BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

DELOITTE & TOUCHE INC.

ROSE CREEK DIVERSION CANAL
DIKE UPGRADE
AS BUILT REPORT

FARO MINE, YT

FINAL REPORT

PROJECT NO.: 0257-026-03
DATE: JUNE 29, 2005

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Project No. 0257-026-03
Date: June 29, 2005

Deloitte & Touche Inc.
79 Wellington Street West
TD Centre, Suite 1900
Toronto, Ontario M5K 1B9

Attention: Mr. Doug Sedgwick

Re: Rose Creek Diversion Canal, Dike Upgrade, As-Built Report

Dear Mr Sedgwick:

Please find attached two copies of our above referenced report dated June 29, 2005. This report summarizes the surface regrading and rip-rap placement activities performed on the Rose Creek Diversion Canal in the summer of 2004 and as-built information on these activities as collected by BGC.

Should you have any questions or comments, please contact me at the number listed above.

Yours truly,
BGC Engineering Inc.
per:

Gerry Ferris, M.Sc., P.Eng.
Geotechnical Engineer

encl: Final Report

GWF/sf

TABLE OF CONTENTS

TABLES

FIGURES

PHOTOGRAPHS

APPENDICES

LIMITATIONS OF REPORT

This report was prepared by BGC Engineering Inc. (BGC) for the account of Deloitte & Touche Inc. The material in it reflects the judgement of BGC staff in light of the information available to BGC at the time of report preparation. Any use which a Third Party makes of this report, or any reliance on decisions to be based on it are the responsibility of such Third Parties. BGC Engineering Inc. accepts no responsibility for damages, if any, suffered by any Third Party as a result of decisions made or actions based on this report.

As a mutual protection to our client, the public, and ourselves, all reports and drawings are submitted for the confidential information of our client for a specific project and authorization for use and/or publication of data, statements, conclusions or abstracts from or regarding our reports and drawings is reserved pending our written approval.

1.0 INTRODUCTION

The Faro Mine is located in the central Yukon, as shown in Figure 1, approximately 200 km north-northeast of Whitehorse or approximately 22 km north of the town of Faro. The Rose Creek Diversion Canal (RCDC) is located to the south of the tailing impoundment, along the south side of the Rose Creek Valley, as shown in Figure 2.

The RCDC diverts the water flow of Rose Creek around the tailings impoundment at Faro Mine. The RCDC consists of two segments; the upper reach, constructed in 1974 as part of the development of the second tailings impoundment and the lower reach, constructed as part of the 1980 Down Valley Tailings development. The 1980 portion of the canal was designed to transfer the 50 year return period flood with a contingency to transmit the 500 year return period flood (Golder 1980).

In a report prepared by BGC Engineering Inc. (BGC) in 2004, the hydraulic capacity of the canal was determined to be less than the design flood required by the Water License. It was recommended that raising the low sections of the canal would re-establish the required capacity. Design requirements and technical specifications were developed for the required dike raise as provided for in BGC (2004).

A copy of the technical specifications and three key design drawings are included in Appendix I. The technical specifications and drawings indicate the required construction, sequencing, volumes and methods of payment. Further details are provided in Section 2.0 and in the 2004 BGC report.

Deloitte & Touche (D & T) selected Tim Moon and Clifford McCleod Contracting to provide equipment to complete this project. The terms of the contract were different than shown in the technical specifications. The contractors were paid on the basis of hours worked (grader, loader, compactor, and excavator) or volume transport (trucks). The contractors worked under the supervision of Anvil and BGC staff. Additionally, select Anvil Range equipment, including a water truck, was used as required to supplement the two contractors.

BGC was retained to provide construction monitoring services relative to the RCDC construction. The information presented in this report documents the construction process related to the RCDC, as well as to other as-built information related to the channel, as observed and collected by BGC.

2.0 DESIGN BACKGROUND

The water license (Yukon Water Board, License Q203-059, Part E, Line 40) for the Faro Mine stipulates that the RCDC has the capacity to pass the 500 year flood. The 2004 study (BGC 2004) indicated that portions of the RCDC could not convey the required flood without overtopping. It was recommended that these portions of the dike crest be raised. Various design considerations were examined and the following design criteria were selected:

- The design elevation for the crest of the canal dike is to be based on the calculated water level determined from the ice filled channel analysis.
- No freeboard is required above the 500 year flood level.
- Rip rap for the raised sections of the canal dike should match the existing rip rap.

During the winter of 2003/2004, both thickness and water content of the snow pack at the site was well above average. A recommendation that the dike be temporarily raised was based on the potential for greater than normal spring flows from the melting of the snow pack and the knowledge that sections of the canal dike crest were lower than required. Sand and gravel fill, the same fill used in the final construction described herein, was brought into place and spread by Anvil Range equipment in May 2004. The fill placement was considered temporary given the frozen condition of the existing dike surface and freezing conditions and limited compaction during placement. This fill was termed 'winter placed fill'. A geotextile strip was placed on the surface prior to fill placement to aid in the removal.

The design of the canal dike upgrade was envisioned to re-establish conditions in the portion of the dike crest know to be low to those that existed following the originally constructed in 1980/81. The location of the canal dike raising, approximately 1 km, is shown in Figure 3. The materials used to raise the crest of the canal dike were selected to match the materials used to construct the original dike (Golder, 1980).

Technical specifications and design drawings are attached in Appendix I. It should be noted that the technical specifications layout the technical requirements for completion of the project as well as measurement and basis of payment. The final contract arrangements between Anvil Range and the contractors modified these technical specifications, in that the contractors were paid on the basis of bulk material moved and an hourly basis. The technical requirements outlined in the technical specifications were followed in the completion of this project.

3.0 CONSTRUCTION / ADMINISTRATION PERSONNEL

The project overview was under the direction of Mr. Dana Haggar, Anvil Range's Site Manager. Prior to BGC arriving on site, Anvil Range equipment was used for borrow excavation, hauling and stockpiling rip rap and granular fill materials. Anvil Range equipment was also used for placement of the 'winter placed fill' in May, 2004. Anvil Range also provided a hydraulic

excavator and operator to perform the borrow excavation work at the Rose Creek Borrow Area (rip rap) and the Haul Road Borrow Area (granular material), shown on Figure 2. Anvil Range also provided truck transport to haul the materials to a stockpile located near the spoil piles along the southern embankment of the Cross Valley Dam. During construction, Anvil provided a water truck and operator.

Survey personnel were provided by Yukon Engineering Services (YES) of Whitehorse, YT. YES established survey stations every 25 m to provide horizontal and vertical (elevation) controls. Following completion of the construction YES performed an as-built survey of the surface of the dike.

Tim Moon Construction provided a day shift of equipment, truck drivers and equipment operators for this project. Tim Moon Construction worked between July 25 and August 10, 2004. Construction equipment provided by Tim Moon included a hydraulic excavator, a grader, a compactor, a front-end loader and two gravel trucks.

Clifford McLeod Contracting provide a day shift of equipment, truck drivers and equipment operators for this project. Clifford McLeod Contracting worked between July 26 and August 1, 2004. Construction equipment provided by Clifford McLeod included a front-end loader and two gravel trucks.

Initial material property testing and nuclear densometer compaction testing was conducted by Tyler Plante of EBA Engineering Consultants Ltd, on an as-required basis.

Overall project engineering was under the control of BGC. BGC's site personnel consisted of Mr. Gerry Ferris, who was on-site from July 25 to August 2, 2004 and Mr. Mike McCrank, who was on-site from August 3 to 18. Construction daily reports were prepared by BGC and are included in Appendix II. BGC personnel performed surveys of the survey lines and grades of the project throughout construction.

Daily time summary sheets were prepared by the contractors and submitted to BGC for approval. These approved daily time sheets were then forwarded to Anvil Range for review and approval of invoices.

4.0 CONSTRUCTION

4.1 General

The as-built report provided below describes the activities that were undertaken as part of the RCDC upgrade between July 26 and August 10, 2004. Prior to construction commencement, the following tasks were completed:

- Quarrying and stockpiling sand and gravel from the North Fork borrow pit, by Anvil staff.
- Riprap production and stockpile, by Anvil staff.

- Measurement of the rip rap grain size, split net analysis (Photo 1). A copy of the resulting grain size determination is included in Appendix III.
- Grain size analysis of the sand and gravel fill. A copy of the results is included in Appendix III.
- Determination of the Standard Proctor Maximum Dry Density (SPMDD) and optimum moisture content was completed. Copies of the test results are included in Appendix III.
- Layout of survey stations on 25 m stations. These stations, installed by YES, were used throughout construction for vertical (elevation) control of construction, as shown on Figures 3 and 4.

During the construction, the following reporting and Quality Assurance / Quality Control (QA/QC) testing was performed:

- Completion of daily reports, included in Appendix II.
- Measurement of the compacted density. This was completed by nuclear densometer testing included in Appendix III.
- Measurement of the moisture content, via oven drying, of the compacted sand and gravel, included in Appendix III.
- Measurement of the elevation of each of the completed lifts and the final elevation control of the dike crest surface.
- Measurement of the location of the rip rap placement.

YES conducted the final as-built topographic survey of the canal dike during September 2004.

4.2 Construction Equipment Summary

Anvil's equipment was used for the following purpose: to develop the borrow area, including required stripping and grubbing, haul the construction materials (granular fill and rip rap), and conduct associated clean-up activities within the borrow areas. These construction activities occurred between July 15 and 25, 2004 prior to the arrival of BGC staff on-site.

Mobilization of Tim Moon's and sub-contractors equipment began on July 24. The equipment moved to site included the following: a hydraulic excavator, a front-end loader (Clifford McLeod, sub-contractor), two 10 m^3 capacity gravel trucks (Clifford McLeod), a grader and a vibrating roller compactor. A third 10 m^3 dump truck was supplied by John Kraft (sub-contractor) for movement of material for the borrow source to the canal dike. The grader was used to scarify the surface of the dike. The hydraulic excavator was used at the granular fill stockpile for loading the gravel trucks. Once the haul trucks had placed the fill in designated areas along the crest of the dike, the grader was used to spread the fill into 150 mm lifts. The vibrating roller compactor was then used, along with the Anvil water truck, to compact the fill to design specifications (98 % SPMDD).

The Anvil range personnel and the contractors worked one shift per day; each shift was 10 hours in duration.

4.3 Construction Details

The gravel and sand material used in the raising of the crest of the RCDC dike was obtained from the Haul Road borrow area pit, as shown on Figure 2. A copy of the grain size testing of the sand and gravel SPMDD testing is included in Appendix III.

The rip rap material used in the RCDC dike upgrades was developed at the Rose Creek borrow area by Anvil Range and hauled to a local borrow area (Photo 2). The rip rap was tested for material grain size distribution to ensure that the material met the original specifications for the RCDC (Golder 1980). The rip rap was larger, therefore acceptable, than the specification shown in Figure Appendix III-1.

Prior to construction, the RCDC dike was surveyed by YES. The original topography is illustrated in Figures 3, 4 and 5. Survey stations were placed every 25 m and were used throughout construction to ensure vertical (elevation) control the sand and gravel lifts.

The following describes the construction sequence:

- Remove winter fill (Photo 3).
- Scarify the crest in locations of dike raise (Photos 4 and 5).
- Sand and gravel was hauled and placed along the crest of the dike in locations where the survey indicated elevations not meeting the design requirements.
- Sand and gravel fill was spread, moisture conditioned and compacted to minimum 98% SPMDD (Photos 6 to 10).
- Elevation control was maintained through ongoing survey and layout staking (Photo 11).
- Upon completion of placement of the sand and gravel fill, grade staking for placement of rip rap was undertaken (Photos 12 to 16). During preparation for rip rap placement it was discovered that the existing rip rap did not extend to the existing surface of the dike crest, in places. The surface prepared for the rip rap was extended until the new rip rap would tie into the existing. This resulted in increased volumes of rip rap for this project, the additional rip rap was produced by Anvil Range staff.
- If compaction specifications were not met, additional water was placed and the material was compacted again. Density testing may not have been repeated in sections of recompaction due to logistical constraints, however, these areas were evaluated based on performance comparison with near by sections of satisfactory density. One section, from 0+625 to 0+750, may not be compacted to 98% along the shoulder as conditions were unsafe for water truck access. The section with low compaction results represent a third of the dike width (Photos 14 to 16).

- Rip-rap material was hauled and placed along the edge of the crest of the RCDC dike in locations where the dike had been raised and where it was determined that there was insufficient rip-rap protection. The material was placed with an excavator along the banks of the dike (Photos 17 to 23).

A summary of the materials used as part of the RCDC dike upgrades construction is provided in Table 1.

Table 1 – Summary of Materials Used During the RCDC Dike Upgrades

Material	Estimated Quantity	As-Built Quantity
Sand and Gravel Placement	4245 m^3	4100 m^3
Rip rap placement	508 m^3	800 m^3

Upon completion of construction, the finished surfaces of the sand and gravel fill and rip rap were surveyed. A contour plot was created based on this as-built survey and is shown on Figures 4 and 5, along with the pre-construction topography. The preconstruction survey, on going survey during construction and the final survey were used to create section and profile views shown on Figures 4 through 7. Photographs of the completed construction are shown in Photos 23 and 24.

4.4 Conclusion

Based on the observations undertaken while on site, and information provided by third parties, it is concluded that the dike raise project was constructed in accordance with the overall design intent (BGC 2004). The raised section of the RCDC dike crest should be monitored, via both visual monitoring and instrumentation to ensure on-going satisfactory performance. Such a monitoring program is currently in place for the RCDC as part of the Annual Geotechnical monitoring of the Faro Mine site.

5.0 POST-CONSTRUCTION MONITORING

Monitoring of the performance of the RCDC dike will be performed as part of the annual visual inspections. Visual inspections will focus on settlement, erosion and/or any cracking that may be occurring. Visual inspections and monitoring should be conducted in May/June and September each year as discussed in the 2004 Annual Geotechnical Evaluation and Instrumentation Review (BGC 2005). Maintenance activities, including surface grading of the dike, should occur each September or October after the annual inspection to cover areas where cracks and potholes have developed.

6.0 CLOSURE

This report summarizes the construction required to upgrade a portion of the RCDC Dike crest. The RCDC dike upgrade was required to increase the hydraulic capacity of the canal to pass the 500 year flood, as required by the Water License. The construction described in the report was completed in accordance with design specifications and drawings for the project.

We trust that this report meets your needs at this current time. Should you have any questions or comments concerning the information provided within this report, please contact the undersigned.

Respectively submitted:
BGC Engineering Inc.
Per:

Jordan Severin, M.Sc., Geol.I.T (AB)
Geologist

Gerry Ferris, M.Sc., P.Eng. (AB)
Geotechnical Engineer

James W. Cassie, M.Sc., P.Eng.
Specialist Geotechnical Engineer

PERMIT TO PRACTICE
Signature
Date 29-JUNE-05
PERMIT NUMBER: PP092
Association of Professional Engineers of Yukon

REFERENCES

BGC Engineering Inc., 2004. Hydraulic Capacity Assessment, Rose Creek Diversion Canal, Faro Mine, Yukon. June 2004.

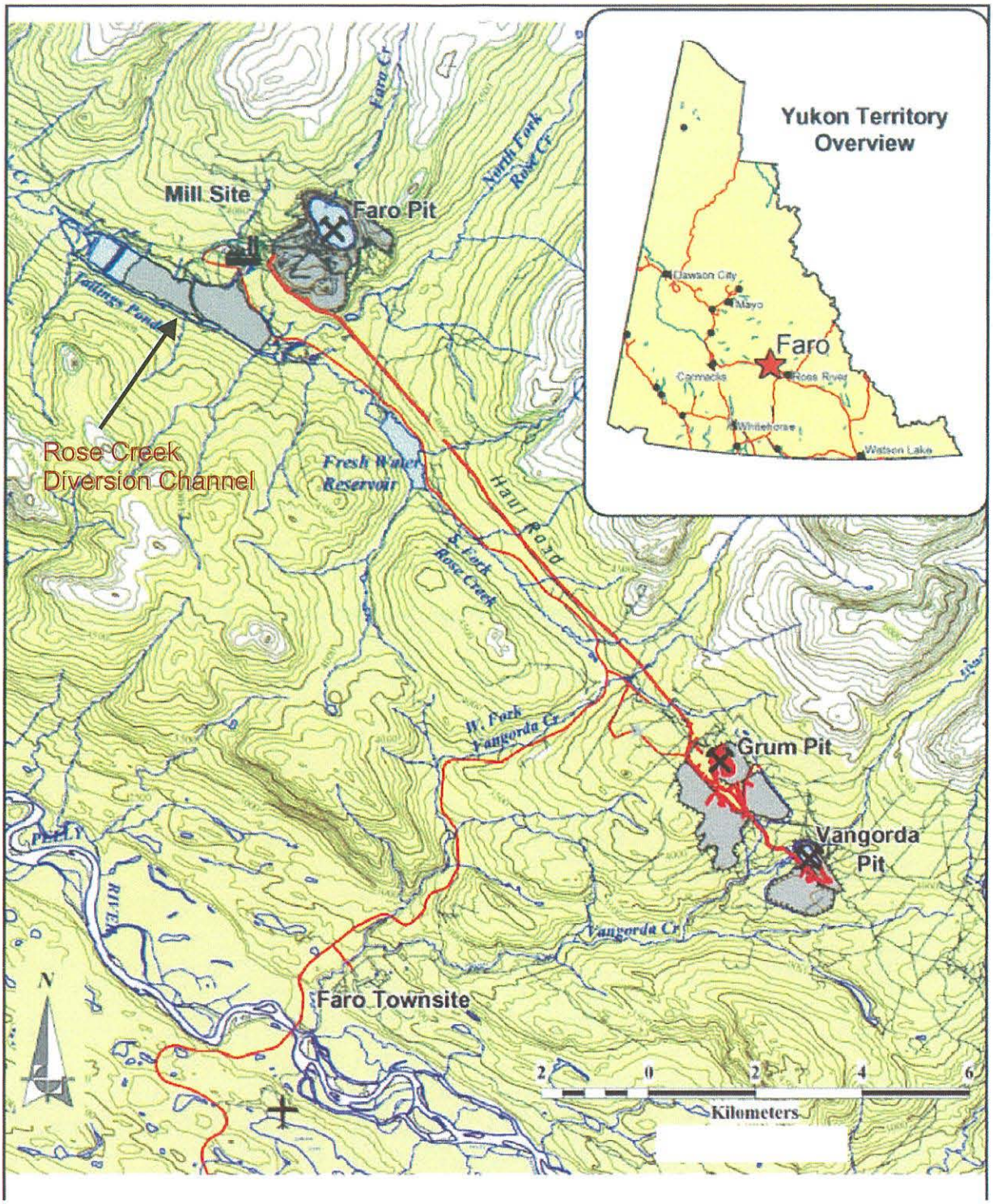
BGC Engineering Inc., 2005. 2004 Annual Geotechnical Evaluation and Instrumentation Review, Faro Mine, Yukon. February 2005.

Golder Associates Limited., 1980. Final Design Recommendations for the Down Valley Tailings Disposal Project, Faro, Yukon Territory. Report prepared for Cyprus Anvil Mining Corporation, June 1980.

Northwest Hydraulic Consultants, 2001a. Hydrotechnical Assessment for Faro Mine Site. Report prepared for BGC Engineering, December 2001.

Northwest Hydraulic Consultants, 2001b. Faro Mine – Preliminary Routing of Extreme Floods Through the FWSD and the Potential of Dam Break. Report prepared for BGC Engineering

FIGURES



Note: Base map figure provided by Gartner Lee Limited.

SCALE:	As Shown	DESIGNED:	JMS
DATE:	JUNE 2005	CHECKED:	GWF
DRAWN:	SLF	APPROVED:	JWC

CLIENT: Deloitte & Touche

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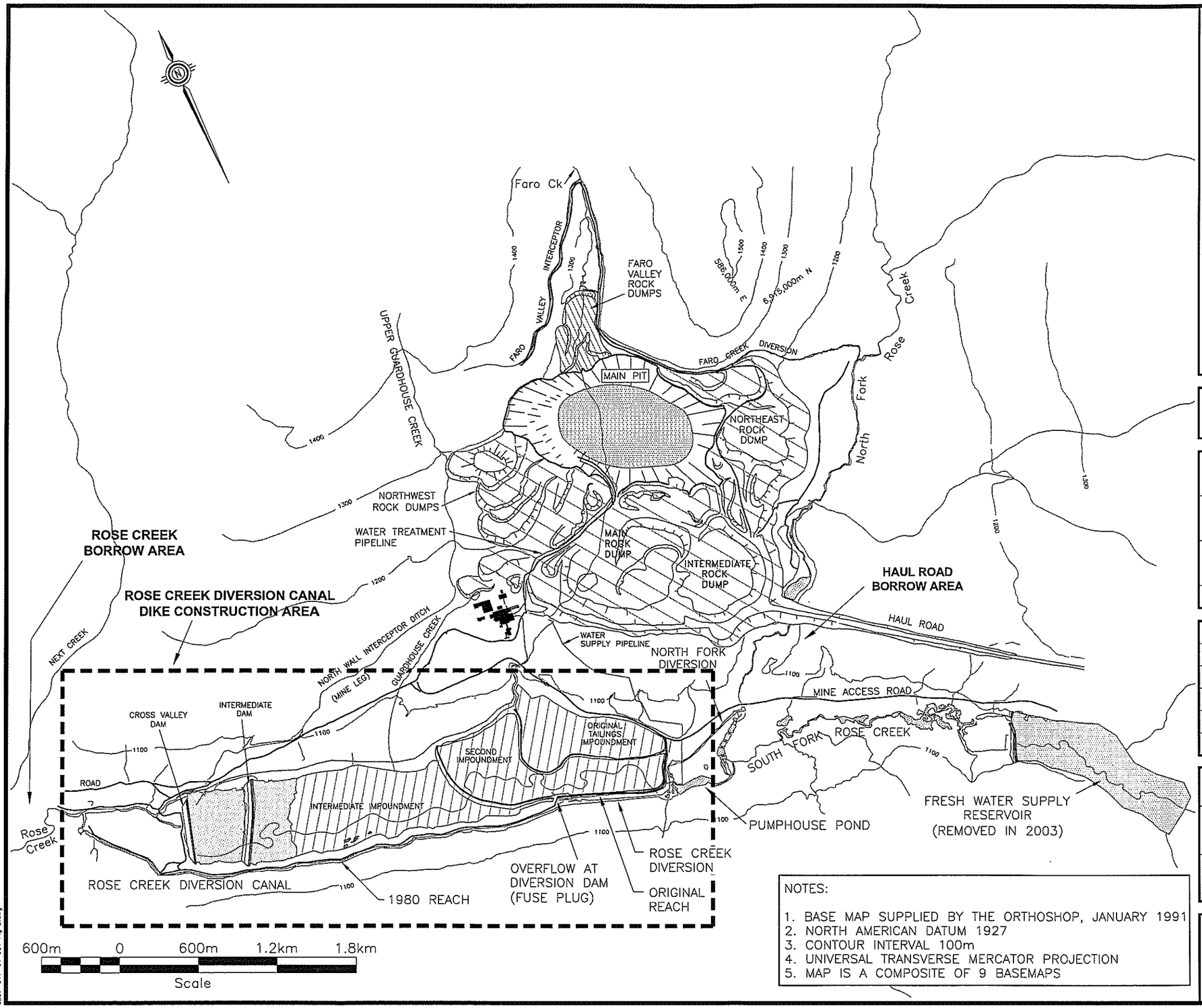
PROJECT: ROSE CREEK DIVERSION CANAL DIKE UPGRADE AS BUILT

TITLE: SITE LOCATION

PROJECT No.	FIGURE No.	REV.
0257-026-03	1	0



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LEGEND:

- ROADS
- EXISTING DRAINAGE
- ORIGINAL DRAINAGE
- EFFLUENT PIPELINE
- PIPELINE

REV.	DATE	REVISION NOTES	DRAWN	CHECKED	APPROVED

SCALE:	AS SHOWN
DATE:	JUNE 2005
DRAWN:	CJT
DESIGNED:	JMS
CHECKED:	GWF
APPROVED:	JWC

PROJECT: ROSE CREEK DIVERSION CANAL DIKE UPGRADE AS BUILT

TITLE: MINE SITE OVERVIEW

PROJECT No.	FIGURE No.	REV.
0257-026-03	2	0

NOTES:

1. BASE MAP SUPPLIED BY THE ORTHOSHOP, JANUARY 1991
2. NORTH AMERICAN DATUM 1927
3. CONTOUR INTERVAL 100m
4. UNIVERSAL TRANSVERSE MERCATOR PROJECTION
5. MAP IS A COMPOSITE OF 9 BASEMAPS

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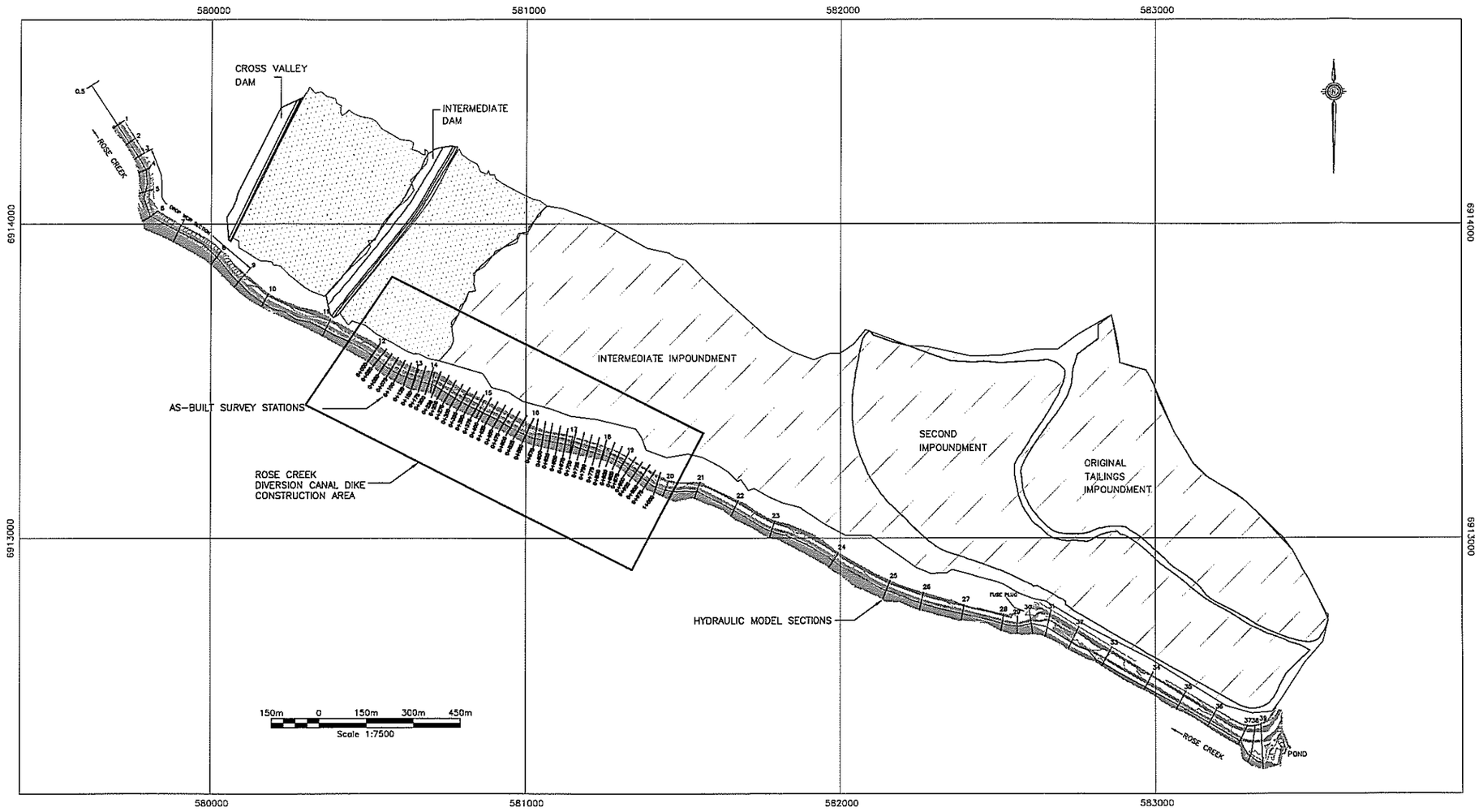
0257-017-01 001 Fig 2.dwg



NOTES:

1. BASE PLAN TAKEN FROM HYDRAULIC CAPACITY ASSESSMENT OF ROSE CREEK DIVERSION CANAL (BGC, 2004)
2. HYDRAULIC MODEL SECTIONS ARE TAKEN FROM HYDRAULIC CAPACITY ASSESSMENT OF ROSE CREEK DIVERSION CANAL (BGC, 2004)
3. SURVEY INFORMATION PROVIDED BY YUKON ENGINEERING SERVICES (YES)

CLIENT: **Deloitte & Touche**

NO.	DATE	REVISION NOTES	DRAWN	CHECKED	APPROVED

SCALE:	AS SHOWN
DATE:	JUNE 2005
DRAWN:	CJT
DESIGNED:	JMS
CHECKED:	GWF
APPROVED:	JWC

PROJECT: ROSE CREEK DIVERSION CANAL DIKE UPGRADE AS BUILT

TITLE: ROSE CREEK CANAL DIKE CONSTRUCTION OVERVIEW

PROJECT No.	DWG. No.	REV.
0257-026-03	3	0

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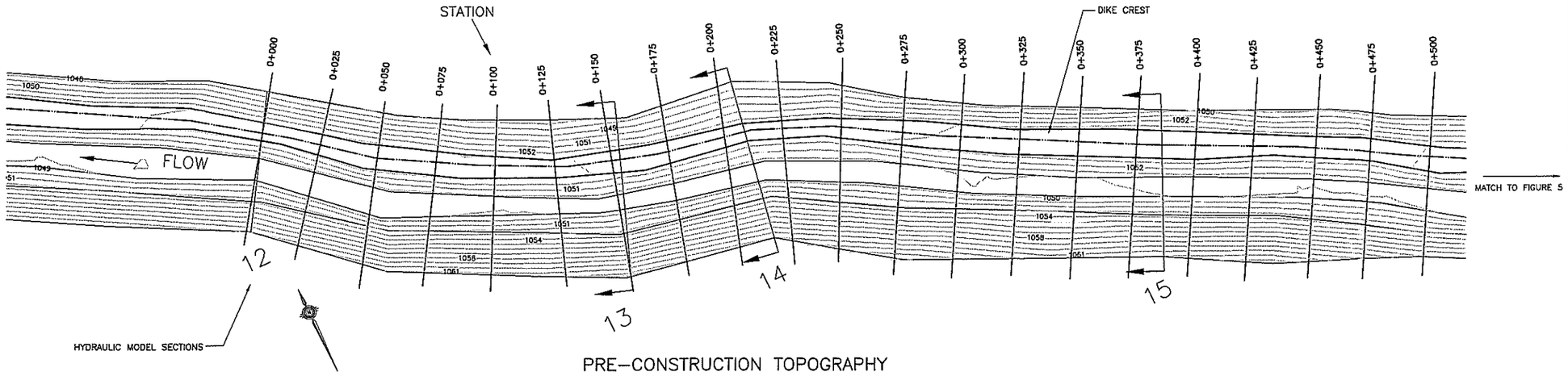
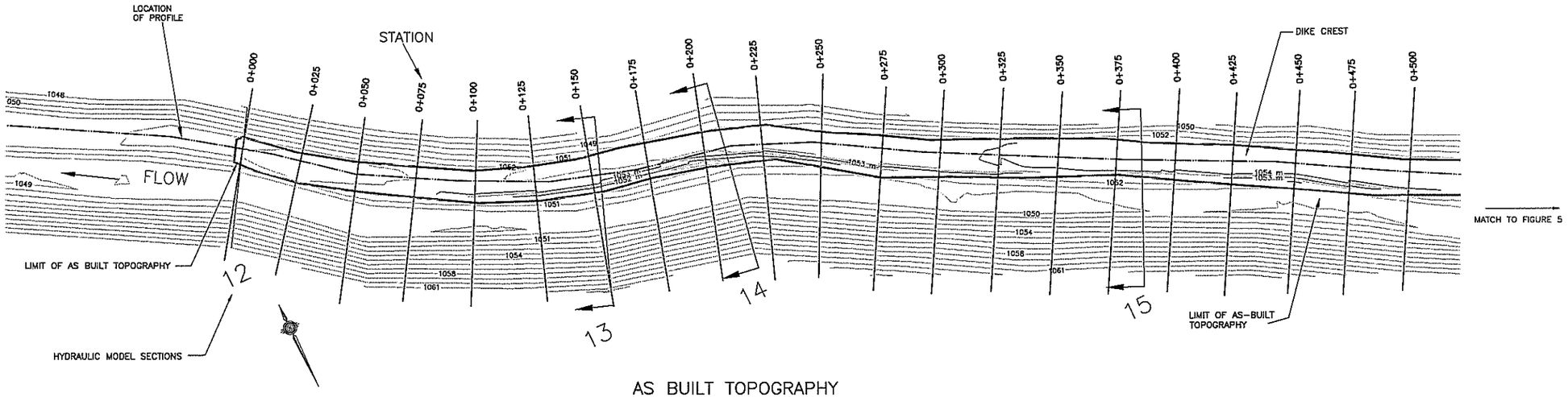
0257-026-03 Fig 3.dwg



PRE-CONSTRUCTION TOPOGRAPHY



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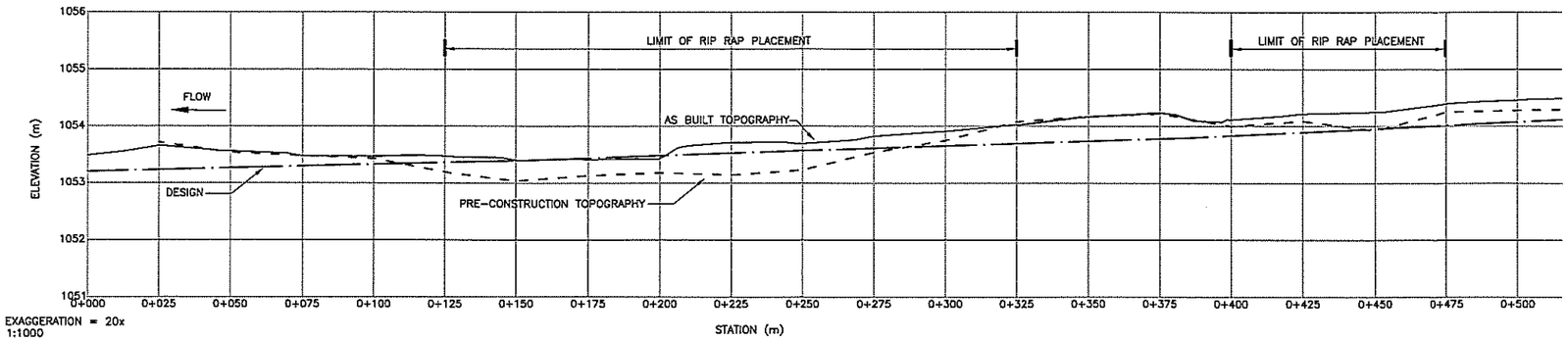

VERTICAL EXAGGERATION = 20x
SCALE = 1:1000

PROFILE

MATCH TO FIGURE 5

NOTES:
1. SURVEY INFORMATION PROVIDED BY YUKON ENGINEERING SERVICES.
2. ELEVATIONS ARE GEODETIC.
3. HYDRAULIC MODEL SECTIONS TAKEN FROM HYDROTECHNICAL STUDY (BGC, 2004)
4. PROFILE TAKEN ALONG TOP OF NORTHERN BANK OF CANAL.

20m 0 20m 40m 60m
Scale 1:1000

CLIENT:
Deloitte & Touche

REV.	DATE	REVISION NOTES	DRAWN	CHECKED	APPROVED

SCALE:	AS SHOWN
DATE:	JUNE 2005
DRAWN:	CJT/GCB
DESIGNED:	JMS
CHECKED:	GWF
APPROVED:	JWC

PROJECT: ROSE CREEK DIVERSION CANAL DIKE UPGRADE AS BUILT

TITLE: CANAL DIKE CREST RAISING
PLAN & PROFILE, 0+000 TO 0+500

PROJECT No.	FIGURE No.	REV.
0257-026-03	4	0

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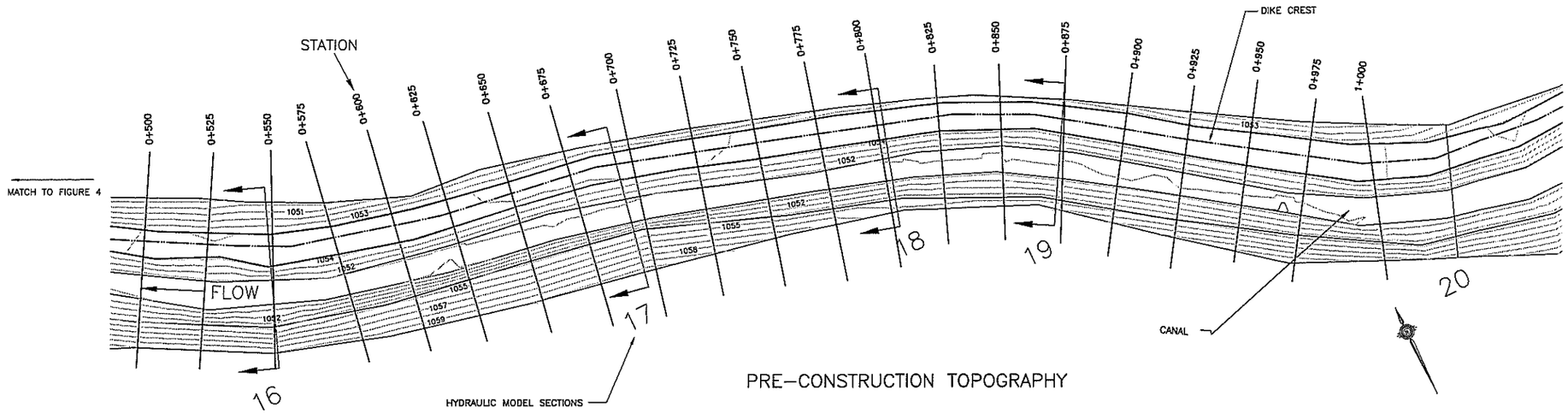

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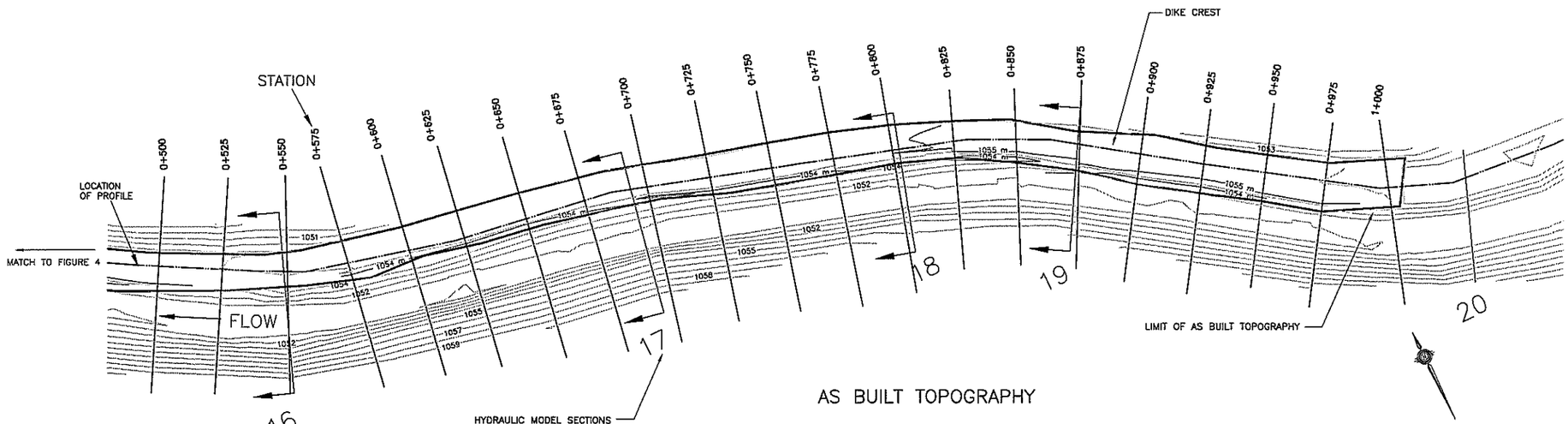

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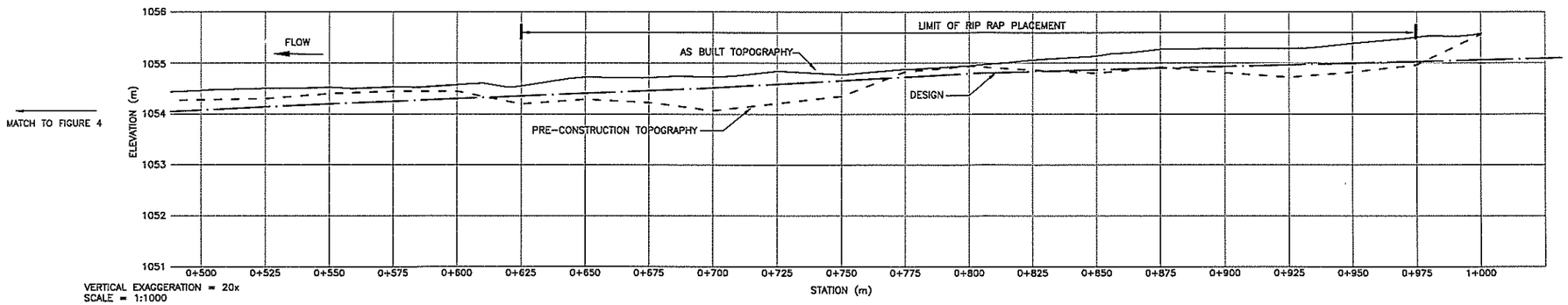

PROFILE

NOTES:
1. SURVEY INFORMATION PROVIDED BY YUKON ENGINEERING SERVICES.
2. ELEVATIONS ARE GEODETIC.
3. HYDRAULIC MODEL SECTIONS TAKEN FROM HYDROTECHNICAL STUDY (BGC, 2004)
4. PROFILE TAKEN ALONG TOP OF NORTHERN BANK OF CANAL.

20m 0 20m 40m 60m
Scale 1:1000

CLIENT:
Deloitte & Touche

REV.	DATE	REVISION NOTES	DRAWN	CHECKED	APPROVED

SCALE:	AS SHOWN
DATE:	JUNE 2005
DRAWN:	CJT/OCB
RESEARCH:	JWS
CHECKED:	CWF
APPROVED:	JWC

PROJECT: ROSE CREEK DIVERSION CANAL DIKE UPGRADE AS BUILT

TITLE: CANAL DIKE CREST RAISING
PLAN & PROFILE, 0+500 TO 1+000

PROJECT No.	FIGURE No.	REV.
0257-026-03	5	0

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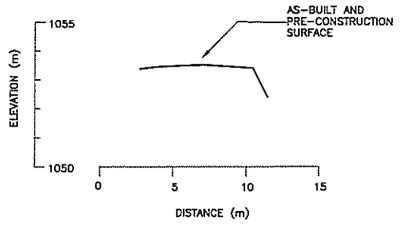
0257-026-03 Fig 5.dwg



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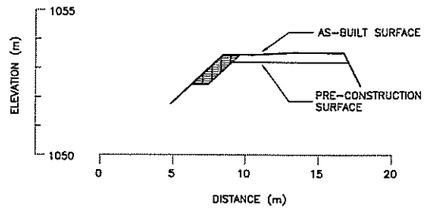

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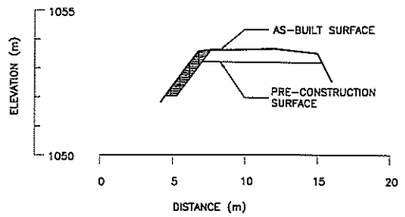

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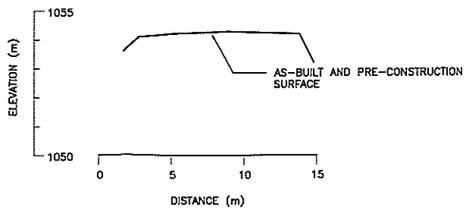

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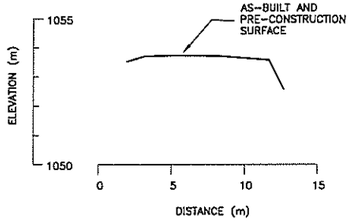

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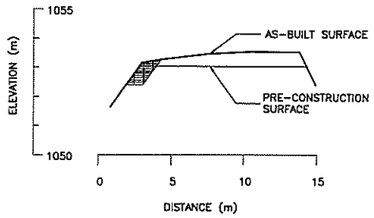

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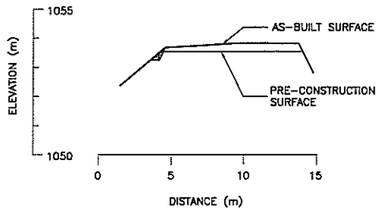

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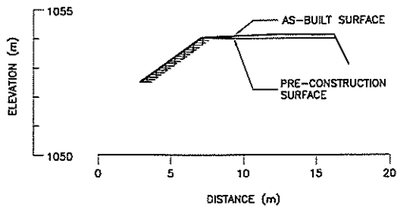

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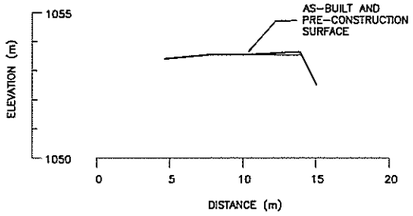

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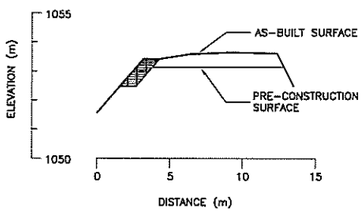

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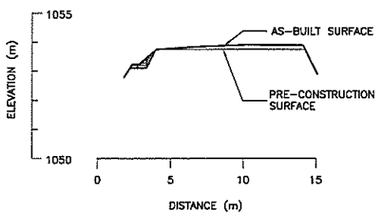

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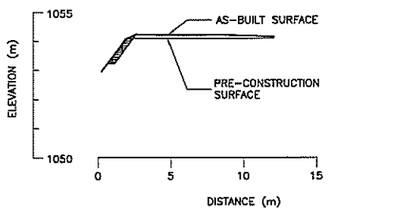

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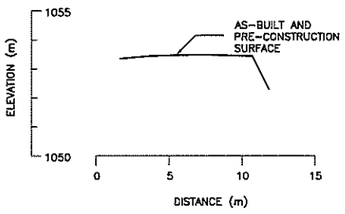

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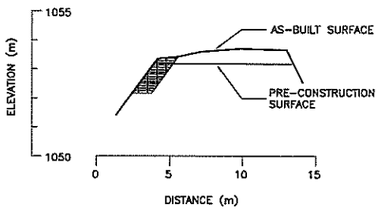

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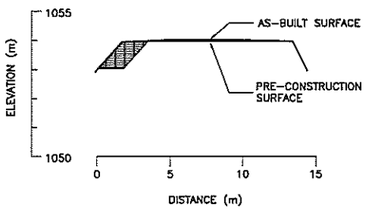

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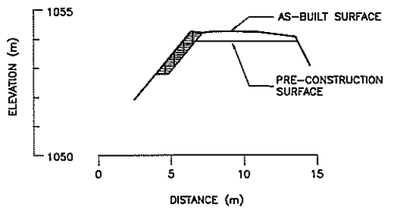

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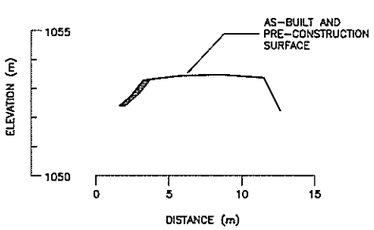

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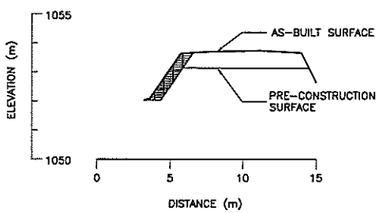

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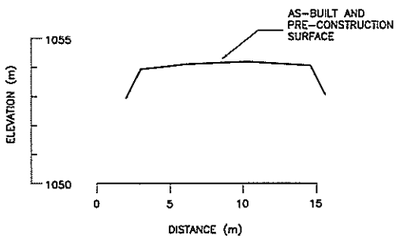

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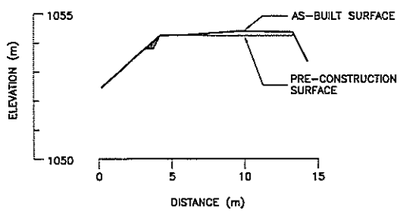

STATION 0+475

NOTES:
1. SURVEY INFORMATION PROVIDED BY YUKON ENGINEERING SERVICES (YES).
2. RIP RAP BURIED LINES SURVEYED BY BGC.

VERTICAL EXAGGERATION=2X FOR ALL SECTIONS.

CLIENT:

Deloitte & Touche

LEGEND:

RIP RAP

REV.	DATE	REVISION NOTES	DRAWN	CHECKED	APPROVED

SCALE:	AS SHOWN
DATE:	JUNE 2005
DRAWN:	CJT/CCB
DESIGNED:	JMS
CHECKED:	GWF
APPROVED:	JWC

PROJECT: ROSE CREEK DIVERSION CANAL DIKE UPGRADE AS BUILT

TITLE: CROSS-SECTIONS 0+000 – 0+475

PROJECT No.	FIGURE No.	REV.
0257-026-03	6	0

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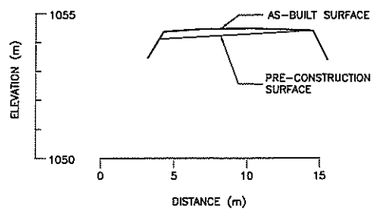
0257-026-03 SECTIONS AND XSL.dwg



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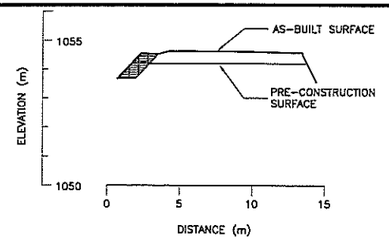

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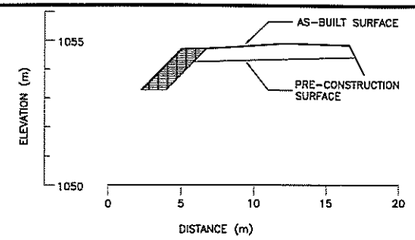

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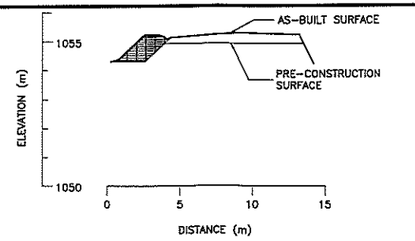

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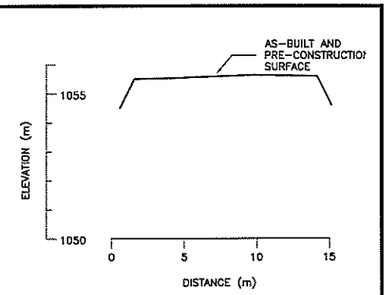
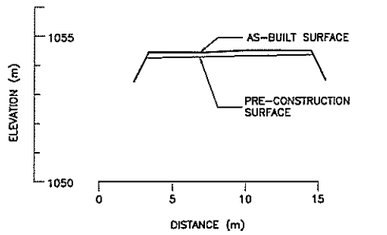


STATION 1+000



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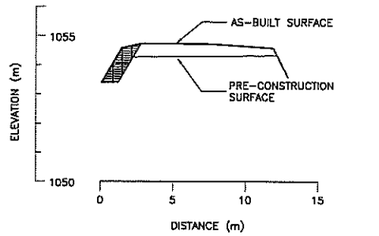

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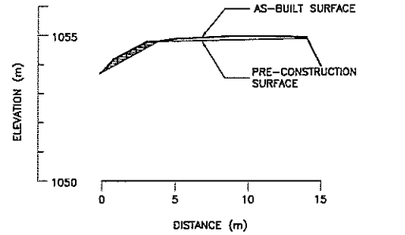

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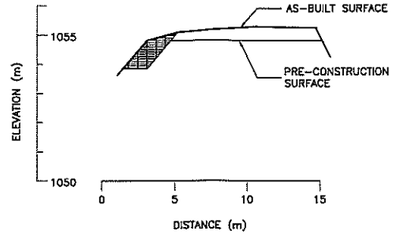

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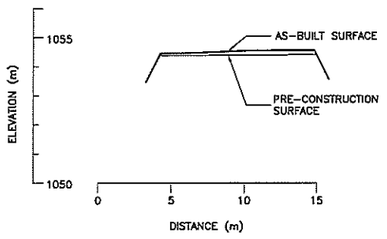

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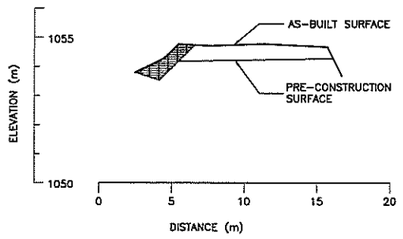

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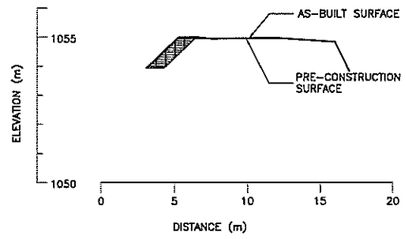

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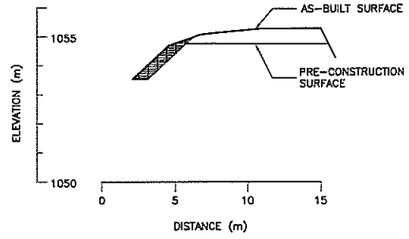

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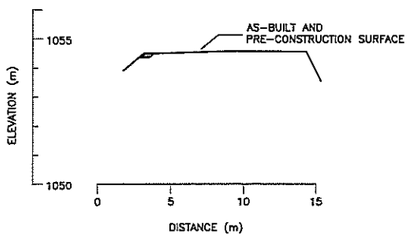

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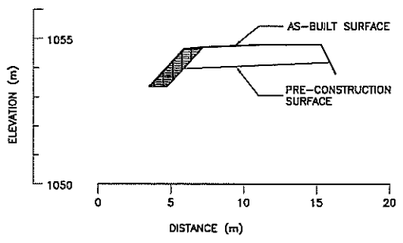

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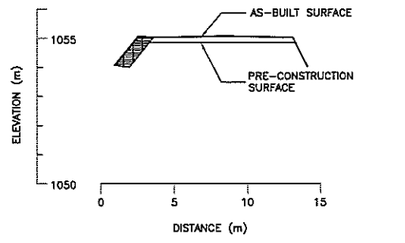

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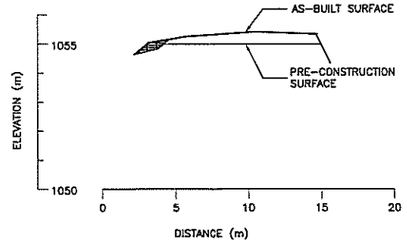

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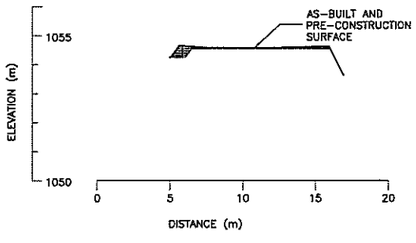

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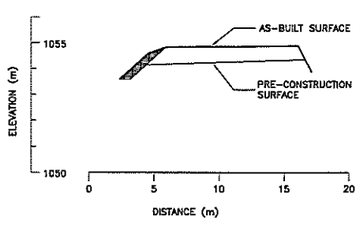

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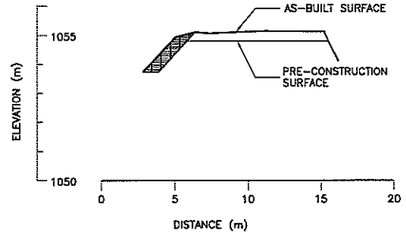
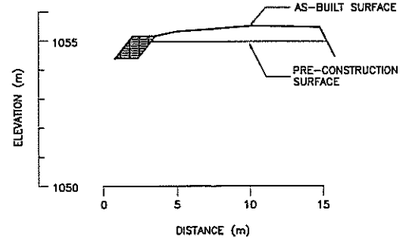


STATION 0+850



STATION 0+975

NOTES:
1. SURVEY INFORMATION PROVIDED BY YUKON ENGINEERING SERVICES (YES).
2. RIP RAP BURIED LINES SURVEYED BY BGC.

VERTICAL EXAGGERATION=2X FOR ALL SECTIONS.

CLIENT:

Deloitte & Touche

LEGEND:

RIP RAP

REV.	DATE	REVISION NOTES	BY/APP'D	CHECKED	APPROVED

SCALE:	AS SHOWN
DATE:	JUNE 2005
DRAWN:	CJT/CCB
DESIGNED:	JMS
CHECKED:	GWF
APPROVED:	JWC

PROJECT: ROSE CREEK DIVERSION CANAL DIKE UPGRADE AS BUILT

TITLE: CROSS-SECTIONS 0+500 – 1+000

PROJECT No.	FIGURE No.	REV.
0257-026-03	7	0

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AN APPLIED EARTH SCIENCES COMPANY
Calgary, AB Phone: (403) 250 5185

0257-026-03 SECTIONS AND YDA.dwg

PHOTOGRAPHS

Photo 1 shows the Split Net balls on the riprap stockpile.

Photo 2 shows a view of the remaining sand and gravel borrow following completion of the RCDC crest raise.

Photo 3 shows a view looking to the west from Station 0+750. Note this section is currently having the winter placed fill removed. This material is being windrowed into the central section. This material is being reused (with large cobbles removed) in the dike raising.

Photo 4 shows a view of the 160G grader as it starts to scarify the surface of the Canal Dike.

Photo 5 shows a view looking east from Station 0+500 at the scarified surface of the original Canal Dike. This is the original surface of the dike, following removal of the winter placed fill.

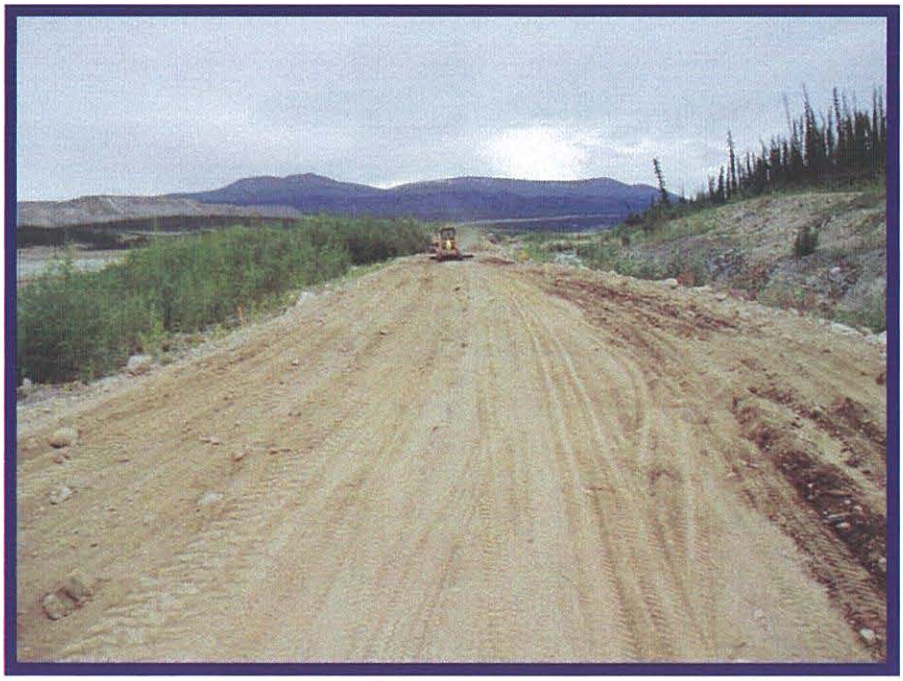


Photo 6 shows a view taken from Station 0+550 looking towards the east. The scarified surface of the road is now being back-bladed to create a smooth upper surface prior to compaction.

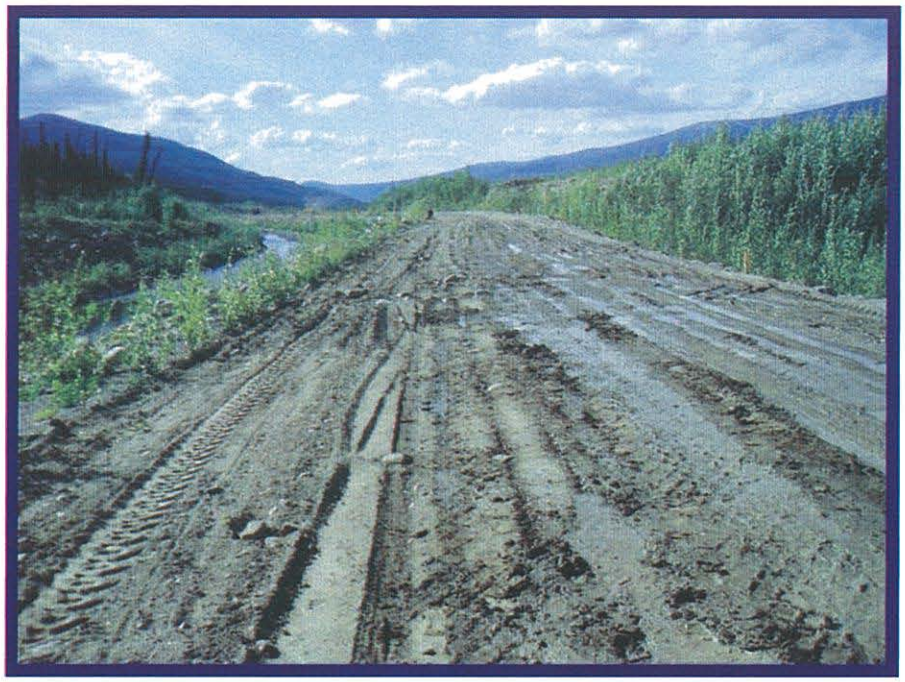


Photo 7 shows a view looking towards the west from Station 0+950. Note on the right hand side of this photo that water has been placed and compaction started and on the left hand side no water has yet been placed.

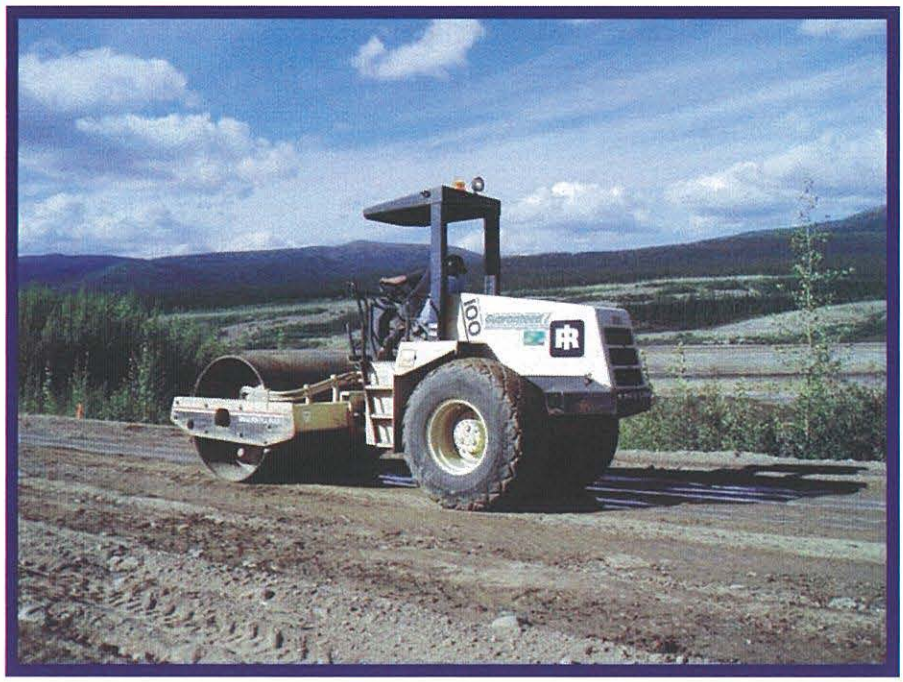


Photo 8 shows a view of the compacter working on the scarified and watered surface near 0+925.

Photo 9 shows a view of the first scarified and compacted section of the Rose Creek Diversion Canal Dike, looking to the north from station 1+000. Note the application of water.

Photo 10 shows the surface of the scarified and re-compacted surface. This photo is taken looking to the east from Station 0+525.

Photo 11 shows the grade stake at station 0+800.

Photo 12 shows a view looking to the east from station 0+150. This shows the second lift of general fill (sand and gravel) currently being compacted.

Photo 13 view looking to the east from station 0+650. In this section the third lift of gravel has been placed and bladed level in preparation for compaction.

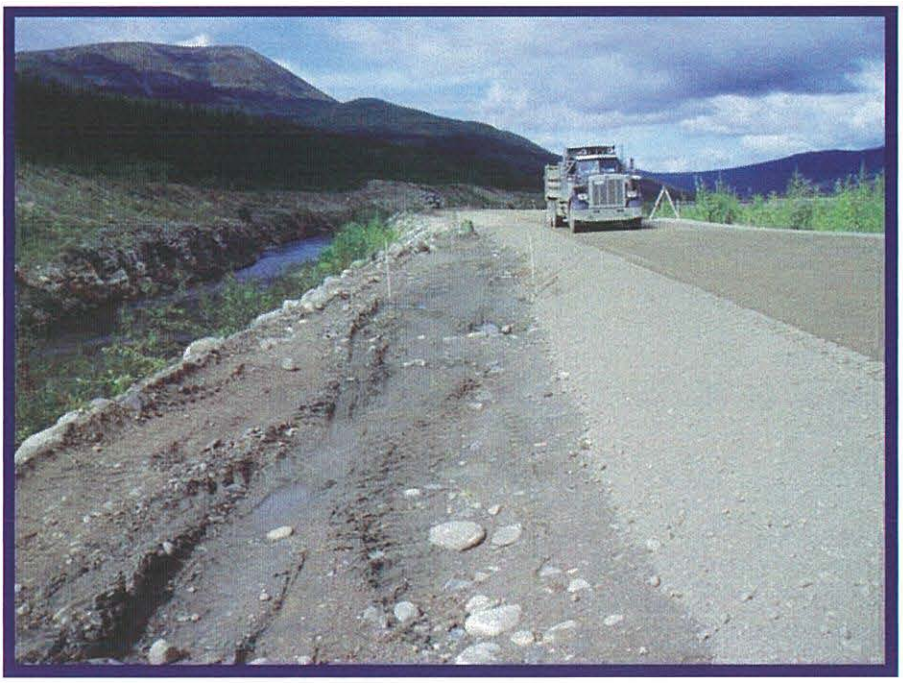


Photo 14 shows a view looking to the east from station 0+725. Note the wide space between the stakes, this area needs to be filled with granular fill prior to riprap placement.

Photo 15 shows a view looking to the west from station 0+725. This shows the area from the previous photo and the start of fill placement in this area.

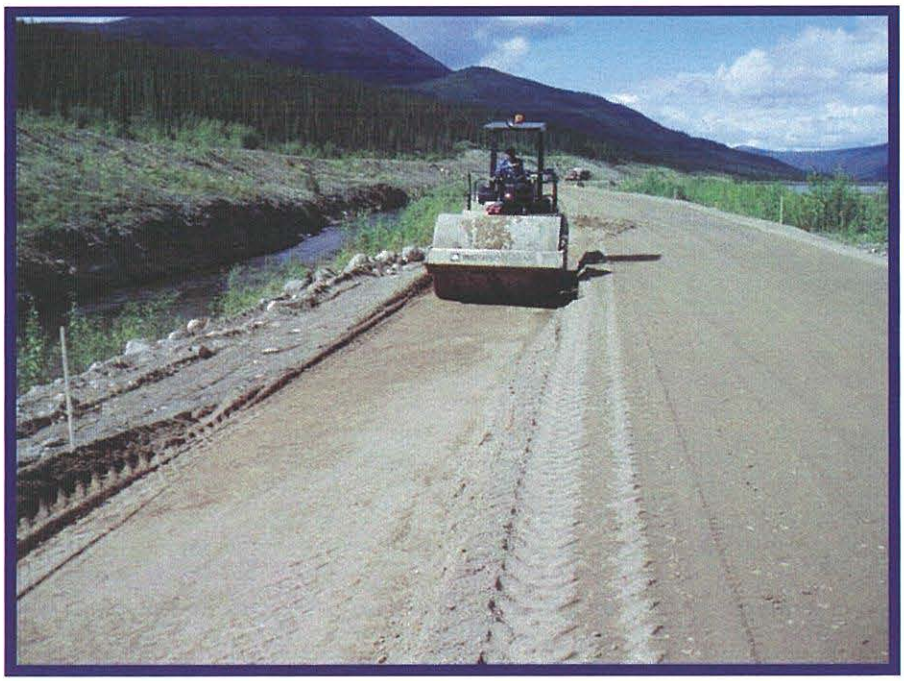


Photo 16 shows a view looking east from station 0+850. This photo shows the grade staking for riprap placement and the soil that has been in filled in this area.

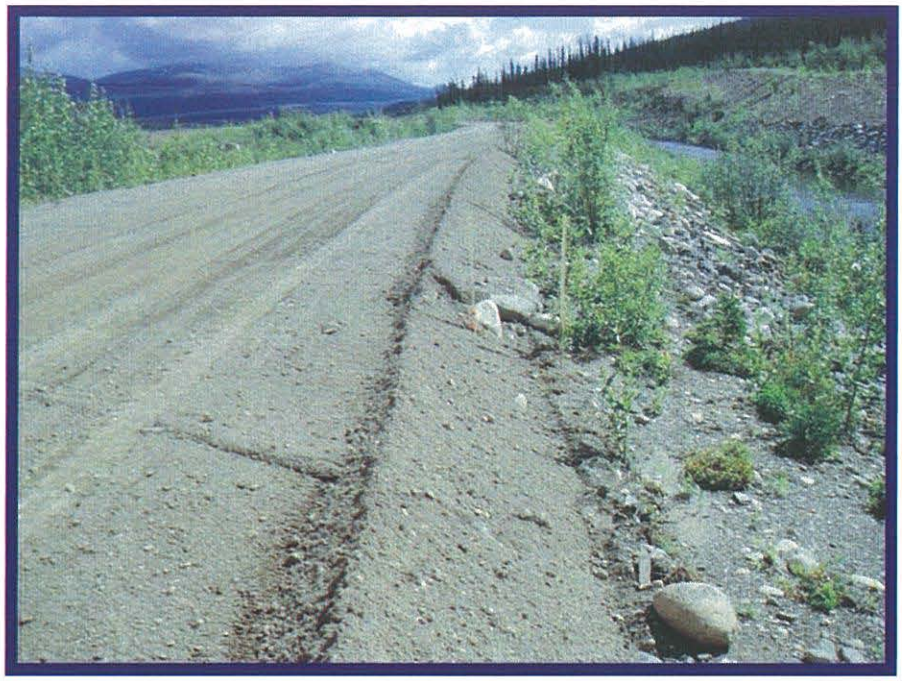


Photo 17 shows grade stakes for riprap placement.

Photo 18 shows a view at station 0+700. Note the instrument location which has some fill directly adjacent to it. Some fill needs to removed around this instrument and riprap placed in this area.

Photo 19 shows a view taken at station 0+175 showing the completed surface of the general fill and the grade stakes for riprap placement.

Photo 20 shows a view at station 0+825 of the prepared surface for riprap placement.

Photo 21 surveying the prepared surface at the RCDC riprap upgrade prior to placement. Note the stockpiles of riprap ready for placement.

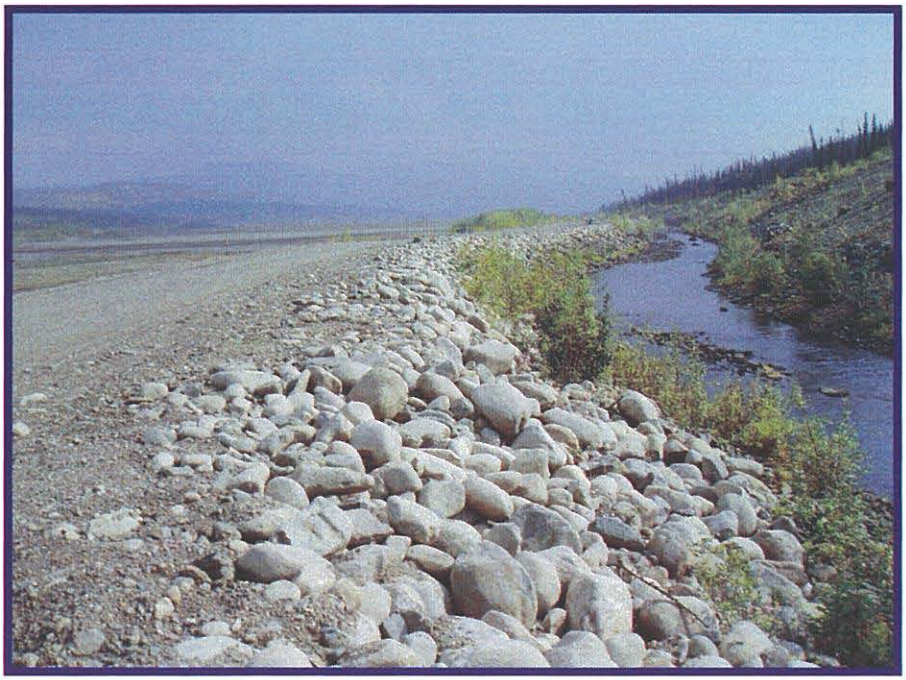


Photo 22 shows a view of the completed riprap surface, at Station 0+150 looking east.

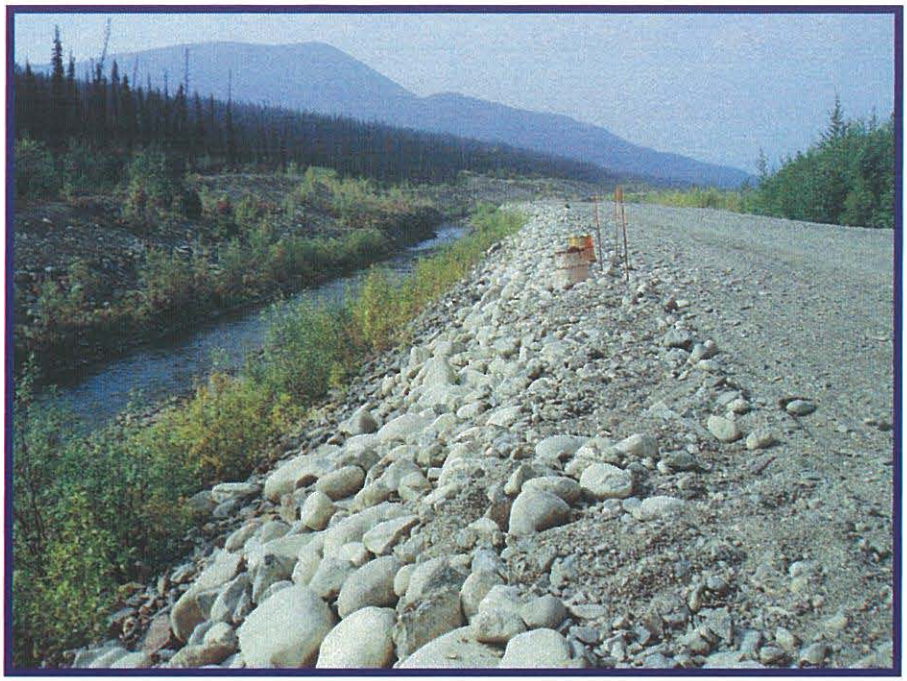


Photo 23 shows a view of the riprap placed at 0+800, looking towards the west.

DELOITTE & TOUCHE INC.
ROSE CREEK DIVERSION CANAL DIKE RAISING

TECHNICAL SPECIFICATIONS

FARO MINE, YUKON TERRITORY

June, 2004

0257-017-01

GENERAL CLAUSES
GENERAL DESCRIPTION OF THE PROJECT

1.0 LOCATION

The site of the work is located within the valley of Rose Creek, at the Anvil Mining Corporation Property, near the town of Faro, Yukon Territory. The work comprises the following:

- The Rose Creek Diversion Canal Dike Raising – the diversion canal is located along the southern edge of the tailings impoundments.

2.0 PURPOSE

The purpose of the construction project is:

- To increase the capacity of the canal by raising the crest of the canal dike to specific elevations along a portion of the canal dike.

3.0 SCOPE OF WORK

The work includes, but shall not necessarily be limited to, the following:

- Preparation of the existing dike surface for the placement of the new fill material; consisting of scarifying and re-compaction of the upper 150 mm of the existing surface,
- Borrow excavation, hauling, placement and compaction of granular material,
- Borrow excavation, hauling and placement of rip rap material.
- Protect the existing instrumentation. Extend the overall height of the existing instruments as required.

The following activities related to this project will be undertaken by the Owner or Owner's representative:

- Survey and layout of work to the specified lines and grades,
- Maintenance of the access roads between the borrow area and the work,
- Development of the borrow area, including any required stripping and grubbing,
- Supply of construction materials (granular fill and rip rap),
- Clean-up activities in the borrow area.

4.0 DIRECTION OF WORK

The Contractor shall supply all equipment and suitably experienced personnel to manage his construction forces and to manage, supervise, service and operate the equipment such that best usage of the equipment will be achieved. The Contractor will be responsible for providing all maintenance and repair of equipment. The Owner or his representative will provide the necessary construction surveys.

ITEM 3. GRANULAR FILL (DIVERSION CANAL DIKE RAISING)

3.1 DESCRIPTION

The work includes but shall not necessarily be limited to the excavation, processing, hauling and placement of the materials to the lines, grades and dimensions shown on the drawings or as otherwise designated by the Owner or the Engineer.

3.2 MATERIALS

The materials shall consist of clean, well-graded sand and gravel with less than 30 percent by weight passing the 80 micron Standard sieve size and a maximum size of 75mm.

3.3 CONSTRUCTION

Sand and Gravel shall be placed along the diversion canal in accordance with the drawings or as otherwise required by the Engineer.

In areas of standing water, drainage shall be improved prior to fill placement.

The sand and gravel shall be compacted to 98 percent of SPMDD. All new fill will be blended with ground contours and adequately compacted subject to approval of the Owner or his representative.

The final surface of the canal dike should be graded to drain towards the canal.

Sand and Gravel placed by the Contractor that fails to meet the requirements of this specification shall be removed and replaced at no charge to the owner.

3.4 MEASUREMENT

All work shall be carried out only with the prior approval of the Owner or the Engineer. Measurement of the material placed will be of the final, neat volumes as measured by the Engineer.

Work that is carried out without the prior approval of the Owner or his representative will NOT be measured for payment.

3.5 PAYMENT

Payment for work measured under this specification shall be according to the volumes measured by the Engineer, and will be of the final "as-built" neat volume. No payment will be made for the bulk (or hauled) volume.

ITEM 4. RIP RAP

4.1 DESCRIPTION

The work includes, but shall not necessarily be limited to, the excavation, processing, hauling and placement of the rip rap material to the lines, grades and dimensions shown on the drawings or as otherwise designated by the Owner or the Engineer.

4.2 MATERIALS

The materials shall consist of clean, well-graded, hard and durable cobbles and boulders of quarry rock, and shall not contain soft or friable rock types or rock pieces that contain fractures or have a maximum dimension more than four times a minimum dimension.

The rip rap shall meet the following gradation specifications:

D_{15}	120 to 180 mm
D_{50}	180 to 210 mm
D_{max}	210 to 300 mm

4.3 CONSTRUCTION

Rip rap shall be placed along the diversion canal in accordance with the drawings or as otherwise required by the Owner or his representative.

The Contractor shall haul and place the material in such a manner as to minimize the degradation of the individual rock particles. The rip rap shall be placed so as to ensure that the larger and smaller particles are uniformly distributed and that the smaller particles serve to fill the voids between the larger particles. In this manner, a uniform layer of rip rap of specified thickness and minimal void space will be produced.

Rip rap placed by the Contractor that fails to meet the requirements of this specification shall be removed, resized, and replaced at no charge to the owner.

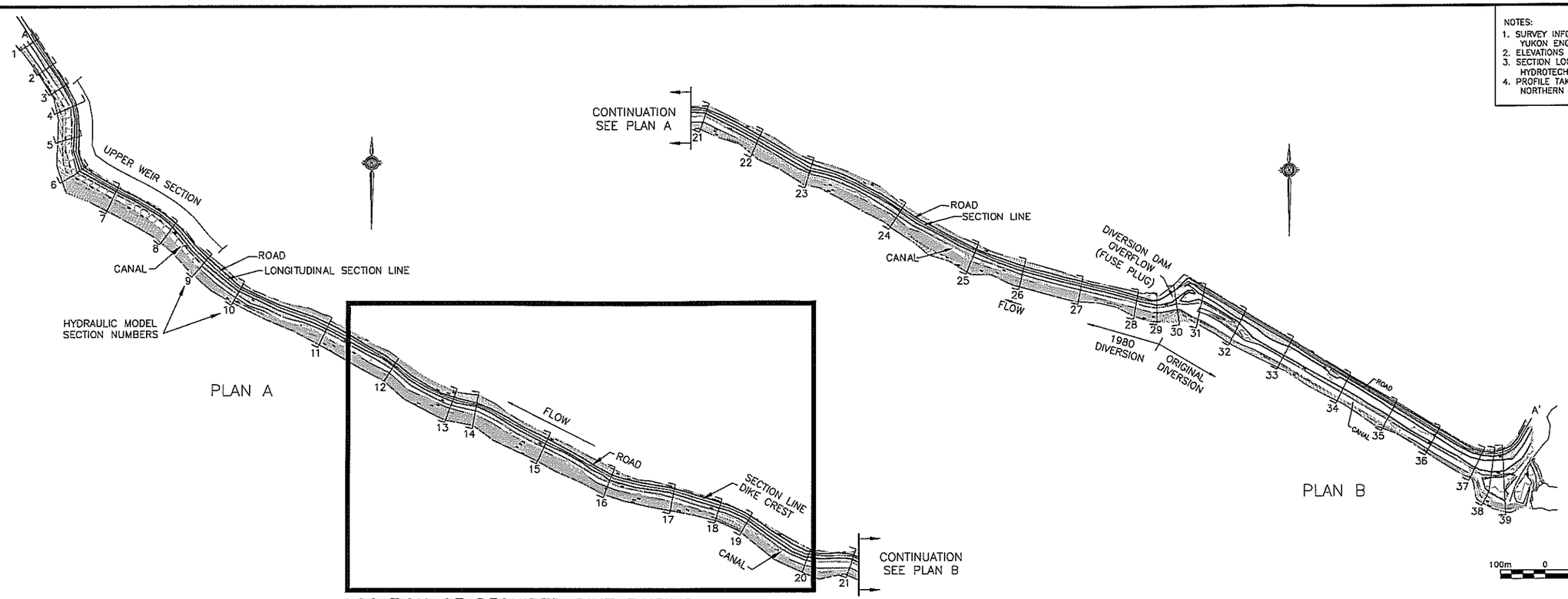
4.4 MEASUREMENT

All work shall be carried out only with the prior approval of the Owner or the Engineer. The measurement will be of the final, completed, neat volume of rip rap in place.

Work that is carried out without the prior approval of the Owner or his representative will NOT be measured for payment.

4.5 PAYMENT

Payment for work measured under this specification shall be according to the rates provided by the Contractor for placement of rip rap and based on the measured "as-built" volume.

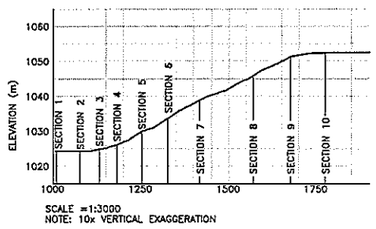


LOCATION OF REQUIRED DIKE RAISING – DETAIL ON DWG. 4

NOTES:
1. SURVEY INFORMATION PROVIDED BY YUKON ENGINEERING SERVICES.
2. ELEVATIONS ARE GEODETIC.
3. SECTION LOCATIONS TAKEN FROM HYDROTECHNICAL STUDY (APPENDIX 1)
4. PROFILE TAKEN ALONG TOP OF NORTHERN BANK OF CANAL.

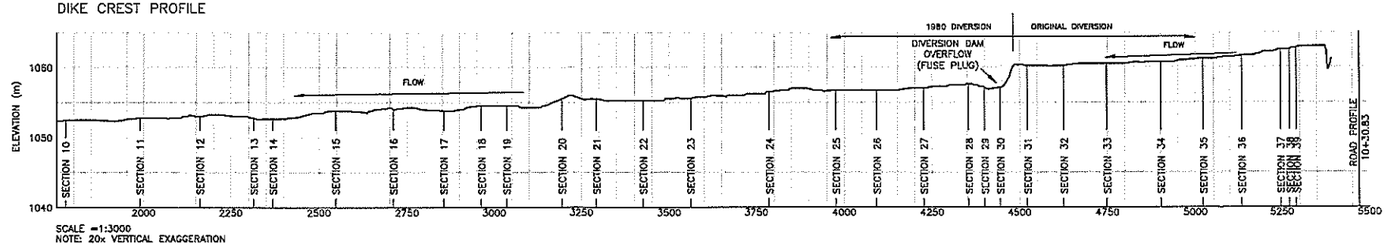
100m 0 100m 200m 300m
SCALE

DIKE CREST WEIR SECTION PROFILE



SCALE =1:3000
NOTE: 10x VERTICAL EXAGGERATION

DIKE CREST PROFILE



SCALE =1:3000
NOTE: 20x VERTICAL EXAGGERATION

CLIENT: Deloitte & Touche

REV.	DATE	REVISION NOTES	DRAWN	CHECKED	APPROVED
1	30/06/04	ISSUED FOR CONSTRUCTION	CJT	GWF	JWC

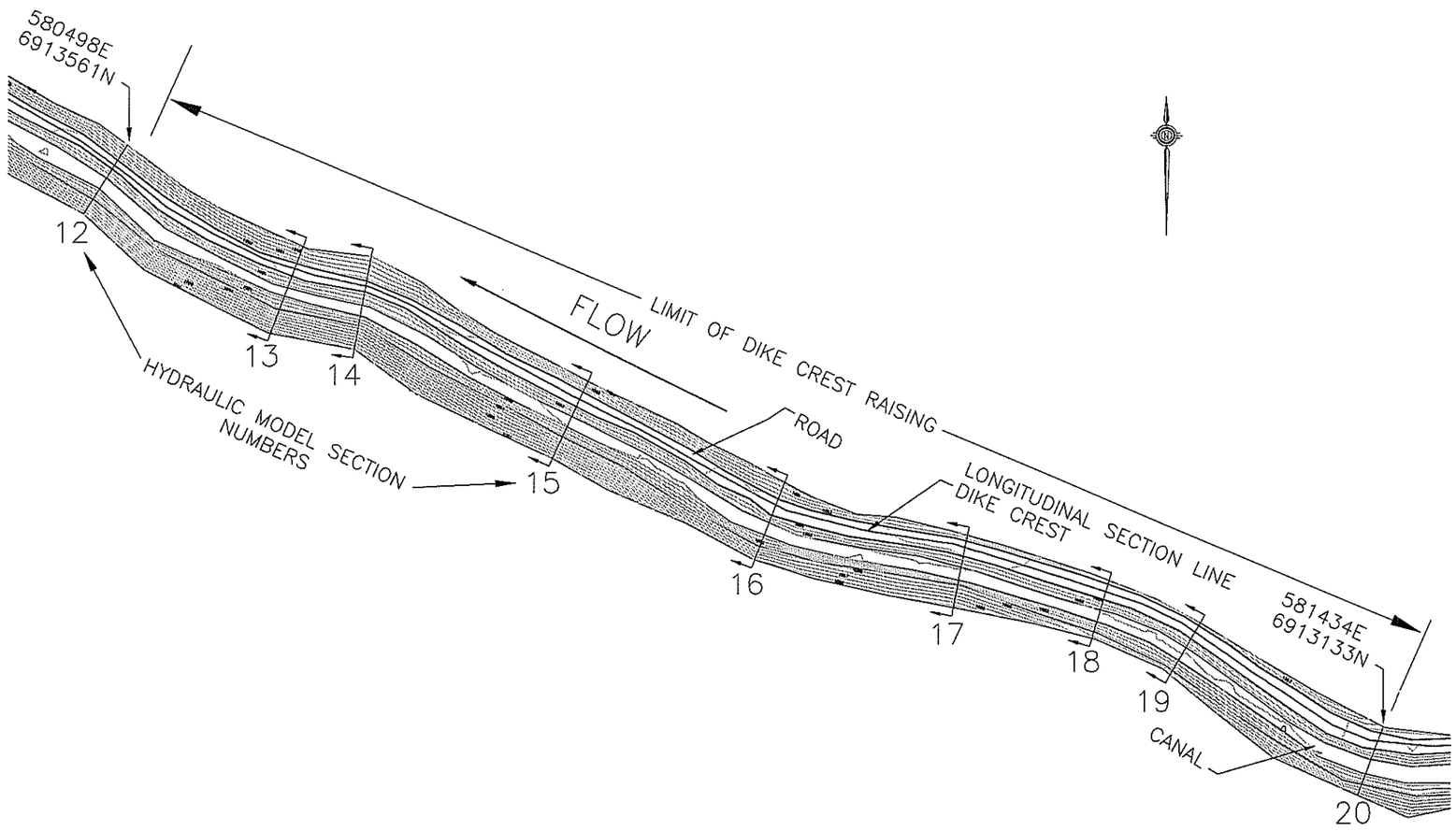
SCALE:	AS SHOWN
DATE:	JUNE 2004
DRAWN:	CJT/OCB
DESIGNED:	JMS
CHECKED:	GWF
APPROVED:	JWC

PROJECT: ROSE CREEK DIVERSION CHANNEL HYDRAULIC CAPACITY ASSESSMENT

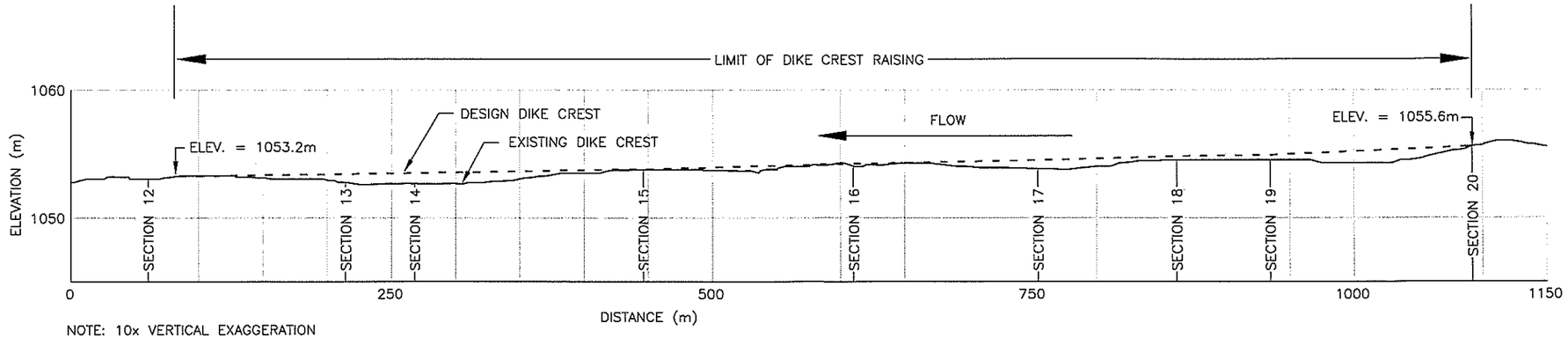
TITLE: ROSE CREEK DIVERSION CANAL PLAN & PROFILE

PROJECT No.	FIGURE No.	REV.
0257-017-01	3	0

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY
Calgary, AB Phone: (403) 250 5185



DIKE CREST CENTER LINE PROFILE



NOTE: 10x VERTICAL EXAGGERATION

NOTES:
1. SURVEY INFORMATION PROVIDED BY YUKON ENGINEERING SERVICES.
2. ELEVATIONS ARE GEODETIC.
3. SECTION LOCATIONS TAKEN FROM HYDROTECHNICAL STUDY (APPENDIX 1)
4. PROFILE TAKEN ALONG TOP OF NORTHERN BANK OF CANAL.

40m 0 40m 80m 120m
SCALE

CLIENT: Deloitte & Touche

REV.	DATE	REVISION NOTES	DRAWN	CHECKED	APPROVED
1	30/08/04	ISSUED FOR CONSTRUCTION	CJT	GWF	JWC

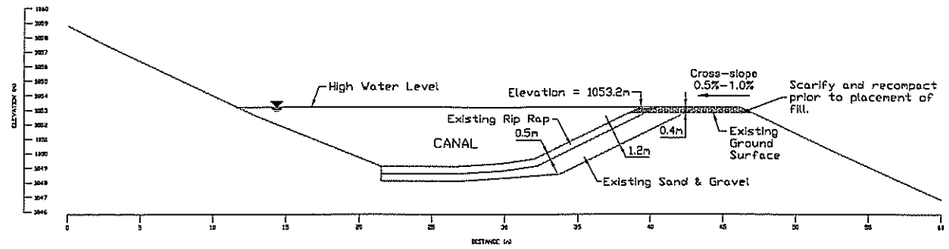
SCALE:	AS SHOWN
DATE:	JUNE 2004
DRAWN:	CJT/GCB
DESIGNED:	JMS
CHECKED:	GWF
APPROVED:	JWC

PROJECT: ROSE CREEK DIVERSION CHANNEL HYDRAULIC CAPACITY ASSESSMENT

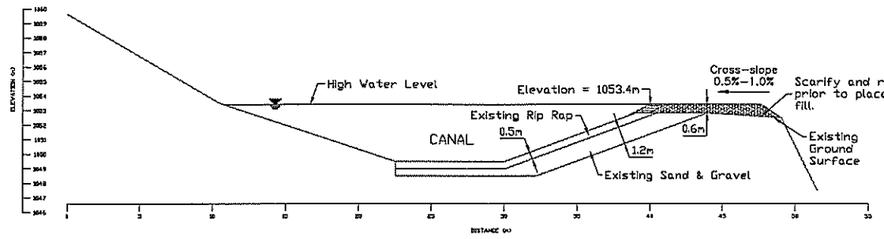
TITLE: CANAL DIKE CREST RAISING PLAN & PROFILE

PROJECT No.	FIGURE No.	REV.
0257-017-01	4	0

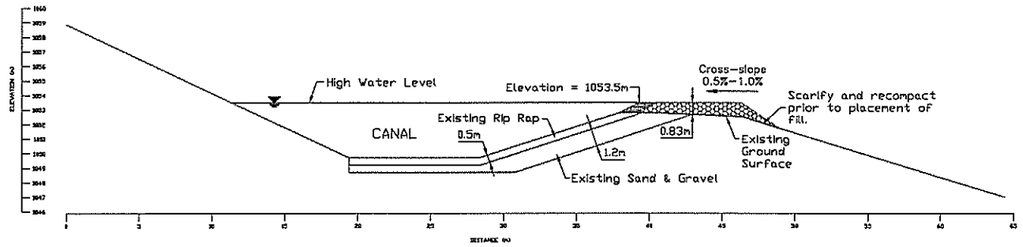
BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY
Calgary, AB Phone: (403) 250 5185



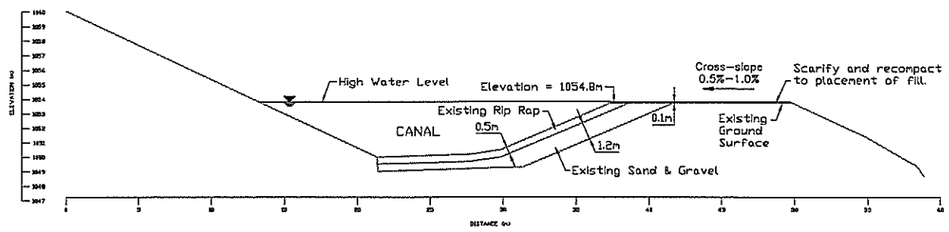
CROSS SECTION 12



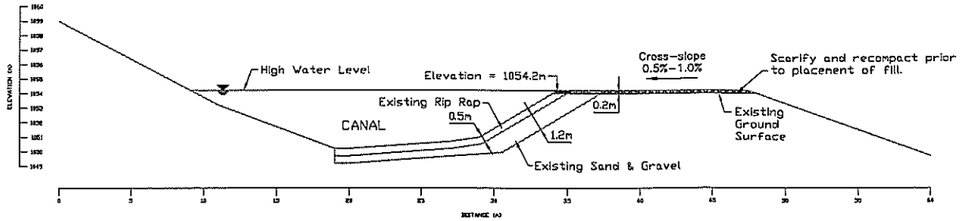
CROSS SECTION 13



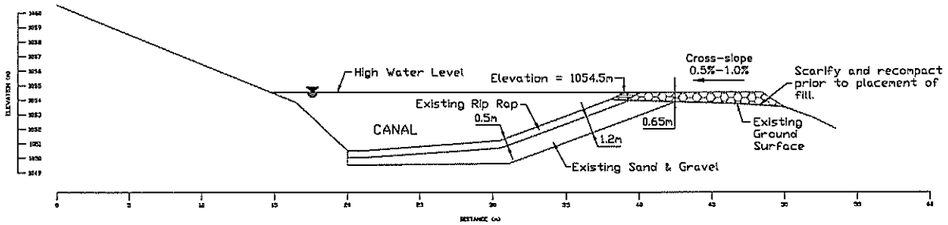
CROSS SECTION 14



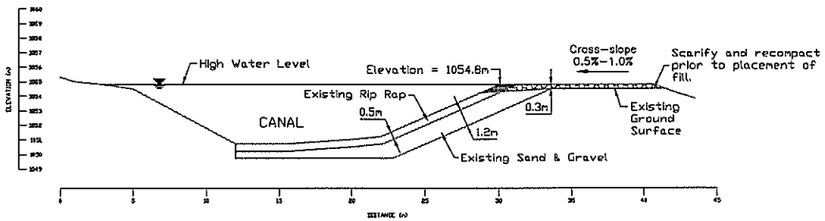
CROSS SECTION 15



CROSS SECTION 16



CROSS SECTION 17



CROSS SECTION 18

NOTES:
1. SURVEY INFORMATION PROVIDED BY YUKON ENGINEERING SERVICES.
2. ELEVATIONS ARE GEODETIC.
3. BURIED LINES SHOWN ON THESE SECTIONS TAKEN FROM ORIGINAL DESIGN DRAWINGS (GOLDER 1980).
4. GRADE SURFACE OF FINAL DIKE CREST TO DRAIN INTO THE CANAL.
5. ALL DRAWINGS ARE DRAWN WITH NO VERTICAL EXAGGERATION.

4m 0 4m 8m 12m
SCALE

CLIENT: Deloitte & Touche

LEGEND:
GRAVEL FILL
RIP RAP

REV.	DATE	REVISION NOTES	DRAWN	CHECKED	APPROVED
1	30/06/04	ISSUED FOR CONSTRUCTION	CJT	GWF	JWC

SCALE: AS SHOWN
DATE: JUNE 2004
DRAWN: CCB
DESIGNED: GWF
CHECKED: GWF
APPROVED: JWC

PROJECT: ROSE CREEK DIVERSION CHANNEL HYDRAULIC CAPACITY ASSESSMENT
TITLE: CANAL DIKE RAISING – SECTIONS

PROJECT No.	FIGURE No.	REV.
0257-017-01	5	0

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY
Vancouver, BC Phone: (604) 684 5900

0257-017-01 600 Fig 5.dwg

APPENDIX II

Daily Construction Reports

DAILY INSPECTION SUMMARY

Project No.: 0257-026-01

Inspection Report No. 1 **Page:** 1 **of** _____ **Date:** July 26/04

WEATHER

Temperature: 24 - 27°C **Wind:** Slight **Sky:** Clear

Precipitation: NONE

Contractor Forces on Site 3 CONTRACTORS

TIM MOON - COMPACTOR (1.5H use), Grader (8H)

Clifford McCleod - 2, 10m³ Dump Trucks (Tandom Axle)
966 Loader

John Kraft - 1, 10m³ Dump Truck (Tandom Axle)
Water Truck → Supplied by Mine.

Tim Moon's forces working on hourly basis, others working on a hauled Cu.metre basis

Contractor Activities (incl. quantities/volumes):

No fill was hauled. → Dana Indicated that a stand-by would be paid for 3 truck drivers and Loader operator.
→ Sent trucks & Loader home @ 4:30 pm

Scarified 0+900 → 1+024 & STARTED COMPACTON

Scarified 0+775 → 0+900

Broke up and windrowed the spring placed fill between 0+500 & 0+775

Unusual Conditions and Remarks:

Waited for kick-off meeting with Contractor forces & DANA Itaggar - Site Manager. Meeting @ 9:45 am, start work @ 10:00 am.

YES Laid out STATIONING on the Tailings side of the dyke Crest

Water truck did not start until 4:30 pm.

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Project: Upgrade to Canal.

Location: RCDC - RAISE

Inspector: Gerry Ferris
(8-6 → 10H)

DAILY INSPECTION SUMMARY

Project No.: 0257-026-01

Inspection Report No. 2 **Page:** 1 of 1 **Date:** July 27/04

WEATHER

Temperature: 22°c **Wind:** 1-3 km/h **Sky:** Overcast

Precipitation: Slight for 15 min period

Contractor Forces on Site Compactor (10h - 3h of STANDBY WAITING FOR Water truck), grader (10h), Loader & 3 Tandem axle dump trucks were on site

Water truck needed repairs for 3 Hr. worked between 8am → 5:30pm

Contractor Activities (incl. quantities/volumes):

Completed scarification & Compaction from 0+800 → 1+024

Placed & compacted one lift between 0+800 → 1+024

KRAFT (Dump Truck) - 22 loads 220 m³ Loader

McLeod (Dump trucks) - 21 + 17 loads 380 m³ Total 600 m³

Placed and started compaction of 2ND Lift 0+850 → 1+000

Scarified from 0+500 → 0+750

Unusual Conditions and Remarks:

@ 4:30pm all loads of fill had been hauled → Sent loader and 3 Dump trucks home → Need water and compaction prior to more fill to be placed.

→ Started compaction of 2ND Lift @ 5:00 pm

→ Started windrowing Spring placed fill

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Project: Construction Inspection

Location: Rose Creek Canal Dike

Inspector: Gerry Ferris

10 Hours on site

DAILY INSPECTION SUMMARY

Project No.: 0257-026-01

Inspection Report No. 3 **Page:** 1 of 1 **Date:** July 28, 04

WEATHER

Temperature: 15°C **Wind:** None to Slight **Sky:** Overcast

Precipitation: Light rain throughout the day

Contractor Forces on Site 3 - tandem dump trucks, Loader, grader and water truck from Minto, Compactor

Compactor (10 - 4.5 standby), Grader (10 hours)

LOAD COUNTS (DAILY)

KT-47 34

NC-Head 18 & 29 LOADER TOTAL 81 truck loads of 810 m³

Contractor Activities (incl. quantities/volumes):

Completed compaction of scarified surface 0+800 to 0+500

Completed compaction of 2ND Lift from 0+850 to 1+000

Scarified from 0+750 to 0+800

Started removal of winter fill from 0+100 to 0+300

→placing this for 3rd Lift between 0+875 to 0+1000

Placed first lift between 0+500 & 0+800

Unusual Conditions and Remarks: Some co-ordination issues occurred with the truck drivers concentrating on the 0+500 to 0+800 section but not adding the last few lifts to 0+800 to 1+000 section, packer & water truck stood by. Once I got back on site this was corrected

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Project: Upgrade to Canal

Location: RCDC - Crest Raise

Inspector: Gerry Ferris

10H

DAILY INSPECTION SUMMARY

Project No.: 0257-026-01

Inspection Report No. 4 **Page:** 1 **of** _____ **Date:** July 29/04

WEATHER

Temperature: _____ **Wind:** 0 - 20 km/h **Sky:** overcast

Precipitation: Occasional light rain.

Contractor Forces on Site 3 - tandem dumptrucks, Loader, grader, compactor and water truck (Min equipment)
Ken Bob was driving one of the McLeod trucks replacing Dempsey.

Load Counts
John Kraft - 29
McCleod (2 trucks) - 23, 17 Loader - 69 or 690 m^3

Compactor - 10 Hours, Grader - 10 Hours

Contractor Activities (incl. quantities/volumes):
Complete scarification & compaction between 0+500 & 0+000
Spread first lift (partial) between 0+500 & 0+000
Spread & graded 2ND lift between 0+800 & 0+600
Spread & graded 4th & potentially the final lift between 0+800 & 1+020.

Unusual Conditions and Remarks:
Performed final layout of grades from 0+800 to 1+000
laid out grade stakes between 0+800 & 0+500
EBA came to the site in evening to perform density testing via nuclear methods.

Tim Moon is switching both grader & packer operator for tomorrow.

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Project: Upgrade to Canal
Location: RCDC - Crest Raise
Inspector: Gerry Ferris
10H

DAILY INSPECTION SUMMARY

Project No.: 0257-026-02

Inspection Report No. 5 **Page:** 1 of 1 **Date:** July 30/04

WEATHER

Temperature: _____ **Wind:** Calm to slight breeze **Sky:** Overcast

Precipitation: Some rain overnight, none during the day

Contractor Forces on Site 3 tandem Dump trucks, 966 Loader, Compactor grader, water truck (mine)

KRAFT - 30 loads

McLeod 14 & 23 loads Loader - 67 Loads

Compactor - 10 hours

Grader - 10 hours

Contractor Activities (incl. quantities/volumes):

Completed compaction of final lift 1+000 to 0+825

Completed compaction of 2ND lift between 0+800 to 0+600

Completed placement, grading & compaction 2ND LIFT between 0+100 & 0+400

~~STARTED~~ placement, grading for final 3rd to final lift between 0+825 to 0+600

Unusual Conditions and Remarks: Layed out finish grade stakes for 0+500 to 0+800

Still need 2-3 lifts in zone from 0+300 to 0+100

→ expect a Saturday (July 31) finish.

EBA was on site for density tests.

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Project: Upgrade to Canal

Location: RCDC – Crest Raise

Inspector: Gerry Ferris

10 H

DAILY INSPECTION SUMMARY

Project No.: 0257-026-01

Inspection Report No. 6 **Page:** 1 of 1 **Date:** July 31/04

WEATHER

Temperature: 15 – 22°C **Wind:** None **Sky:** (morning) Overcast afternoon Partly cloudy

Precipitation: None

Contractor Forces on Site Grader, compactor, water truck (mine's)
3 tandem agile dump trucks and Loader.

KRAFT - 29

McLeod - ~~28~~ 51 Loader - 90

Grader - 10

Compactor - 10

Contractor Activities (incl. quantities/volumes):

Spread 4th lift between 0+600 & 0+775, Compacted

Spread, graded and compacted ~~3rd~~ 3rd lift between 0+100 → 0+300

Spread, graded and compacted 2 seperate lifts in New lane between 0+625 → 0+~~8~~50

Spread graded & compacted final lift between 0+400 & 0+475

Unusual Conditions and Remarks: Between 0+625 → 0+~~8~~50 a New land was created on inside of road to fill between lane created and fill required to support rip rap. Compaction of this area is done without water addition → since water truck can not travel in this narrow area.

Marked final grade stakes between 0+600 → 0+775, 0+475 → 0+400
0+100 → 0+300 EBA was out to do
layout of rip rap placement 0+500 → 1+000 density tests

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Project: Upgrade to Canal

Location: RCDC - Raise.

Inspector: Gerry Ferris

10H

DAILY INSPECTION SUMMARY

Project No.: 0257-026-02

Inspection Report No. 7 **Page:** 1 of 1 **Date:** Aug 1/04

WEATHER

Temperature: 13 - 21°C **Wind:** None **Sky:** Partly cloudy

Precipitation: None

Contractor Forces on Site 3 tandem axle dump trucks, Loader Compactor, grader, water truck (mine's)

KRAFT - 23 Compactor - 8o5

McLeod - 20 LOADER - 43 Grader - 7

Totals for this phase

Compactor -

Volume - 4100 m^3 Grader - 65 Volume hauled by KRAFT = 1670

Contractor Activities (incl. quantities/volumes):

Completed placement, grading & compaction of final lift 0+100 -> 0+300

Completed placement, grading & compaction of final lift 0+625 -> 0+775

Completed local, spot raises, haul, grade and compact.

The bulk raise of the dike is complete -> now rip rap placement needs to occur

Unusual Conditions and Remarks: Completed the layout for rip rap placement which is to start tommorrow

Density testing on final surfaces to occur tommorrow.

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Project: Upgrade to Canal.

Location: PCDC - dike raise

Inspector: Gerry Ferris

N:\Administration\Forms\DAILY INSPECTION SUMMARY.doc

10H

DAILY INSPECTION SUMMARY

Project No.: 0257-026-02

Inspection Report No. 9 **Page:** 1 of 1 **Date:** Aug 2/04

WEATHER

Temperature: _____ **Wind:** Slight **Sky:** Overcast to Partly Cloudy

Precipitation: None

Contractor Forces on Site Excavator Hyundai 290

Start work @ 11:00 am Mob the excavator from near the mill using Low boy in the morning and then begin work.

10 Hr (3 Hr mob to site)

Contractor Activities (incl. quantities/volumes):

Prep work for placement of riprap was begun and about 300 m was completed.

Unusual Conditions and Remarks: Layout for this work was completed yesterday.

Upon excavation it was revealed that the rip rap did not always extend to the top of the old road surface, THIS will result in additional requirement for rip rap to complete this project.

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Project: Canal Upgrades

Location: RCDC – Dike Raise

Inspector: Gerry Ferris

DAILY INSPECTION SUMMARY

Project No.: 0257-026-01

Inspection Report No. 11 **Page:** 1 of 1 **Date:** Aug 3/04

WEATHER

Temperature: 22°C **Wind:** Slight **Sky:** Partly Cloudy.

Precipitation: None.

Contractor Forces on Site Excavator (Hyundai 290) - 10 Hours

Contractor Activities (incl. quantities/volumes): Completed preparation of area for rip rap placement.

Unusual Conditions and Remarks: Continuation of ~~exposure of~~ extra need for riprap was discovered. Due to the existing rip rap being lower than the old road surface.

→ PLAN TO START RIP RAP PLACEMENT on Aug 4/04

→ Site staff will prepare additional rip rap for this project.

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Project: Canal Upgrade

Location: RCDC - Dike Raise

Inspector: Gerry Ferris

DAILY INSPECTION SUMMARY

Project No.: 0257-026-02 - Rose Creek Rip Rap placement

Inspection Report No. MZ **Page:** 1 of 1 **Date:** Aug 4, 2004

WEATHER

Temperature: ~20°C **Wind:** light **Sky:** Clear

Precipitation: —

Contractor Forces on Site Larry (w/ the hoe), + 2 truck drivers + trucks, + 1 loader (w/ operator) - FIM MOON CONTRACTOR

hours - 8-6

Hoe - 10 hrs
Truck 1 - 7 hrs
Truck 2 - 9.5 hrs
Loader - 3.5 hrs

Contractor Activities (incl. quantities/volumes):

- Contractor completed side cut cleaning, removed spoil on roadway, and started stockpiling rip-rap.

Unusual Conditions and Remarks:

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Project: RCDC repairs
Location: Faro, Rose Creek Diversion Canal
Inspector: Mike McCrank

DAILY INSPECTION SUMMARY

Project No.: 0247-026-02 Rip Rap placement

Inspection Report No. MH **Page:** 1 of 1 **Date:** Aug 5, 2004

WEATHER

Temperature: ~25°C **Wind:** — **Sky:** clear

Precipitation: —

Contractor Forces on Site One operator → One hoe
Two truck drivers → Two trucks
One loader on site, used sporadically by truck driver

TIM MOON - On site 8:-6 EXCAVATOR - 10 hrs
TRUCK 1 - 7 hrs
TRUCK 2 - 9.5 hrs

Contractor Activities (incl. quantities/volumes): Haul rip rap from stockpile; place alongside road; move some boulders with loader (some roll onto driving lane); one driver helped me w/ surveying for one hour.

Unusual Conditions and Remarks: One truck was out of service for 3 hrs

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Project: Rip Rap Placement
Location: ~~0247-026~~ - Faro, Yukon
Inspector: Mike McCrank

DAILY INSPECTION SUMMARY

Project No.: 0257-026-02
Inspection Report No. Aug 6 - R.R. Rap **Page:** 1 of 1 **Date:** Aug 6, 2004

WEATHER

Temperature: 20-25°C **Wind:** light **Sky:** Clear, some cloud

Precipitation:

Contractor Forces on Site
1 operator - 1 excavator (10 hours)
1 driver - 1 truck (7 hours)
- 1 loader

Contractor on-site for 10 hours
(1 driver for only 7)

Contractor Activities (incl. quantities/volumes): Finish hauling + placing remainder of stockpile; loader was used to push rip rap into place and then the excavator was used to clean-up and place boulders.

Unusual Conditions and Remarks: Excavator (Larry) estimates 20 more loads will be required to complete the job. There will be work done on the week-end.

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Project: Rip Rap Placement
Location: Faro, Yukon
Inspector: Mike McCrank

DAILY INSPECTION SUMMARY

Project No.: 0257-026-02

Inspection Report No. Aug 10, rip-rap **Page:** 1 **of** 1 **Date:** Aug 10, 2004

WEATHER

Temperature: 20-25°C **Wind:** light **Sky:** Smoky

Precipitation:

Contractor Forces on Site 2 people
- 2 trucks, 1 excavator + 1 loader

Contractor on site: 8:00 AM to 6:00 PM

Contractor Activities (incl. quantities/volumes): Haul more rip-rap, approximately 30 loads hauled; Hauling now complete.

Hoe used @ rip rap stockpile to load trucks, operator loaded own truck.

Unusual Conditions and Remarks:

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Project: Rip Rap Placement

Location: Faro Mine Yukon

Inspector: Mike McCrank

DAILY INSPECTION SUMMARY

Project No.: 0247-026-02

Inspection Report No. Aug 1, Rip Rap **Page:** 1 **of** 1 **Date:** Aug 11, 2024

WEATHER

Temperature: 10-15°C **Wind:** light **Sky:** Cloudy

Precipitation: light rain

Contractor Forces on Site 1 operator
1 excavator

Contractor on-site 8:00 hrs → 6:00 PM

Contractor Activities (incl. quantities/volumes): Walked excavator up from pit and placed all of the remaining Rip Rap piles. Contractor will perform a grading of the surface tomorrow to clean off random rip rap!

Unusual Conditions and Remarks:

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Project: Rip Rap Job
Location: Faro Mine, Yukon
Inspector: Mike McCrank

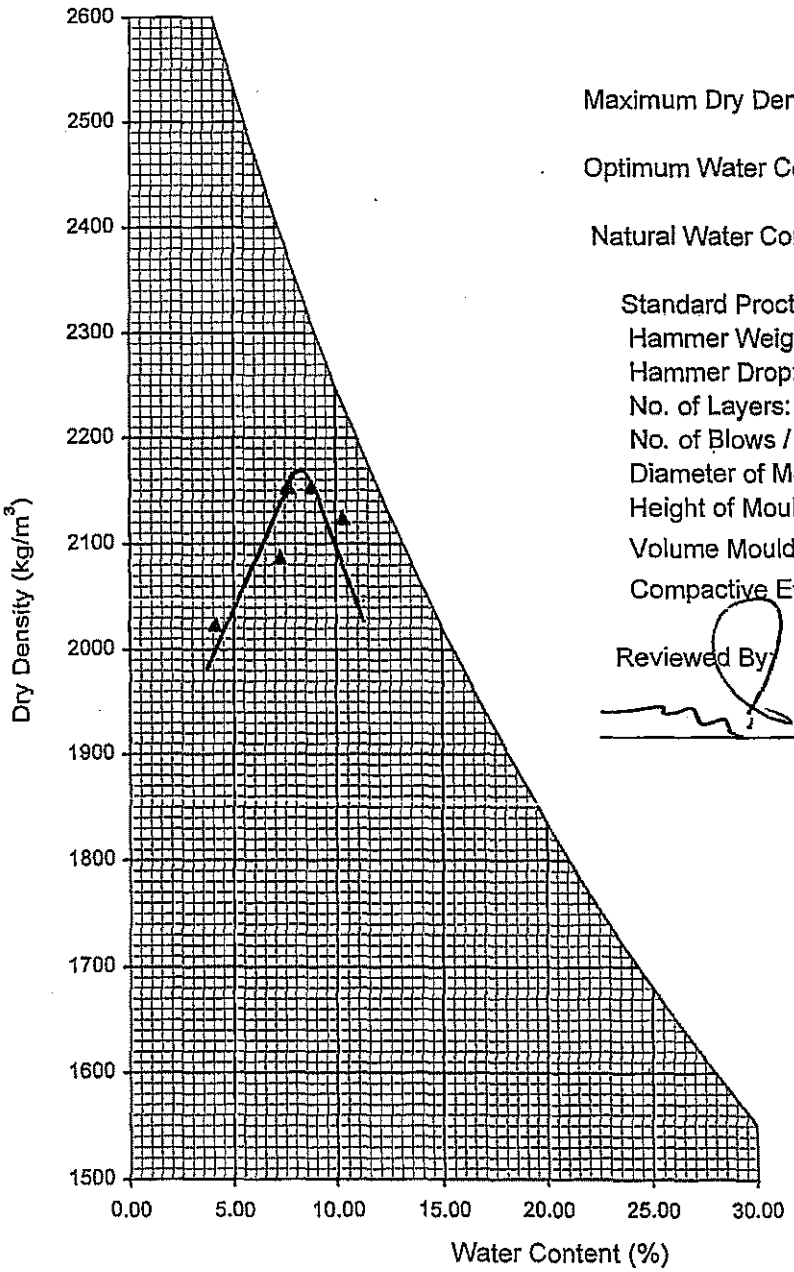
APPENDIX III

Lab and Field Test Results

EBA Engineering Consultants Ltd.

MOISTURE-DENSITY RELATIONSHIP

Project:	RCDC Fill	Sample No.:	SA01
Address:	Faro, YT	Date Sampled:	14-Jul-04
		Sample Location:	On-site Stockpile
Project No.:	0201-1200091.015		
Date Tested:	16-Jul-04 By: MCP	Sample Description:	20 mm CRUSHED GRAVEL
Client:	BGC Engineering		
Attention:	Jim Cassie, P.Eng		



Maximum Dry Density : 2170 kg/m^3

Optimum Water Content: 8.0 %

Natural Water Content: %

Standard Proctor (ASTM D 698)

Hammer Weight:	2.5	kg
Hammer Drop:	305	mm
No. of Layers:	3	
No. of Blows / Layer:	56	
Diameter of Mould:	116	mm
Height of Mould:	116	mm
Volume Mould	0.002124	m^3
Compactive Effort	600	kJ/m^3

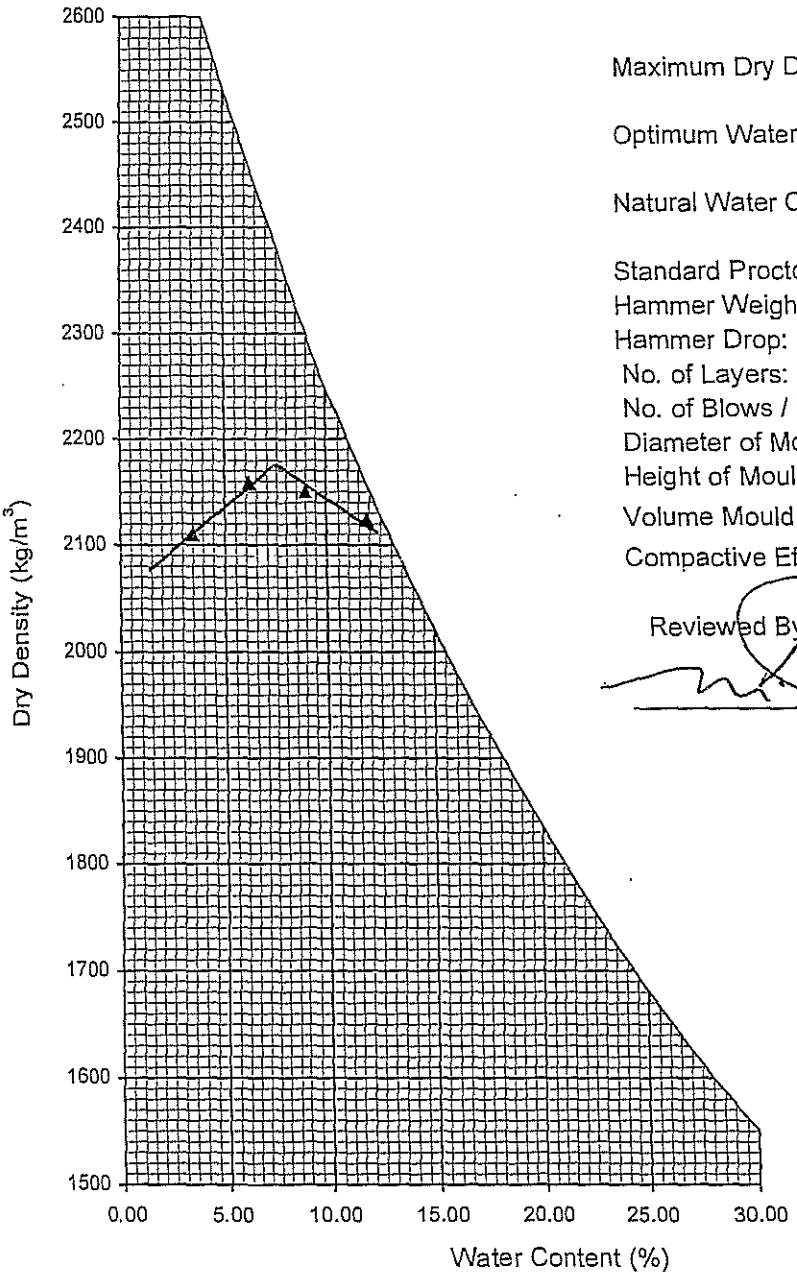
Reviewed By:

P. Eng.

EBA Engineering Consultants Ltd.

MOISTURE-DENSITY RELATIONSHIP

Project:	Culvert Install	Sample No.:	SA01
Address:	Anvil Range, Faro, YT	Date Sampled:	28-Jul-04
		Sample Location:	Borrow pit
Project No.:	1200091.015		
Date Tested:	Aug. 2, 2004 By: TP	Sample Description:	gravel
Client:	BGC Engineering Inc.		
Attention:	Mr. Gerry Ferris		



Maximum Dry Density : 2175 kg/m^3

Optimum Water Content: 7.5 %

Natural Water Content: 2.5 %

Standard Proctor (ASTM D 698)

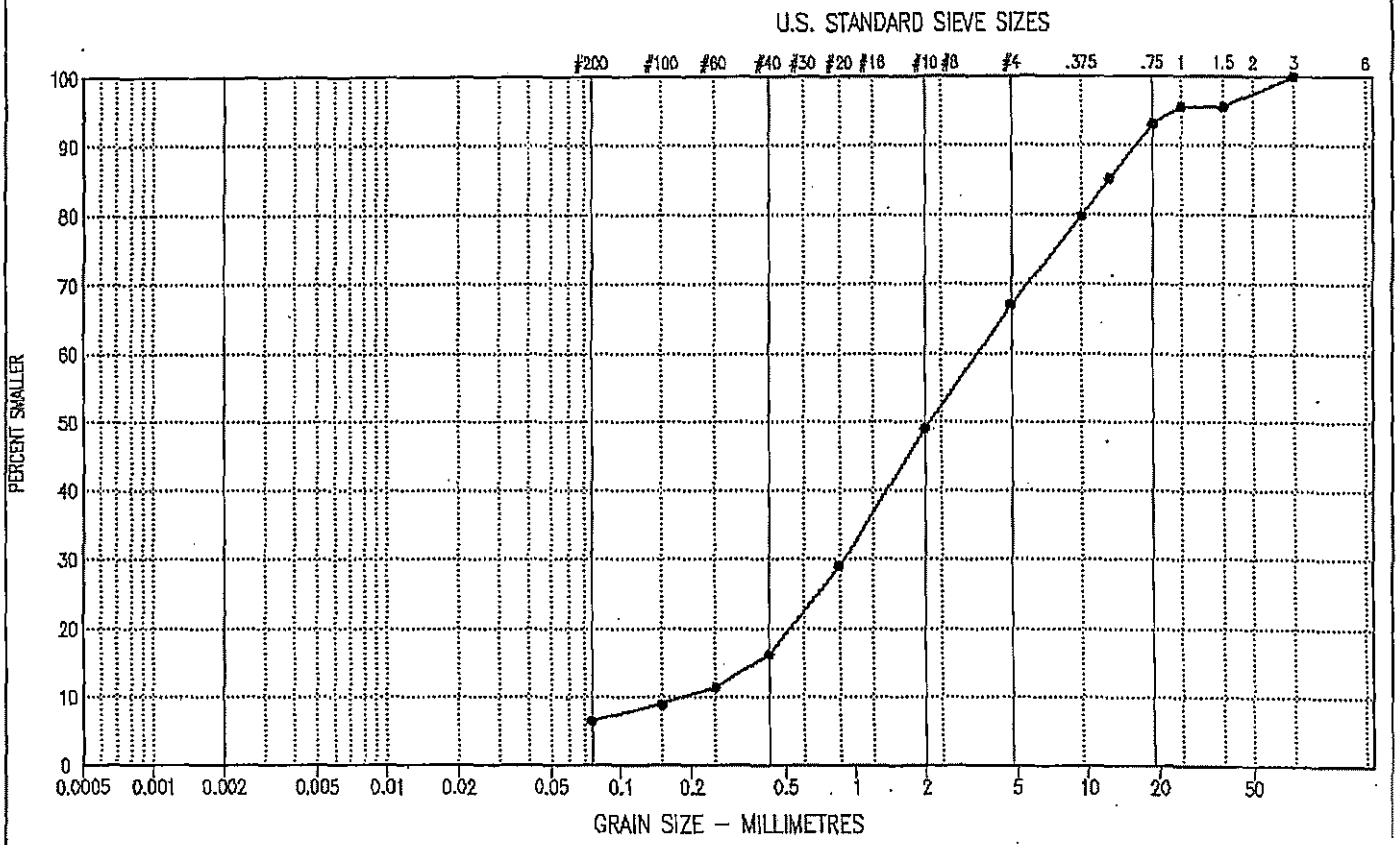
Hammer Weight:	2.5	kg
Hammer Drop:	305	mm
No. of Layers:	3	
No. of Blows / Layer:	56	
Diameter of Mould:	152	mm
Height of Mould:	102	mm
Volume Mould	2.125 x 10^{-3}	m^3
Compactive Effort	600	kJ/m^3

Reviewed By:

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (ft)	DESCRIPTION			Cu	Cc	U.S.C
			CLAY & SILT %	SAND %	GRAVEL %			
●—●	SA01	0.00	7	61	33	18.9	1.1	SW-SM

Project: 0201-1200091.015 Date Tested: 04/06/16 BY: MB

Tested in accordance with ASTM D422 unless otherwise noted.

Split Engineering Digital Imaging Form

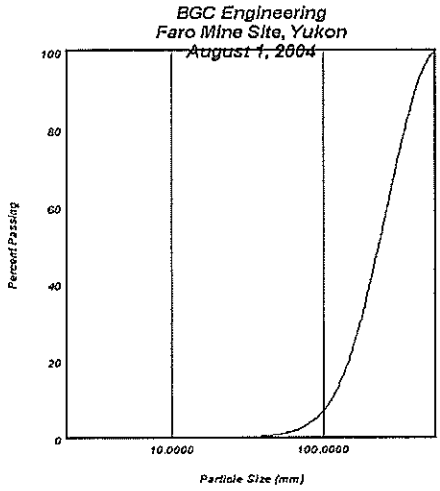
Test Sample #	BGC04-01, BGC04-02, BGC04-03
Photographer	Gerry Ferris
Test Sample Date	August 1, 2004
Test Sample Location	Faro Mine Site, Yukon
Test Sample Geology	Screened Rip Rap Stockpile
Test Blasting Conditions	N/A

Test Sample Information

Key: *Picture Location*: Stockpile
Scaling Method: BALLS = 10"

Pic #	Time	Picture Resolution	Picture Location (M,T,P)	Scaling Method (B,S,B/S,T)	Comments	Download Information (FILE NAME)
001	9:30	200 x 200 dpi	Stockpile	Balls 10"	Remove Sky/ Background from upper left corner.	RCDC BGC04-01
002	9:30	200 x 200 dpi	Stockpile	Balls 10"	Remove Sky from upper portion of picture.	RCDC BGC04-02
003	9:30	200 x 200 dpi	Stockpile	Balls 10"	Remove Sky from upper portion of picture.	RCDC BGC04-03

* TEST NOTES:



size (mm)	%
4000.00	100.00
2000.00	100.00
1000.00	100.00
750.00	100.00
500.00	97.33
250.00	53.25
125.00	12.89
88.00	4.68
63.00	1.62
44.00	0.55
31.00	0.21
22.00	0.09
16.00	0.04
11.00	0.01
7.800	0.00
5.500	0.00
4.000	0.00

P20 Size (mm) 148.99
P50 Size (mm) 239.69
P80 Size (mm) 355.56
Top size (mm) 545.91

SPLIT ENGINEERING

Date: Tue Apr 26 17:50:24 2005

Sieve series: ISO Units: (mm) Number of Images 3

Cumulative Percent Passing Data

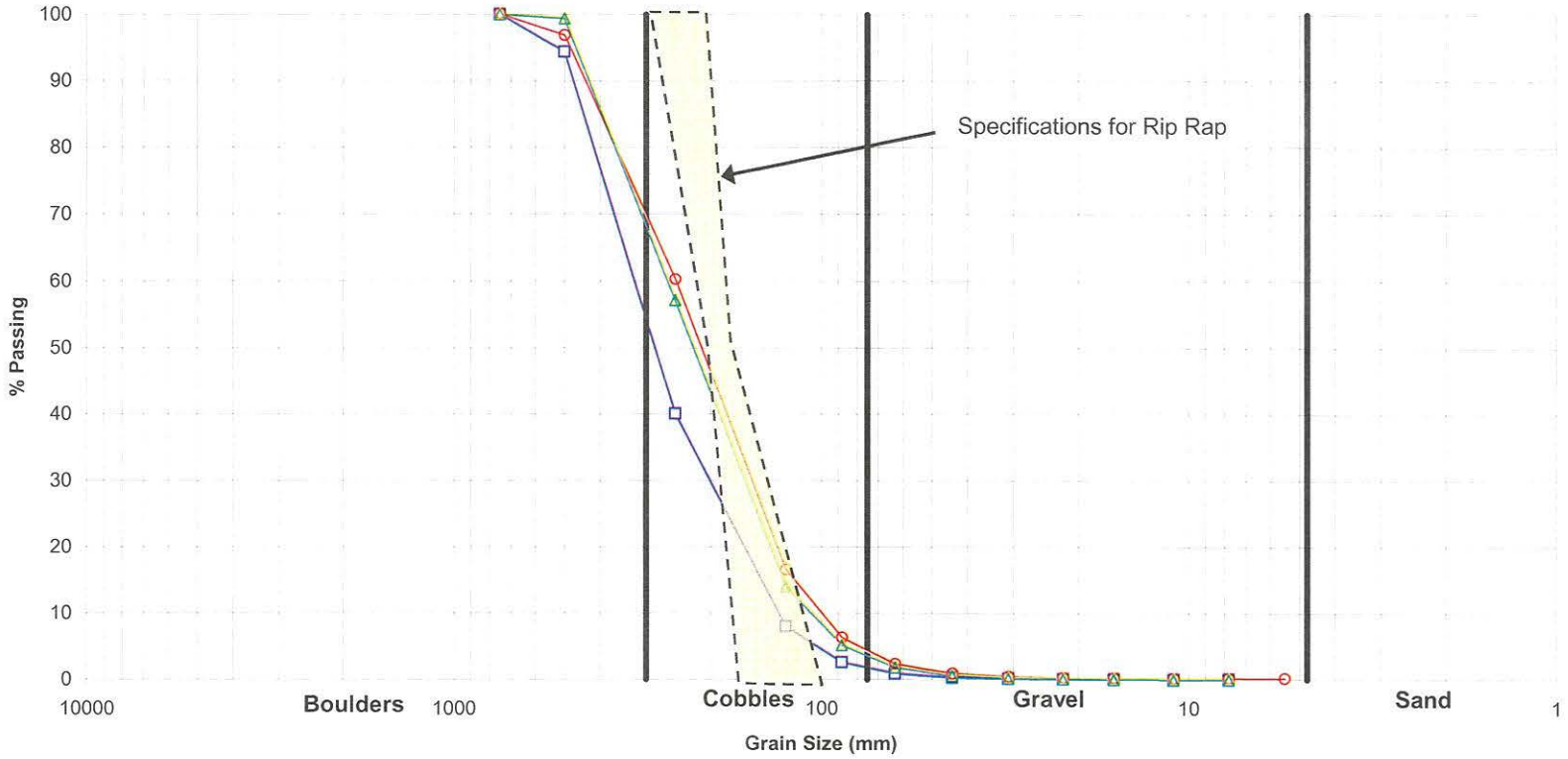
Size	All Images	AUG 1 001	AUG 1 002	AUG 1 003
1000	100	100	100	100
750	100	100	100	100
500	97.33	94.37	96.77	99.38
250	53.25	40	60.14	57.14
125	12.89	7.93	16.42	13.97
88	4.68	2.59	6.17	5.2
63	1.62	0.85	2.2	1.81
44	0.55	0.31	0.75	0.58
31	0.21	0.14	0.28	0.21
22	0.09	0.07	0.11	0.09
16	0.04	0.03	0.05	0.04
11	0.01	0.01	0.02	0.01
7.8	0	0	0.01	0
5.5	0	0	0	0
4	0	0	0	0

Following Data in (mm)				
F10	113.86	135.56	103.87	110.27
F20	148.99	176.44	135.39	144.42
F30	179.7	215.66	162.46	173.66
F40	209.53	249.99	189.83	201.27
F50	239.69	285.3	217.91	229.38
F60	272.69	321.74	249.5	258.68
F70	310.11	361.52	288.07	291.46
F80	355.56	409.21	338.62	331.24
F90	418.53	466.99	416.58	384.28
Topsize	545.91	564.45	549.69	508.78

Fines factor:	0

RosRam uniformity:	2.35
RosRam X50:	246.07
R-squared:	0.9965

Schuhmann Slope:	1.65
Schuhmann X50:	267.14
R-squared:	0.9536



BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: Deloitte and Touche Inc.

PROJECT: ROSE CREEK DIVERSION CANAL DIKE UPGRADE AS BUILT

TITLE: Grain Size Distribution for Riprap

PROJECT NO. 0257-026-03

FIGURE. NO. III - 1

EBA Engineering

DENSITY TEST RESULTS

ASTM Designation D2922 & D3017, or D1556

Project No: **1200091.015**

Project: Anvil Range Mine

Client: **BGC Engineering Inc.**
1605, 840 - 7th Ave. S.W.
Calgary, AB
T2P 3G2

Att'n: **Mr. Gerry Ferris**

Test Apparatus: Nuclear Machine No: 16924

Soil Description: SAND - some gravel

Temperature Air: ____ °C Soil: ____ °C

Specified Compaction: 98.0

Compaction Standard: Standard Proctor

Minimum Dry Density: ____

Maximum Dry Density: 2170

Optimum M.C.: 8.0

Date Tested: 2004.07.29 By: TP

Test No./ Probe Depth	Location	Elevation	% Moisture Content	Dry Density Kg/m^3	% Compaction
1/100	STA 1+000 left shoulder	GR	5.6	2124	97.9
2/100	STA 0+975 left lane	GR	4.8	2147	98.9
3/100	STA 0+950 centre line	GR	4.7	2132	98.2
4/100	STA 0+925 right lane	GR	5.5	2102	96.9
5/100	STA 0+900 right shoulder	GR	5.5	2219	102.0+
6/100	STA 0+875 left shoulder	GR	5.7	2102	96.9
7/100	STA 0+850 left lane	GR	4.9	2174	100.2
8/100	STA 0+825 centre lane	GR	4.5	2156	99.4
9/100	STA 0+800 right lane	GR	4.6	2162	99.6
10/100	STA 0+775 right shoulder	GR	5.0	2180	100.5
11/100	STA 0+575 left shoulder	GR	4.8	2184	100.6
12/100	STA 0+550 left lane	GR	4.3	2188	100.8
13/100	STA 0+525 centre line	GR	5.0	2228	102.0+
14/100	STA 0+500 right lane	GR	4.7	2156	99.4
15/100	STA 0+475 right shoulder	GR	5.0	2169	100.0
16/100	STA 0+450 left shoulder	GR	4.3	2162	99.6

Remarks: ____

Reviewed By: ____

c.c.
FILE COPY

Mr. Gerry Ferris
BGC Engineering Inc.
1605, 840 - 7th Ave. S.W.
Calgary, AB
T2P 3G2

EBA Engineering

DENSITY TEST RESULTS

ASTM Designation D2922 & D3017, or D1556

Project No: 1200091.015

Project: Anvil Range Mine

Client: **BGC Engineering Inc.**
1605, 840 - 7th Ave. S.W.
Calgary, AB
T2P 3G2

Att'n: **Mr. Gerry Ferris**

Test Apparatus: Nuclear Machine No: 16924

Soil Description: SAND - some gravel

Temperature Air: °C Soil: °C

Specified Compaction: 98.0 %

Compaction Standard: Standard Proctor

Minimum Dry Density:

Maximum Dry Density: 2170

Optimum M.C.: 8.0

Date Tested: 2004.07.29 By: TP

Test No./ Probe Depth	Location	Elevation	% Moisture Content	Dry Density Kg/m^3	% Compaction
17/100	STA 0+425 left lane	GR	4.0	2158	99.4
18/100	STA 0+400 centre line	GR	4.0	2192	101.0

Remarks:

Reviewed By:

c.c.
FILE COPY

Mr. Gerry Ferris
BGC Engineering Inc.
1605, 840 - 7th Ave. S.W.
Calgary, AB
T2P 3G2

eba

EBA Engineering

DENSITY TEST RESULTS

ASTM Designation D2922 & D3017, or D1556

Project No: **1200091.015**

Project: Anvil Range Mine

Client: **BGC Engineering Inc.**
1605, 840 - 7th Ave. S.W.
Calgary, AB
T2P 3G2

Att'n: **Mr. Gerry Ferris**

Test Apparatus : Nuclear Machine No: 16924

Soil Description: SAND - some gravel

Temperature Air: °C Soil: °C

Specified Compaction: 98.0

Compaction Standard: Standard Proctor

Minimum Dry Density:

Maximum Dry Density: 2170

Optimum M.C.: 8.0

Date Tested: 2004.07.30 By: TP

Test No./ Probe Depth	Location	Elevation	% Moisture Content	Dry Density Kg/m^3	% Compaction
19/100	STA 0+600 right shoulder	GR	5.1	2145	98.8
20/100	STA 0+625 right lane	GR	5.3	2155	99.3
21/100	STA 0+650 centre line	GR	4.7	2170	100.0
22/100	STA 0+675 left lane	GR	5.1	2154	99.3
23/100	STA 0+700 left shoulder	GR	4.7	2148	99.0
24/100	STA 0+725 right shoulder	GR	4.2	2142	98.7
25/100	STA 0+750 right lane	GR	4.7	2148	99.0
26/100	STA 0+775 centre lane	GR	5.1	2178	100.4
27/100	STA 1+000 left shoulder	GR	4.8	2142	98.7
28/100	STA 0+450 right lane	GR	5.0	2146	98.9
29/100	STA 0+425 centre line	GR	4.9	2145	98.8
30/100	STA 0+400 left lane	GR	5.3	2182	100.6
31/100	STA 0+375 left shoulder	GR	4.9	2144	98.8
32/100	STA 0+100 right shoulder	GR	5.2	2145	98.8
33/100	STA 0+075 right lane	GR	5.2	2174	100.2
34/100	STA 0+050 centre line	GR	5.4	2172	100.1

Remarks:

Reviewed By:

c.c.
FILE COPY

Mr. Gerry Ferris
BGC Engineering Inc.
1605, 840 - 7th Ave. S.W.
Calgary, AB
T2P 3G2

EBA Engineering

DENSITY TEST RESULTS

ASTM Designation D2922 & D3017, or D1556

Project No: **1200091.015**

Project: Anvil Range Mine

Client: **BGC Engineering Inc.**
1605, 840 - 7th Ave. S.W.
Calgary, AB
T2P 3G2

Att'n: **Mr. Gerry Ferris**

Test Apparatus : Nuclear Machine No: 16924

Soil Description: SAND - some gravel

Temperature Air: ____ °C Soil: ____ °C

Specified Compaction: 98.0

Compaction Standard: Standard Proctor

Minimum Dry Density: ____

Maximum Dry Density: 2170

Optimum M.C.: 8.0

Date Tested: 2004.07.30 By: TP

Test No./ Probe Depth	Location	Elevation	% Moisture Content	Dry Density Kg/m^3	% Compaction
35 /100	STA 0+025 left lane	GR	5.2	2201	101.4
36 /100	STA 0+000 left shoulder	GR	5.5	2185	100.7

Remarks: ____

Reviewed By: ____

c.c.
FILE COPY

Mr. Gerry Ferris
BGC Engineering Inc.
1605, 840 - 7th Ave. S.W.
Calgary, AB
T2P 3G2

EBA Engineering

DENSITY TEST RESULTS

ASTM Designation D2922 & D3017, or D1556

Project No: 1200091.015

Project: Anvil Range Mine

Client: BGC Engineering Inc.
1605, 840 - 7th Ave. S.W.
Calgary, AB
T2P 3G2

Att'n: Mr. Gerry Ferris

Test Apparatus: Nuclear Machine No: 16924

Soil Description: SAND - some gravel

Temperature Air: ____ °C Soil: ____ °C

Specified Compaction: 98.0

Compaction Standard: Standard Proctor

Minimum Dry Density: ____

Maximum Dry Density: 2170

Optimum M.C.: 8.0

Date Tested: 2004.07.31 By: TP

Test No./ Probe Depth	Location	Elevation	% Moisture Content	Dry Density Kg/m^3	% Compaction
37/100	STA 0+125 left lane	GR	5.3	2147	98.9
38/100	STA 0+400 right shoulder	GR	4.7	2097	96.6
39/100	STA 0+425 right lane	GR	5.7	2063	95.1
40/100	STA 0+450 left lane	GR	4.5	2069	95.3
41/100	STA 0+475 left shoulder	GR	5.5	2067	95.3
42/100	STA 0+625 left lane	GR	5.3	2137	98.5
43/100	STA 0+650 left lane	GR	5.5	2146	98.9
44/100	STA 0+675 left lane	GR	5.9	2148	99.0
45/100	STA 0+700 left lane	GR	4.9	2140	98.6
46/100	STA 0+725 left lane	GR	5.3	2137	98.5
47/100	STA 0+750 left lane	GR	5.3	2142	98.7
48/100	STA 0+775 left lane	GR	5.5	2145	98.8
49/100	STA 0+750 right lane	GR	4.2	2000	92.2
50/100	STA 0+725 right lane	GR	4.0	2009	92.6
51/100	STA 0+700 right lane	GR	3.9	2020	93.1
52/100	STA 0+675 right lane	GR	4.6	1974	91.0

Remarks: ____

Reviewed By: ____

c.c.
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Mr. Gerry Ferris
BGC Engineering Inc.
1605, 840 - 7th Ave. S.W.
Calgary, AB
T2P 3G2

EBA Engineering

DENSITY TEST RESULTS

ASTM Designation D2922 & D3017, or D1556

Project No: **1200091.015**

Project: Anvil Range Mine

Client: **BGC Engineering Inc.**
1605, 840 - 7th Ave. S.W.
Calgary, AB
T2P 3G2

Att'n: **Mr. Gerry Ferris**

Test Apparatus: Nuclear Machine No: 16924

Soil Description: SAND - some gravel

Temperature Air: ____ °C Soil: ____ °C

Specified Compaction: 98.0

Compaction Standard: Standard Proctor

Minimum Dry Density: ____

Maximum Dry Density: **2170**

Optimum M.C.: 8.0

Date Tested: **2004.07.31** By: TP

Test No./ Probe Depth	Location	Elevation	% Moisture Content	Dry Density Kg/m^3	% Compaction
53 /100	STA 0+650 right lane	GR	3.7	2015	92.9
54 /100	STA 0+625 right lane	GR	4.9	1997	92.0

Remarks: ____

Reviewed By: ____

c.c.
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Mr. Gerry Ferris
BGC Engineering Inc.
1605, 840 - 7th Ave. S.W.
Calgary, AB
T2P 3G2

EBA Engineering

DENSITY TEST RESULTS

ASTM Designation D2922 & D3017, or D1556

Project No: **1200091.015**

Project: Anvil Range Mine

Client: **BGC Engineering Inc.**
1605, 840 - 7th Ave. S.W.
Calgary, AB
T2P 3G2
Att'n: **Mr. Gerry Ferris**

Test Apparatus: Nuclear Machine No: 16924
Soil Description: SAND - some gravel
Temperature Air: °C Soil: °C
Specified Compaction: 98.0
Compaction Standard: Standard Proctor
Minimum Dry Density:
Maximum Dry Density: 2170
Optimum M.C.: 8.0
Date Tested: 2004.08.02 By: TP

Test No./ Probe Depth	Location	Elevation	% Moisture Content	Dry Density Kg/m^3	% Compaction
55/100	STA 0+800 left lane	GR	5.4	2136	98.4
56/100	STA 0+775 right lane	GR	5.3	2138	98.5
57/100	STA 0+750 right lane	GR	5.0	2044	94.2
58/100	STA 0+725 right lane	GR	4.2	2054	94.7
59/100	STA 0+700 left lane	GR	4.8	2134	98.3
60/100	STA 0+675 right lane	GR	5.0	2064	95.1
61/100	STA 0+650 right lane	GR	5.1	2041	94.1
62/100	STA 0+625 right lane	GR	5.7	2019	93.0
63/100	STA 0+475 left shoulder	GR	5.3	2164	99.7
64/100	STA 0+450 left lane	GR	5.5	2208	101.8
65/100	STA 0+425 centre line	GR	4.5	2145	98.8
66/100	STA 0+400 right lane	GR	4.4	2148	99.0
67/100	STA 0+375 right shoulder	GR	5.7	2172	100.1
68/100	STA 0+350 left shoulder	GR	4.8	2144	98.8
69/100	STA 0+325 left lane	GR	5.1	2150	99.1
70/100	STA 0+300 centre line	GR	4.7	2137	98.5

Remarks:

Reviewed By:

c.c.
FILE COPY

Mr. Gerry Ferris
BGC Engineering Inc.
1605, 840 - 7th Ave. S.W.
Calgary, AB
T2P 3G2

eba

EBA Engineering

DENSITY TEST RESULTS

ASTM Designation D2922 & D3017, or D1556

Project No: **1200091.015**

Project: Anvil Range Mine

Client: **BGC Engineering Inc.**
1605, 840 - 7th Ave. S.W.
Calgary, AB
T2P 3G2

Att'n: **Mr. Gerry Ferris**

Test Apparatus : Nuclear Machine No: 16924

Soil Description: SAND - some gravel

Temperature Air: ____ °C Soil: ____ °C

Specified Compaction: 98.0

Compaction Standard: Standard Proctor

Minimum Dry Density: ____

Maximum Dry Density: 2170

Optimum M.C.: 8.0

Date Tested: 2004.08.02 By: TP

Test No./ Probe Depth	Location	Elevation	% Moisture Content	Dry Density Kg/m^3	% Compaction
71 /100	STA 0+275 right lane	GR	5.0	2171	100.0
72 /100	STA 0+250 right shoulder	GR	5.2	2158	99.4
73 /100	STA 0+225 left shoulder	GR	4.8	2170	100.0
74/100	STA 0+200 left lane	GR	4.9	2171	100.0
75 /100	STA 0+175 centre line	GR	5.1	2146	98.9
76 /100	STA 0+150 right lane	GR	5.6	2149	99.0
77 /100	STA 0+125 right shoulder	GR	5.2	2148	99.0
78 /100	STA 0+100 centre line	GR	4.3	2148	99.0

Remarks: ____

Reviewed By: [signature]

c.c.
FILE COPY

Mr. Gerry Ferris
BGC Engineering Inc.
1605, 840 - 7th Ave. S.W.
Calgary, AB
T2P 3G2

RCDC Moisture Content Testing

Project: RCDC Dike Raise
Client: Deloitte & Touche Inc.
Project Number: 0257-026-03
Date of Lab Testing: August 7-8, 2004
Sampled by: Mike McCrank
Tested by: EBA Engineering Ltd.

Location of Sample	Surface	Moisture Content (%)
0+800	Original	7.6
0+925	Original	6.6
0+925	Original	5.2
0+950	Original	6.6
0+975	Original	1.0
Average		***5.4***
0+150	Scarified	6.6
0+175	Scarified	5.8
0+700	Scarified	6.5
Average		***6.3***
0+575	1st Lift	5.2
0+675	1st Lift	6.4
0+700	1st Lift	4.5
0+735	1st Lift	3.9
Average		***5.0***
0+200	2nd Lift	7.4
0+675	2nd Lift	8.0
Average		***7.7***
0+250	3rd Lift	8.9
0+700	3rd Lift	7.8
0+975	3rd Lift	6.2
Average		***7.6***
0+700	Final Surface	7.8
0+675	Final Surface	-
0+275	Final Surface	-
Average		**7.8**
Overall Average		***6.2***