Shear Minerals Ltd.

ISSUED FOR USE – REV 1

JERICHO DIAMOND MINE
2010 GEOTECHNICAL INSPECTION

E14101117

November 2010

EBA Engineering Consultants Ltd.
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TABLE OF CONTENTS

PAGE

FIGURES

TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

EBA Engineering Consultants Ltd. (EBA) completed the 2010 Annual Geotechnical Inspection of earthworks infrastructure at the Jericho Mine in Nunavut. The inspection and the report, presented herein, were prepared on behalf of Shear Minerals Ltd. (Shear) of Edmonton, Alberta. The report presents the observations noted during the inspection and recommendations for each structure. It is understood that Shear will also use this report to fulfill the water license requirement for an annual geotechnical inspection of the completed water retaining structures as specified in the Jericho Diamond Mine Water License NEWB1JER0410, Part G, Section 4.

The following structures were evaluated during the inspection:

- Processed Kimberlite Containment Area (PKCA) Dams and Dykes (West Dam, East Dam, Southeast Dam and Divider Dyke);
- Fuel Containment Facilities (Fuel tank farm, airstrip and generator containment facilities);
- Landfill; and
- C1 Diversion channel.

2.0 METHODOLOGY FOR INSPECTION

The inspection of each structure was completed by Mr. Jason Porter, P.Eng., of EBA on September 29th and 30th, 2010. Mr. Andrew Coster of Shear provided support during the inspection.

Each structure and its immediate surroundings were visually examined for signs of settlement, seepage, cracking, erosion or other signs of distress. It must be noted however, that there was a light snow cover on the ground at the time of the inspection. As such, the snow may have obscured fine details such as minor cracking or erosion however; the snow did not appear to be deep enough to obscure larger deficiencies. The snow did begin to melt on the September 30th and some of the structures were briefly re-inspected to determine if the melting snow had revealed any deficiencies. Photographs of the structures were not retaken on the 30th as no other noteworthy observations were noted.

Observations made during the inspection were photographed and recorded. Photographs of the general condition of each site were also taken for the record to track year by year changes to each structure. Selected photographs and inspection summary for each structure are presented in Appendices A though I. Also included in the appendices are plots of ground temperature data collected by the site personal at intervals throughout the year with the most recent set of readings obtained on September 27th, 2010. The data plots were reviewed in conjunction with the observations from each site to develop any recommendations presented for each structure.

As discussed previously, the snow cover may have obscured some minor deficiencies on the structures such as small cracks and incidents of settlement or erosion. EBA therefore, recommends that a follow up inspection take place in the spring. The inspection should take place as soon as practical after freshet is complete and the snow cover on the structures has melted. A spring inspection may give a better indication of the performance of the dams as pond water levels will be much higher than the late fall when discharging is complete.

The weather during the inspection was as follows:

- September 29, 2010 -4°C, moderate wind, Overcast
- September 30, 2010 +2°C, light wind, Sun

3.0 BACKGROUND

The Jericho Mine was operated by Tahera Diamond Corporation from 2006 through 2008. In late 2008, operations ceased due to financial difficulties. INAC assumed the care and maintenance of the mine in December 2008 until Shear purchased the facility in late August, 2010. At the time of the inspection, Shear had not resumed mining activities and was simply continuing the care and maintenance regime.

During past mine operation, fine processed kimberlite (fine PK) was deposited in a basin south of the main process plant as shown in Figure 1. The processed kimberlite management plan is presented in EBA 2006. The fine PK deposited in the eastern portion of the facility is contained by two dams, the East Dam and the Southeast Dam, and by one filter dyke, Divider Dyke A.

Fine PK effluent is filtered through Divider Dyke A into the western portion of the facility (Cells B and C). The West Dam and the surrounding high ground impounds the water in the cells until it is discharged by pumping over the West Dam. At present Cells B and C are, therefore, only being used as polishing ponds for the facility. The construction of the dams and dykes was staged such that each structure was constructed as required. The current status of the dams and dykes is summarized in Table 1.

TABLE 1: SUMMARY OF JERICHO PKCA STRUCTURES

Structure	Status	Design Crest Elevation (m)	As-built Crest Elevation (approx.) (m)	Comment
East Dam	Completed	524.5 Crest 523.5 Liner	524.5 Crest 523.5 Liner	A road was constructed on top of the East Dam. The crest of the road is approximately 527 m.
Southeast Dam	Completed	524.5 Crest 523.5 Liner	524.5 Crest 523.5 Liner	
Divider Dyke A	Partially Constructed	524	Varies – low point 521.5	

TABLE 1: SUMMARY OF JERICHO PKCA STRUCTURES				
Structure	**Status**	**Design Crest Elevation (m)**	**As-built Crest Elevation (approx.) (m)**	**Comment**
Divider Dyke B	Not in Place	524	–	
West Dam	Partially Constructed	528 Crest 524 Core	525 (min.) Crest 520 (min.) Core	
North Dam	Not in Place – upstream cofferdam constructed in 2007	528 Crest 524 Core	Coffer Dam Till 521 ROM Crest 522	Natural Ground of North Dam saddle 518.2 m (approx.)
Perimeter PK Containment Berm	Not in Place	528.5	–	

Originally, construction of Divider Dyke B, the North Dam, and the West Dam was to be completed on or before 2007; however, the construction was delayed due to operational constraints and the subsequent suspension of mining activities. Details of each of the structures evaluated during the 2010 Geotechnical inspection are discussed in Sections 4.0 through 12.0 with further details presented in Appendices A through I.

The subsequent sections of this report briefly summarize the observations and measurements obtained for each of the structures. The appendices present site plans, photographs, and ground temperature data for each of the structures inspected.

4.0 WEST DAM

The West Dam, as its name indicates, is located at the west end of the PKCA area. The dam has an impervious core constructed of frozen saturated gravel with secondary containment provided by a geosynthetic clay liner. The West Dam was partially constructed during the winters of 2005/2006 and 2006/2007. At the end of the 2007 season, the core had been constructed to its final elevation at the south abutment; however, the centre portion of the core was only constructed to approximately 520 m instead of its final design elevation of 524 m. The core was subsequently covered with a minimum of approximately 4 m of run-of-mine coarse rockfill for thermal protection.

At the time of the inspection the elevation of the water impounded against the dam was 516.08 m and discharge pumping had been suspended for the season. From the Stage Storage Curve for the combined Cells B and C of the PKCA (EBA, 2009), the corresponding volume in the facility at the present water elevation is approximately 150,000 m^3. The total allowable volume in the cells to maintain a 1.0 m freeboard at the North Dam saddle (the lowest point in the facility) is 167,000 m^3. Based on the Mean Year precipitation event, EBA expects that the freeboard will be exceeded in early June if pumping is not resumed promptly in Spring 2011.

Detailed results of the inspection of the West Dam are presented in Appendix A. Minor settlement and cracking on the downstream face, which has been noted during previous

inspections, did not appear to be progressing during this inspection. The dam performance is satisfactory.

Horizontal ground temperature cables have been installed through the dam core and downstream shell at base of the key trench, at original ground elevation, and at elevation 522 m. Plots of the ground temperature are presented in Appendix A. Temperature readings indicate that the base of the key trench is, in general, consistent with expectations. Several null readings were present however, as were warmer temperatures indicated by some beads. EBA believes that these deviations may be caused by malfunctioning cables or, more likely, by the equipment used to take the readings. EBA recommends that the cables be re-read as soon as possible in the spring of 2011.

5.0 DIVIDER DYKE A

Divider Dyke A divides the processed kimberlite containment area (PKCA) into two areas. Fine PK was deposited upstream (east) of Divider Dyke A. The area downstream of the Divider Dyke is a polishing pond for the PKCA water. The dyke consists of a sand and gravel filter zone, supported by rock fill superstructure. The filter is protected with a layer of rip-rap on the upstream side.

At present the divider dyke is only partially constructed. The rock fill superstructure crest is at the design elevation of 524 m; however, the filter zone of the dyke has only been brought to elevation 521.5 m. In the fall of 2007, localized migration of fines through the dyke was observed by Tahera. In an attempt to mitigate the migration of the fines, a layer of coarse processed kimberlite (coarse PK) was placed on the lower portion of the dyke face. The dyke has been performing well since this time up to and including the time of the inspection. Clean water meeting discharge criteria was present downstream of the dyke. At the time of the inspection the water level in Cell B/C was 516.08 m.

Divider Dyke A is performing well with no signs of distress. The inspection report and photos for the structure are presented in Appendix B.

6.0 EAST DAM

The East Dam is an impervious geomembrane lined dam at the east end of the PKCA. The dam was constructed during the 2005/2006 winter season. The liner is keyed into saturated sand and gravel till permafrost, and bedrock. The upstream shell of the dam was constructed of a thick till layer and a coarse PK layer. Fine PK was then deposited off the upstream face of the dam. A layer of rockfill was placed on the dam crest in the summer 2006 above the liner elevation allowing equipment to travel over the dam during the construction of the Southeast Dam. No water was impounded against the dam at the time of the inspection.

Two ground temperature cables are installed in the key trench at the base of the geomembrane liner. The temperature at the base of the key trench was measured at

between -2°C and -4°C during the summer and fall of 2009 and 2010. No significant signs of settlement or cracking were noted during the inspection nor was any evidence of seepage at this time.

The East Dam is performing well with no signs of distress. The inspection report, ground temperature plots and photos are presented in Appendix C.

7.0 SOUTHEAST DAM

The Southeast Dam is an impervious geo-membrane lined dam at the east end of the PKCA. The dam was constructed during the 2006/2007 winter season. The liner is keyed into saturated sand and gravel till permafrost, and bedrock. The upstream shell of the dam was constructed of a thick till layer and a coarse PK layer. Fine PK was then deposited off the upstream face of the dam. No water was impounded against the dam at the time of the inspection.

Two ground temperature cables are installed in the key trench at the base of the geo-membrane liner. The ground temperatures are cooling with time with the 2010 temperatures colder than the 2009 temperatures. The base of the key trench was between -3°C and -4°C during September 2010. No significant signs of settlement or cracking were noted during the inspection though the area was snow covered. A wet natural low-lying area was noted at the downstream dam toe. No evidence of seepage from the dam was observed.

The Southeast Dam is performing well with no signs of distress. The inspection report, ground temperature plots and photos are presented in Appendix D.

8.0 C1 DIVERSION

The C1 Diversion channel was constructed to divert water from the natural C1 stream around the Jericho open pit. It consists of a cut-off area lined with a HDPE liner keyed into bedrock; a rock cut channel (Reach A), a transition zone to natural ground (Reach B), and two till berms that contain the diverted stream (Reach C), which redirects the water back to the original stream bed. The rock cut was constructed in the summer of 2005, and the cut-off and berms were constructed in the winter 2005/2006. Water first flowed through the diversion in the spring of 2006.

Water was not flowing to any significant degree at the time of the inspection, though water was observed in the base of the channel. The rock cut in Reach A appeared to be stable with no evidence of sloughing. Reach C and the cut-off berms were snow covered but showed signs of surficial cracking in the till. The cracks were approximately 100 mm wide, 100 mm in depth and several meters in length. The cracks are not expected to impact the performance of the structure though they should be inspected more carefully once the snow has cleared.

The C1 diversion works are performing as intended. The inspection report and photos for the structure are presented in Appendix E.

9.0 TANK FARM

9.1 GENERAL

The primary tankfarm for the site is located at the Jericho plant site area. The tankfarm is currently divided into two sections: Phase 1 and Phase 2. Phase 1 was constructed in winter 2004/2005 during the construction of the Jericho plant site. Phase 2 was constructed between May and October 2005. Phase 1 consists of eight 500,000 litre tanks, and Phase 2 consists of four 1,500,000 litre tanks. EBA was informed that there is currently minimal product in the Phase 1 tanks and three of the Phase 2 tanks. At the time of the inspection, there was an estimated 1,300,000 litres of fuel in Phase 2 tanks. The tanks in Phase 1 have been drained to a level below the outlet valves. It is estimated that there is approximately 104,000 litres of residual fuel in these tanks.

Both tankfarm containment areas are lined with a 60 mil high density polyethylene (HDPE) liner for secondary containment. EBA understands that the base of the Phase 1 area was constructed of frozen esker fill while the base of the Phase 2 tankfarm was constructed of run-of-mine rockfill.

9.2 PHASE 1 AREA

Significant settlement (up to 390 mm since being monitored) has been observed in the Phase 1 tank farm during the first two years of operation. The majority of the settlement occurred between the spring of 2005 and September 2006. The settlement of the tanks in the Phase 1 tankfarm varied between 5 mm and 40 mm between September 2006 and July 2007. Settlement was not measured after July 2007. There was a 50 mm gap between some of the tank bottoms and the soil under the tank.

In addition there appears to be some settlement of the perimeter crest of the Phase 1 berms. The settlements do not appear to be impacting the performance of the structure however, if the liner crest at any point is lower than the design elevation, the capacity of the containment facility will be reduced. EBA recommends that a survey of the berms be performed to determine if the elevation of the berm liner has indeed been lowered if the Phase I tank will be used to store additional fuel.

During the inspection, EBA used a magnetic protractor (see photo F-3) to measure the approximate list of the tanks in the Phase 1 tankfarm. Two measurements, ninety degrees apart were taken on each tank. The range of listing observed during the inspection was from 0º to 1.5º in a single direction. It should be noted that the measurements taken are for reference only and must not be used in place of a proper survey of the tanks. The list angles and locations of the measurements are presented in Figure F-1.

Ponded water, snow and ice was observed throughout the Phase 1 tankfarm during the inspection. Stained soil and a slight sheen on the ponded water were also observed in several places around the Phase 1 area. The staining and sheen do not appear to be recent rather EBA has noted the same conditions within the tank farm berms over the past several years.

As stated in previous inspection reports, EBA recommends that the tank manufacturer be retained to evaluate the integrity of the Phase 1 tanks before they are put back in service. That being said, the tankfarm appears to be performing adequately given the low volume of fuel stored on site at this time. The inspection report and photos for the structure are presented in Appendix F

9.3 PHASE 2 AREA

Minimal vertical movement of the tanks in Phase 2 was measured between September 2006 and July 2007; however, settlement under the edge of Tank 9 is apparent and has been noted during previous inspections. The gap between the Tank 9 bottom and the soil under the tank is approximately 35 mm. The inspection report and photos for the structure are presented in Appendix F

10.0 GENERATOR TANK CONTAINMENT AREA

One 64,000 litre fuel tank is located adjacent to the generator area at the plant site. The tank is contained by a lined berm containment area covered with a layer of crushed gravel. The tank presently contains approximately 49,000 litres of fuel.

As noted in the previous years report, there appears to be low spots in the north berm. It is recommended that the as-built information be reviewed to determine at what elevation the liner is located. These low areas should be hand excavated to determine the liner elevation in this area. As with the Phase 1 of the tankfarm, the capacity of the secondary containment should be reviewed if the liner is lower than the designed/as-built configuration.

The inspection report and photos for the structure are presented in Appendix G.

11.0 AIRSTRIP TANK CONTAINMENT AREA

Two 64,000 litre fuel tanks are located adjacent to the airstrip apron within a lined containment area. The secondary containment liner is covered with a layer of crushed gravel. No signs of berm instability were found though some exposure of the HPDE liner was present during the inspection.

It is understood that a fuel spill occurred within the tankfarm area in the winter of 2006/2007. Stained soil is present inside the base of the tank farm containment area. The current inspection deals only with the geotechnical issues of the tankfarm and does not address the fuel spill.

The containment area appears to performing satisfactory. The inspection report and photos for the structure are presented in Appendix F.

12.0 LANDFILL

Waste generated during mine operations was landfilled in a designated area within the till dump area. Metal debris is separated and stockpiled in a separate area. Domestic wastes are burned in the open and placed into a small pit, which, during active mining operations was capped with till from the open pit mine. Food wastes are not placed in the landfill rather they are processed in a designated incinerator. Surface and subsurface drainage from the landfill area flows towards the open pit.

The landfill appears to be performing adequately. The inspection report and photos for the landfill are presented in Appendix I.

13.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Shear Minerals Ltd. EBA does not accept any responsibility for the accuracy of any of the data, the analysis or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Shear Minerals Ltd., or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user.

14.0 CLOSURE

This project will be undertaken subject to the attached General Conditions, which will be incorporated into the report. With respect to contractual terms, this assignment will be undertaken subject to the attached sample Services Agreement unless other Contractual Terms are executed by both parties.

We trust this report meets your present requirements. Should you have any questions or comments, please contact the undersigned at your convenience.

EBA Engineering Consultants Ltd.

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jporter@eba.ca

Bill Horne, P.Eng.
Principal Consultant, Arctic Region
Direct Line: 780.451.2130 x276
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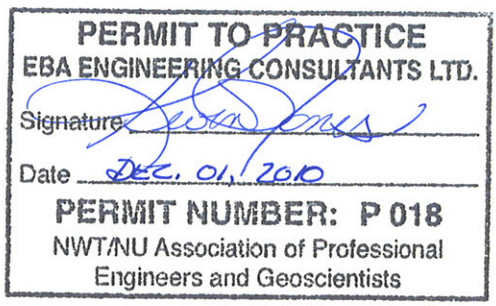
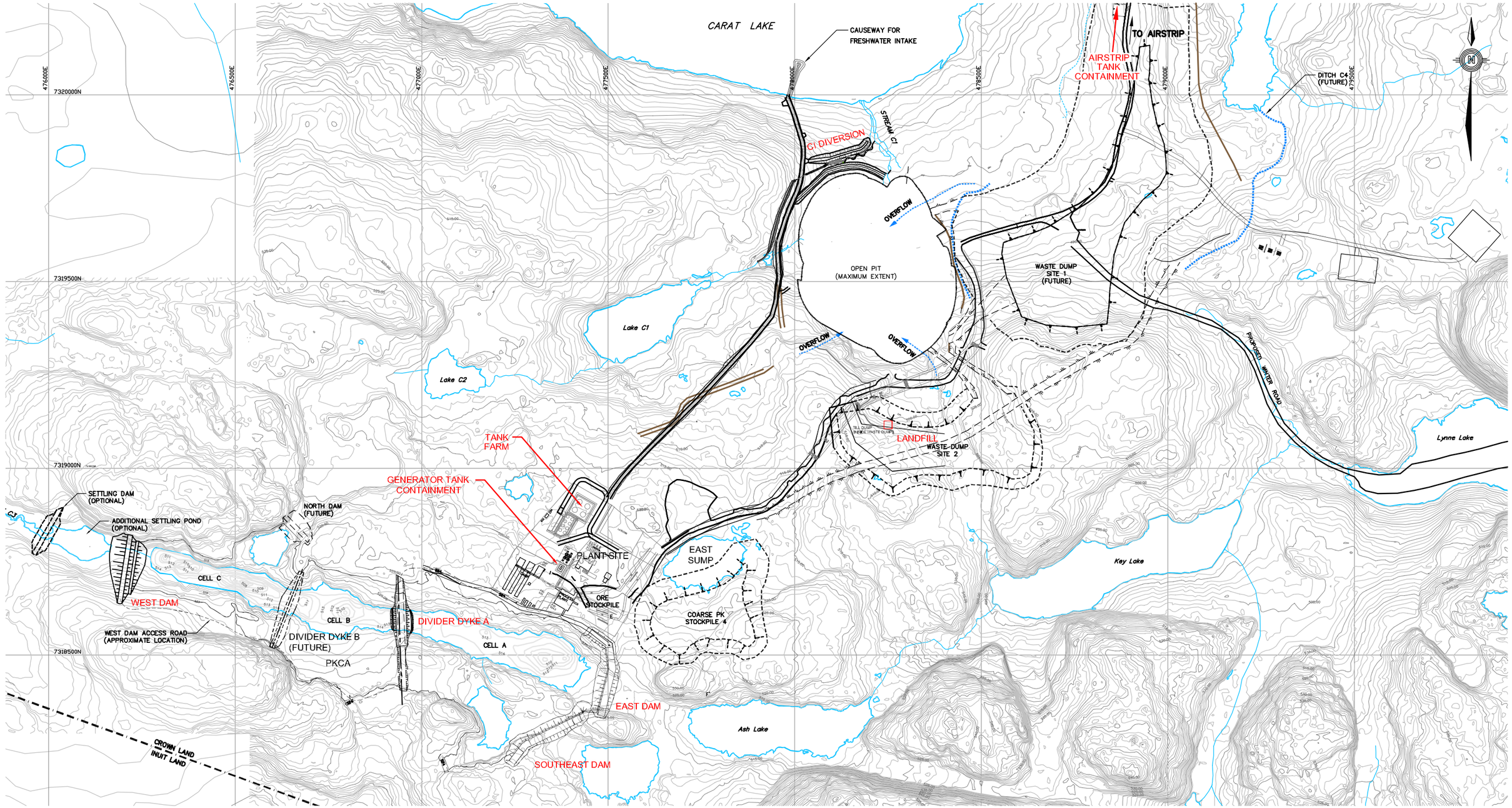


REFERENCES

EBA Engineering Consultants Ltd., 2009. Water Management – Jericho Mine. Submitted to Indian and Northern Affairs Canada, April 2009.

FIGURES



LEGEND:

AREAS EVALUATED 2010 GEOTECHNICAL INSPECTION

0 500

Scale (metres)

CLIENT

Shear Minerals Ltd.

JERICHO PROJECT
2010 GEOTECHNICAL INSPECTION

JERICHO MINE SITE PLAN

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
E14101117	TK	JP	1
OFFICE: EBA-EDM	DATE: November 24, 2010		

Figure 1

Q:\Edmonton\Drafting\DIVISIONS\2007-E14\E14101117\Acad\E14101117_FIG 1.dwg [Figure 1] November 24, 2010 - 12:09pm lkiros

APPENDIX A

GEOTECHNICAL INSPECTION SUMMARY

Location: **Jericho Mine**
Facility: **West Dam**
Observation Date: **September 29-30, 2010**

Inspected by: Jason L. Porter, P.Eng.
EBA Engineering Consultants Ltd.

OPERATING CONDITION	
Minimum Crest Elevation	525 (approximate – varies 525 to 527.5 m)
Top of Core or Liner	521.0 - (minimum elevation – varies from 524 to 521 m)
Water Levels - Upstream	516.08
Water Levels - Downstream	Not measured
Discharge	Complete for 2010 at time of inspection

OBSERVED CONDITION					
Features:	Present (Yes/No)	Dimensions	Extent	Description	Photographic Records
Erosion	None noted				
Cracking	None noted			No new cracking was noted during the inspection. Note that small cracking may have been obscured by the light snow cover present.	
Settlement	None noted			No new settlement was noted during the inspection.	
Seepage	None noted				
Other Features					

THERMAL SUMMARY:

Dam Core Frozen – Ground temperature measurements in attached Figures A-2 to A-17. Temperature readings indicate that the base of the key trench is, in general, consistent with expectations. However, several null readings were present as was some unanticipated deviation measured from some beads. EBA believes that the deviations may be caused by malfunctioning cables or, more likely, by the equipment used to take the readings. EBA recommends that the cables be re-read as soon as possible in the Spring.

RECOMMENDATIONS AND CONCLUSIONS:

Dam performance is satisfactory.

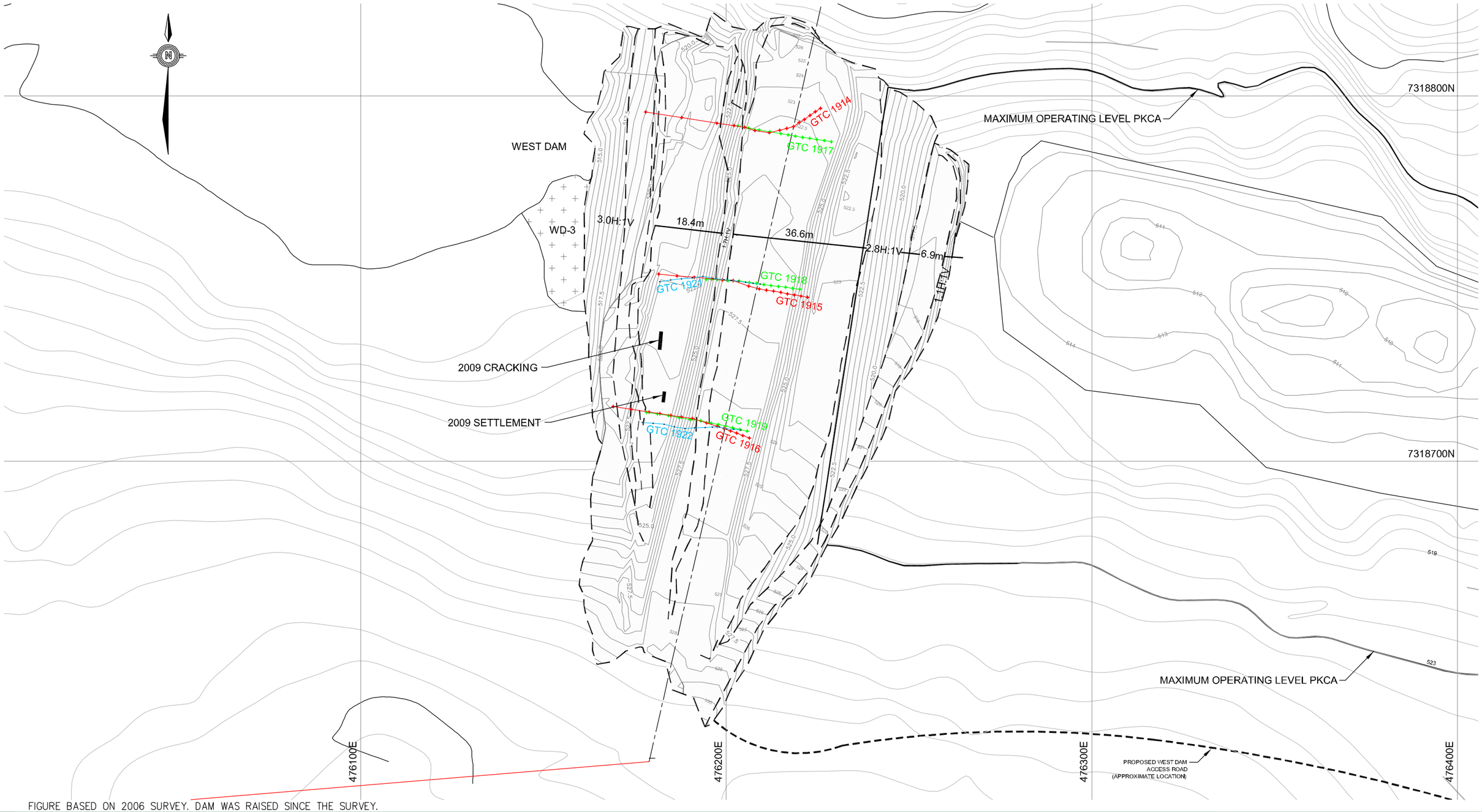


FIGURE BASED ON 2006 SURVEY. DAM WAS RAISED SINCE THE SURVEY.

NOTE:

GROUND TEMPERATURE CABLES 1914, 1915 AND 1916 IN BASE OF CORE KEY TRENCH.

GROUND TEMPERATURE CABLES 1917, 1918 AND 1919 AT ORIGINAL GROUND LEVEL IN CORE ZONE.

GROUND TEMPERATURE CABLES 1921 AND 1922 AT ELEVATION 522 m.

CLIENT

Shear Minerals Ltd.

JERICHO PROJECT
2010 GEOTECHNICAL INSPECTION

WEST DAM

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
E14101117	TK	JP	1
OFFICE: EBA-EDM	DATE: October 7, 2010		

Figure A1

O:\Edmonton\Drafting\DIVISIONS2007\E14\E14101117\AcadE14101117_FIG A-1.dwg [Figure A-1] October 07, 2010 - 10:10am tkiros

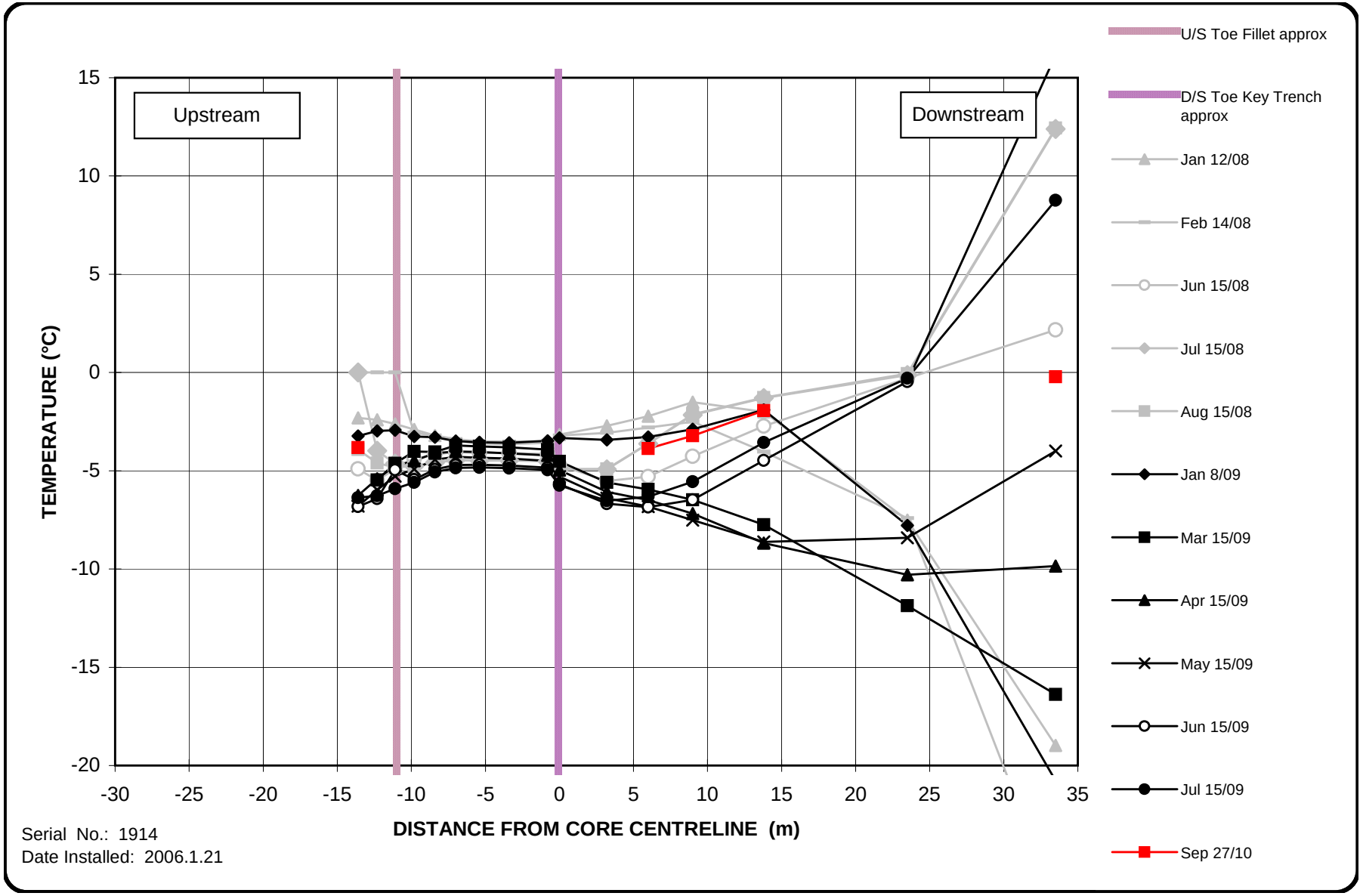


Figure A-2
Horizontal Ground Temperature Distribution
West Dam
Station 0+035, Trench Elevation 513 m

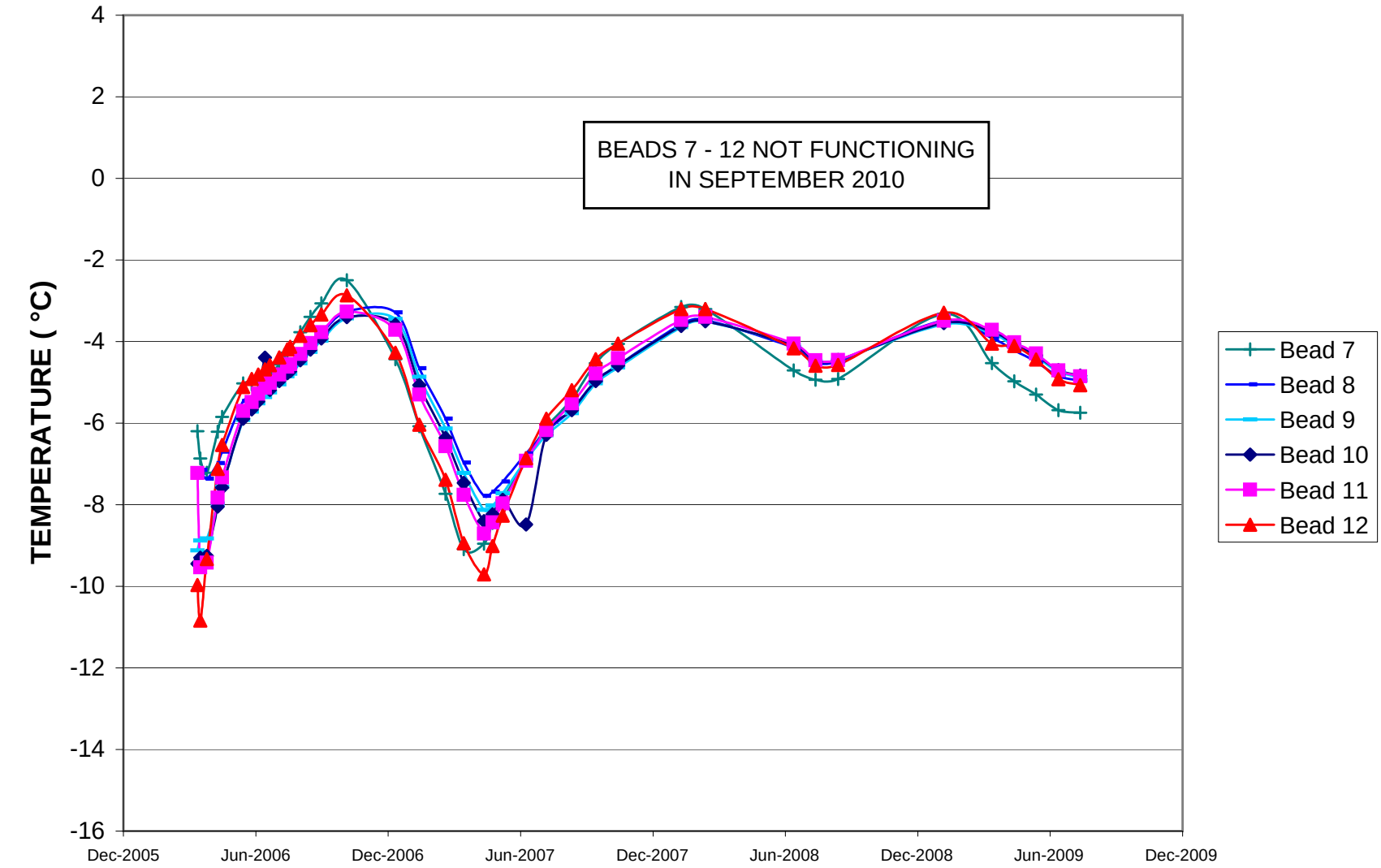


Figure A-3
Horizontal Ground Temperature Distribution
West Dam
Station 0+035, Trench Elevation 513 m

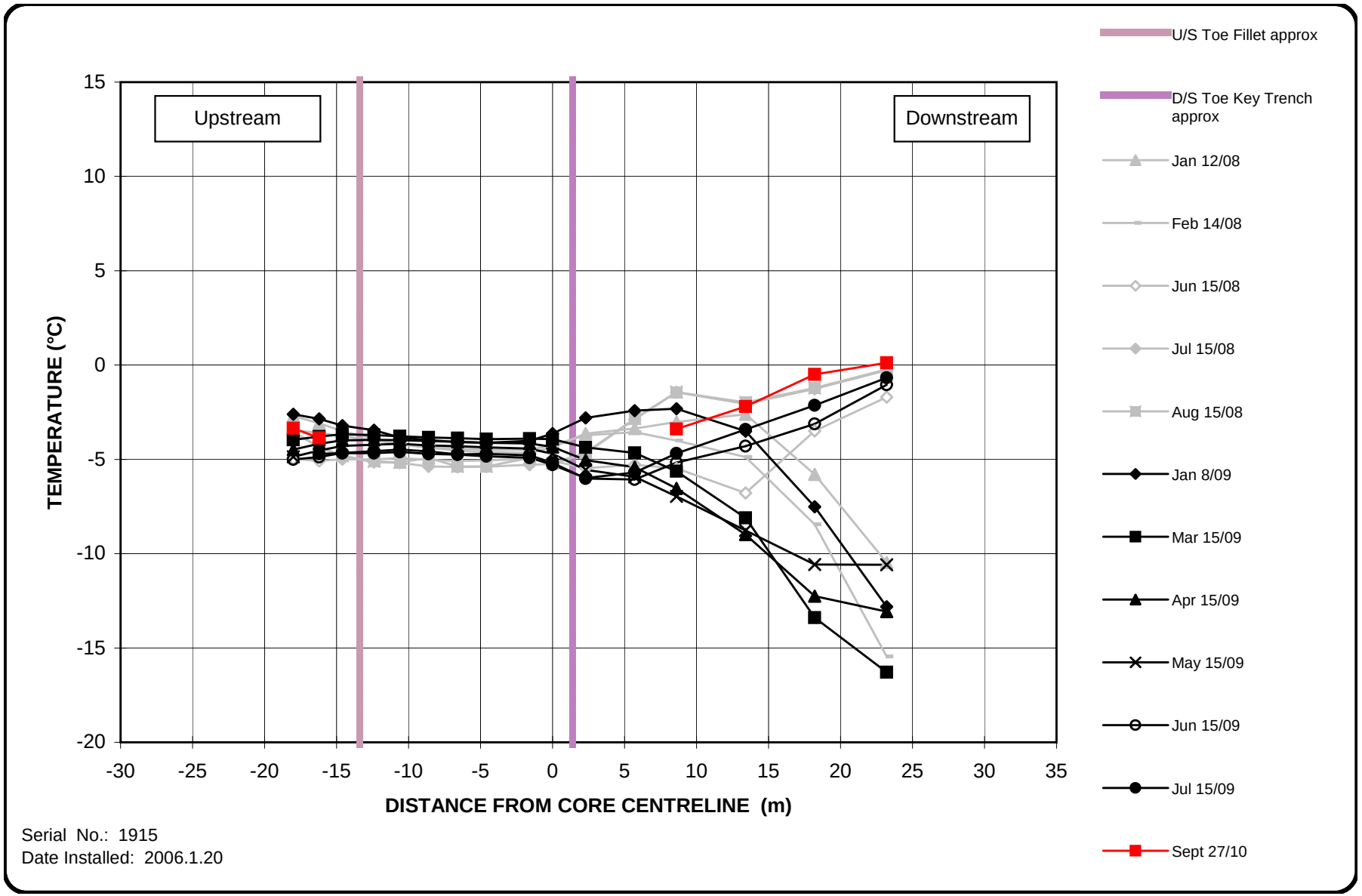
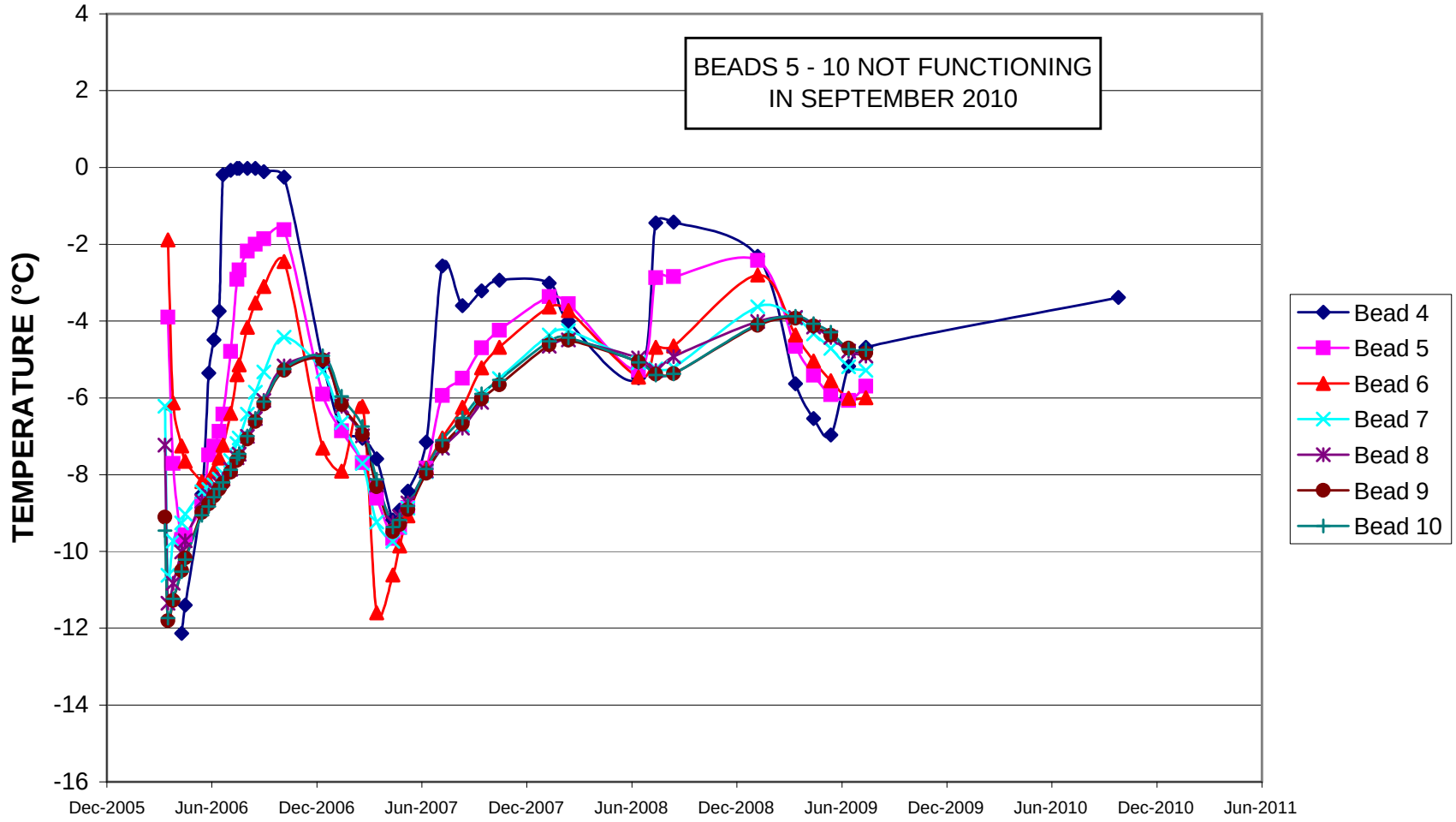


Figure A-4
Horizontal Ground Temperature Distribution
West Dam
Station 0+080, Trench Elevation 514 m



Serial No.: 1915
Date Installed: 2006.1.20

Figure A-5
Horizontal Ground Temperature Distribution
West Dam

Station 0+080, Trench Elevation 514 m

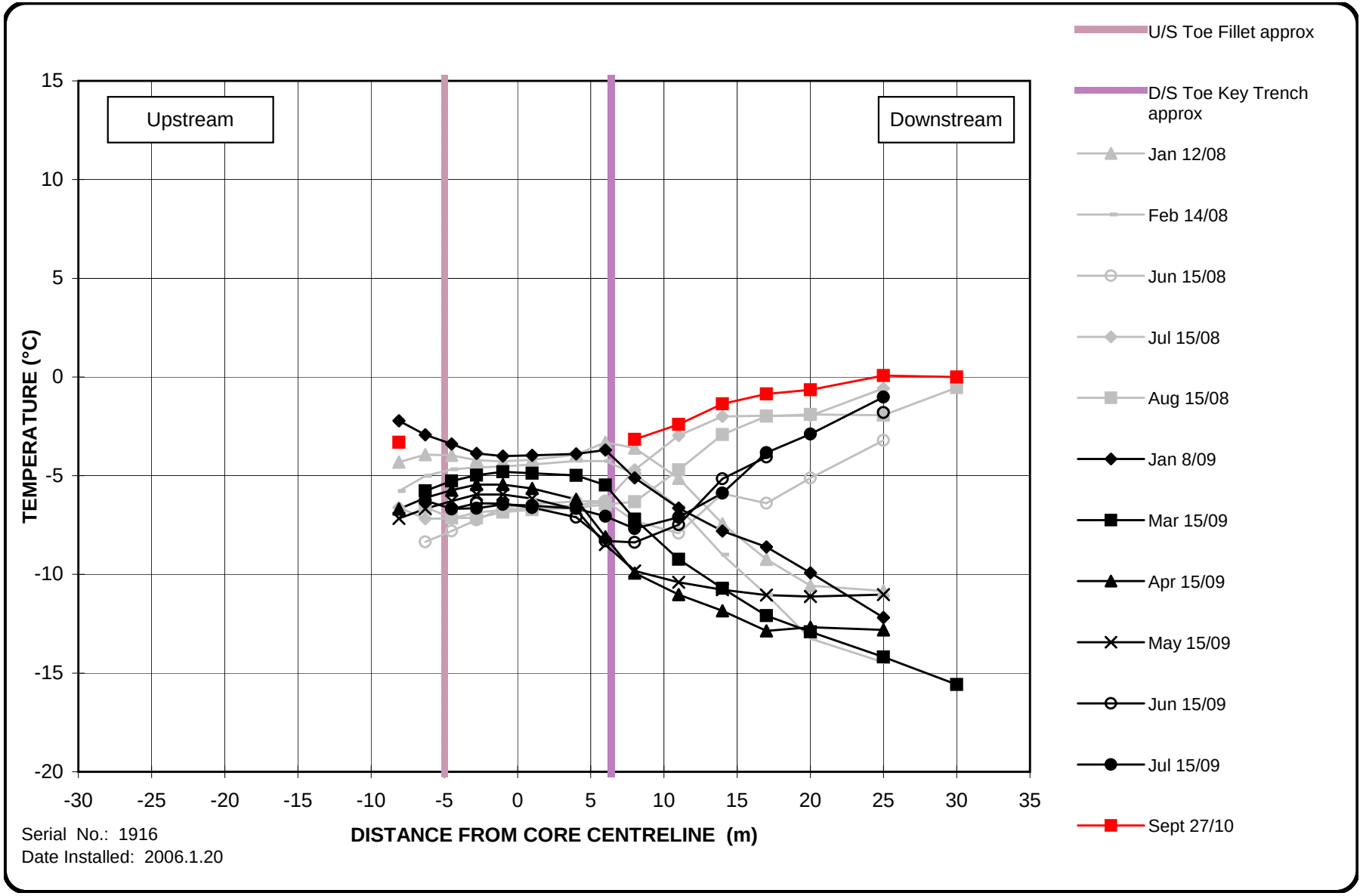
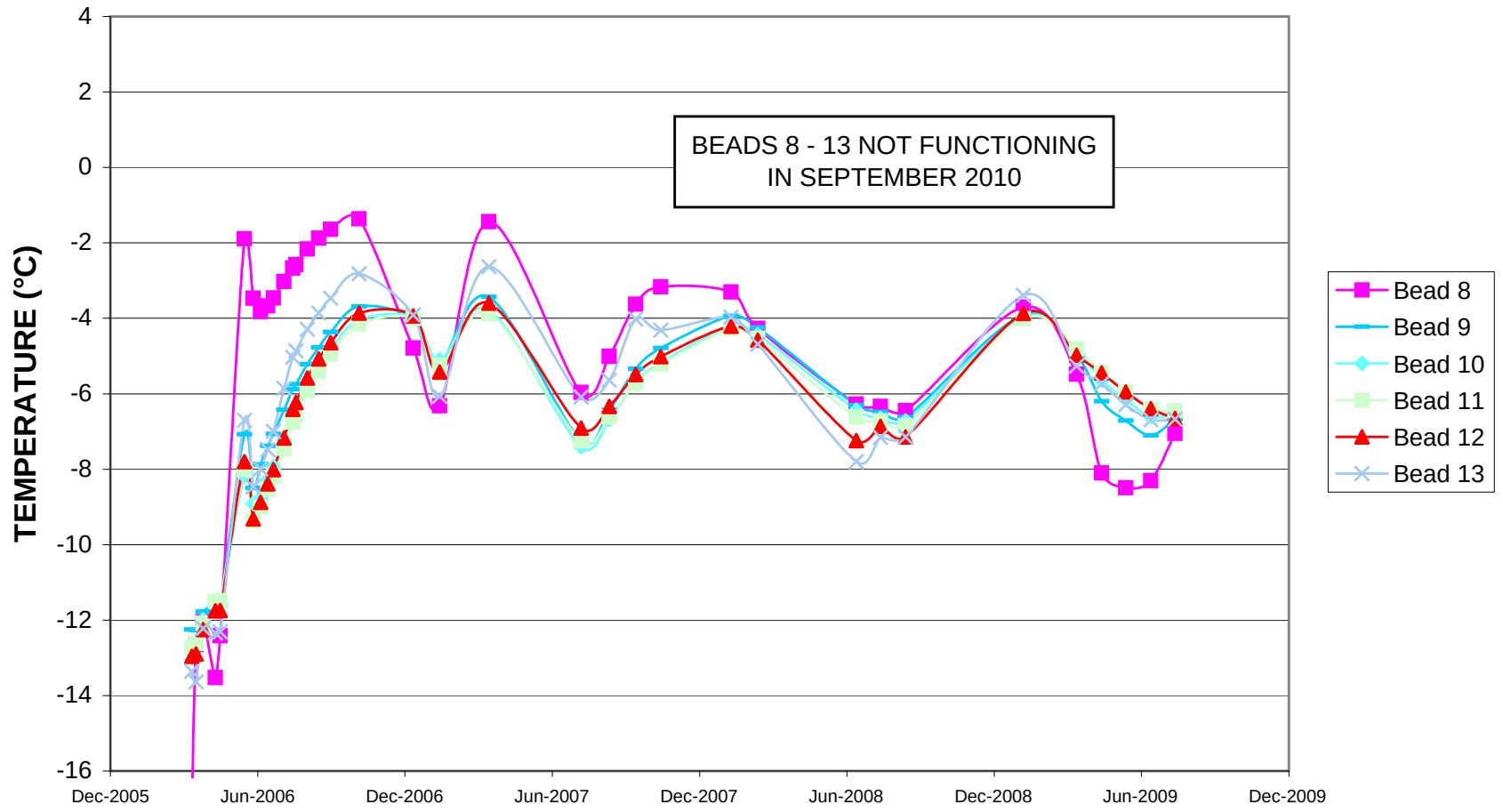


Figure A-6
Horizontal Ground Temperature Distribution
West Dam
Station 0+120, Trench Elevation 518 m



Serial No.: 1916
Date Installed: 2006.1.20

Figure A-7
Horizontal Ground Temperature Distribution
West Dam
Station 0+120, Trench Elevation 518 m

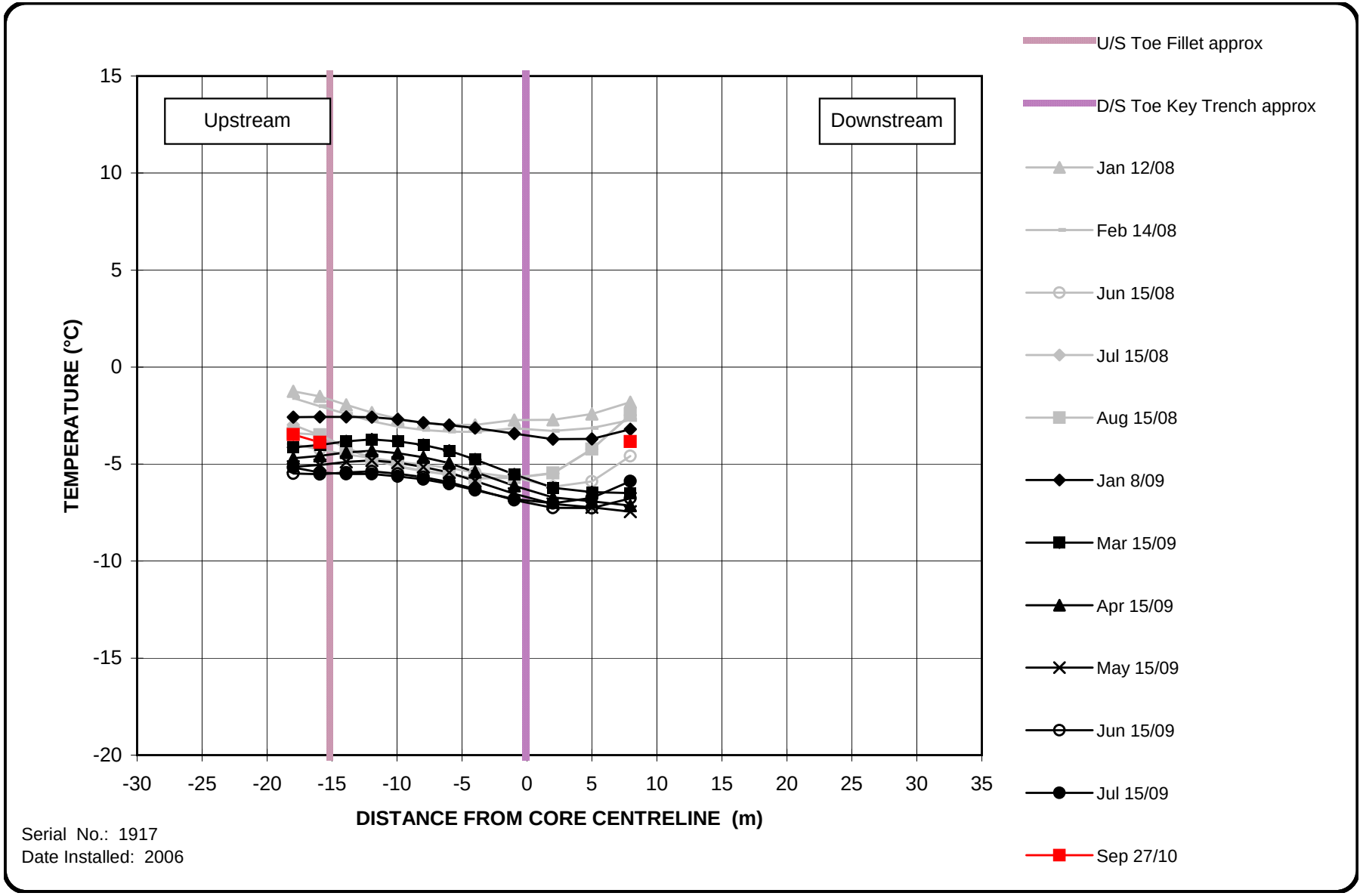
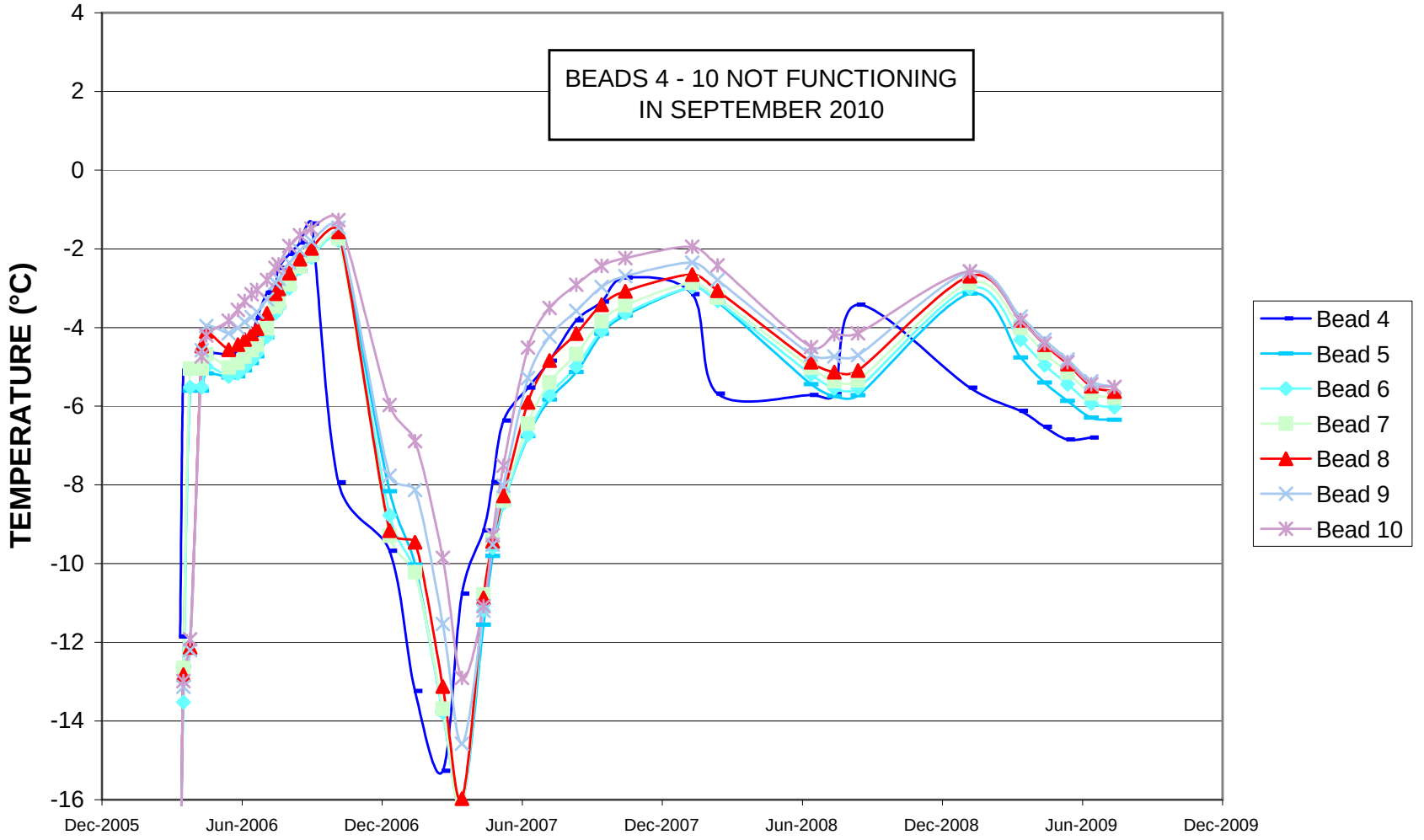


Figure A-8
Horizontal Ground Temperature Distribution
West Dam
Station 0+035, Trench Elevation 516 m



Serial No.: 1917
Date Installed: 2006

Figure A-9
Horizontal Ground Temperature Distribution
West Dam
Station 0+035, Trench Elevation 516 m

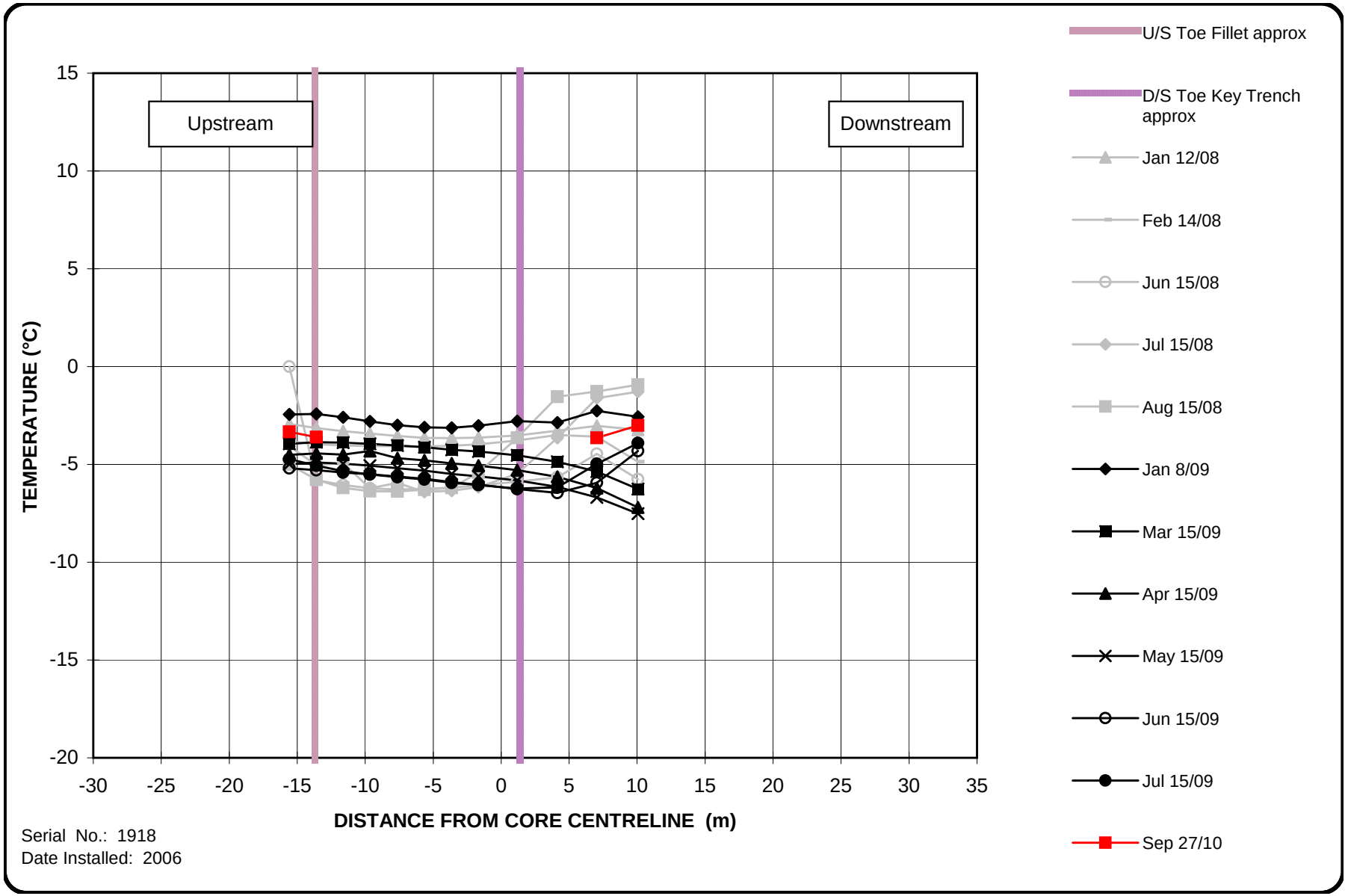
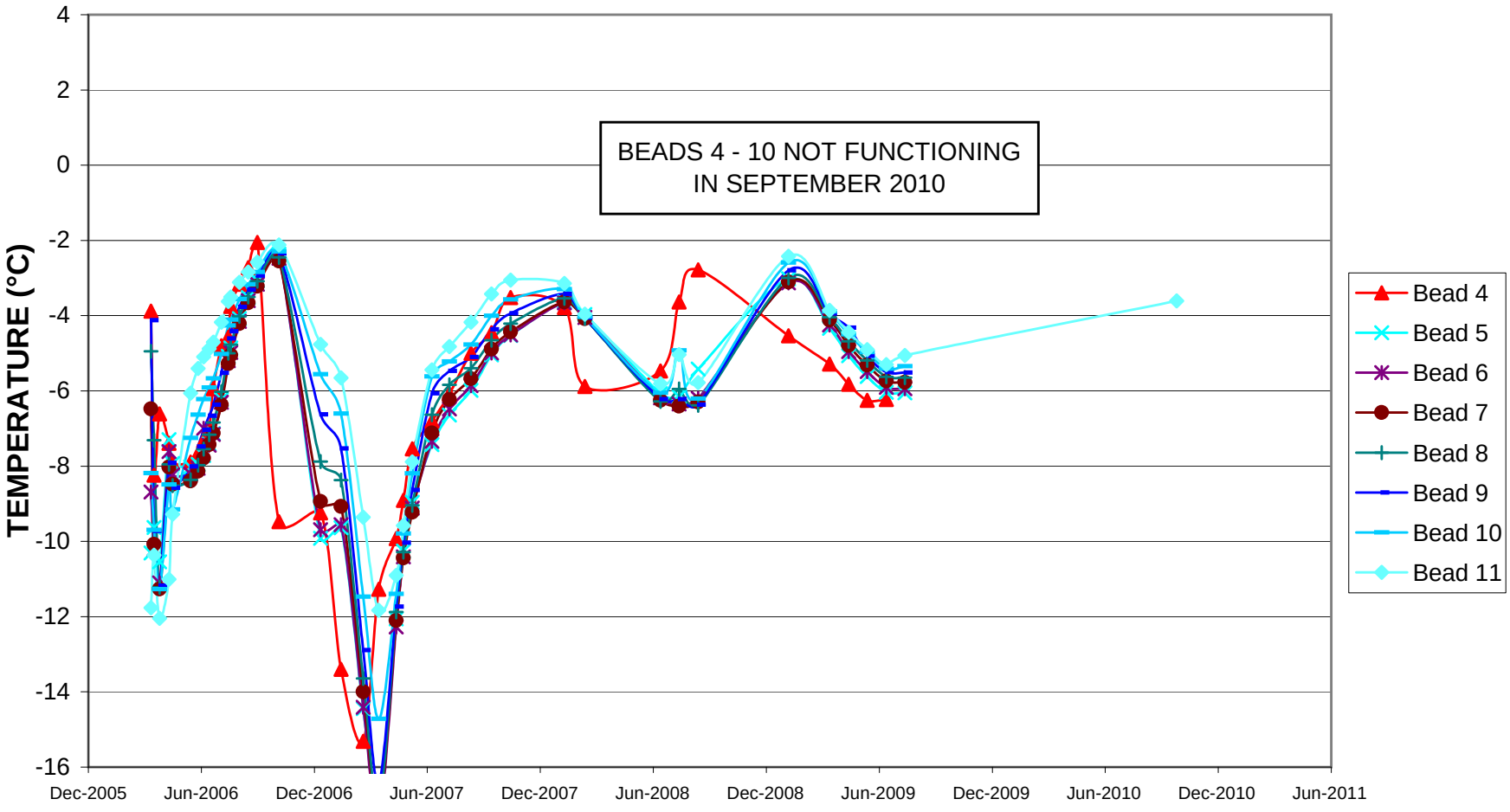


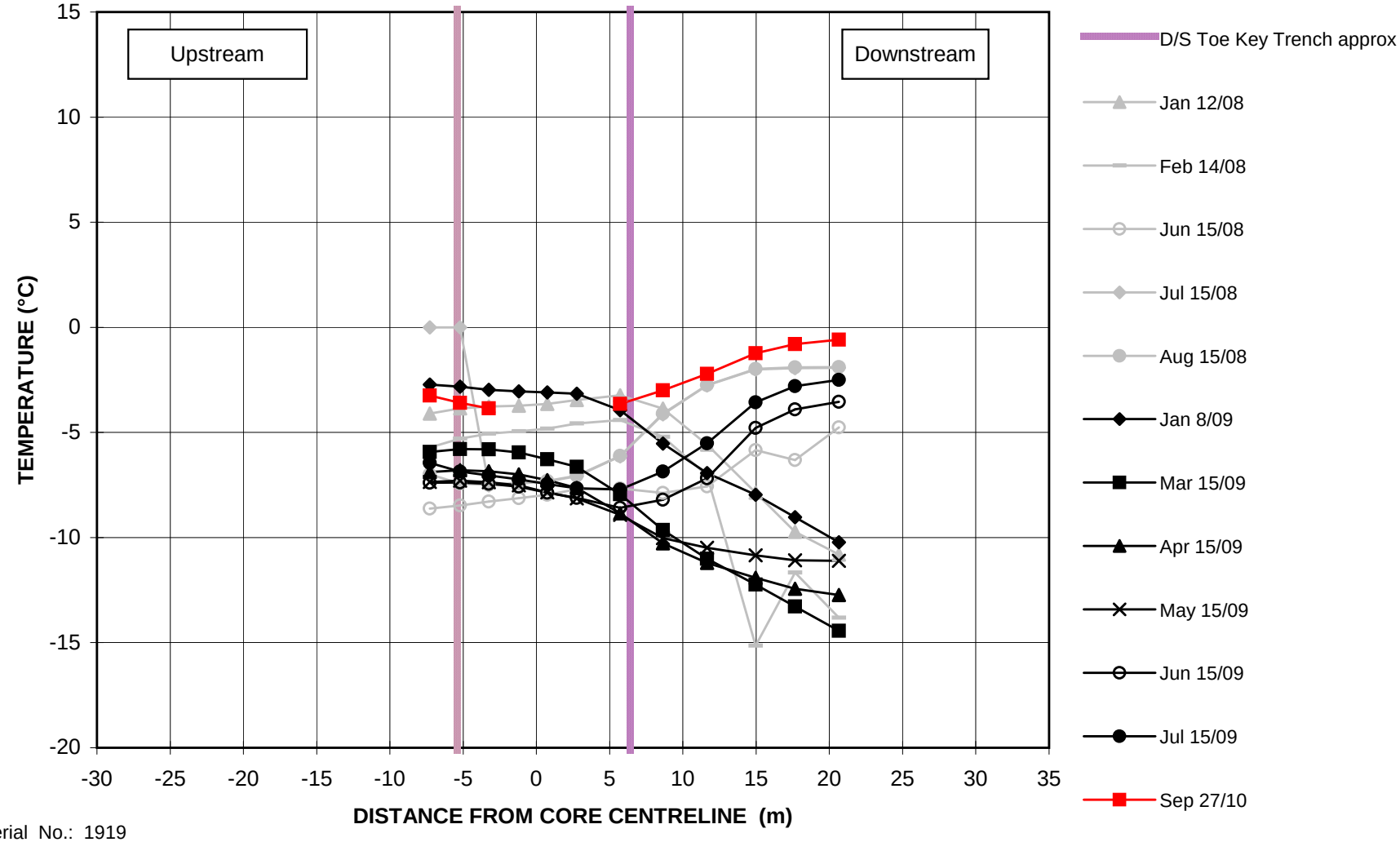
Figure A-10
Horizontal Ground Temperature Distribution
West Dam
Station 0+080, Trench Elevation 518 m



Serial No.: 1918
Date Installed: 2006

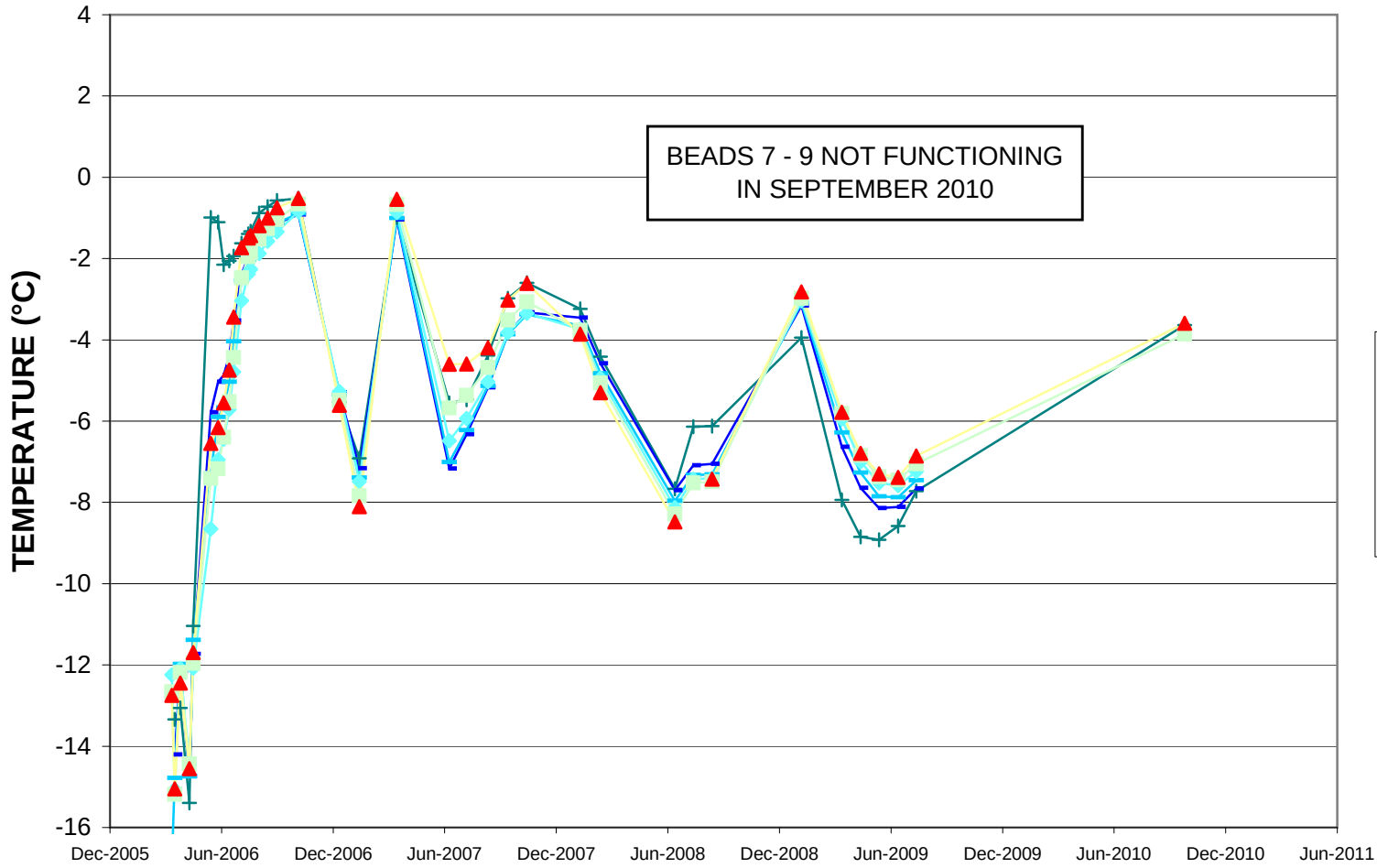
Figure A-11
Horizontal Ground Temperature Distribution
West Dam

Station 0+080, Trench Elevation 518 m



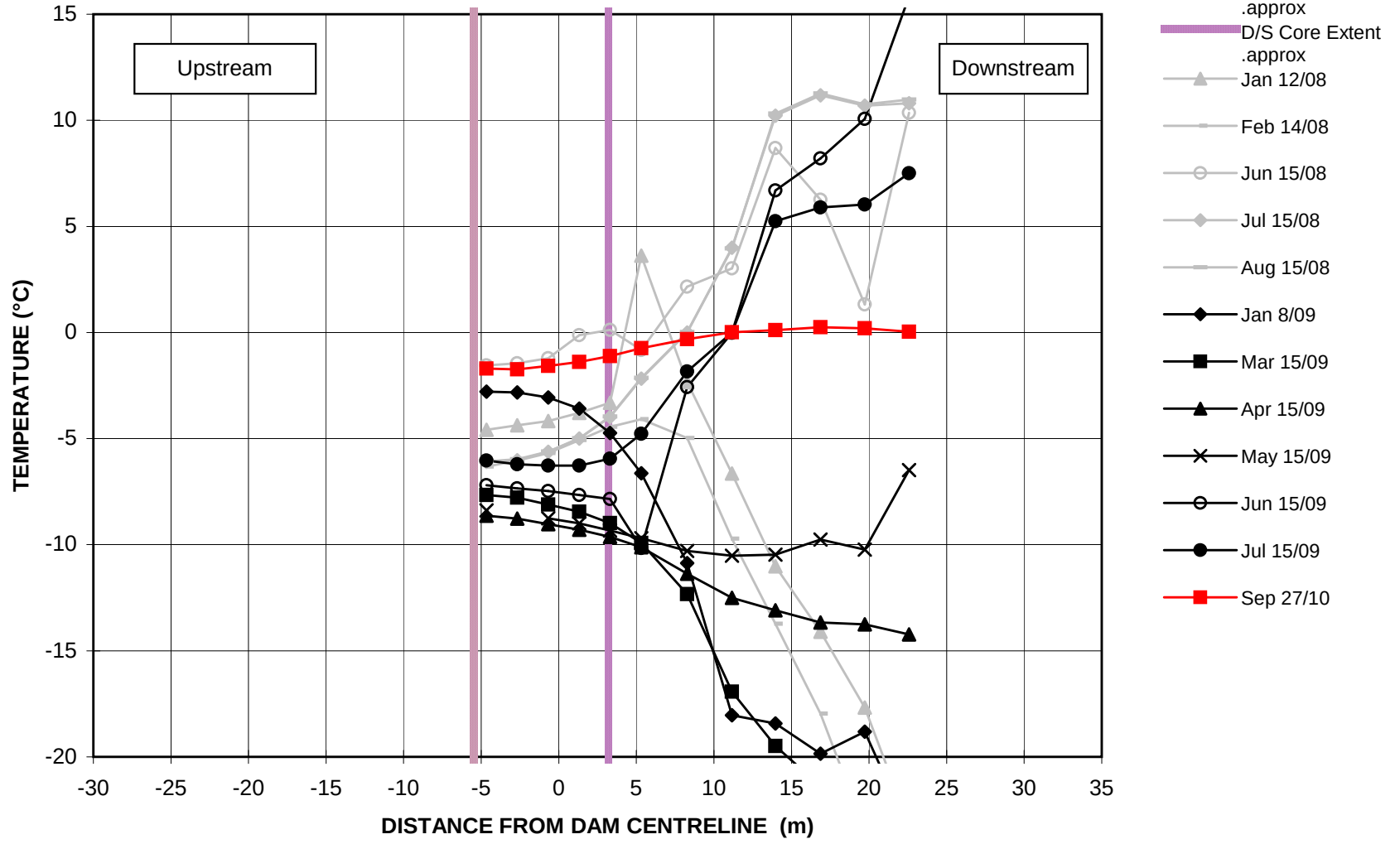
Serial No.: 1919
Date Installed: 2006

Figure A-12
Horizontal Ground Temperature Distribution
West Dam
Station 0+120, Trench Elevation 520 m



Serial No.: 1919
Date Installed: 2006

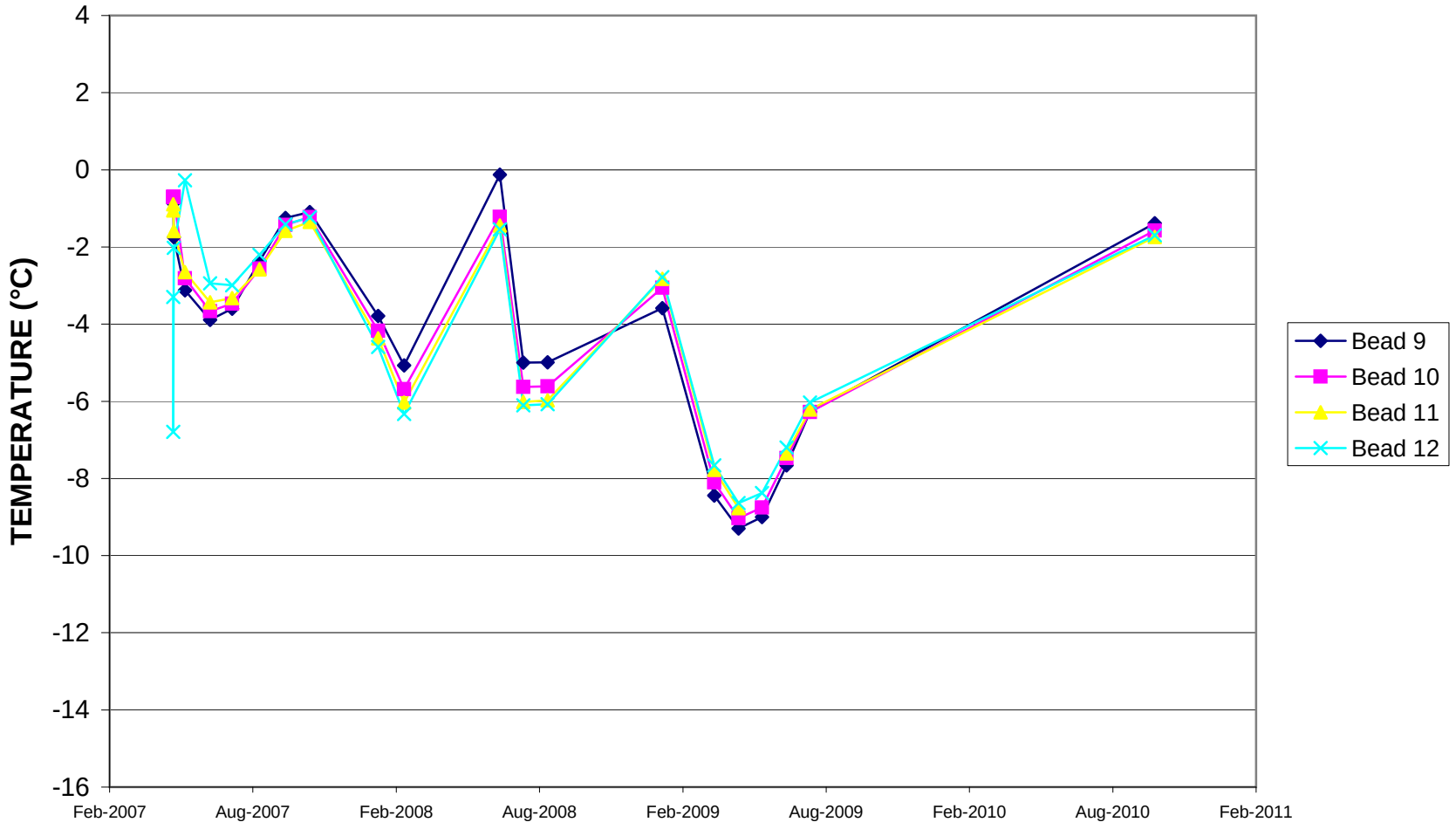
Figure A-13
Horizontal Ground Temperature Distribution
West Dam
Station 0+120, Trench Elevation 520 m



Serial No.: 1921
Date Installed: 04/01/2007

EBA File No: 1100060.007

Figure A-14
Horizontal Ground Temperature Distribution
West Dam
Station 0+080, Average Elevation 522 m



Serial No.: 1921
Date Installed: 04/01/2007

Figure A-15
Horizontal Ground Temperature Distribution
West Dam
Station 0+080, Average Elevation 522 m

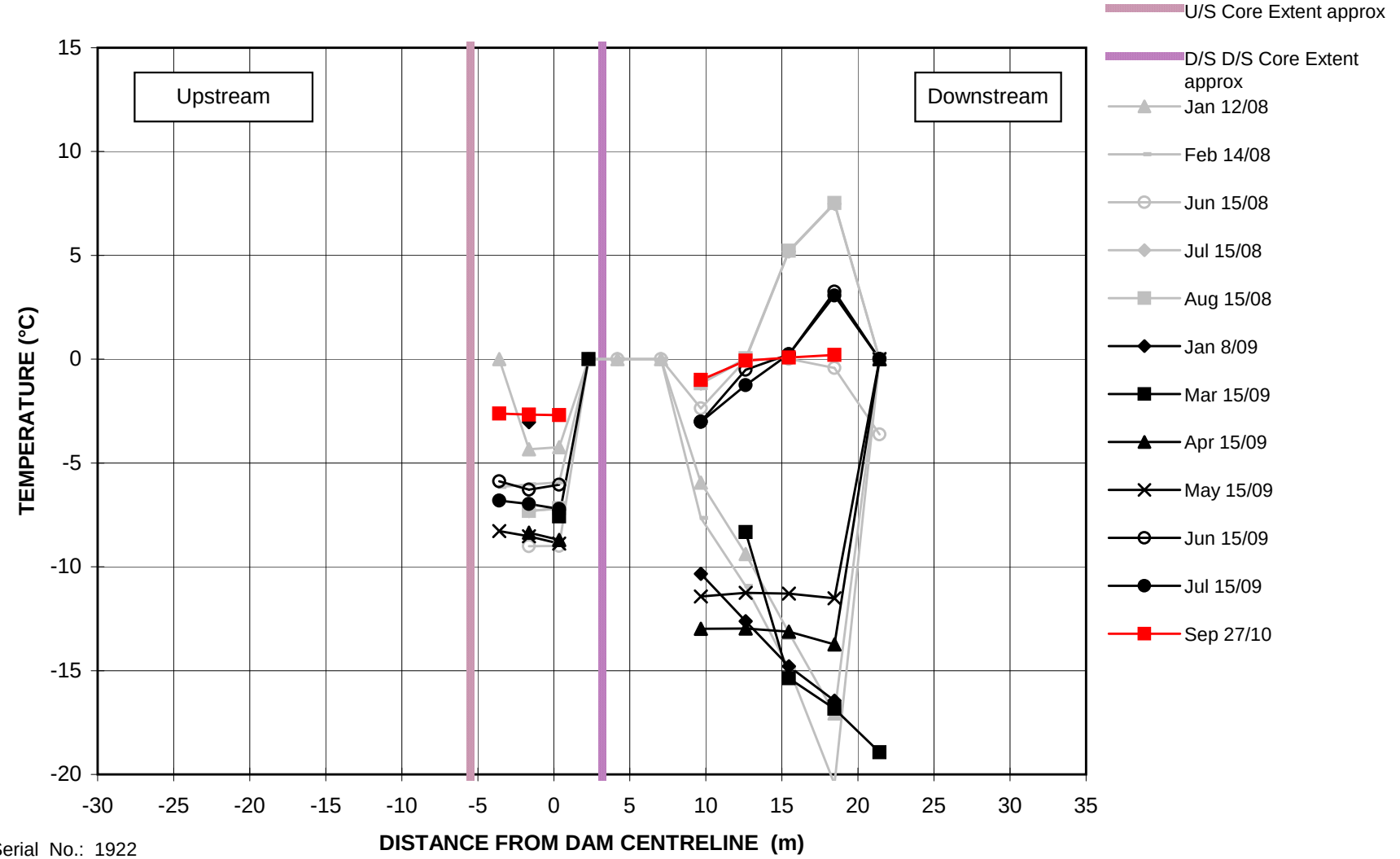
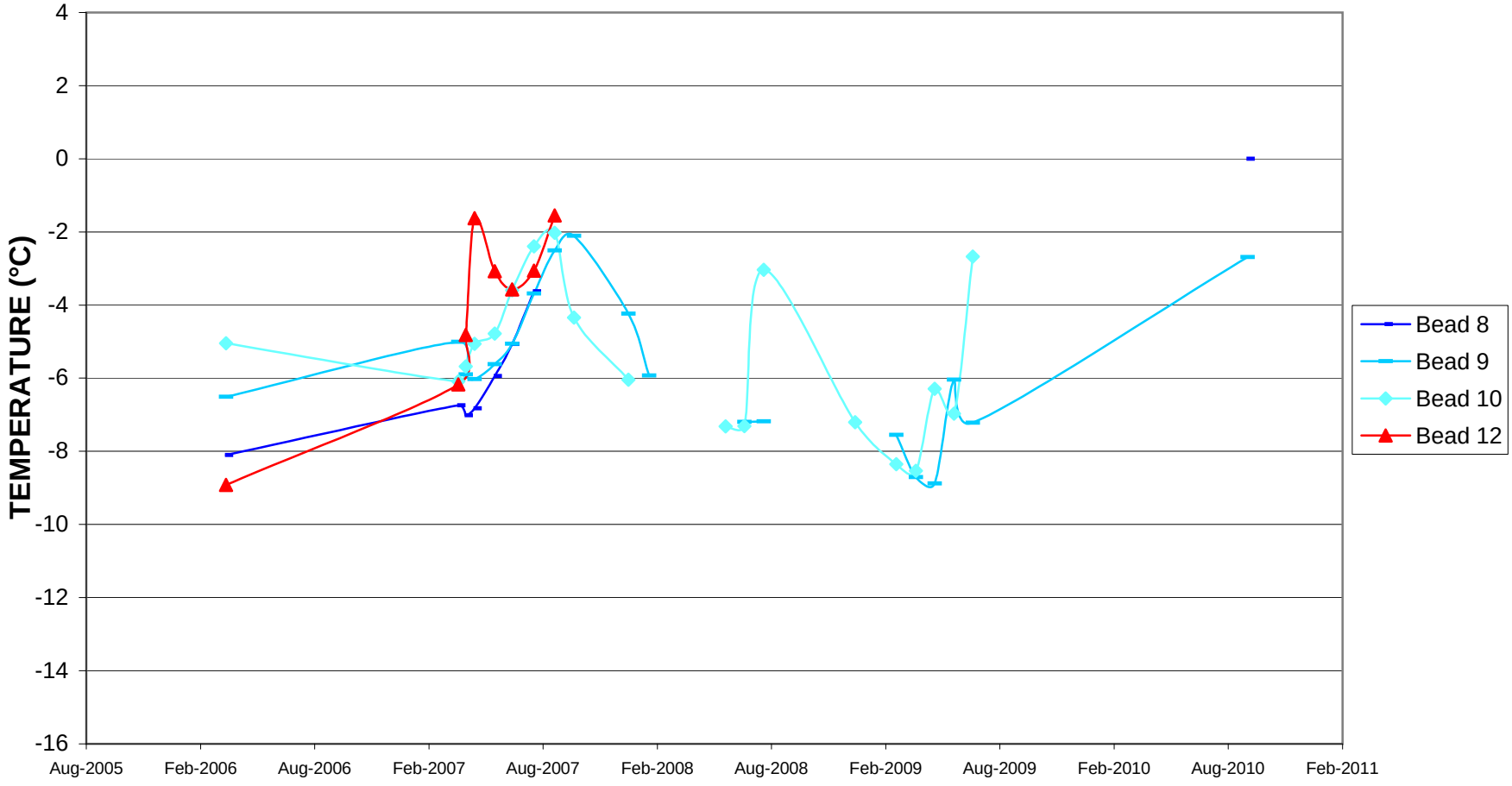


Figure A-16
Horizontal Ground Temperature Distribution
West Dam
Station 0+120, Elevation 522 m



Serial No.: 1922
Date Installed: 04/01/2007

Figure A-17
Horizontal Ground Temperature Distribution
West Dam
Station 0+120, Elevation 522 m

Photo A-1
General condition of upstream of West Dam (Aspect: NW)

Photo A-2
Crest of thermal cover on West Dam (Aspect: N)

Photo A-3
Downstream slope of West Dam (Aspect: N)

Photo A-4
Upstream crest and thermal cover of West Dam (Aspect: S)

APPENDIX B

APPENDIX B DIVIDER DYKE A

GEOTECHNICAL INSPECTION SUMMARY

Location: **Jericho Mine**
Facility: **Divider Dyke A**
Observation Date: **September 29-30, 2010**

Inspected by: Jason L. Porter, P.Eng.
EBA Engineering Consultants Ltd.

OPERATING CONDITION:	
Minimum Crest/Filter Elevation	524
Top of Filter	Varies 521.5 to 524 m
Water Levels - Upstream	Tailings Only
Water Levels - Downstream	518.6
Discharge	Minimal flow observed through filter dyke

OBSERVED CONDITION:					
Features:	Present	Dimensions	Extent	Description	Photographic Records
Erosion	None noted				
Cracking	None noted				
Settlement	None noted				
Seepage	None noted				
Other Features	None noted				

THERMAL SUMMARY:

No ground temperature measurements in the dyke.

RECOMMENDATIONS AND CONCLUSIONS:

Dyke performance is satisfactory.

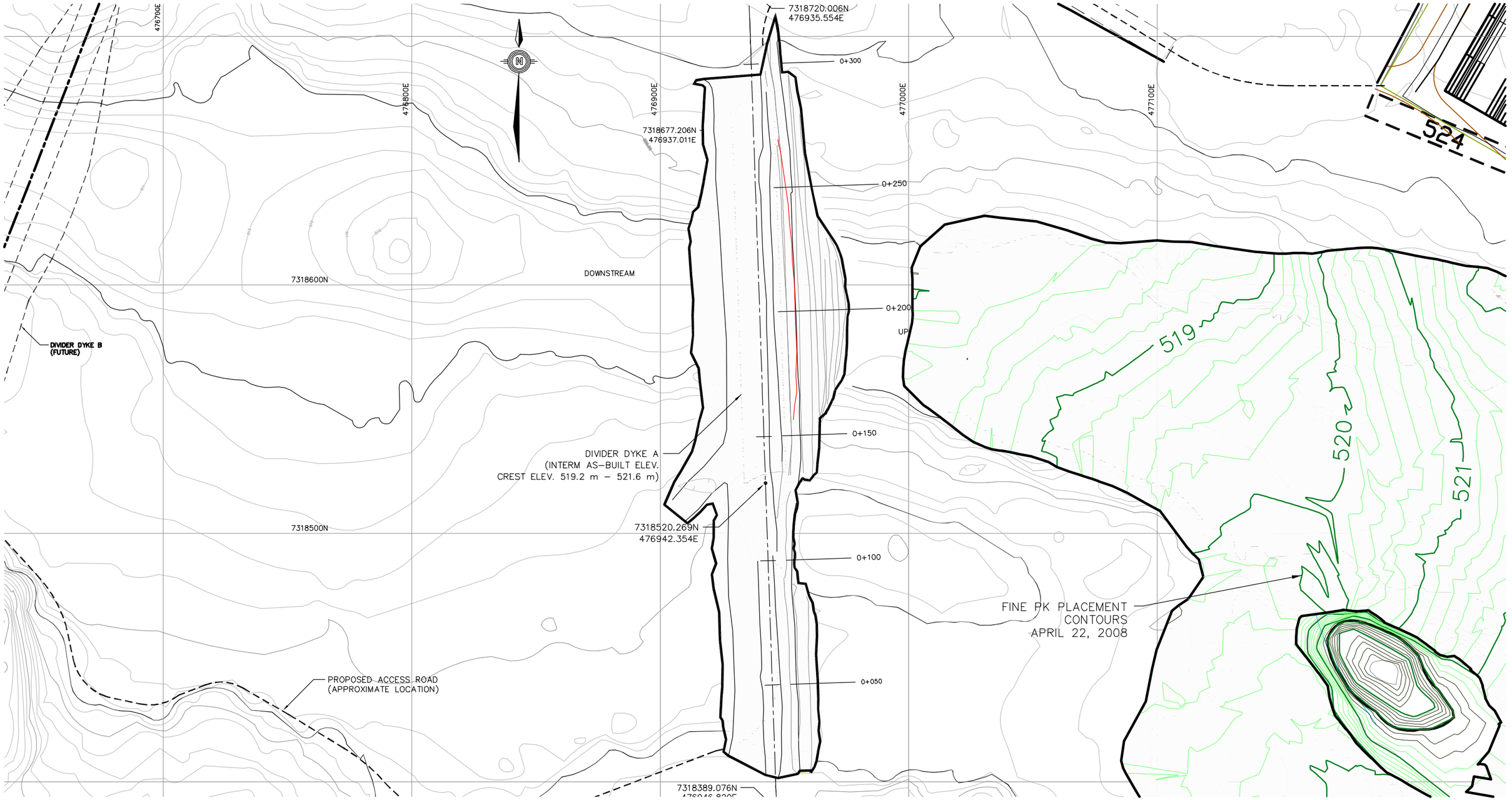


FIGURE BASED ON 2006 SURVEY. DYKE WAS RAISED SINCE THE SURVEY.

0 50
Scale (metres)

Q:\Edmonton\Drafting\DIVISIONS\2007\E14\E14101117\Acad\E14101117_FIG B-1.dwg [Figure B-1] October 07, 2010 - 9:29am Nikos

CLIENT

Shear Minerals Ltd.

JERICHO PROJECT
2010 GEOTECHNICAL INSPECTION

DIVIDER DYKE A

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
E14101117	TK	JP	1
OFFICE: EBA-EDM	DATE: October 7, 2010		

Figure B1

Photo B-1
Downstream slope of Divider Dyke A (Aspect: N)

Photo B-2
Upstream slope and filter zone of Divider Dyke A (Aspect: S)

Photo B-3
Aerial view of Divider Dyke A (Aspect: NW)

APPENDIX C

GEOTECHNICAL INSPECTION SUMMARY

Location: **Jericho Mine**
Facility: **East Dam**
Observation Date: **September 19-30, 2010**

Inspected by: Jason L. Porter, P.Eng.
EBA Engineering Consultants Ltd.

OPERATING CONDITION:	
Minimum Crest Elevation	527 (approx.)
Top of Core or Liner	523.3
Processed Kimberlite - Upstream	526 (varies – approximate)
Water Levels - Downstream	Not measured
Discharge	No discharge

OBSERVED CONDITION:					
Features:	Present	Dimensions	Extent	Description	Photographic Records
Erosion	None noted				
Cracking	None noted				
Settlement	None noted				
Seepage	None noted				
Other Features					

THERMAL SUMMARY:

Ground temperature measurements in attached Figures C.2 to C.5 Base of key trench approximately -2.0 to -4.0. Temperatures within the key trench cooling or steady over the past year.

RECOMMENDATIONS AND CONCLUSIONS:

Dam performance is satisfactory.

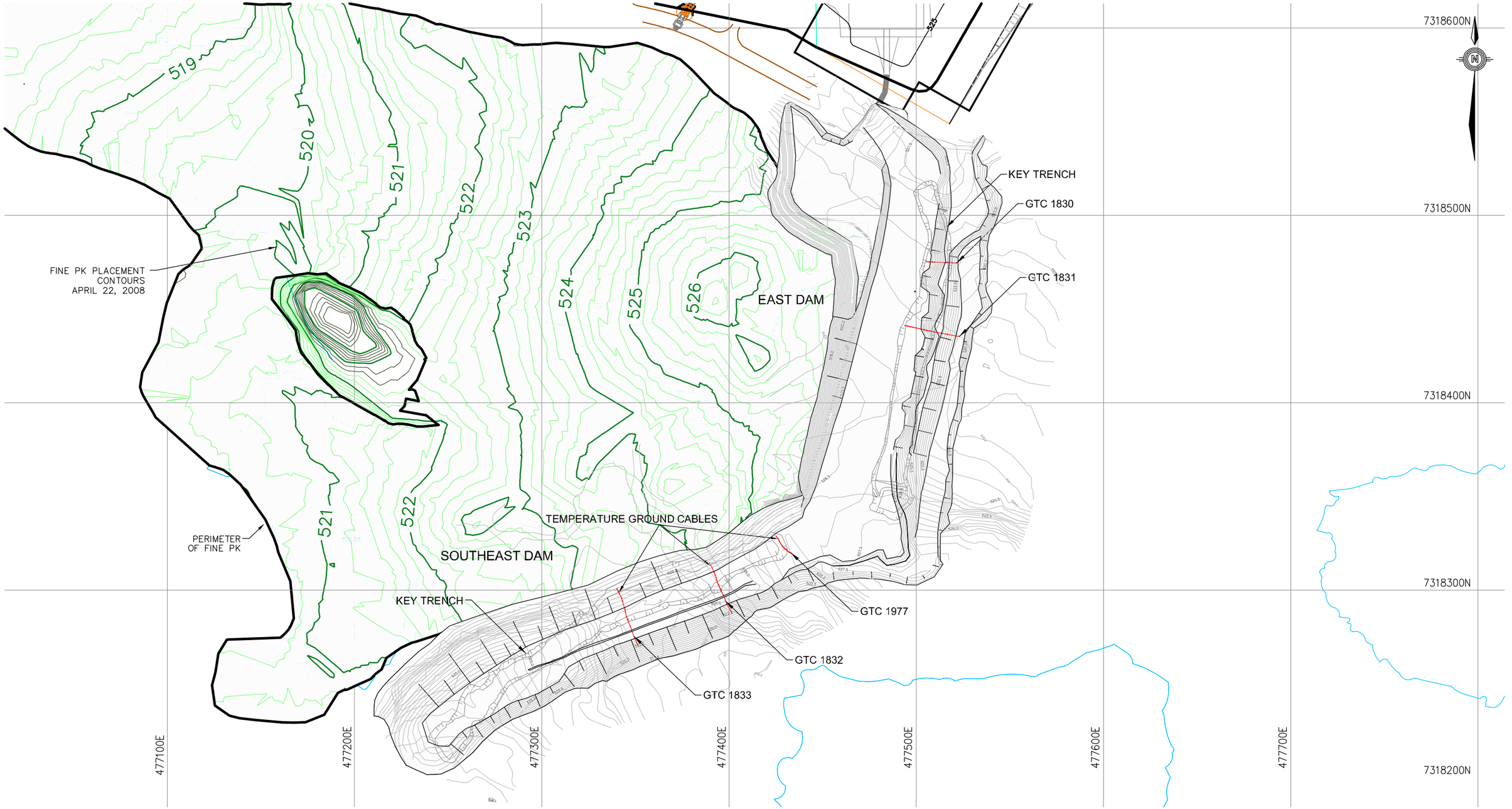


FIGURE BASED ON 2007 RECORD DRAWINGS.

LEGEND:
GROUND TEMPERATURE CABLES (APPROXIMATE LOCATION)
CABLES AT BASE OF LINER IN KEY TRENCH

0 100
Scale (metres)

CLIENT
Shear Minerals Ltd.

JERICHO PROJECT
2010 GEOTECHNICAL INSPECTION

EAST DAM

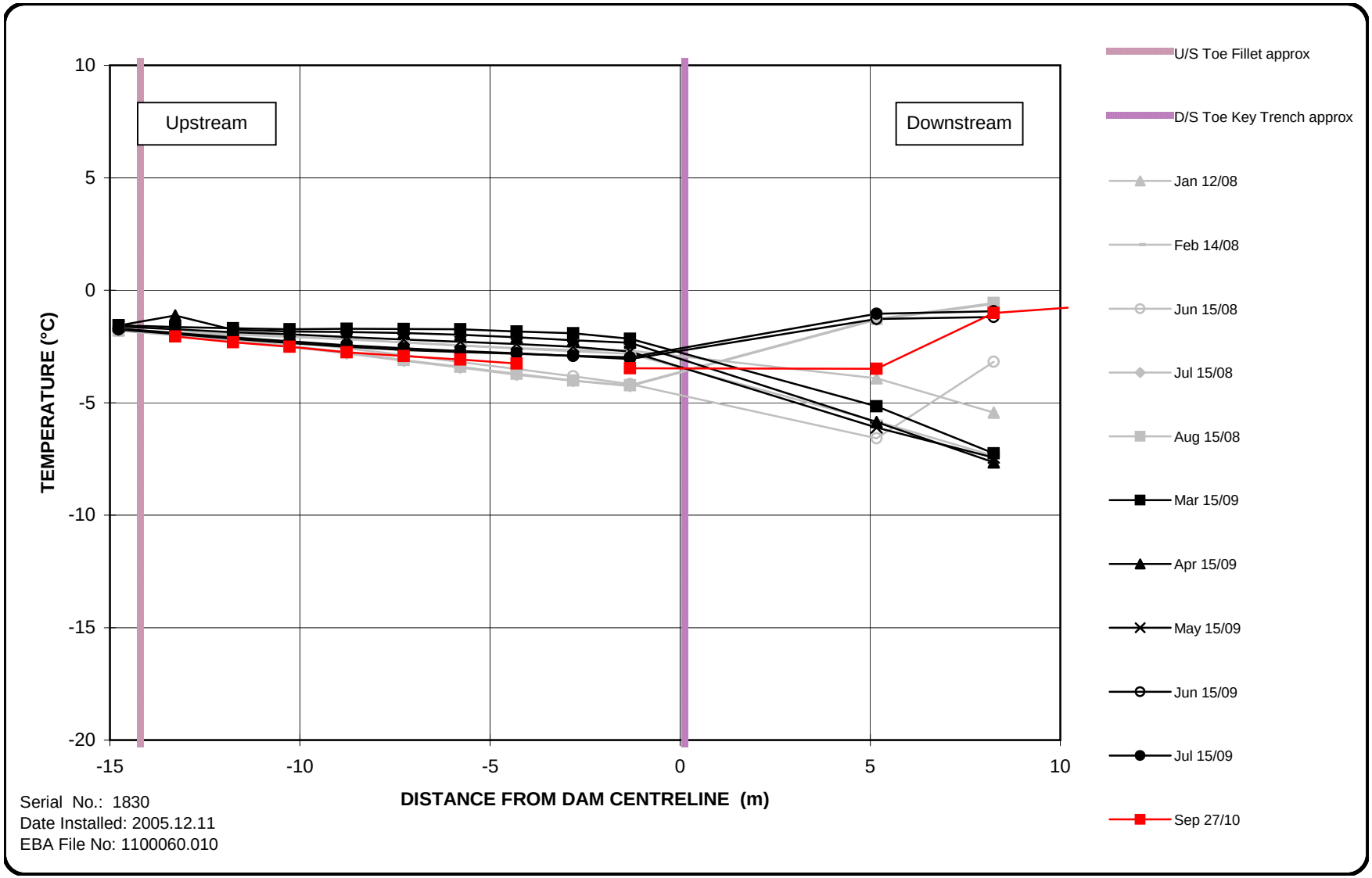
EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
E14101117	TK	JP	1

OFFICE: EBA-EDM
DATE: October 7, 2010

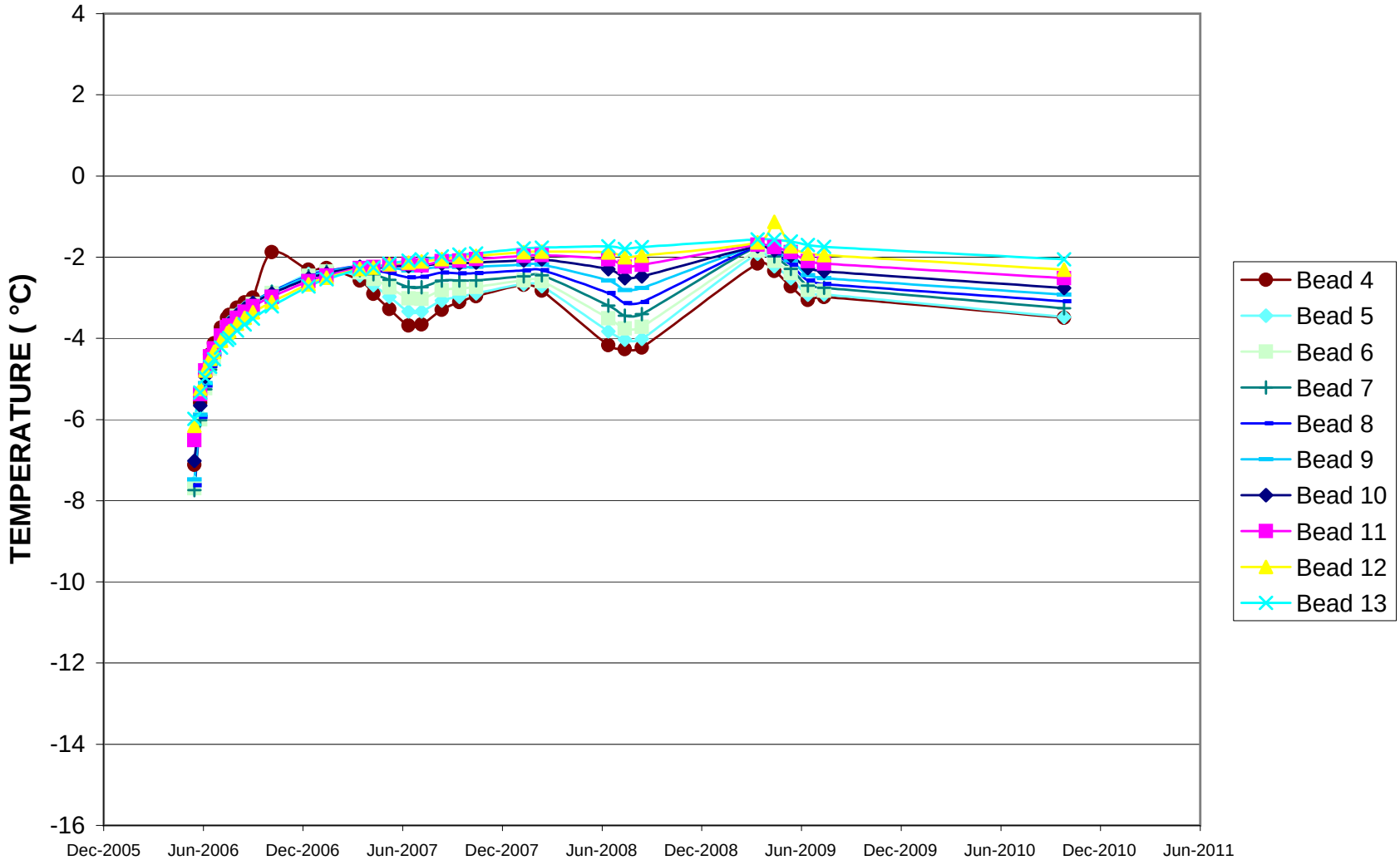
Figure C-1

Q:\Edmonton\Drafting\DIVISIONS\2007\E141\E14101117\Acad\E14101117_FIG C-1.dwg [FigC-1] October 07, 2010 - 9:49am lkiros



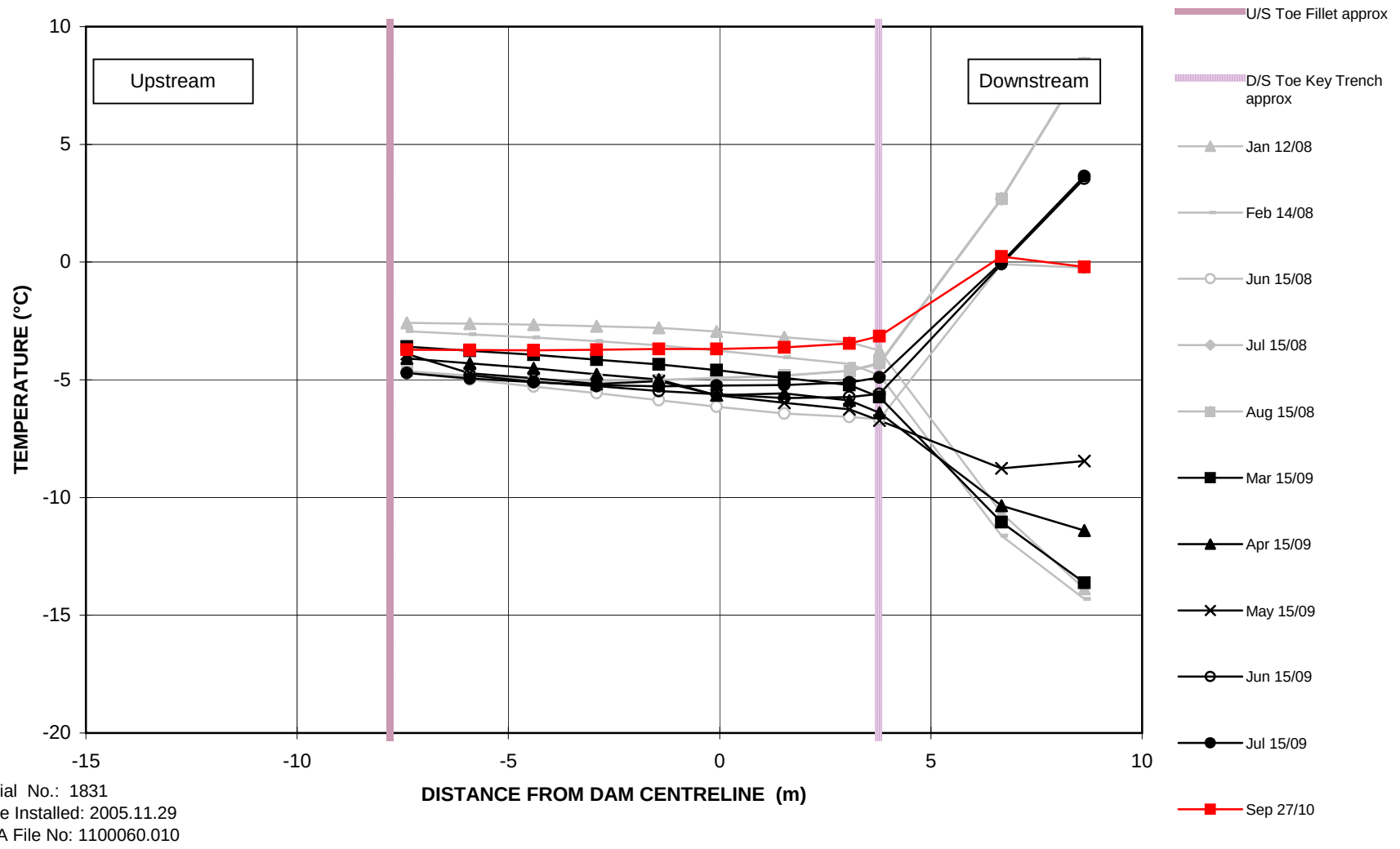
Serial No.: 1830
Date Installed: 2005.12.11
EBA File No: 1100060.010

Figure C-2
Horizontal Ground Temperature Distribution
East Dam
Station 0+100, Trench Elevation 517 m



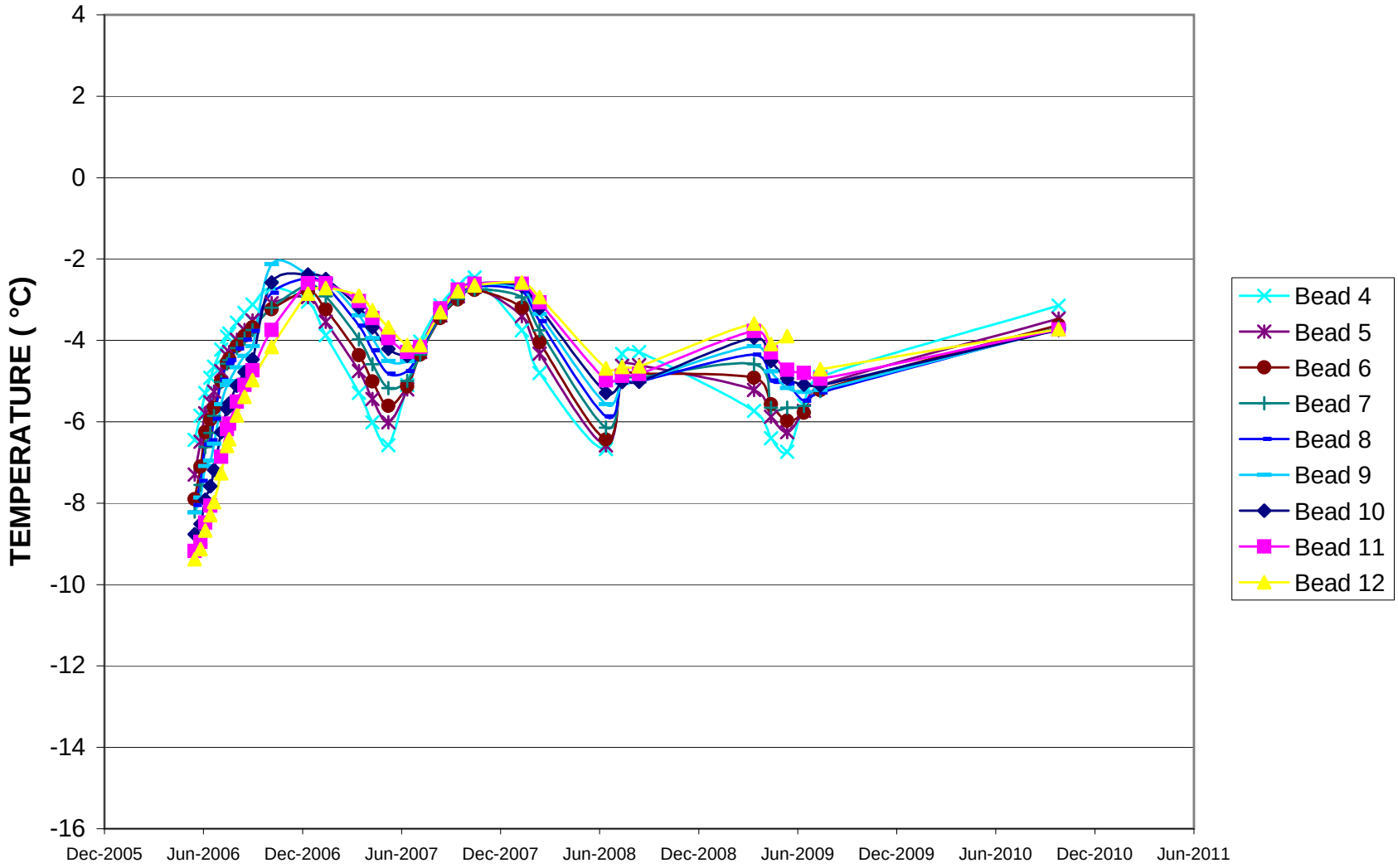
Serial No.: 1830
Date Installed: 2005.12.11
EBA File No: 1100060.010

Figure C-3
Horizontal Ground Temperature Distribution
East Dam
Station 0+100, Trench Elevation 517 m



Serial No.: 1831
Date Installed: 2005.11.29
EBA File No: 1100060.010

Figure C-4
Horizontal Ground Temperature Distribution
East Dam
Station 0+150, Trench Elevation 515 m



Serial No.: 1831
Date Installed: 2005.11.29
EBA File No: 1100060.010

Figure C-5
Horizontal Ground Temperature Distribution
East Dam
Station 0+100, Trench Elevation 517 m

Photo C-1
Downstream slope of East Dam (Aspect: N)

Photo C-2
Crest surface of East Dam (Aspect: N)

Photo C-3
Upstream slope of East Dam (Aspect: NE)

Photo C-4
Aerial view of East Dam

APPENDIX D

GEOTECHNICAL INSPECTION SUMMARY

Location: **Jericho Mine**
Facility: **Southeast Dam**
Observation Date: **September 29-30, 2010**

Inspected by: Jason L. Porter, P.Eng.
EBA Engineering Consultants Ltd.

OPERATING CONDITION:	
Minimum Crest Elevation	527 (approx.)
Top of Core or Liner	523.3
Processed Kimberlite - Upstream	523 (varies - approximate)
Water Levels - Downstream	N/A
Discharge	No discharge

OBSERVED CONDITION:

Features:	Present	Dimensions	Extent	Description	Photographic Records
Erosion	None noted				
Cracking	None noted				
Settlement	None noted				
Seepage	None noted				
Other Features					

THERMAL SUMMARY:

Ground temperature measurements in attached Figures D.2 to D.7 Base of key trench range from -2ºC to -5 C. Temperatures within the key trench cooling with time, as the dam freezes back. Temperatures within design assumptions.

RECOMMENDATIONS AND CONCLUSIONS:

Dam performance is satisfactory.

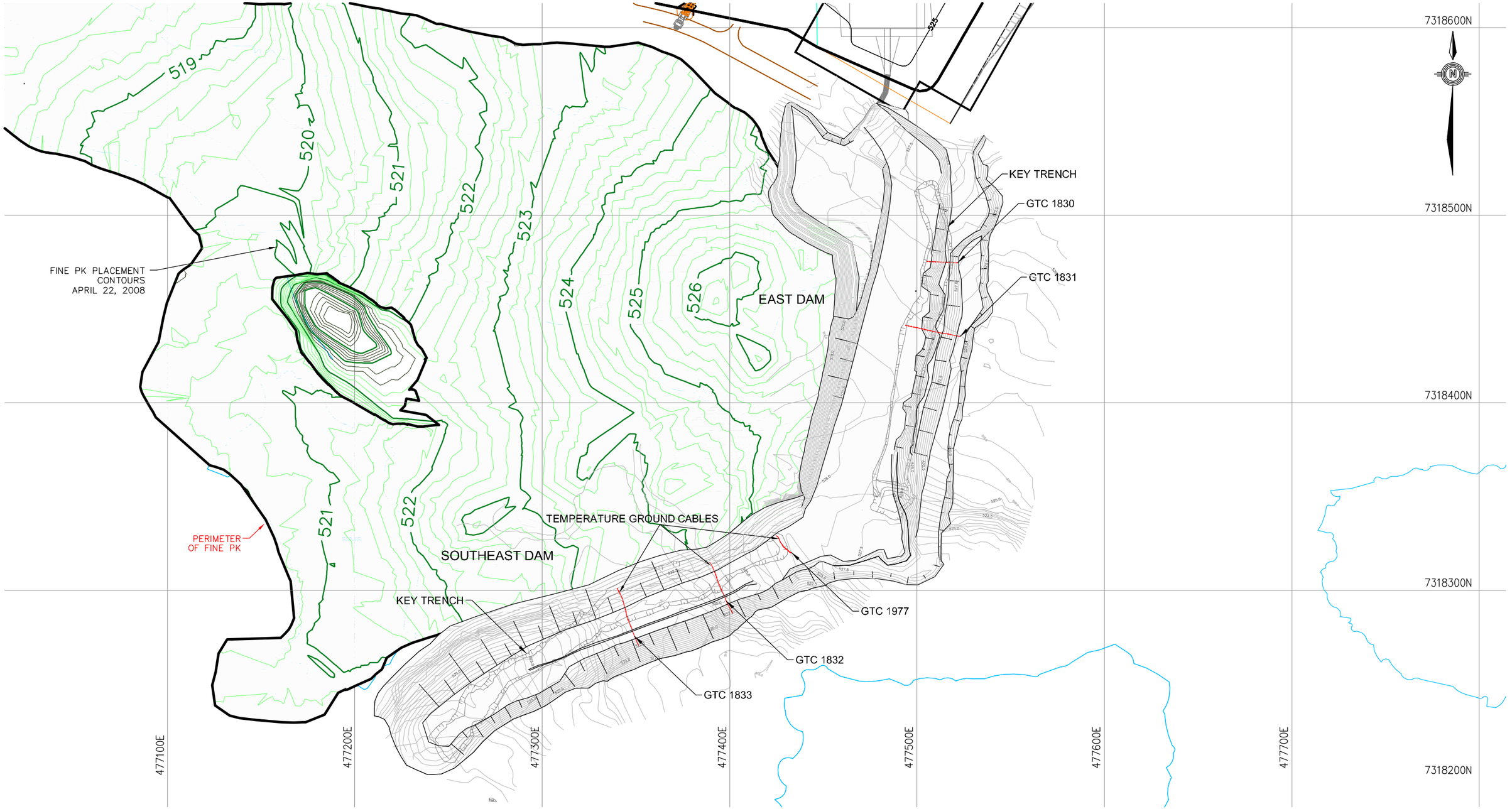


FIGURE BASED ON 2007 RECORD DRAWINGS.

LEGEND:
GROUND TEMPERATURE CABLES (APPROXIMATE LOCATION)
CABLES AT BASE OF LINER IN KEY TRENCH

0 100
Scale (metres)

CLIENT
Shear Minerals Ltd.

JERICHO PROJECT
2010 GEOTECHNICAL INSPECTION

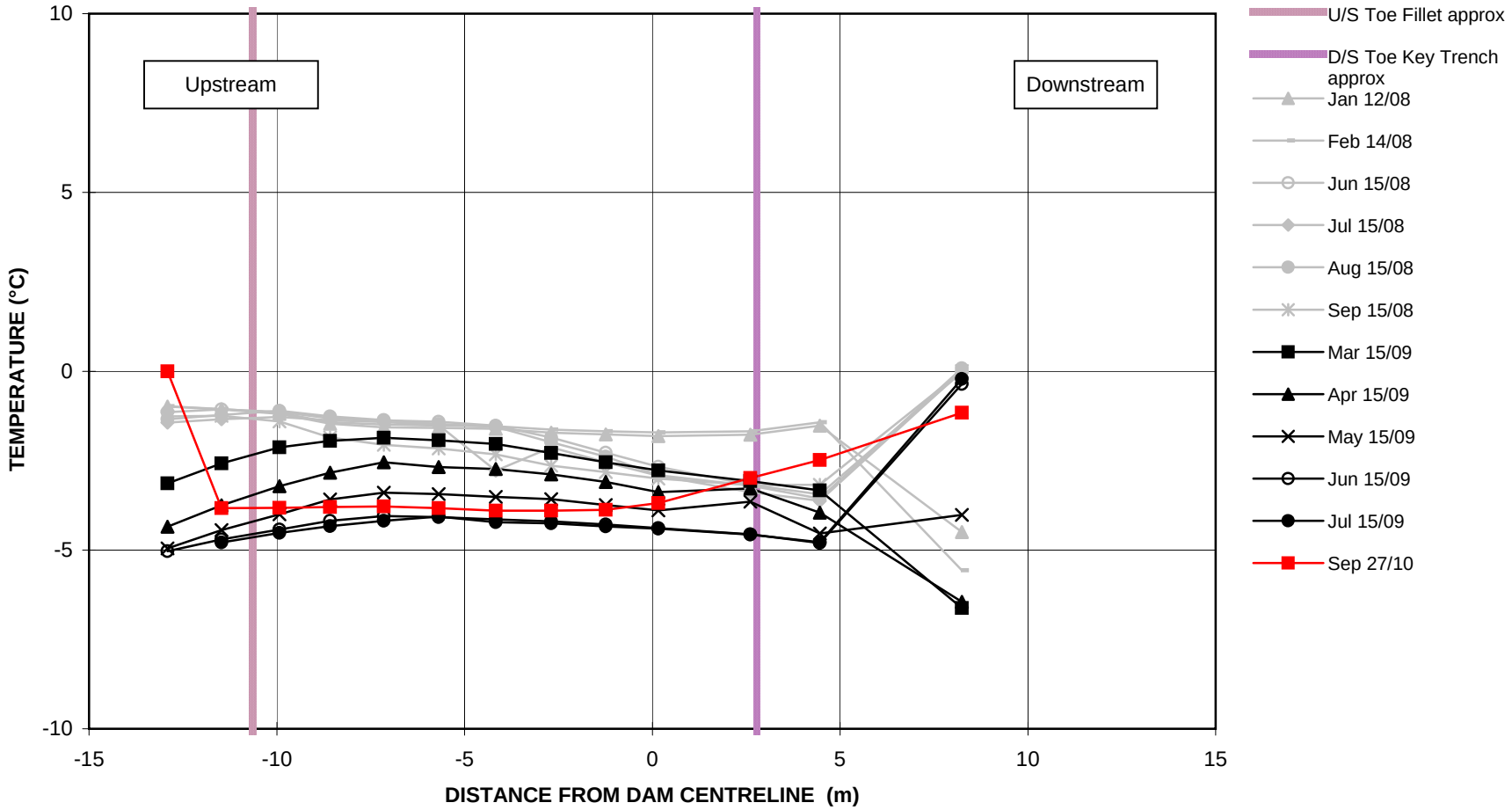
SOUTHEAST DAM

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
E14101117	TK	JP	1
OFFICE: EBA-EDM	DATE: October 7, 2010		

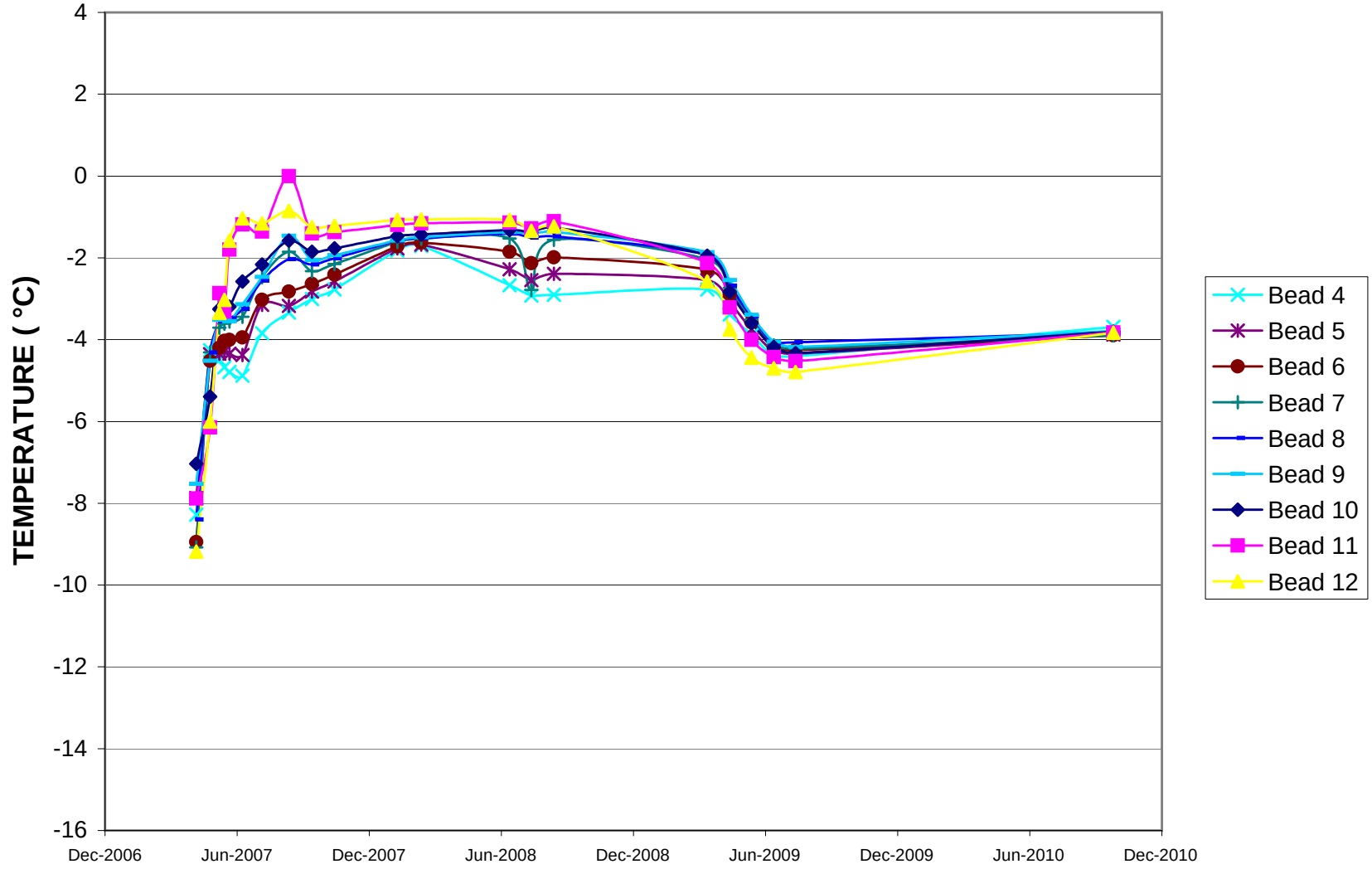
Figure D-1

Q:\Edmonton\Drafting\DIVISIONS2007\E141\E14101117\Acad\E14101117_FIG D-1.dwg [FIG D-1] October 07, 2010 - 1:53pm lidros



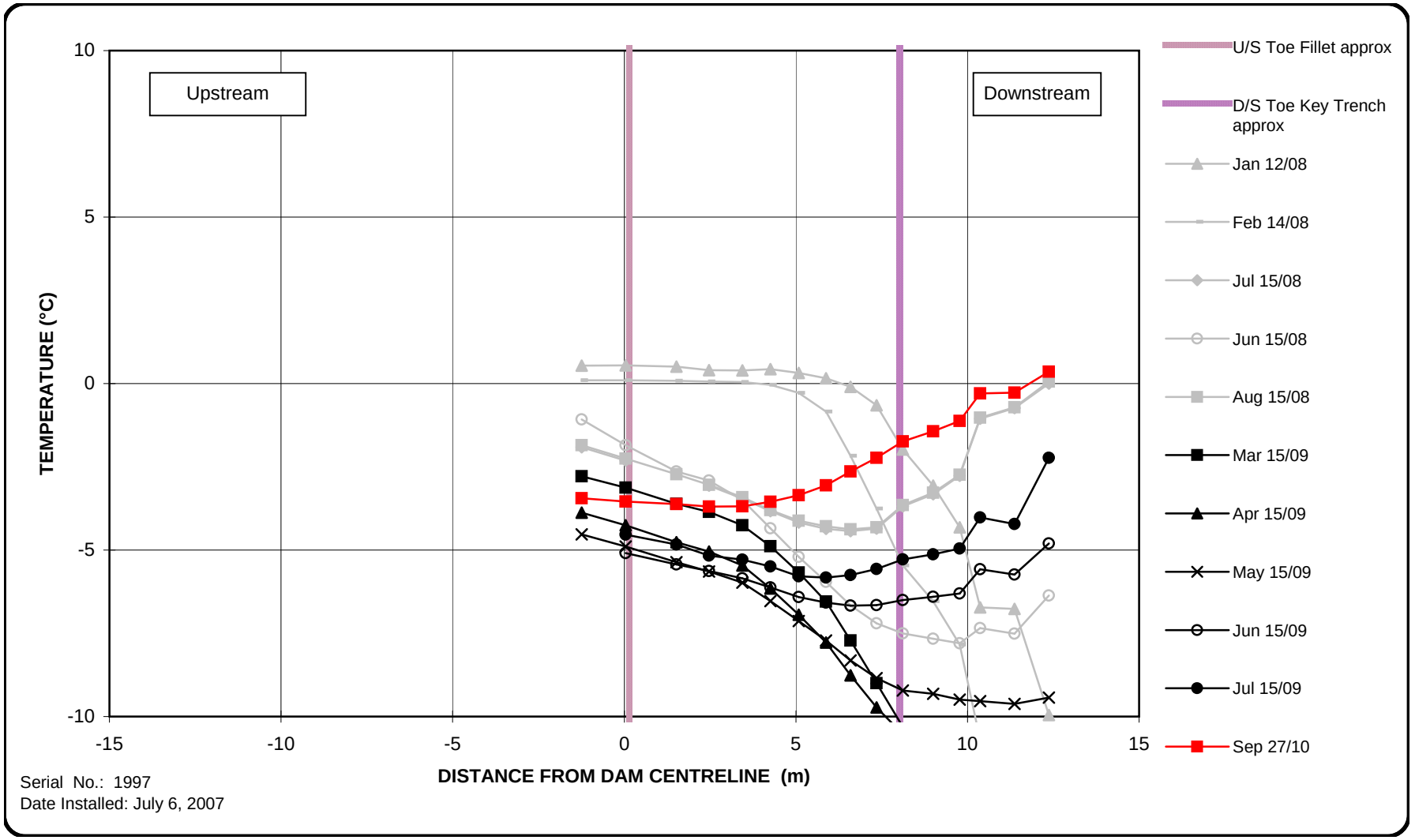
Serial No.: 1832
Date Installed: April 5, 2007

Figure D-2
Horizontal Ground Temperature Distribution
Southeast Dam
Station 0+150, Trench Elevation 516 m



Serial No.: 1832
Date Installed: April 5, 2007

Figure D-3
Horizontal Ground Temperature Distribution
Southeast Dam
Station 0+150, Trench Elevation 516 m



Serial No.: 1997
Date Installed: July 6, 2007

Figure D-4
Horizontal Ground Temperature Distribution
Southeast Dam
Station 0+240, Trench Elevation 520 m

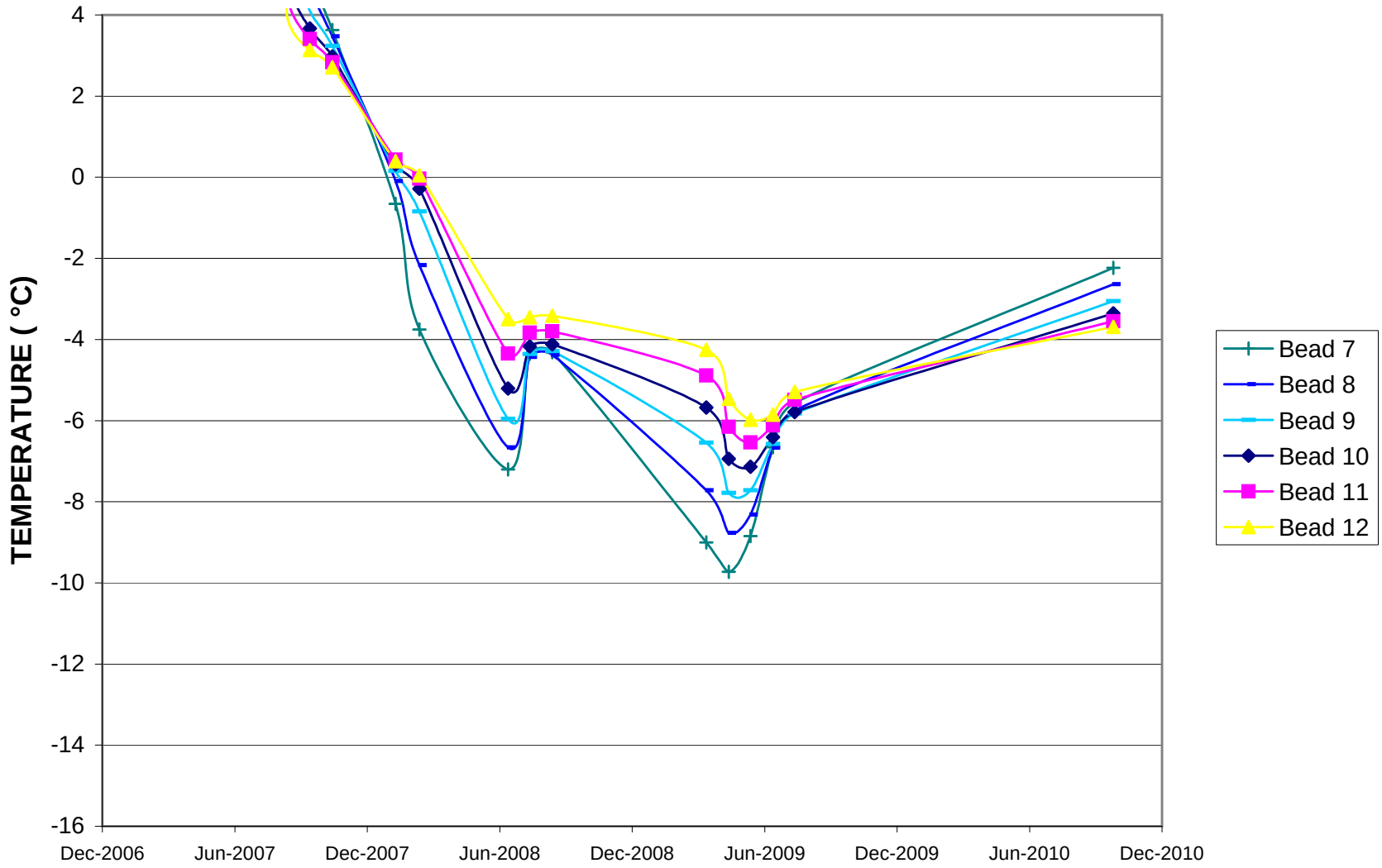


Figure D-5
Horizontal Ground Temperature Distribution
Southeast Dam
Station 0+150, Trench Elevation 516 m

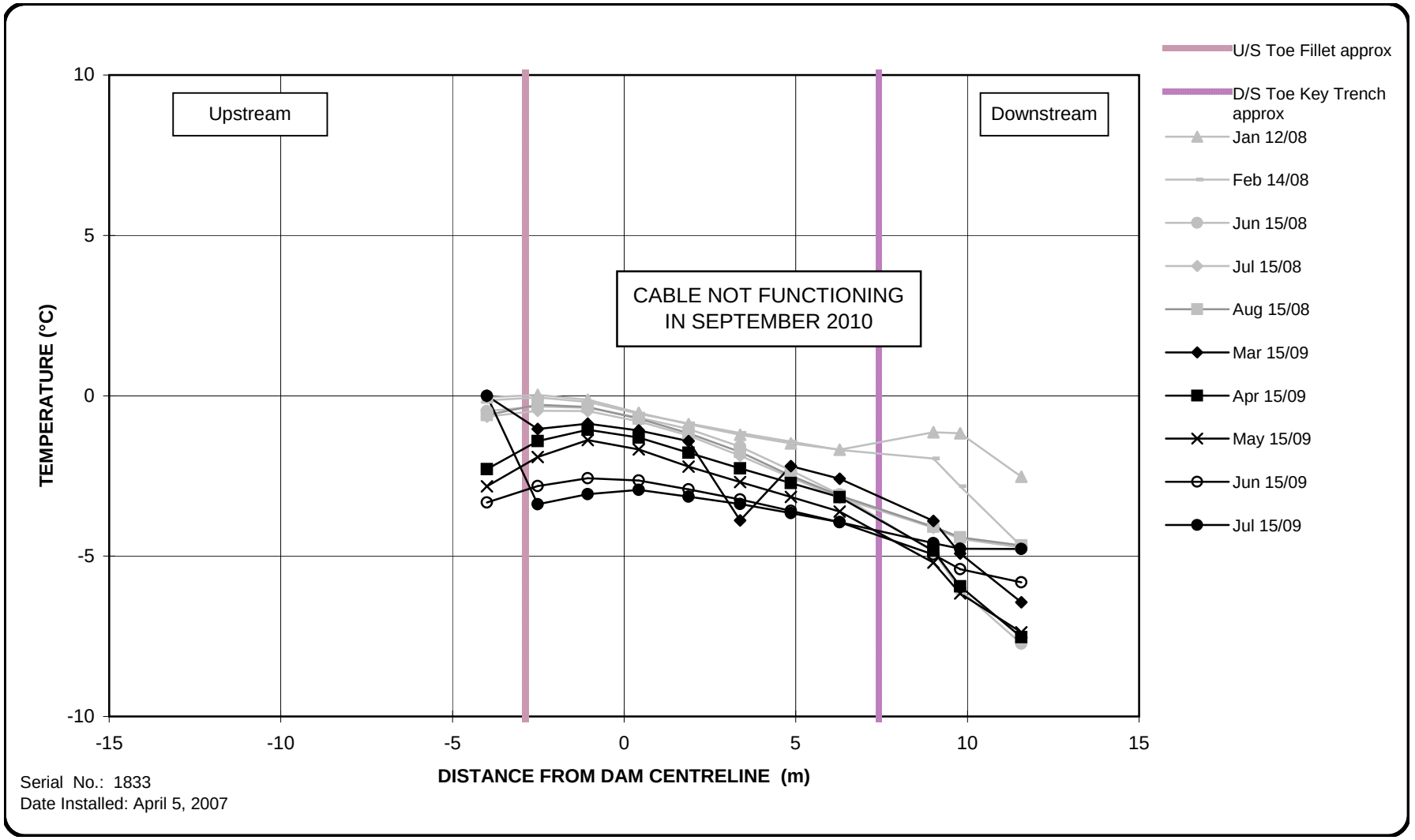


Figure D-6
Horizontal Ground Temperature Distribution
Southeast Dam
Station 0+200, Trench Elevation 516 m

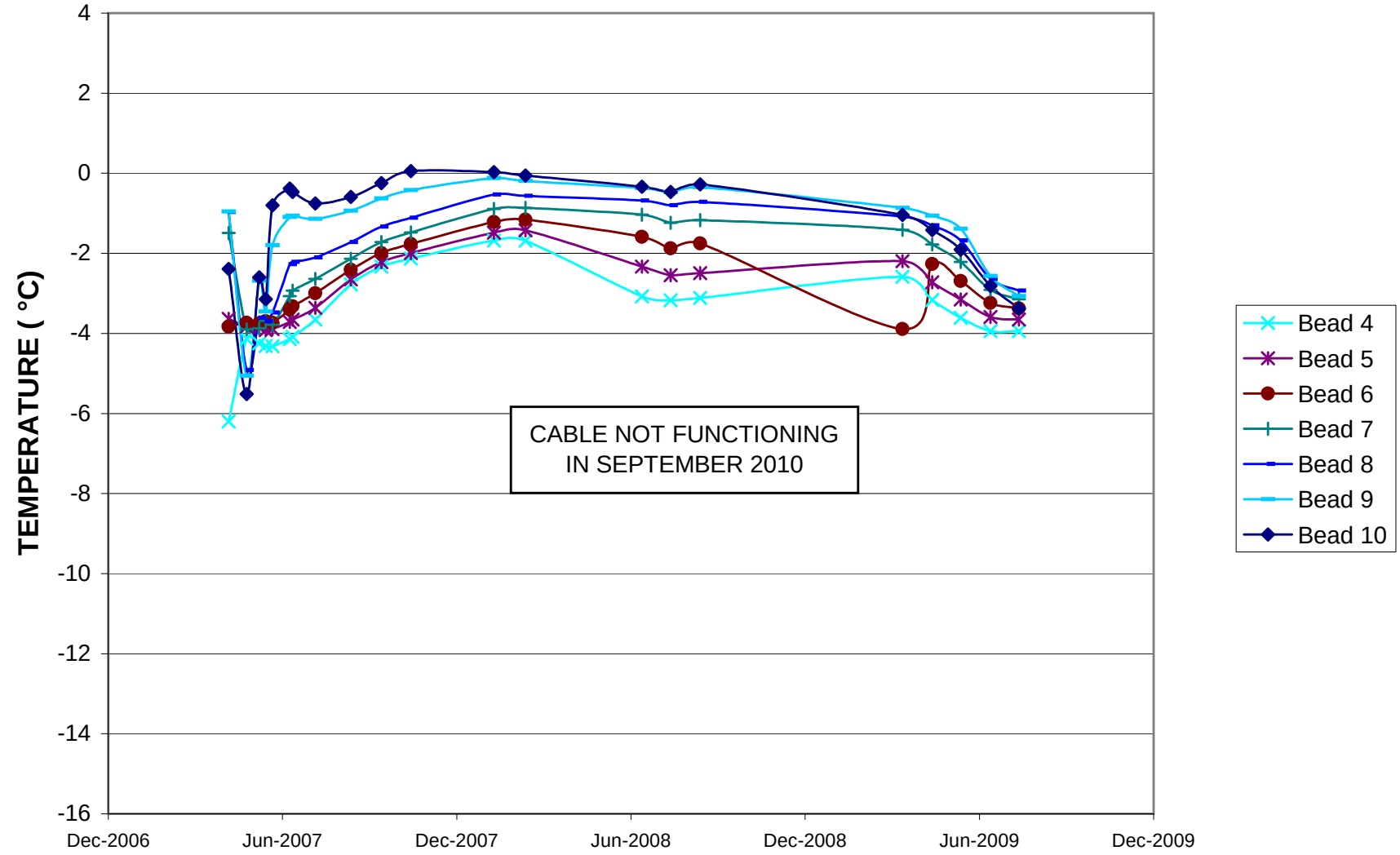


Figure D-7
Horizontal Ground Temperature Distribution
Southeast Dam
Station 0+150, Trench Elevation 516 m

Photo D-1
Crest surface of Southeast Dam (Aspect: SW)

Photo D-2
Downstream slope of Southeast Dam (Aspect: SW)

Photo D-3
Upstream slope of Southeast Dam (Aspect: NE)

Photo D-4
Aerial view of Southeast Dam

APPENDIX E

APPENDIX E C1 DIVERSION

GEOTECHNICAL INSPECTION SUMMARY

Location: **Jericho Mine**
Facility: **C1 Diversion**
Observation Date: **September 29-30, 2010**

Inspected by: Jason L. Porter, P.Eng.
EBA Engineering Consultants Ltd.

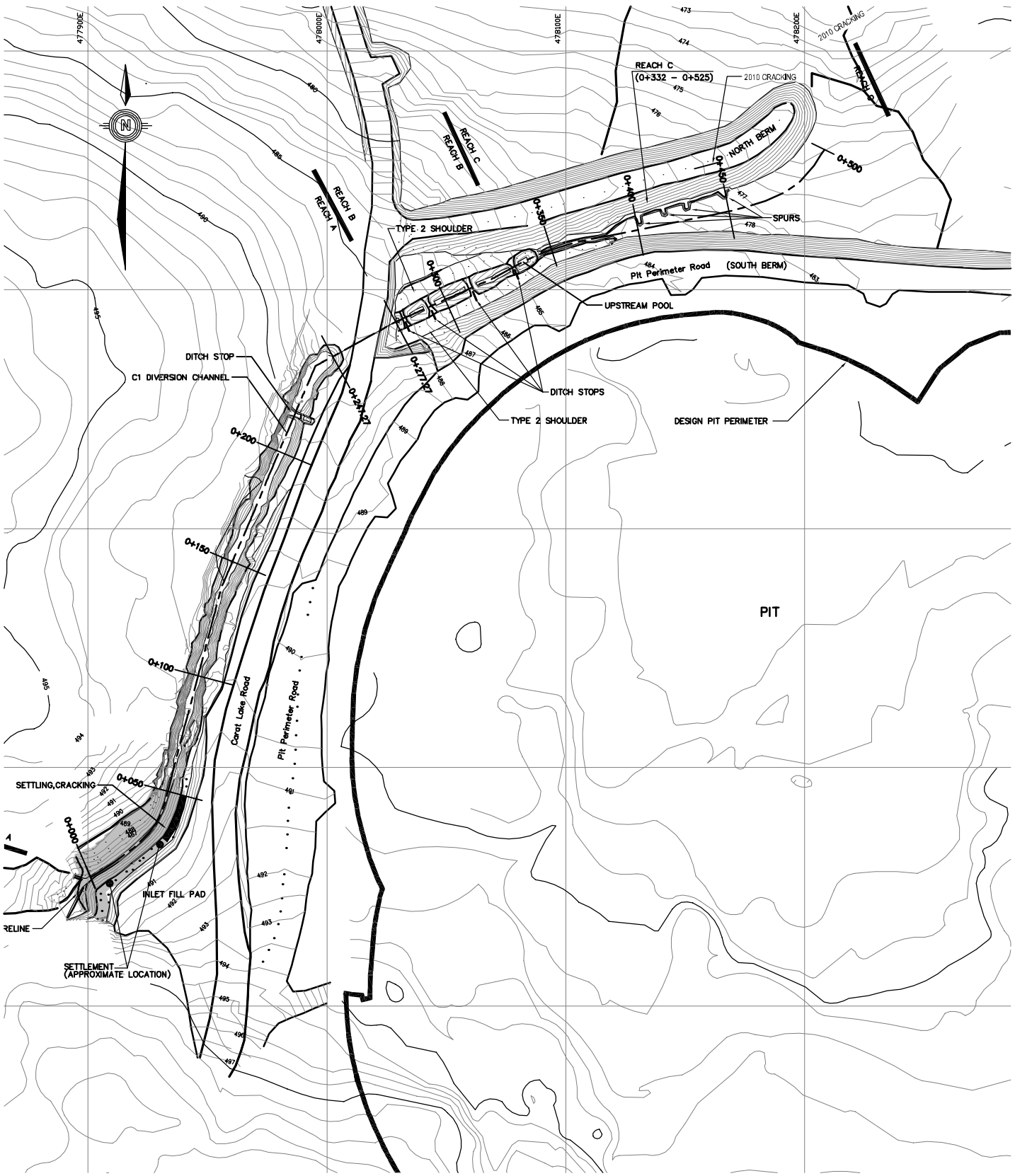
OPERATING CONDITION:	
Flow	Very low flow – maximum water depth in culvert < 25 mm.

OBSERVED CONDITION:					
Features	Present	Dimensions	Extent	Description	Photographic Records
Erosion	None noted				
Cracking	None noted	0.1 m wide by 6 m+ long	Localized	Cracking on Reach C till berm	E-7
Settlement	None noted				
Seepage	None noted				
Other Features	C1-4 – Bent culvert inlet and outlet			As noted in the 2009 inspection, the Reach B culvert has been bent.	E-4

THERMAL SUMMARY:
Not applicable

RECOMMENDATIONS AND CONCLUSIONS:

C1 Diversion structure performance is satisfactory. Minor repairs to culvert inlet and outlet may be required to sustain flow during high flow.



DRAWING BASED ON 2006 AS BUILT

LEGEND:

● – FEATURE IDENTIFIED 2007 GEOTECHNICAL INSPECTION

0 100

Scale (metres)

CLIENT

Shear Minerals Ltd.

JERICHO PROJECT
2010 GEOTECHNICAL INSPECTION

DIVERSION CHANNEL

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
E14101117	TK	JP	1
OFFICE	DATE		
EBA-EDM	November 24, 2010		

Figure E-1

Q:\Edmonton\Drafting\DIVISIONS2007\E14\E14101117\Acad\E14101117_FIG E-1.dwg [Fig E-1] November 24, 2010 - 12:02pm klarios

Photo E-1
Reach A inlet (Aspect: SW)

Photo E-2
Fill zone along Reach A (Aspect: N)

Photo E-3
Rock cut in Reach A (Aspect: N)

Photo E-4
Culvert in Reach B

Photo E-5
General condition of Reach C (Aspect: E)

Photo E-6
Downstream slope of Reach C berm (Aspect: E)

Photo E-7
Cracking noted in Reach C berm

APPENDIX F

APPENDIX F TANK FARM

GEOTECHNICAL INSPECTION SUMMARY

Location: **Jericho Mine**
Facility: **Tankfarm**
Observation Date: **September 29-30, 2010**

Inspected by: Jason L. Porter, P.Eng.
EBA Engineering Consultants Ltd.

OPERATING CONDITION (AS NOTED IN 2009):	
Phase 1 (southern portion) Eight 500,000 litre tanks	Tanks 1, 2, 3, 4 5, 6, 7, 8 reported to be empty
Phase 2 (northern portion) Four 1,500,000 litre tanks	Tank 9 <5% full 50% full Tanks10 <10% full Tank 11 1,200,000 litres Tank 12 <5% full

OBSERVED CONDITION:					
Features:	Present	Dimensions	Extent	Description	Photographic Records
Erosion	None noted				
Cracking	None noted				
Settlement	Settlement within Phase 1 Tankfarm	Uneven surface throughout tank farm Gaps up to 50 mm high under several of the tanks. Tanks in Phase 1 tilting. Previous monitoring indicated settlement during the first year, settlement appeared to slow down. Has not been monitored recently. Presently no fuel in Phase 1. Berm settlement along east berm.	Throughout the tankfarm and berm.	Settlement apparent under tanks. New flexible pipe connections were installed in 2007 to accommodate the settlement. Settlement in east berm appears to be greater than 0.3 m.	
Settlement	Settlement with Phase 2 Tankfarm	Gap under edge of Tank 9 - up to 35 mm.	Only noted on Tank 9	Settlement has resulted in gap under edge of the tank. Edges tanks partially obscured by snow and ice.	F-4
Seepage	None noted				
Other Features	Stained Soil	Numerous large stain areas	Sporadic, most at valve locations	Hydrocarbon stained soil on inside surface of tankfarm base	
	Ponded/Frozen Water		Sporadic	Sections throughout Phase 1	F-1, F-2

THERMAL SUMMARY:

Not applicable

RECOMMENDATIONS AND CONCLUSIONS:

The deficiencies noted in the Tank Farm are similar to the previous inspection indicating that settlement has slowed or stopped at present. List angles of the tanks were measured by EBA but a survey of the tanks should be performed when possible.

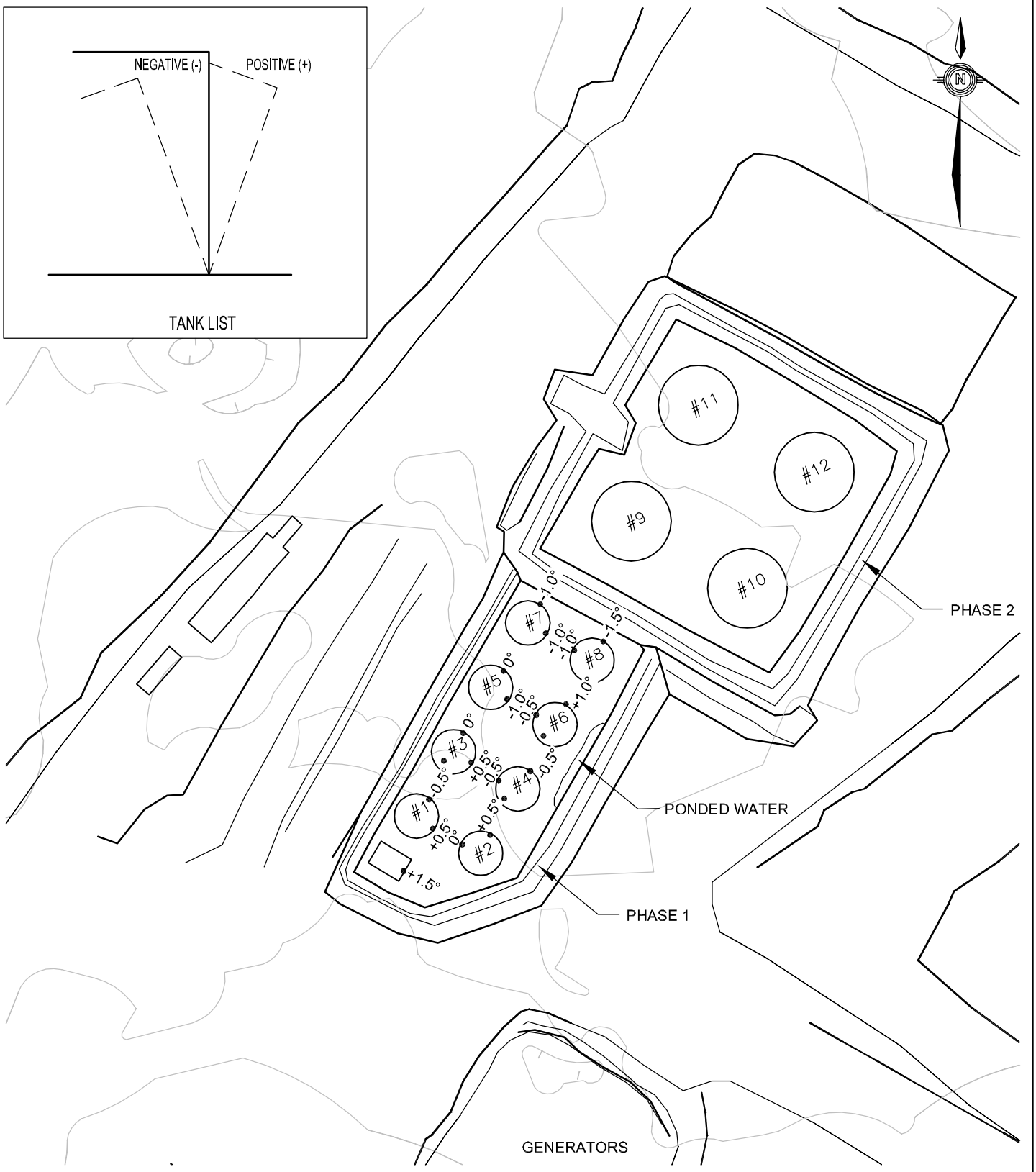


FIGURE BASED ON 2006 SURVEY.

0 50

Scale (metres)

CLIENT

Shear Minerals Ltd.

JERICHO PROJECT
2010 GEOTECHNICAL INSPECTION

TANK FARM

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
E14101117	TK	JP	1

OFFICE: EBA-EDM

DATE: November 24, 2010

Figure F-1

Q:\Edmonton\Drafting\DIVISIONS2007\E14\E14101117\Acad\E14101117_FIG F-1 - I-1.dwg [Fig F-1] November 24, 2010 - 12:06pm tkiros

Photo F-1
Area between the tanks in Phase 1 of the tank farm (Aspect: S)

Photo F-2
General condition of the east bern of Phase 1 at the tank farm (Aspect: S)

Photo F-3
Magnetic protractor used to measure the list of the tanks in Phase 1 tank farm

Photo F-4
West berm of Phase 2 tank farm (Aspect: S); North berm of Phase 2 tank farm (Aspect: W)

APPENDIX G

APPENDIX G GENERATOR TANK CONTAINMENT AREA

GEOTECHNICAL INSPECTION SUMMARY

Location: **Jericho Mine**
Facility: **Generator Tank Containment**
Observation Date: **September 29-30, 2010**

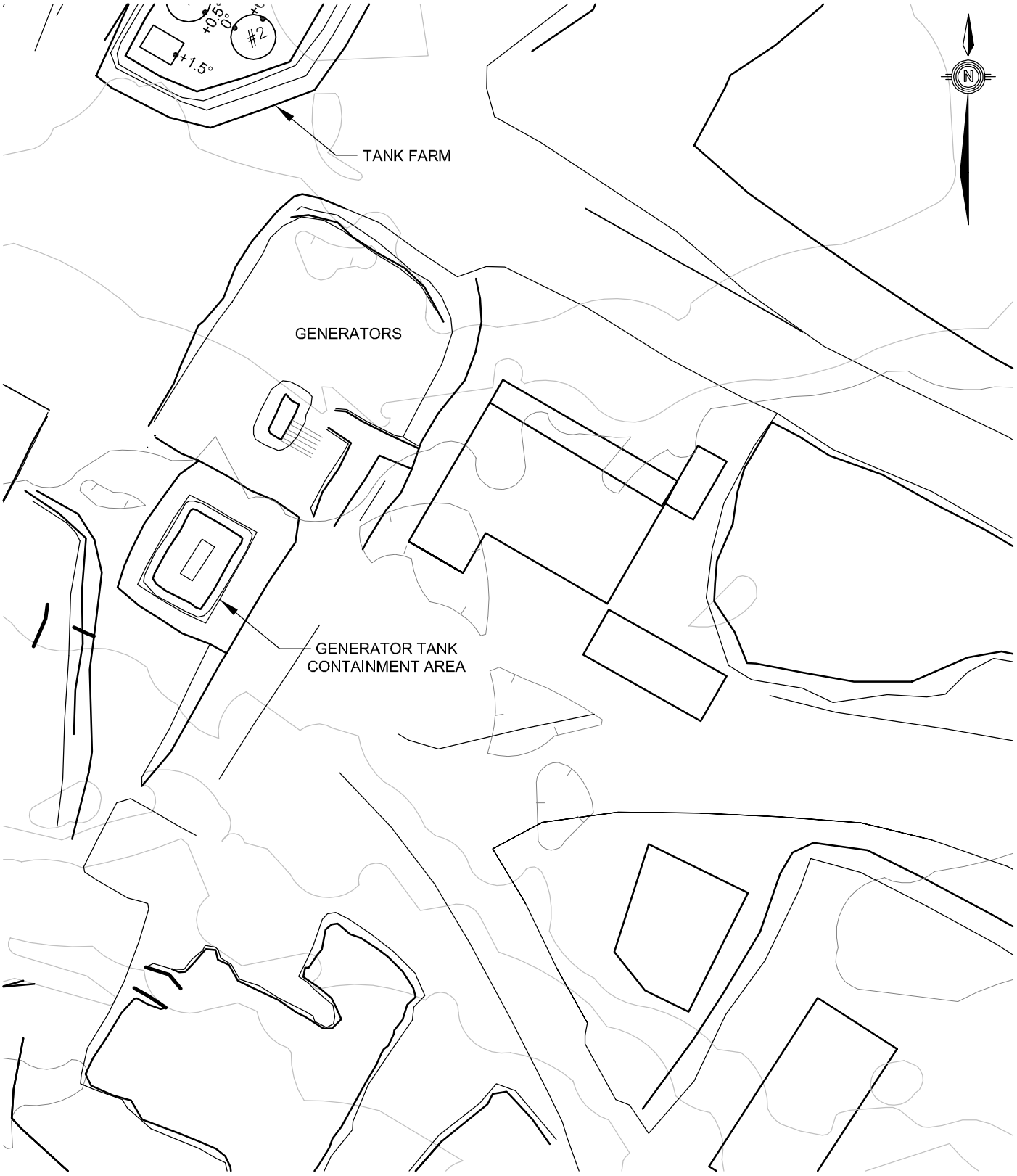
Inspected by: Jason L. Porter, P.Eng.
EBA Engineering Consultants Ltd.

OBSERVED CONDITION:					
Features:	Present	Dimensions	Extent	Description	Photographic Records
Erosion	None noted				
Cracking	None noted				
Settlement	None noted				
Seepage	None noted				
Other Features	Low area in 20 mm crush on West berm	Berm is approximately 0.4 m low along the north berm	5% of berm	Low area in berm (as noted in 2009)	
Other Features	Ponded Water	Some ice present in the base of the berm. Obscured by snow cover.	100% of berm base		G-2, G-3

THERMAL SUMMARY:
Not applicable

RECOMMENDATIONS AND CONCLUSIONS:

Low spot in the 20 mm crush berm – berm supported by 150 mm crush berm. Record drawings should be reviewed to determine where the liner is located to determine if there is a low area in the liner along the north berm. If so, the containment capacity should be reviewed to determine if berm modifications are required.



0 50

Scale (metres)

CLIENT

Shear Minerals Ltd.

JERICHO PROJECT
2010 GEOTECHNICAL INSPECTION

GENERATOR TANK CONTAINMENT AREA

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
E14101117	TK	JP	1
OFFICE	DATE		
EBA-EDM	October 7, 2010		

Figure G-1

Q:\Edmonton\Drafting\DIVISIONS2007\E14\E14101117\Acad\E14101117_FIG F-1 - I-1.dwg [FigG-1] October 07, 2010 - 11:33am tkiros

Photo G-1
General view of Generator Tank containment (Aspect: NE)

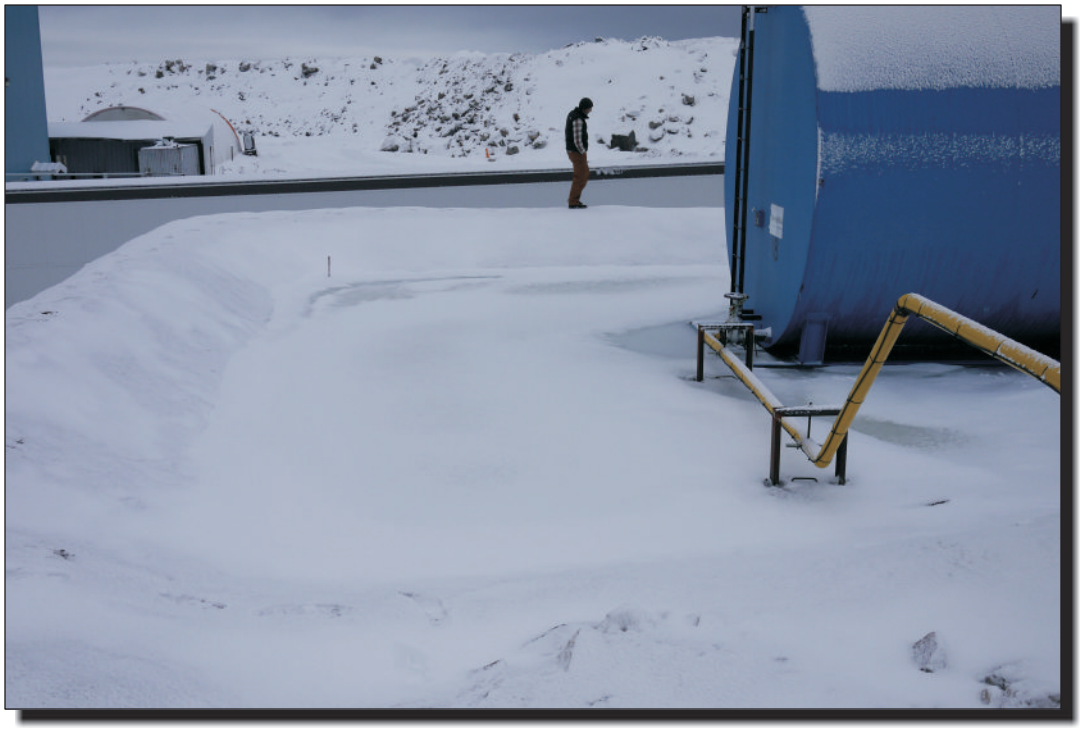


Photo G-2
Generator Tank containment crest and base (Aspect: SE)

Photo G-3
Generator Tank containment crest and base (Aspect: E)

APPENDIX H

APPENDIX H AIRSTRIP TANK CONTAINMENT AREA

GEOTECHNICAL INSPECTION SUMMARY

Location: **Jericho Mine**
Facility: **Airstrip Tank Containment Area**
Observation Date: **September 29-30, 2010**

Inspected by: Jason L. Porter, P.Eng.
EBA Engineering Consultants Ltd.

OBSERVED CONDITION:

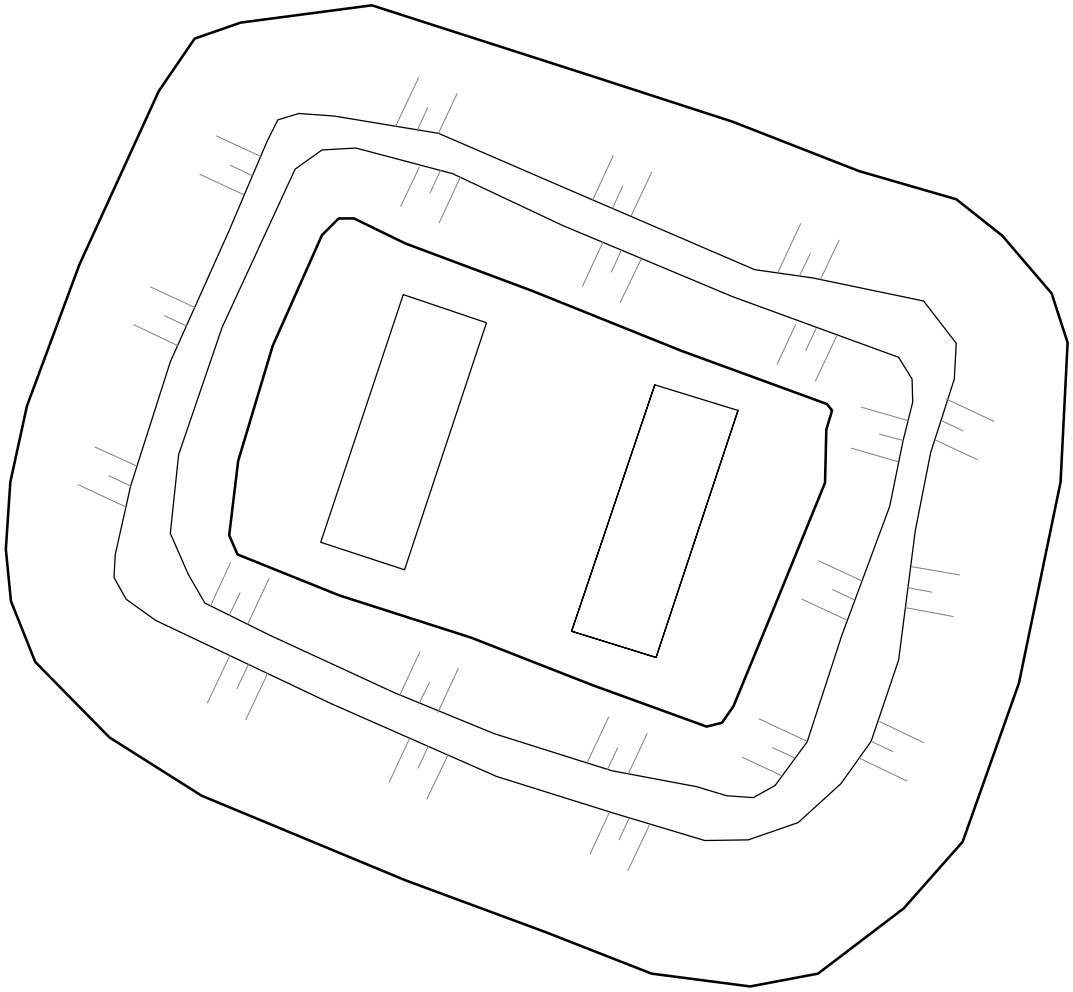
Features:	Present	Dimensions	Extent	Description	Photographic Records
Erosion	None noted				
Cracking	None noted				
Settlement	None noted				
Seepage	None noted				
Other Features	Stained Soil	Base of bermed area.	Prevalent	A spill occurred in the tankfarm winter of 2007/2008. It is understood product was collected and disposed of elsewhere. Contaminated soil in tankfarm remains.	H-2

THERMAL SUMMARY:

Not applicable

RECOMMENDATIONS AND CONCLUSIONS:

Satisfactory performance.



0 10

Scale (metres)

CLIENT

Shear Minerals Ltd.

JERICHO PROJECT
2010 GEOTECHNICAL INSPECTION

AIRSTRIP TANK CONTAINMENT

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
E14101117	TK	JP	1
OFFICE: EBA-EDM	DATE: October 7, 2010		

Figure H-1

Q:\Edmonton\Drafting\DIVISIONS2007\E14\E14101117\Acad\E14101117_FIG F-1 - I-1.dwg [Fig- H-1] October 07, 2010 - 11:31am lukros

Photo H-1
Airstrip tank containment (Aspect: SW)

Photo H-2
Soil staining in Airstrip tank containment

APPENDIX I

APPENDIX I LANDFILL

GEOTECHNICAL INSPECTION SUMMARY

Location: **Jericho Mine**
Facility: **Landfill**
Observation Date: **September 29-30, 2010**

Inspected by: Jason L. Porter, P.Eng.
EBA Engineering Consultants Ltd.

OBSERVED CONDITION:					
Features:	Present	Dimensions	Extent	Description	Photographic Records
Erosion	None noted				
Cracking	None noted				
Settlement	None noted				
Seepage	None noted				
Other Features	None noted				

THERMAL SUMMARY:
Not applicable

RECOMMENDATIONS AND CONCLUSIONS:

The landfill is constructed within the centre of the till dump. Incinerated debris is covered over with till. Metallic debris and non-burnable debris is separated from the burnable debris.

Overall satisfactory condition. Cover should be provided for site closure periods. Snow infilling was noted at time of inspection. This snow should not be covered as it may result in cover material settlement

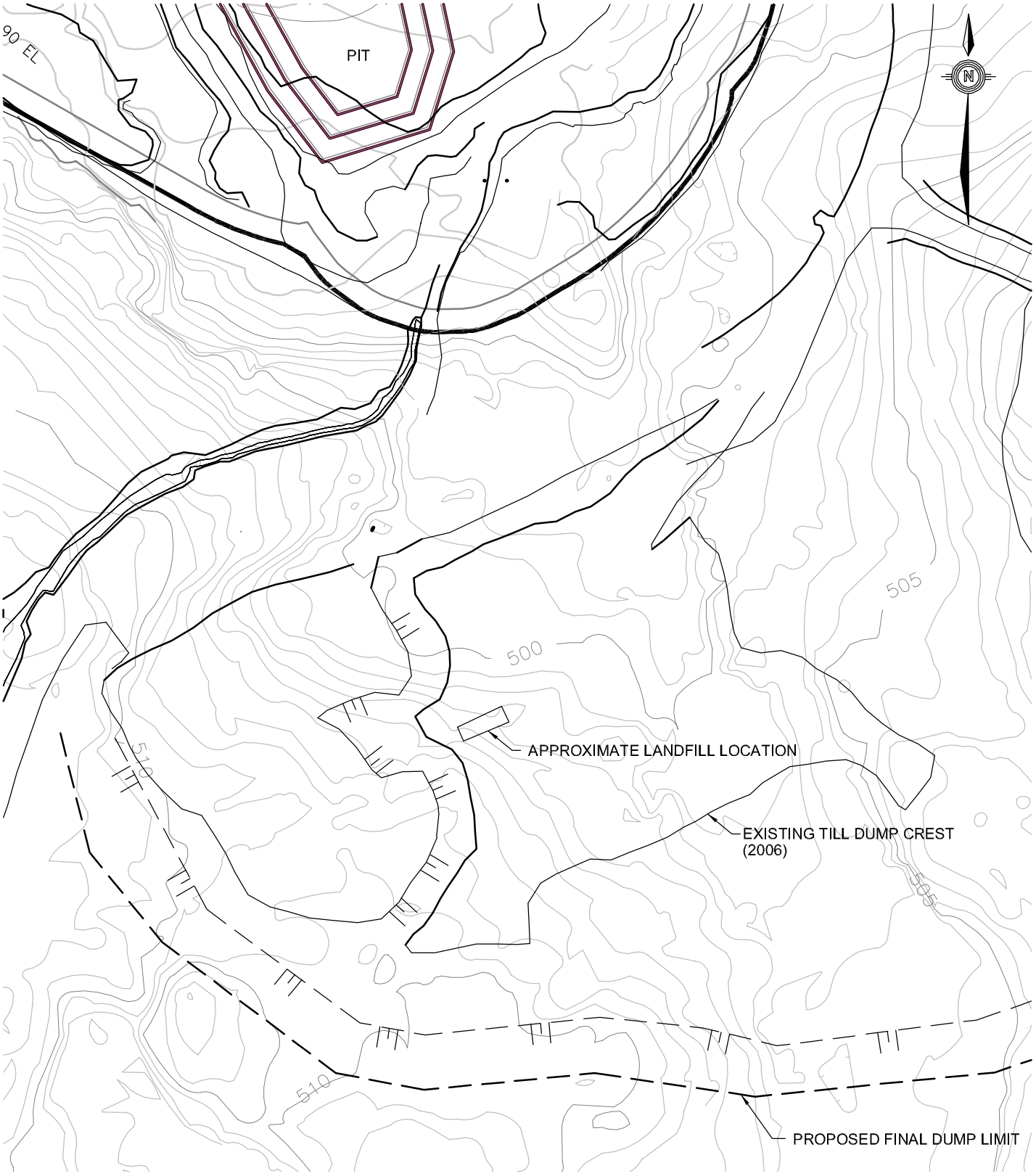


FIGURE BASED ON 2006 SURVEY.

0 100

Scale (metres)

CLIENT

Shear Minerals Ltd.

JERICHO PROJECT
2010 GEOTECHNICAL INSPECTION

LANDFILL AREA

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
E14101117	TK	JP	1
OFFICE: EBA-EDM	DATE: October 7, 2010		

Figure I-1

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Photo I-1
Non burnable waste in landfill

Photo I-2
Non burnable waste in landfill

Photo I-3
Incinerator at landfill

APPENDIX J

APPENDIX J GENERAL TERMS

GEOTECHNICAL REPORT – GENERAL CONDITIONS

This report incorporates and is subject to these "General Conditions".

1.0 USE OF REPORT AND OWNERSHIP

This geotechnical report pertains to a specific site, a specific development and a specific scope of work. It is not applicable to any other sites nor should it be relied upon for types of development other than that to which it refers. Any variation from the site or development would necessitate a supplementary geotechnical assessment.

This report and the recommendations contained in it are intended for the sole use of EBA's Client. EBA does not accept any responsibility for the accuracy of any of the data, the analyses or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than EBA's Client unless otherwise authorized in writing by EBA. Any unauthorized use of the report is at the sole risk of the user.

This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of EBA. Additional copies of the report, if required, may be obtained upon request.

2.0 ALTERNATE REPORT FORMAT

Where EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed EBA's instruments of professional service), only the signed and/or sealed versions shall be considered final and legally binding. The original signed and/or sealed version archived by EBA shall be deemed to be the original for the Project.

Both electronic file and hard copy versions of EBA's instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except EBA. EBA's instruments of professional service will be used only and exactly as submitted by EBA.

Electronic files submitted by EBA have been prepared and submitted using specific software and hardware systems. EBA makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

3.0 ENVIRONMENTAL AND REGULATORY ISSUES

Unless stipulated in the report, EBA has not been retained to investigate, address or consider and has not investigated, addressed or considered any environmental or regulatory issues associated with development on the subject site.

4.0 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems and methods employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system or method prevail, they are specifically mentioned.

Classification and identification of geological units are judgmental in nature as to both type and condition. EBA does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

Where subsurface conditions encountered during development are different from those described in this report, qualified geotechnical personnel should revisit the site and review recommendations in light of the actual conditions encountered.

5.0 LOGS OF TESTHOLES

The testhole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples. Soil and rock zones have been interpreted. Change from one geological zone to the other, indicated on the logs as a distinct line, can be, in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil or rock zone transition elevations may require further investigation and review.

6.0 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from logs of test holes and/or soil/rock exposures. Stratigraphy is known only at the locations of the test hole or exposure. Actual geology and stratigraphy between test holes and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historic environment. EBA does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of more precise locations of geological units is necessary, additional investigation and review may be necessary.

7.0 SURFACE WATER AND GROUNDWATER CONDITIONS

Surface and groundwater conditions mentioned in this report are those observed at the times recorded in the report. These conditions vary with geological detail between observation sites; annual, seasonal and special meteorologic conditions; and with development activity. Interpretation of water conditions from observations and records is judgemental and constitutes an evaluation of circumstances as influenced by geology, meteorology and development activity. Deviations from these observations may occur during the course of development activities.

8.0 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geological materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration. Unless otherwise specifically indicated in this report, the walls and floors of excavations must be protected from the elements, particularly moisture, desiccation, frost action and construction traffic.

9.0 SUPPORT OF ADJACENT GROUND AND STRUCTURES

Unless otherwise specifically advised, support of ground and structures adjacent to the anticipated construction and preservation of adjacent ground and structures from the adverse impact of construction activity is required.

10.0 INFLUENCE OF CONSTRUCTION ACTIVITY

There is a direct correlation between construction activity and structural performance of adjacent buildings and other installations. The influence of all anticipated construction activities should be considered by the contractor, owner, architect and prime engineer in consultation with a geotechnical engineer when the final design and construction techniques are known.

11.0 OBSERVATIONS DURING CONSTRUCTION

Because of the nature of geological deposits, the judgmental nature of geotechnical engineering, as well as the potential of adverse circumstances arising from construction activity, observations during site preparation, excavation and construction should be carried out by a geotechnical engineer. These observations may then serve as the basis for confirmation and/or alteration of geotechnical recommendations or design guidelines presented herein.

12.0 DRAINAGE SYSTEMS

Where temporary or permanent drainage systems are installed within or around a structure, the systems which will be installed must protect the structure from loss of ground due to internal erosion and must be designed so as to assure continued performance of the drains. Specific design detail of such systems should be developed or reviewed by the geotechnical engineer. Unless otherwise specified, it is a condition of this report that effective temporary and permanent drainage systems are required and that they must be considered in relation to project purpose and function.

13.0 BEARING CAPACITY

Design bearing capacities, loads and allowable stresses quoted in this report relate to a specific soil or rock type and condition. Construction activity and environmental circumstances can materially change the condition of soil or rock. The elevation at which a soil or rock type occurs is variable. It is a requirement of this report that structural elements be founded in and/or upon geological materials of the type and in the condition assumed. Sufficient observations should be made by qualified geotechnical personnel during construction to assure that the soil and/or rock conditions assumed in this report in fact exist at the site.

14.0 SAMPLES

EBA will retain all soil and rock samples for 30 days after this report is issued. Further storage or transfer of samples can be made at the Client's expense upon written request, otherwise samples will be discarded.

15.0 INFORMATION PROVIDED TO EBA BY OTHERS

During the performance of the work and the preparation of the report, EBA may rely on information provided by persons other than the Client. While EBA endeavours to verify the accuracy of such information when instructed to do so by the Client, EBA accepts no responsibility for the accuracy or the reliability of such information which may affect the report.