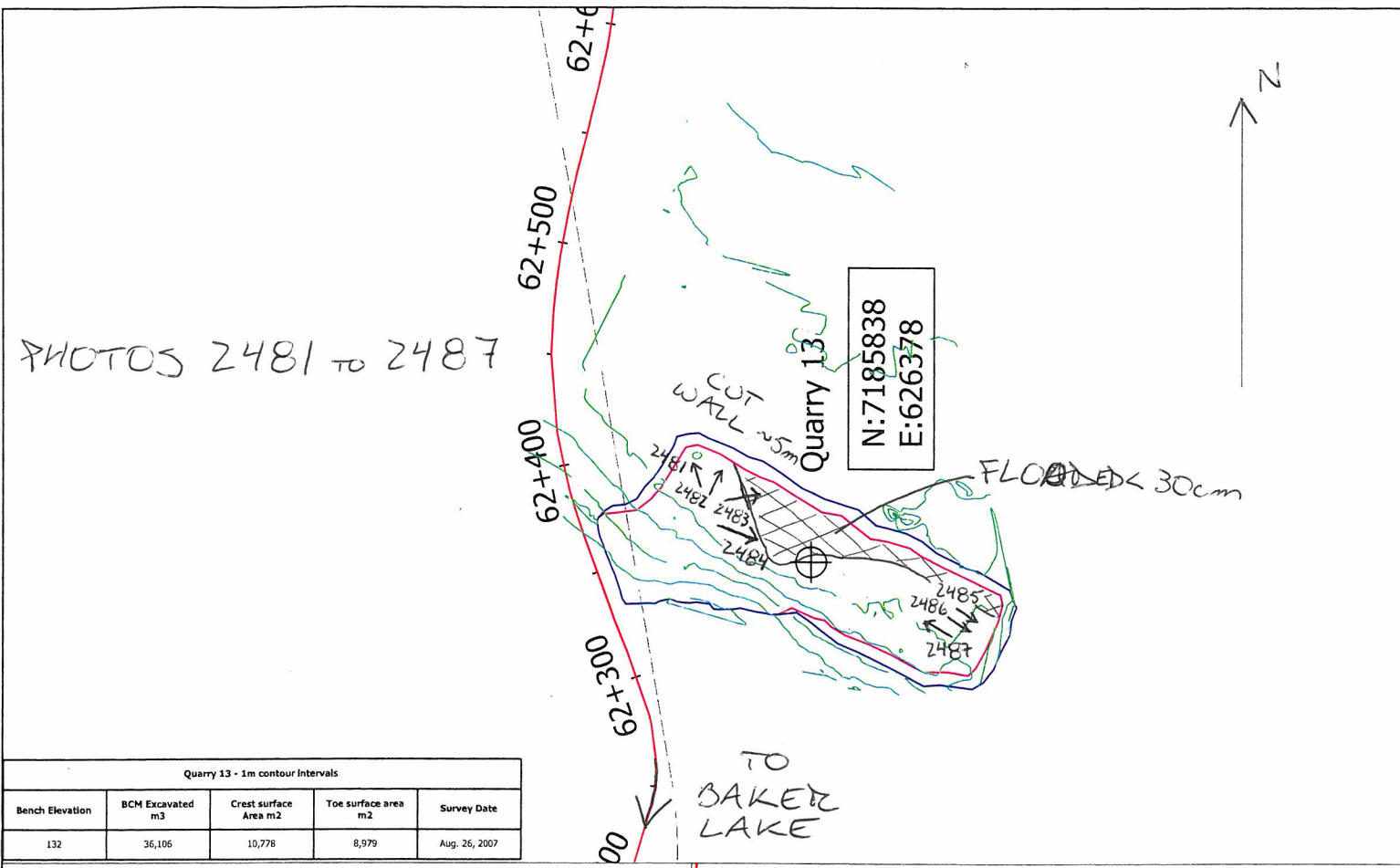
Meadowbank Gold Project
Tehek Access Road Construction

As constructed Quarry Drawing Figure 3

Quarry 9 to Quarry 12



March 31, 2008



GOLDER DATA

- LfLa-3 Existing Archeological site
- Pit-13 Proposed Quarry Site
- Existing Lake/Stream

AS CONSTRUCTED DATA

- 172 Quarry original ground 2m major contour
- 172 Quarry original ground 1m minor contour
- 172 Crest boundary of quarry limit at original ground

NOTES:

Quarry Data Summarized in Table 1
100m stations are referenced to 0+000 N 7135821.224 E 646026.187

Agnico-Eagle Mines Ltd

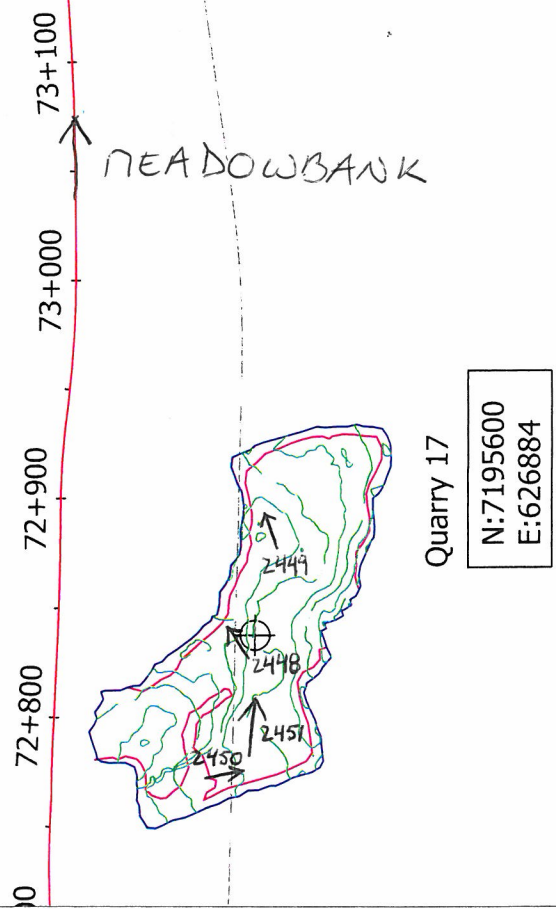
Meadowbank Gold Project
Tehok Access Road Construction

As constructed Quarry Drawing Figure 4

Legend:

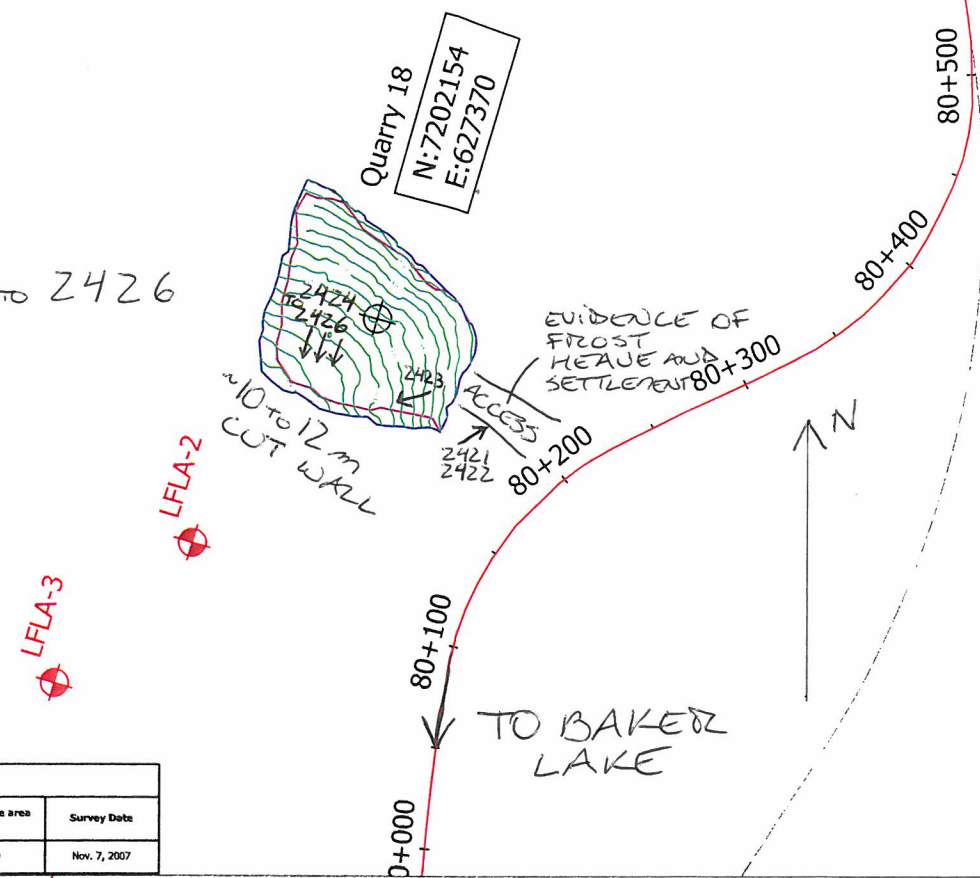
- R02 River crossing (crossing structure and dimension)
- 120 Existing major contour (10m Topo)
- 1+000 Existing minor contour (Interpreted)
- 1+000 Proposed centerline of road
- 1+200 Centerline of road with 100m stations
- R20 PC-1 River crossing-culvert 600mm/1200mm dia
- R02 River Crossing-12m/30m bridge

PHOTOS 2448 to 2451



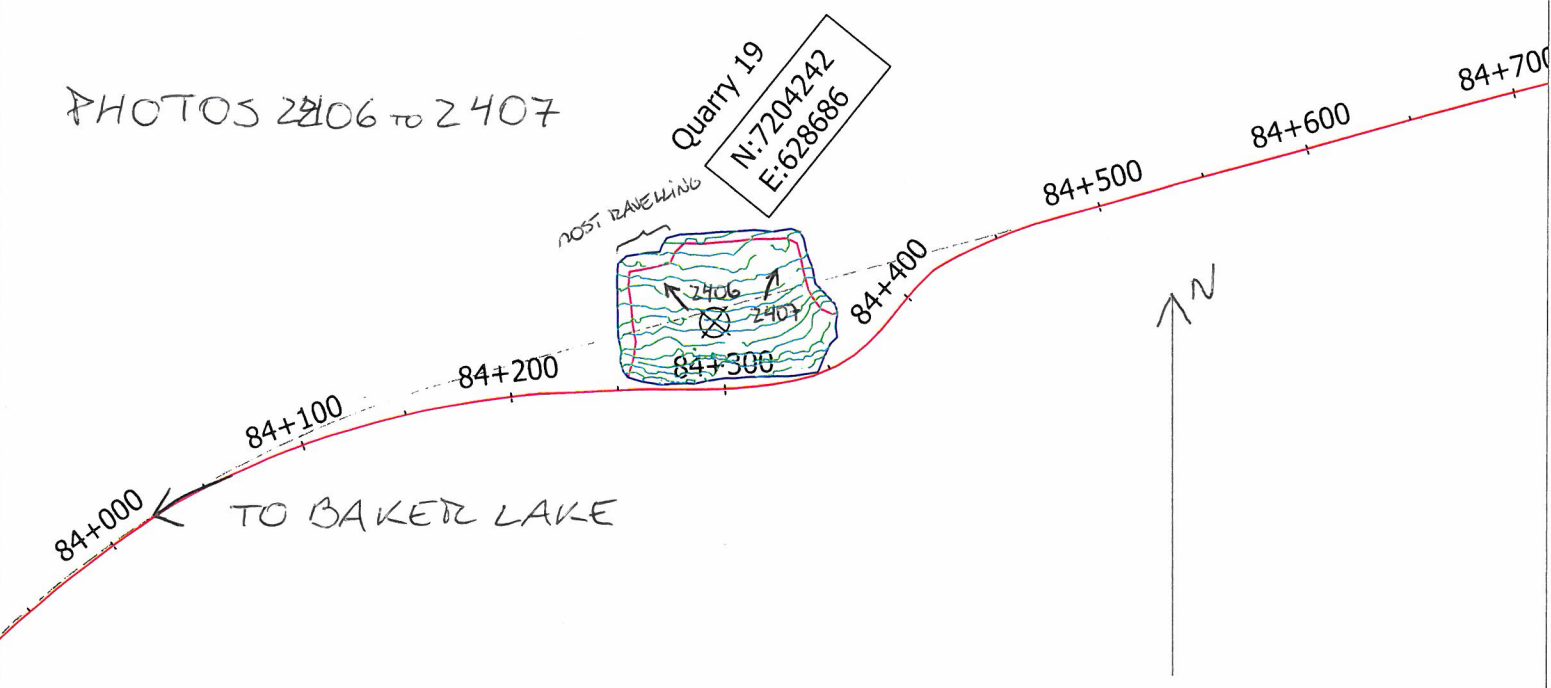
Quarry 17 - 1m contour intervals				
Bench Elevation	BCM Excavated m3	Crest surface Area m2	Toe surface area m2	Survey Date
124	48,539	12,363	10,958	Oct. 17, 2007

PHOTOS 2421 to 2426



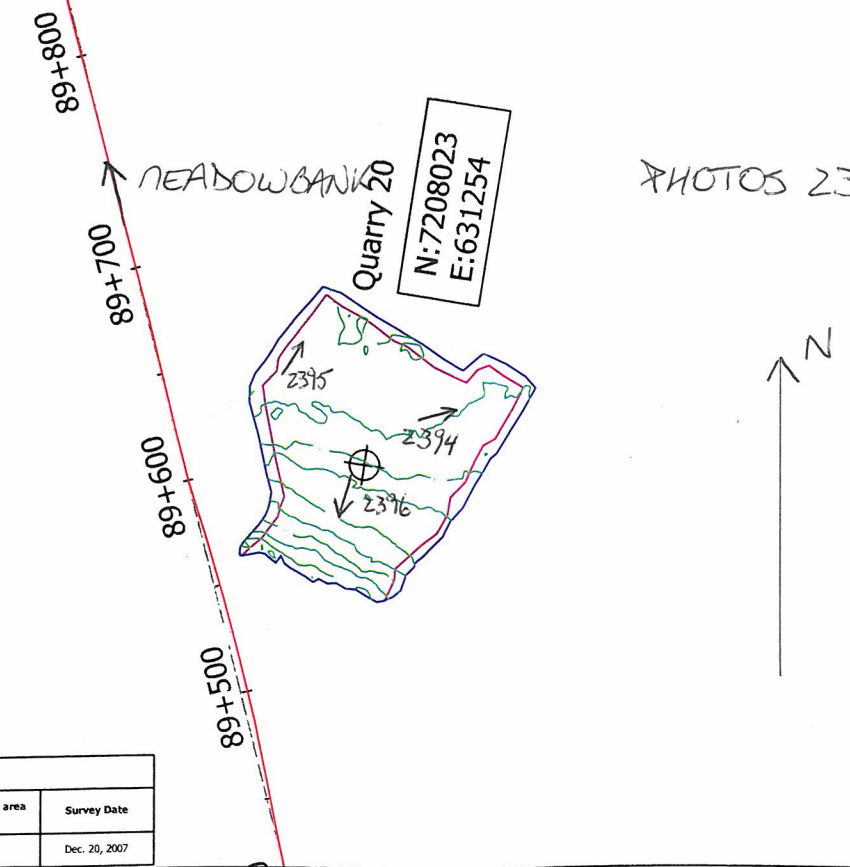
Quarry 18 - 1m contour intervals				
Bench Elevation	BCM Excavated m3	Crest surface Area m2	Toe surface area m2	Survey Date
129	46,094	8,419	7,099	Nov. 7, 2007

PHOTOS 2406 to 2407



Quarry 19 - 1m contour intervals				
Bench Elevation	BCM Excavated m3	Crest surface Area m2	Toe surface area m2	Survey Date
133	34,480	6,230	5,286	Dec. 1, 2007

PHOTOS 2394 to 2396



Quarry 20 - 1m contour intervals				
Bench Elevation	BCM Excavated m3	Crest surface Area m2	Toe surface area m2	Survey Date
191	53,388	11,660	9,874	Dec. 20, 2007

GOLDER DATA

Existing Archeological site

Proposed Quarry Site

Existing Lake/Stream

River crossing (crossing structure and dimension)

Existing major contour (10m Topo)

Existing minor contour (Interpreted)

Proposed centerline of road

AS CONSTRUCTED DATA

Quarry original ground 2m major contour

Quarry original ground 1m minor contour

Crest boundary of quarry limit at original ground

Toe boundary of quarry excavation at bench grade

Centerline of road with 100m stations

River crossing-culvert 600mm/1200mm dia

River Crossing-12m/30m bridges

NOTES:

Quarry Data Summarized in Table 1

100m stations are referenced to 0+000 N 7135821.224 E 646026.187

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Meadowbank Gold Project

Tehek Access Road Construction

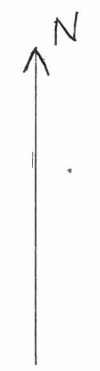
As constructed Quarry Drawing Figure 5

Quarry 17 to Quarry 20

PHOTOS 2386 to 2390

Quarry 21

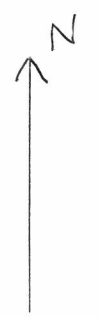
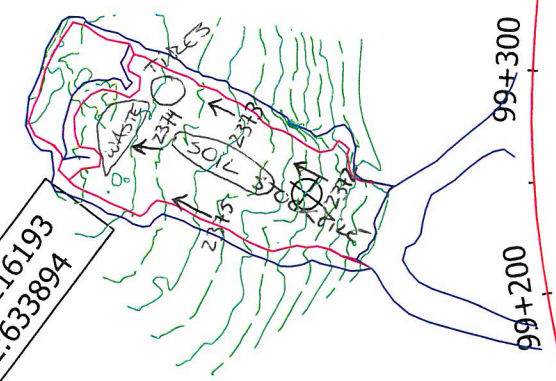
N:7208023
E:631254



PHOTOS 2372 to 2375

Quarry 22

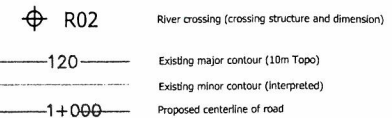
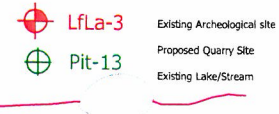
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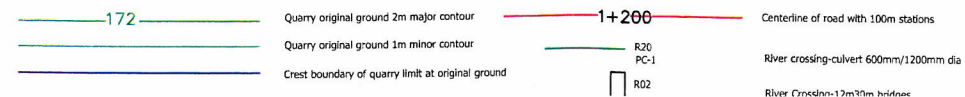
Quarry 20 - 1m contour intervals				
Bench Elevation	BCM Excavated m3	Crest surface Area m2	Toe surface area m2	Survey Date
167	55,360	9,096	7,732	Feb. 5, 2008

Quarry 22 Active Pit - 1m contour intervals				
Bench Elevation	BCM Excavated m3	Crest surface Area m2	Toe surface area m2	Survey Date
147	65,049	10,440	8,634	May 4, 2008

GOLDER DATA



AS CONSTRUCTED DATA



NOTES:

Quarry Data Summarized in Table 1
100m stations are referenced to 0+000 N 7135821.224 E 646026.187

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Meadowbank Gold Project
Tehek Access Road Construction

As constructed Quarry Drawing Figure 6
Quarry 21 to Quarry 22



APPENDIX F

LANDFILL: PHOTOGRAPHIC LOG



PHOTOGRAPHS – MEADOWBANK LANDFILL



PHOTOGRAPH 1 – Landfill

Date: September 24, 2009. **Photo Number:** IMG_2300

Description: Looking north at waste in top of current cell.



PHOTOGRAPH 2 – Landfill

Date: September 24, 2009. **Photo Number:** IMG_2303_2304

Description: Looking northeast at waste in landfill.



APPENDIX G

BULK FUEL STORAGE FACILITIES

Appendix G1 - Baker Lake Tank Farm: Photographic Log

Appendix G2 - Meadowbank Tank Farm: Photographic Log



Appendix G1

Baker Lake Tank Farm: Photographic Log



PHOTOGRAPHS – BAKER LAKE TANK FARM



PHOTOGRAPH 1 – Baker Lake Tank Farm

Date: September 26, 2009. **Photo Number:** IMG_2555

Description: View of road and pipeline between the dock area and the tank farm, looking southwest.



PHOTOGRAPH 2 – Baker Lake Tank Farm

Date: September 26, 2009. **Photo Number:** IMG_2556 and IMG_2557

Description: View of tank farm and fuelling station, looking east. Tank 1 is in the foreground of the photograph.



PHOTOGRAPHS – BAKER LAKE TANK FARM



PHOTOGRAPH 3 – Baker Lake Tank Farm

Date: September 26, 2009. **Photo Number:** IMG_2558

Description: View of containment berm in front of Tank 1 and 2, looking southeast.



PHOTOGRAPH 4 – Baker Lake Tank Farm

Date: September 26, 2009. **Photo Number:** IMG_2559

Description: View of containment berm in front of Tank 3 and 4, looking southeast.



PHOTOGRAPHS – BAKER LAKE TANK FARM



PHOTOGRAPH 5 – Baker Lake Tank Farm

Date: September 26, 2009. **Photo Number:** IMG_2562

Description: View of road and embankment of containment berm downstream of tanks, looking northwest.



PHOTOGRAPH 6 – Baker Lake Tank Farm

Date: September 26, 2009. **Photo Number:** IMG_2563

Description: View of road and containment berm, looking northeast.



PHOTOGRAPHS – BAKER LAKE TANK FARM



PHOTOGRAPH 7 – Baker Lake Tank Farm

Date: September 26, 2009. **Photo Number:** IMG_2564

Description: View of containment berm on the east side of Tank 4, looking southwest.



PHOTOGRAPH 8 – Baker Lake Tank Farm

Date: September 26, 2009. **Photo Number:** IMG_2565

Description: View of tank farm and slope cut on northern side of the tanks, looking west.



PHOTOGRAPHS – BAKER LAKE TANK FARM



PHOTOGRAPH 5 – Baker Lake Tank Farm

Date: September 26, 2009. **Photo Number:** IMG_2566

Description: View of cut slope on the north side of Tank 4, looking northeast. Two benches used along northeast side, upper one is mainly soil, lower bench consists of more competent rock.



PHOTOGRAPH 6 – Baker Lake Tank Farm

Date: September 26, 2009. **Photo Number:** IMG_2567

Description: View of rock cut along north side of the tank farm, looking northwest.



PHOTOGRAPHS – BAKER LAKE TANK FARM



PHOTOGRAPH 7 – Baker Lake Tank Farm

Date: September 26, 2009. **Photo Number:** IMG_2568

Description: View of Tank 3 (foreground) and Tank 4, looking south.



PHOTOGRAPH 8 – Baker Lake Tank Farm

Date: September 26, 2009. **Photo Number:** IMG_2569

Description: View of berm between Tank 2 (right) and Tank 3 (left), looking southwest.



PHOTOGRAPHS – BAKER LAKE TANK FARM



PHOTOGRAPH 9 – Baker Lake Tank Farm

Date: September 26, 2009. **Photo Number:** IMG_2570

Description: View of Tank 2 (foreground) and Tank 1, looking northwest.



PHOTOGRAPH 10 – Baker Lake Tank Farm

Date: September 26, 2009. **Photo Number:** IMG_2571

Description: View of rock cut along north side of tank farm near Tank 1, looking southeast.



PHOTOGRAPHS – BAKER LAKE TANK FARM



PHOTOGRAPH 11 – Baker Lake Tank Farm

Date: September 26, 2009. **Photo Number:** IMG_2572

Description: View of refuelling station adjacent to Tank 1, looking southwest.



PHOTOGRAPH 12 – Baker Lake Tank Farm

Date: September 26, 2009. **Photo Number:** IMG_2573

Description: View of tank farm, looking southeast. Tank 1 is in the foreground of the photograph.



PHOTOGRAPHS – BAKER LAKE TANK FARM



PHOTOGRAPH 13 – Baker Lake Tank Farm

Date: September 26, 2009. **Photo Number:** IMG_2574

Description: View of refuelling station, looking south.



PHOTOGRAPH 14 – Baker Lake Tank Farm

Date: September 26, 2009. **Photo Number:** IMG_2575

Description: View of containment area in front of Tank 1 and Tank 2, looking southeast, small amount of ponded fluid is evident.



PHOTOGRAPHS – BAKER LAKE TANK FARM



PHOTOGRAPH 15 – Baker Lake Tank Farm

Date: September 26, 2009. **Photo Number:** IMG_2576

Description: View of access ramp and ponded water in western corner on the south side of Tank 1, looking west.



PHOTOGRAPH 16 – Baker Lake Tank Farm

Date: September 26, 2009. **Photo Number:** IMG_2577

Description: View of ponded water in containment area in front of Tank 2, looking west.



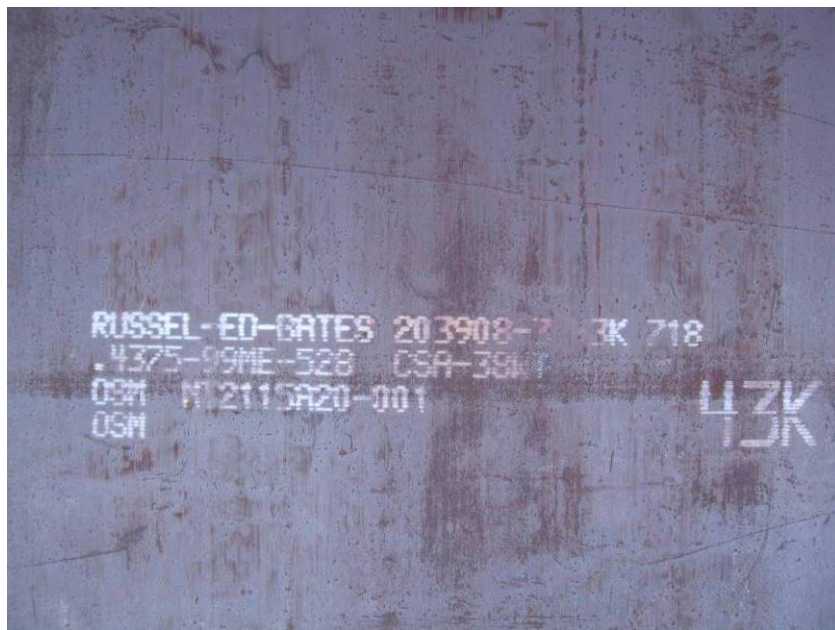
PHOTOGRAPHS – BAKER LAKE TANK FARM



PHOTOGRAPH 17 – Baker Lake Tank Farm

Date: September 26, 2009. **Photo Number:** IMG_2578

Description: View of ponded water and sump in containment area in front of Tank 3, looking west.



PHOTOGRAPH 18 – Baker Lake Tank Farm

Date: September 26, 2009. **Photo Number:** IMG_2579

Description: Tank label.



PHOTOGRAPHS – BAKER LAKE TANK FARM



PHOTOGRAPH 19 – Baker Lake Tank Farm

Date: September 26, 2009. **Photo Number:** IMG_2580

Description: View of containment area in front of Tank 4 and Tank 3, looking west.



PHOTOGRAPH 20 – Baker Lake Tank Farm

Date: September 26, 2009. **Photo Number:** IMG_2581

Description: View of containment area east of Tank 4, looking north.



PHOTOGRAPHS – BAKER LAKE TANK FARM



PHOTOGRAPH 21 – Baker Lake Tank Farm

Date: September 26, 2009. **Photo Number:** IMG_2582

Description: View of containment area east of Tank 4 and buried tank, looking north.

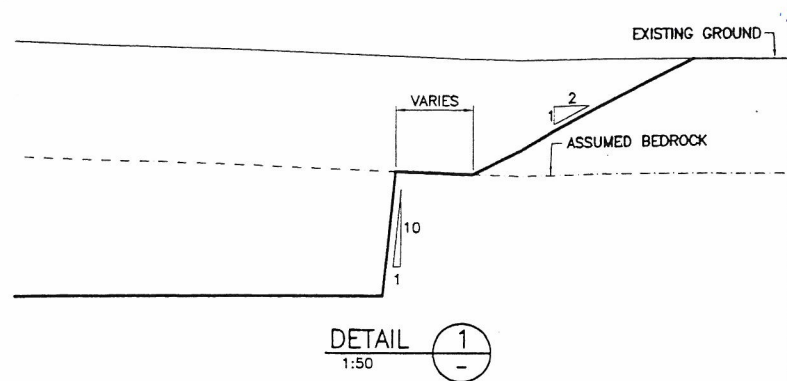
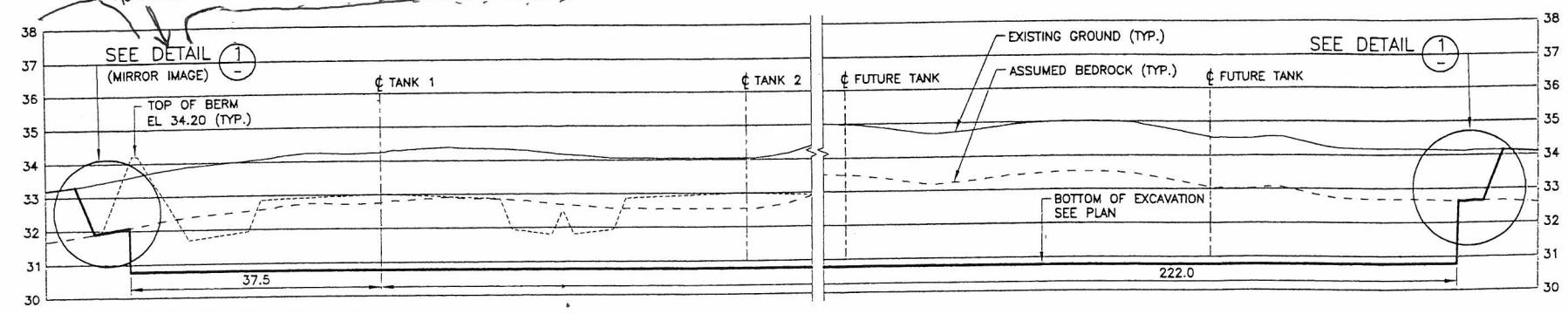
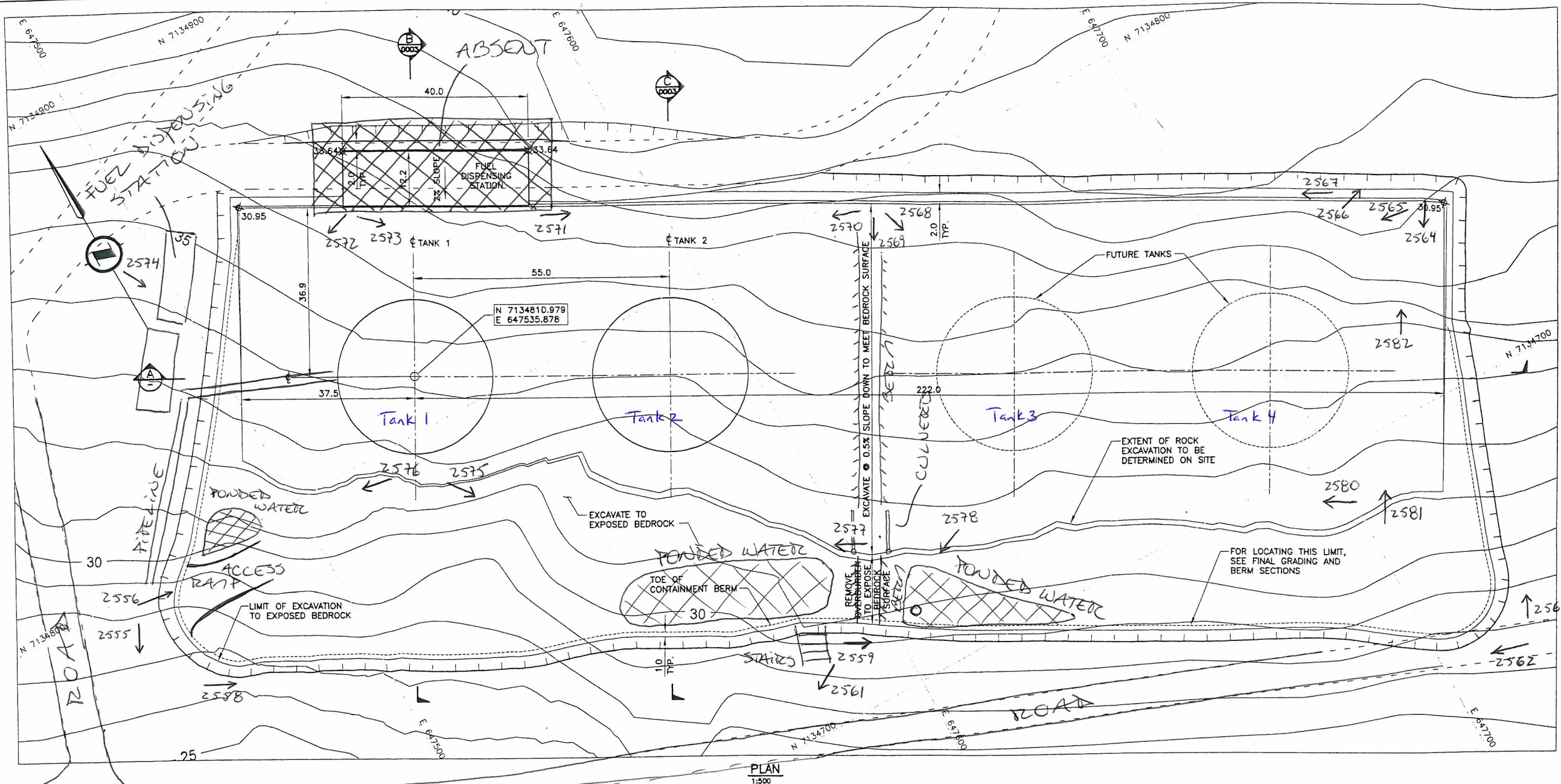


PHOTOGRAPH 22 – Baker Lake Tank Farm

Date: September 26, 2009. **Photo Number:** IMG_2583

Description: View of pipe support within the containment area.

IE: 2007/04/04 - 10:04am
TH: H:\017202 - Meadowbank V1 - Civil Engineering\Y10K - Sketches & Drawings\017202-1000-41D1-0002.dwg
PROJECT: Meadowbank V1 - Civil Engineering\Y10K - Sketches & Drawings\017202-1000-41D1-0002.dwg



- NOTES
- 1) Northings and Eastings are in metres referenced to UTM Zone 14, NAD83.
 - 2) Base Plan information including site topography, access roads and storage areas provided by Cumberland dated February 03, 2006.
 - 3) Elevations are in metres referenced to geodetic datum.

LEGEND:

— TOP OF CUT

33.64 SPOT ELEVATION

PERMIT TO PRACTICE
HEREBY GRANTED TO
Signature: A.R. WACHMANN
Date: ...
PERMIT NUMBER: P 272

NISHI-KHON/
SNC • LAVALIN

MEADOWBANK GOLD PROJECT
BAKER LAKE
DIESEL FUEL TANK FARM
TANK PAD EXCAVATION
PLAN, SECTION AND DETAIL

PROJECT NUMBER: 017202
DRAWING NUMBER: 1000-41D1-0002
REV. PB

DATE	BY	DESCRIPTION
07-04-03	RU	ISSUED FOR TENDER
06-06-22	RU	ISSUED FOR COMMENTS
DATE	BY	DESCRIPTION

CUMBERLAND
RESOURCES



Appendix G2

Meadowbank Tank Farm: Photographic Log



PHOTOGRAPHS – MEADOWBANK TANK FARM



PHOTOGRAPH 1 – Meadowbank Tank Farm

Date: September 23, 2009. **Photo Number:** IMG_2244

Description: View of 4 diesel tanks (green), 1 gasoline tank (white), containment area and fuel storage tank, looking northeast. Sub-excavated area lined with 1.5mm HDPE (not inspected) and covered with approximately 25mm minus gravel and sand.



PHOTOGRAPH 2 – Meadowbank Tank Farm

Date: September 23, 2009. **Photo Number:** IMG_2245

Description: View of containment area and tank, looking southeast.



PHOTOGRAPHS – MEADOWBANK TANK FARM



PHOTOGRAPH 3 – Meadowbank Tank Farm

Date: September 23, 2009. **Photo Number:** IMG_2246

Description: View of containment area and tank, looking southeast. Ponded fluid within the tank farm area.



PHOTOGRAPH 4 – Meadowbank Tank Farm

Date: September 23, 2009. **Photo Number:** IMG_2247

Description: View of 4 diesel tanks adjacent to the tank farm in the refuelling area, looking east.



PHOTOGRAPHS – MEADOWBANK TANK FARM



PHOTOGRAPH 5 – Meadowbank Tank Farm

Date: September 23, 2009. **Photo Number:** IMG_2248

Description: View of 4 diesel tanks and gasoline tank (white), looking southwest in the refuelling area.



PHOTOGRAPH 6 – Meadowbank Tank Farm

Date: September 23, 2009. **Photo Number:** IMG_2249

Description: View of refuelling station, looking west.



PHOTOGRAPHS – MEADOWBANK TANK FARM



PHOTOGRAPH 7 – Meadowbank Tank Farm

Date: September 23, 2009. **Photo Number:** IMG_2251

Description: View of refuelling station, looking southwest.



PHOTOGRAPH 8 – Meadowbank Tank Farm

Date: September 23, 2009. **Photo Number:** IMG_2252

Description: View of containment area and tank, looking west.



PHOTOGRAPHS – MEADOWBANK TANK FARM



PHOTOGRAPH 7 – Meadowbank Tank Farm

Date: September 23, 2009. **Photo Number:** IMG_2254

Description: View from within the tank farm containment area looking at the piping and refuelling station.
Photograph taken looking northeast.



APPENDIX H

STORMWATER MANAGEMENT PONDS: PHOTOGRAPHIC LOG



PHOTOGRAPHS – STORMWATER MANAGEMENT PONDS



PHOTOGRAPH 1 – Stormwater Pond 1, Teardrop Lake

Date: September 24, 2009. **Photo Number:** STA_2312, STB_2313, STC_2314 and STD_2315

Description: View of Stormwater Pond 1, also referred to as Teardrop Lake, looking southeast.



PHOTOGRAPH 2 – Stormwater Pond 2

Date: September 24, 2009. **Photo Number:** STA_2296, STB_2297 and STC_2298

Description: View of Stormwater Pond 2, within the Portage Rock Storage Area, looking northeast.



PHOTOGRAPHS – STORMWATER MANAGEMENT PONDS



PHOTOGRAPH 3 – Stormwater Pond 2

Date: September 24, 2009. **Photo Number:** IMG_2299

Description: View of the south shore of Stormwater Pond 2.

At Golder Associates we strive to be the most respected global group of companies specializing in ground engineering and environmental services. Employee owned since our formation in 1960, we have created a unique culture with pride in ownership, resulting in long-term organizational stability. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees now operating from offices located throughout Africa, Asia, Australasia, Europe, North America and South America.

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