Deloitte & Touche

As-Built Construction Report
Fresh Water Supply Dam, Faro Mine

Prepared for:

DELOITTE & TOUCHE INC.
Interim Receiver of Anvil Range Mining Corporation
Suite 1900, 79 Wellington Street West
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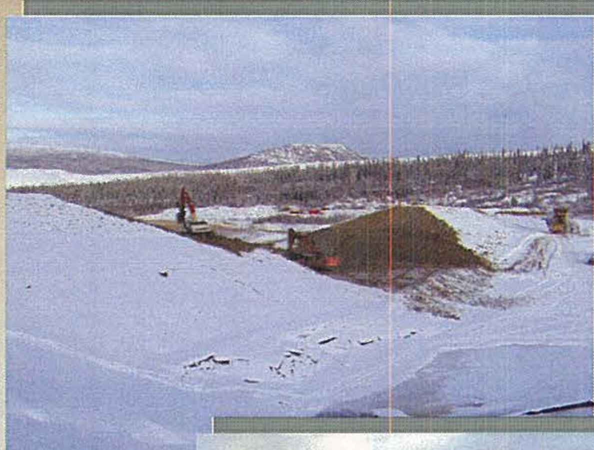

Prepared by:

SRK Consulting
Engineers and Scientists

BGC Engineering Inc.
AN APPLIED EARTH SCIENCES COMPANY

Project Reference Number:
SRK 1CD003.22

February 2004

Project 1CD003.22

AS-BUILT CONSTRUCTION REPORT
FRESH WATER SUPPLY DAM BREACH, FARO MINE

Prepared for:

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AS-BUILT CONSTRUCTION REPORT
FRESH WATER SUPPLY DAM BREACH, FARO MINE

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AS BUILT CONSTRUCTION REPORT
FRESH WATER SUPPLY DAM BREACH, FARO MINE

1.0 INTRODUCTION

The Faro Mine is located in the central Yukon, approximately 200 km north-northeast of Whitehorse or approximately 22 km north of the Town of Faro. The Fresh Water Supply (FWS) Dam and reservoir are located south of the main access road to the Faro Mine site, approximately 5 km from the mine gatehouse. The location of the Faro Mine and the FWS dam are shown in Figure 1.

The FWS Dam was part of the original mine development and was used to supply water for the milling process. The FWS Dam was constructed in 1968, on the South Fork of Rose Creek. It was constructed as a zoned earth fill dam and water was conveyed past the structure via a low level outlet pipe and a spillway. Since the dam and reservoir are no longer required at Faro Mine and given that the risk posed by the dam is considered unacceptable to the downstream tailings impoundment a plan was prepared to breach the dam (SRK 2003a). The breach plan was supported by final design documents, tender documents and project drawings.

The objectives of the construction activities were to:

- Perform an engineered breach through the body of the dam.
- Re-establish the pre-development (1968) creek.
- Develop a pool and riffle arrangement in the re-established creek, such that fish passage is possible under flow conditions up to the 10-year return period flood.

The FWS Dam breach was sized to pass the 1:500 year flood event (nhc 2001, SRK 2003a). The channel within the breach was designed to pass the average (return period of 2 years) flood. The erosion protection at the side of the breach and the grade control structures within the channel were designed to withstand the 1:500 year flood event. The sideslopes of the breach were designed to withstand an earthquake with a return period of 475 years which was equivalent to having a peak ground acceleration of 0.06g.

The principle design concept for the other elements of the breach and channel elements was "adaptive management". This concept considered that only those items which required specific engineering control would be designed for, i.e., stability of the breach sideslopes. Since the goal of the design was to re-establish the pre-development creek the approach minimized the number and extent of design elements and allowed for natural modification of many elements within the breach section, i.e., the base of the floodplain was not protected from erosion, with the intention that the natural inflows to the floodplain would be allowed to modify the channel between the riffles (both channel depth and location) and re-form itself each year.

Deloitte & Touche Inc. (D&T) had previously selected Pelly Construction Ltd. (Pelly) of Whitehorse, YT to perform a lowering of the FWS Dam spillway. The spillway lowering option was subsequently rejected in favour of a full breach of the FWS Dam. A revised bid was prepared by Pelly based on the final construction drawings, the Environmental Management Plan and technical specifications (a copy of each is contained in Appendix B). Pelly was subsequently contracted to complete the breach of the FWS Dam. The construction works associated with the FWS Dam were completed by Pelly during November and December, 2003.

The information presented in this report documents the construction activity related to the breach project as well as the as-built information related to the construction works.

2.0 CONSTRUCTION/ADMINISTRATION PERSONNEL

2.1 Deloitte & Touche/Anvil Range Mining

The general overview of the project was under the direction of Mr. Dana Haggar. Water samples were collected and tested for this project by mine site environmental personnel. Results obtained by the mine site environmental personnel was verified by an outside independent laboratory (Cavendish Laboratories of Vancouver) on two separate occasions, as outlined in the weekly reports (Appendix C2).

2.2 Pelly Construction Ltd.

Pelly Construction Ltd. (Pelly) provided two shifts of equipment operators and labourers during this project. The night shift had a foreman working under the direction of Mr. Roy Smith, the field superintendent, who also acted as the dayshift foreman.

2.3 Engineering / Environmental Personnel

SRK Consulting

Overall project engineering and environmental control was under the supervision of SRK Consulting (SRK). Various other firms provided staff to the project as directed by SRK. On going engineering and project management was provided by SRK throughout the construction; including issuing change directives and co-ordination of communications.

BGC Engineering

BGC Engineering Inc. (BGC) personnel consisted of Mr. Gerry Ferris as Resident Engineer. BGC staff was onsite full time during the day shift construction activities. Construction inspection reports were prepared daily by BGC.

Progress payments during construction were prepared weekly by Pelly and reviewed by BGC. The progress payments reflected either estimated quantities or preliminary surveyed quantities by Pelly and BGC throughout construction. The approved progress payments were submitted to Anvil Range for payment. A record of final quantities for payment is attached in Appendix C4.

Gartner Lee Limited

Gartner Lee Limited (GLL) personnel consisted of Mr. Brad Finnson as the Environmental Monitor. The Environmental Monitor was on site during the following periods:

- Project kick-off, November 7 to 15;
- Performance of fish salvage activities, primarily between November 17 to19 and 23 to 25;
- Night shift during channel construction, December 6 to 14; and
- Project completion, December 15 to 17.

Northwest Hydraulic Consultants Ltd.

Mr. Barry Chilibeck of Northwest Hydraulic Consultants Ltd. visited the site on December 2 and 3. Advice related to the hydraulic structures within the base of the floodplain was provided to the Resident Engineer.

Yukon Engineering Services

Survey personnel were provided by Yukon Engineering Services (YES) of Whitehorse, YT. YES acted in a dual role, providing survey services to both the Resident Engineer and the contractor. Surveying was performed under the supervision of either J.C. Bourget or Gordon Harvey, YES party chiefs. The majority of the survey was performed using a RTK rover unit, however when needed survey data was collected using total station survey. Quantity calculations were made at the end of the project on the basis of this survey information.

3.0 DESIGN BACKGROUND

The conceptual design chosen for this project was of an engineered breach through the body of the dam along the approximate alignment of the original creek channel and re-establishment of the pre-construction creek (SRK 2003a). The design approach included the concept of adaptive management for the work required in both the former reservoir and the channel area downstream of the breach construction. Some of the key considerations of the design approach were:

- Sediment from the former reservoir is to be controlled through re-vegetation of the reservoir base.
- The breach and channel construction was approximately 315 m in total length.
- Grade control in the re-constructed channel is provided at the inlet and at the five riffles, other locations within the channel base are not protected from erosion.
- Erosion protection is provided on the sideslopes of the floodplain only, there is no specific elements constructed to prevent erosion of the channel within the floodplain. The riffles are angled to the main alignment of the floodplain and had a low point in the middle of the riffle. These elements were in place to train the channel within the floodplain.
- The fresh water channel downstream of the breach works was not modified as part of this breach construction, but will be evaluated following the first spring freshet.

Breach sideslopes of 3H:1V (horizontal to vertical) were originally designed based on the assumed immediate post construction piezometric conditions in the FWS dam. However, immediately prior to commencement of the breach construction the immediate post construction stability was re-analyzed using actual piezometric conditions. Based on this analysis the sideslopes for the breach were steepened to 2.5H:1V. A summary memo describing the stability analysis is included in Appendix A1.

Following the completion of the design report, the project was submitted for regulatory approvals. The following permits were obtained for this project:

- Yukon Water Board (License number: QZ03-058)
- CEAA Screening (File: 02-HPAC-PA5-000-000200)
- DFO (Authorization: 02-HPAC-PA5-000-000134)
- NWPA (Approval: 8200-02-8685.2)

The construction drawings, Environmental Management Plan and technical specifications are included in Appendices B1, B2 and B3, respectively.

4.0 CONSTRUCTION PROCEDURES

4.1 General

This as-built report describes the construction activities that were performed in November / December of 2003 by Pelly. The construction activities completed during this period completed the breaching of the dam and the creation of the re-constructed channel. However, prior to the initiation of the breaching, other activities were completed that formed an integral part of the breach project, such as:

- completion of the first phase of the re-vegetation, and
- the fish salvage operation.

As indicated in the design the following activities will to be completed as part of this overall project: review of the performance of the breach and channel following the first freshet and a second phase of re-vegetation will be completed in 2004. Additionally, the water license obtained for this project outlines ongoing environmental monitoring and inspections (Section 6).

4.1.1 Preconstruction Activities

A report on the activities related to the re-vegetation of a portion of the reservoir, Phase I re-vegetation, is included in Appendix A2 (note that the Phase 1 re-vegetation activities spanned 18 days in June and 16 days in September and that the re-vegetation report refers to these as Phases I and II, respectively). A report on the activities related to the fish salvage completed prior to the breach construction is also included in Appendix A3.

4.1.2 Construction schedule

The construction schedule, prepared by Pelly for this project, is included in Figure 2. Mobilization of the contractor's equipment began on November 5, 2003. Preparation of the re-fuelling area and clearing of the spoil areas commenced on November 9, and breach activities started on November 10.

The contractor worked two shifts per day throughout the majority of the project. Each shift was 10 hours in duration. A 10-hour night shift commenced on November 11 and continued until December 15. Following clean-up, the contractor demobilized from the site on December 17, 2003.

There were no weather related delays on this project. There were some break downs of key equipment but nothing that created a delay longer than about half of a shift.

4.1.3 Construction equipment

The majority of the construction equipment was mobilized to the site during the week of November 3. The use of the equipment varied throughout the progress but typically comprised of two rock trucks, three hydraulic excavators, one loader and one dozer. One of the hydraulic excavators used on this project was owned by Anvil Range Mining Corporation, this excavator had biodegradable hydraulic fluid and was used for all stream work. The excavator was operated by Pelly personnel.

4.1.4 Contractor's Working Hours

The hours worked by the contractor during day and night shift were 8:00 to 17:30 and 20:00 to 5:30, respectively. The time between shifts was used to complete servicing and refuelling of the equipment.

4.1.5 Change Orders and Extra Work Items

Several change orders were issued during the course of the project. Copies of these change orders are included in Appendix C5.

In addition to the items completed as part of the tendered work, Pelly was requested to perform one item of extra work, removal of PAG rock that was located on the downstream toe of the dam. This material was taken to the designated PAG storage area located on the upstream side of the dam.

4.1.6 Weather

A summary of the weather conditions was kept by BGC for the duration of the project. This information was summarized on the daily reports contained in Appendix C1. Additionally, daily maximum/minimum temperatures and wind speeds were obtained from the Faro weather station and are summarized in Appendix C4.

4.1.7 Inspection & Testing

The contractors work, on the day shift, was monitored on a full-time basis by BGC personnel. The contractors work was monitored during the night shift for the period between December 6 and December 14 by GLL personnel. Daily, weekly and monthly reports summarizing the construction activities are provided in Appendices C1, C2 and C3, respectively.

A summary of the QA/QC testing performed on this project is contained in Appendix C4.

The majority of the construction activity consisted of excavation. The inspection and testing performed consisted of ensuring that the excavation was performed to the lines and grades indicated on the drawings.

Fill materials placed within the breach construction consisted of non-woven geotextile and rip rap. The geotextile used met the project specifications. It was placed in accordance with the manufacturer's specifications and the overlap of adjacent sheets was visually inspected. The gradation of the rip rap was tested near the start of the project and an "example" pile of rip rap with the correct gradation was created. Rip rap placed during construction was compared to the rip rap in the example pile. A summary of the inspections performed throughout the construction project is presented in Appendix C4.

4.2 Breaching Activities

Selected photographs taken during the breaching activities at the site are attached to this report. Additional photographs taken by Mine site personnel and the resident engineer are stored in the project file.

4.2.1 Site Preparation

Site preparation consisted primarily of clearing. Clearing was required at two of the three spoil areas; the spillway and the upstream spoil areas. Additionally, clearing was performed in the area surrounding the former fresh water channel downstream of the valve house. Some road creation and surfacing was performed for access for the rock trucks.

4.2.2 Creek Water Management

The creek water (flow was required in the South Fork of Rose Creek throughout the construction project) was managed in the following stages prior to and during November:

- Prior to receipt of the water licence, the water in the reservoir was maintained at an approximate elevation of 1086 m.
- Following receipt of the water licence, the water was lowered using the low level outlet (LLO) to elevation 1082 m, which is the elevation of the breach through the original cofferdam. The measured creek flow on November 10 was 4,000 US gpm (0.252 m^3/s, compared with predictions of 0.269 m^3/s in 1968 and 0.29 m^3/s in 2003).
- Pumps were installed upstream of the cofferdam and creek water was pumped into the LLO inlet. Various arrangements of pumps were used during this period (inflow was managed using one 10-inch flyght pump with a capability of 4,000 US gpm).

Table 2 Monitoring Parameters

Monitoring Location/Parameter	**FWSD-1**	**FWSD-2**	**FWSD-3**	**FWSD-4**	**FWSD-5**	**FWSD-6**
Flow (m^3/s)	M				M	
Temperature (°C)						A
pH						A
Total Suspended Solids (mg/L)	D, M	D	D	D	D, M	A
Total Dissolved Solids (mg/L)						A
Sulphate (mg/L)						A
Conductivity						A
Alkalinity						A
Hardness						A
ICP Total Metals Scan, including Sb, As, Ba, Cd, Cu, Pb, Hg, Mo, Ni, Se, Ag, Zn (ppm)						A

Table 3 Sampling Frequency

Key	Frequency
A	Annually
D	Daily during construction
D, M	Daily during construction activities, otherwise twice per month during the period of April to August, inclusive. Measurement to be made concurrently for each parameter identified.

The results of the Daily TSS monitoring were presented on the daily reports, weekly reports and monthly reports. Copies of these reports are included in Appendices C1, C2 and C3, respectively. A single sheet summary of the daily monitoring results is presented in Appendix C4.

5.0 AS-BUILT DRAWINGS

Eight as-built drawings, based on survey information provided by YES, are presented in Appendix D. Note that several of the original drawings, principally the as-built drawings from the original dam construction in 1968, have been excluded from the as-built drawings describing the 2003 breach construction.

6.0 POST-CONSTRUCTION MONITORING

6.1 Water licence requirements

Yukon Water Licence (QZ03-058) obtained for this project required monitoring of the breach and the channel until 2008, the length of the license. The locations for monitoring, type of monitoring and the schedule of monitoring are given in Tables 1, 2 and 3, respectively. Table 4 outlines the parameters and the maximum concentrations allowed under this water license for the run-off from the PAG spoil pile, sampling location FWSD-6.

Table 4 Monitoring of run-off from PAG stockpile

Parameter	Maximum concentration (mg/L)
Total Antimony (Sb)	0.10
Total Arsenic (As)	0.05
Total Barium (Ba)	1.00
Total Cadmium (Cd)	0.02
Total Copper (Cu)	0.20
Total Lead (Pb)	0.20
Total Mercury (Hg)	0.005
Total Molybdenum (Mo)	0.50
Total Nickel (Ni)	0.50
Total Selenium (Se)	0.05
Total Silver (Ag)	0.10
Total Zinc (Zn)	0.50

In addition to the specific water monitoring the following two sections of the water license are relevant to the long term monitoring required at the breach location:

Part E. 34.

The licensee shall conduct an annual inspection and assessment of the performance of the dam breach and the constructed channel downstream of the fresh water supply dam. A report on the inspection and assessment, sealed by a Professional Engineer licensed to practice in the Yukon, shall be submitted to the Board as part of the Annual Report. The report shall contain recommendations regarding any proposed modifications to the breach, channel or related works.

Part E, 35.

The Licensee shall carry out an annual inspection and assessment of the success of revegetation activities and shall submit a report on the inspection and assessment to the Board as part of the annual report. The report shall contain recommendations regarding any proposed remedial actions.

6.2 Recommended Monitoring

During the construction process the majority of the piezometers that were previously installed to monitor the performance of the dam, during operation, were destroyed. The following piezometers should be monitored (once per month, April to September, inclusive) throughout 2004 to confirm the piezometric assumptions made for the stability analysis: 85-1, 85-6 and BGC02-05 (this will require rehabilitation of the piezometer).

In addition to the piezometer monitoring, it is important that site staff make weekly visits to the breach for inspection purposes described below and that a log of the observations be maintained:

1. To note and record the water level in the creek, at one of the riffles.
2. To inspect the entire length of the channel for signs of erosion. This includes the disturbed area about the inlet structure, the inlet structure and the five riffles and the banks of the channel.
3. To inspect the undisturbed portion of the fresh water channel, between the end of the breach construction and the natural channel, for signs of erosion (as discusses as part of the adaptive management approach).

This data should be collected and reviewed as part of the review of the performance of the breach and to validate the adaptive management approach taken.

Any change in condition that is noted as a consequence of this program of routine inspection must be brought immediately to the attention of the inspector's superiors and reviewed by the engineer as part of the on going assessment of the performance of the constructed works and related elements. The changed condition should be photographed and stored as part of this record.

7.0 CLOSURE

The construction works associated with the breach of the FWS Dam were completed in November and December, 2003 in accordance with the original design intent and philosophy. The details regarding this construction are provided within this report.

This report "**As-built Construction Report, Fresh Water Supply Dam Breach, Faro Mine**" has been prepared by:

STEFFEN ROBERTSON & KIRSTEN (CANADA) INC.

Gerry Ferris, P.Eng.
BGC Engineering Inc.

PROFESSIONAL
YUKON
PETER HEALEY
TERRITORY
ENGINEER

Mar 05/04

Peter Healey, P.Eng.
SRK Consulting

Cameron Scott, P.Eng.
SRK Consulting

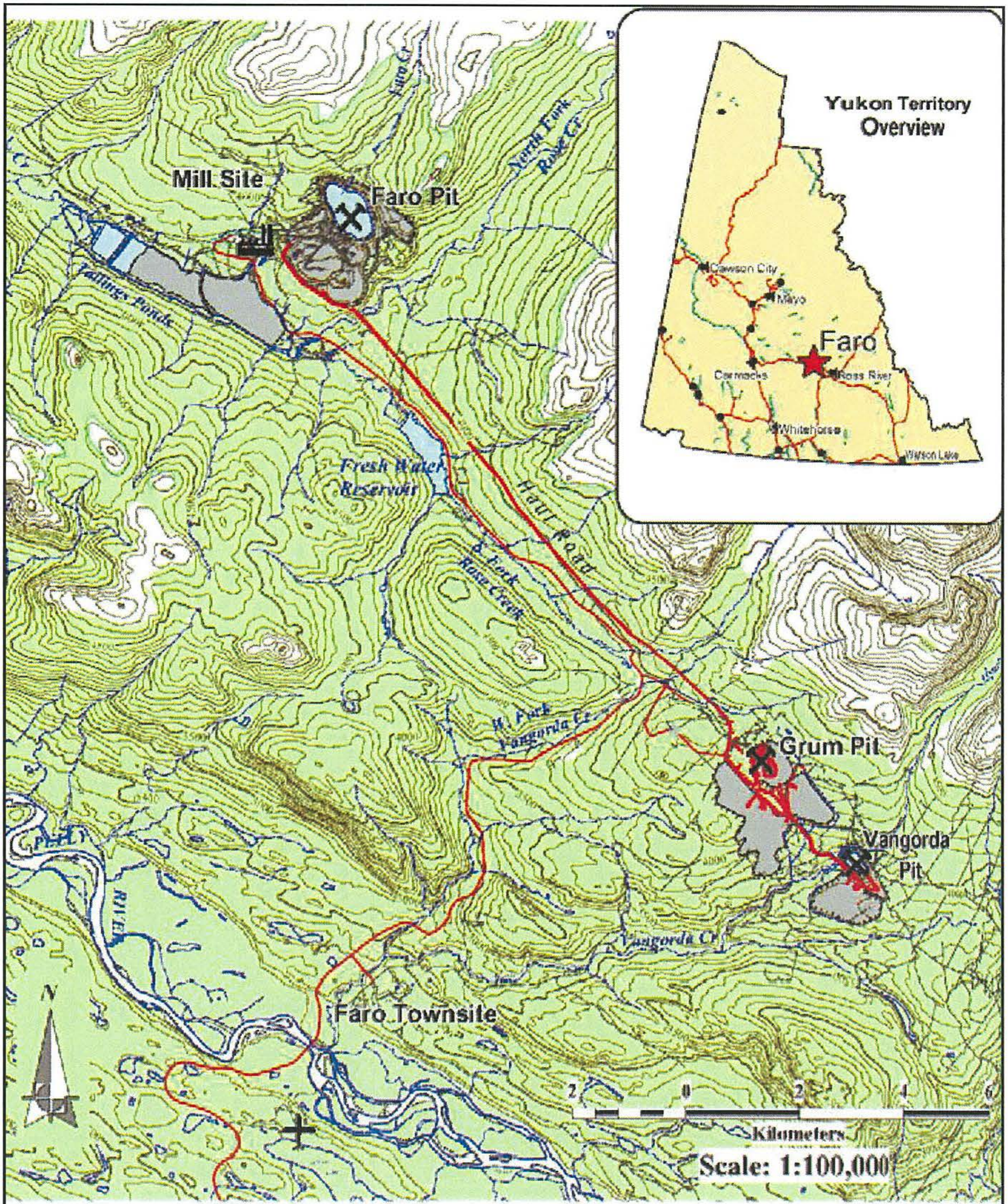
8.0 REFERENCES

Northwest Hydraulic Consultants. 2001. Hydrotechnical Assessment for Faro Mine Site. Report prepared for BGC Engineering Inc.

SRK Consulting. 2003a. Final Breach Design, Fresh Water Supply Dam, Faro Mine. Prepared for Deloitte & Touche as Interim Receivers.

SRK Consulting. 2003b. Supplement to the Preliminary Breach Design, Fresh Water Supply Dam, Faro Mine. Prepared for Deloitte & Touche as Interim Receivers.

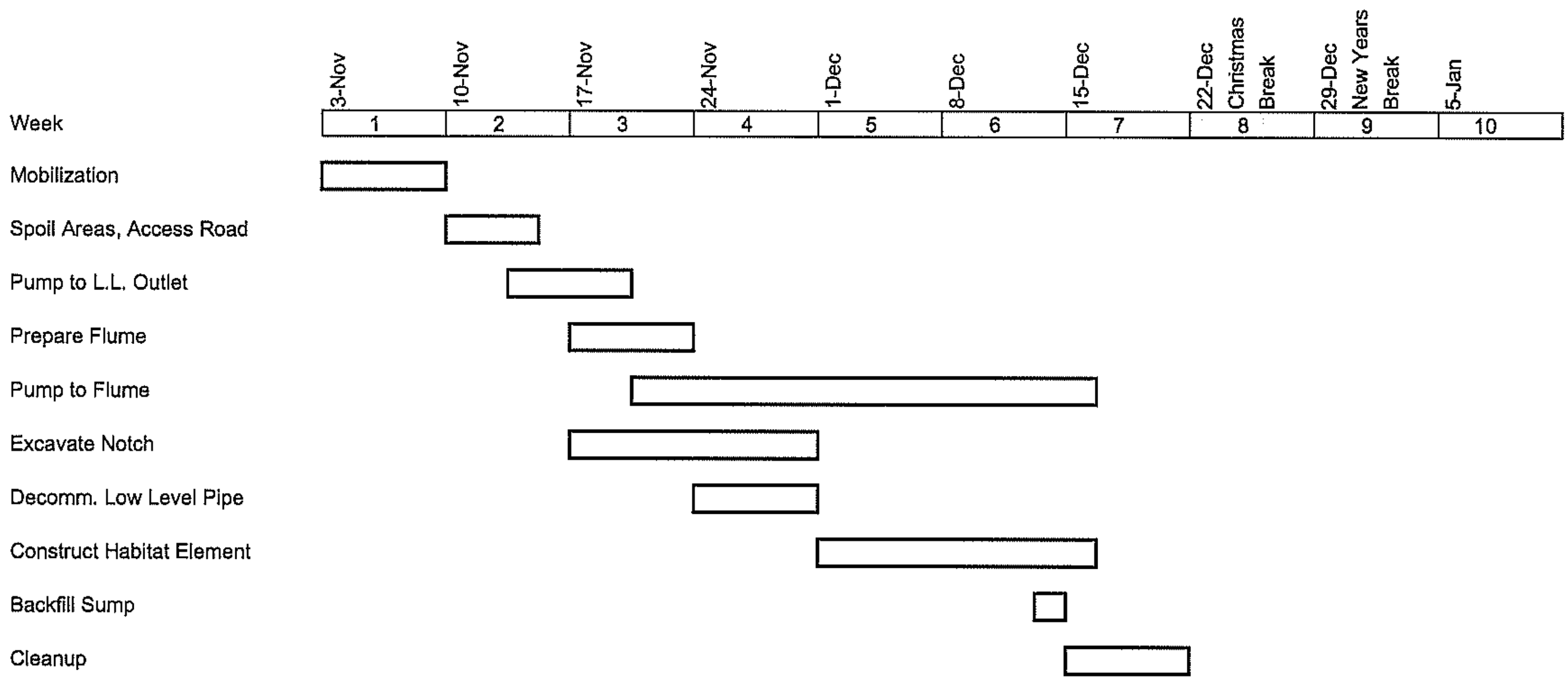
FIGURES



SRK Consulting Engineers and Scientists	FWSD BREACH FARO MINE, YUKON TERRITORY			
Gartner Lee Limited / BGC Engineering Inc. AN APPLIED EARTH SCIENCES COMPANY	LOCATION MAP			
Deloitte & Touche Inc.	PROJECT NO. 1CD003.22	DATE FEB. 26/04	APPROVED GWF	FIGURE 1

Dwg Ref: Figure 1.1.dwg

Figure 2
FWSD BREACH PROJECT CONSTRUCTION SCHEDULE



NOTE 1: Week 1 starts with notice to proceed.
NOTE 2: Pumping to the flume is extended into the next week (CCS).
NOTE 3: Downstream mitigation not needed as part of this contract (CCS).

Pelly Cons't Oct 31/03
Revised by SRK Nov 10/03

PHOTOS

SRK Consulting
Engineers and Scientists

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Document Transmittal

To: Dana Haggar
Deloitte & Touche

Date: March 5, 2004

Address: Bag 1000
Faro, Yukon, Y0B 1K0

Project #: 1CD003.22

Copies to: -

Project Engineer: Cam Scott

Documents Enclosed:

Title or Description	No. of Copies
-As-Built Construction Report, Fresh Water Supply Dam, Faro Mine	1

☒ Enclosed with this transmittal

☐ Mailed/Delivered under separate cover

Deliver by:

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☐ Regular Mail

☒ Direct Courier

Courier Company: Loomis
Waybill number: 706792035

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Project No. 0257-015-06
February 27, 2004

Yukon Territory Water Board
Suite 106 – 419 Range Road
Whitehorse, Yukon
Y1A 3V1

Re: 2003 Annual Geotechnical Evaluation
FWD Dam Breach and Constructed Channel at Faro Mine, Yukon
Water License QZ03-058

Dear Board:

Construction of the FWS Dam Breach and Channel at the Faro Mine was completed on December 17, 2003. Given the limited timeframe between the end of construction and the end of the year, no specific geotechnical evaluation was performed following the completion of construction. Information related to the design of the FWS Dam breach[1] was previously submitted to the board. Information related to 2003 performance of the FWS Dam prior to breaching is contained in a BGC Engineering Report[2] which is to be submitted separately to the board as part of the requirements for water license QZ95-003. Attached to this letter are five bound and one unbound copies of the As Built Report, Fresh Water Supply Dam Breach, Faro Mine as prepared by SRK Consulting Inc. and BGC Engineering Inc. that describes the construction of the FWS Dam Breach and channel, as required by Part D of the water license.

This summary of the activities at the FWS Dam and its breaching fulfil the requirements of Part A of the license. BGC Engineering Inc. has prepared this letter on the behalf of Deloitte and Touche Inc., in their capacity as Interim Receiver for Anvil Range Mining Corporation.

As recommended in the design report[1], the 2004 geotechnical evaluation will commence with a review of the performance of the breach and the channel following the freshet in the spring of 2004.

[1] SRK, BGC & GLL 2003. Final Breach Design, Fresh Water Supply Dam, Faro Mine. Report prepared for Deloitte & Touche Inc., April 2003.
[2] BGC 2004 2003 Annual Geotechnical Evaluation and Instrument Review, Various Facilities at Faro Mine, Yukon. Report prepared for Deloitte & Touche Inc., February 2004.

If there are any questions regarding this report please contact the undersigned at your convenience.

Yours truly,
BGC Engineering Inc.
per:

Gerry Ferris

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

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

Encl: As-built Report
JWC:GWF/sf

Photo 1 – Upstream face of FWS Dam, prior to breaching, Nov. 9, 2003.

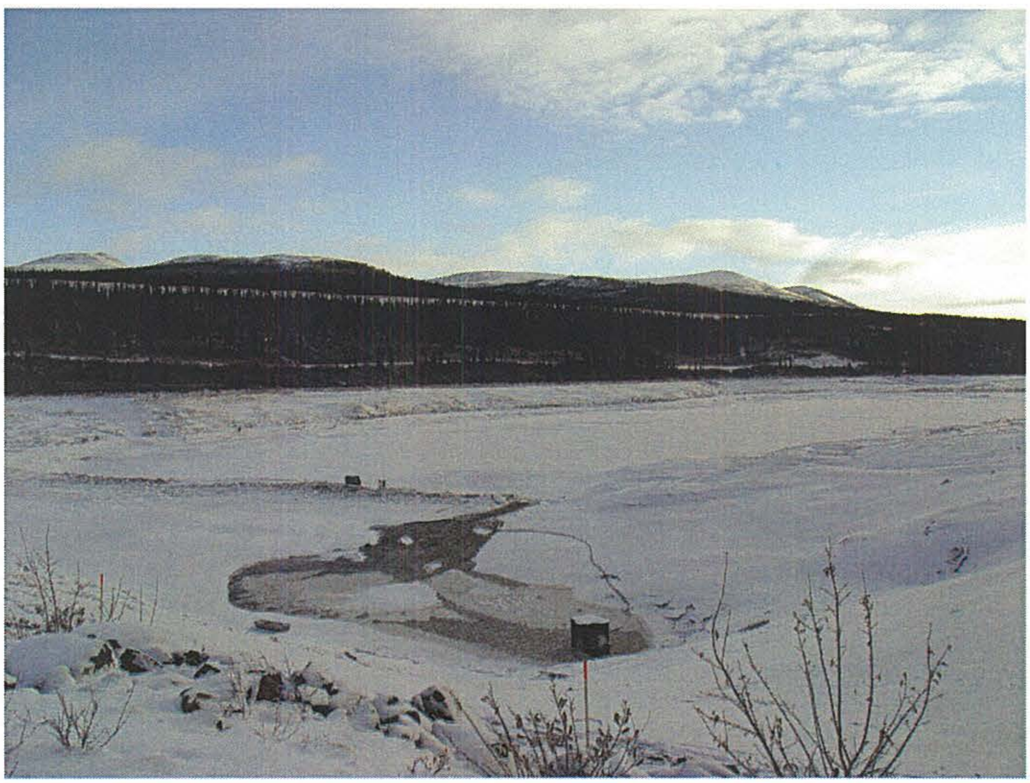


Photo 2 – View from FWS Dam of creek flow over cofferdam prior to pumping. Note position of inlet of low level outlet pipe at lower right, Nov. 9, 2003.

Photo 3 – Southward view of initiation of bulk excavation on downstream face, Nov. 11, 2003.

Photo 4 – Excavation of the breach through the upstream face, Nov.11, 2003.

Photo 5 – Southward view of continued bulk excavation, Nov. 15, 2003.

Photo 6 – Bulk excavation nearing the floodplain level, Nov. 18, 2003.

Photo 7 – Exposure of the 1969 berm, at downstream toe. The lighter grey material was taken to the PAG spoil area, Nov. 18, 2003.

Photo 8 – Northward view of continued bulk excavation and slope trimming, Nov. 20, 2003.

Photo 9 – Bulk excavation at the downstream limit of the breach. Fresh water channel in foreground, Nov. 23, 2003.

Photo 10 – Northward view of final excavation to floodplain level and slope trimming, Nov. 25, 2003.

Photo 11 – Excavation for erosion protection, on right side of floodplain, Nov. 29, 2003.

Photo 12 – Excavation for erosion protection, left side of floodplain, Nov. 29, 2003.

Photo 13 – Installation of geotextile, Dec. 1, 2003.

Photo 14 - Installation of rip rap within erosion protection, Dec. 2, 2003.

Photo 15 – View of floodplain, erosion protection riprap installed, prior to channel excavation, Dec. 4, 2003.

Photo 16 – Completion of the rip rap surface at riffle 1 (southward view), Dec. 7, 2003.

Photo 17 – View of upstream portion of completed channel, erosion protection and riffles 1 & 2, Dec. 9, 2003.

Photo 18 – View of valve house, Dec. 8, 2003.

Photo 19 – Valve house removed and fill placed in fresh water channel, Dec. 11, 2003.

Photo 20 – Excavation of final portion of the channel at the location of the cofferdam, Dec. 13, 2003.

Photo 21 – Excavation for the placement of the inlet structure, Dec. 14, 2003.


Photo 22 – Excavation for the downstream apron of the inlet structure, Dec 15, 2003.

Photo 23 – Overview of completed breach, Dec. 16, 2003.

Photo 24 – Completed construction, looking at middle portion of the breach, Dec. 16, 2003.

Photo 25 – Crest of the inlet structure, Dec. 16, 2003.

Photo 26 – View of the downstream portion of the completed channel and floodplain, Dec. 16, 2003.

Photo 27 – View looking downstream at the completed breach. Photo taken from upstream of the inlet structure, Dec. 16, 2003.

APPENDIX A
Preconstruction Activities

APPENDIX A1
Updated Stability of FWSD at end of Breach Construction

BGC ENGINEERING INC.

AN APPLIED EARTH SCIENCES COMPANY

1605, 840 – 7 Avenue S.W. , Calgary, Alberta, Canada. T2P 3G2
Phone (403) 250-5185 Fax (403) 250-5330

PROJECT MEMORANDUM

To:	**File**	**Fax No.:**	
Attention:		**CC:**	
From:	**Gerry Ferris**	**Date:**	**November 4, 2003**
Subject:	**Updated Stability of FWSD at end of Breach Construction**		
No. of Pages (including this page): 7		**Project No:**	**0257-012-08**

Stability analyses conducted previously to evaluate the stability of the cut slopes on either side of the breach (SRK 2003) are updated in this memorandum. The analyses described in this memorandum were completed using Bishop's method for circular failure surfaces within the slope stability program, Slope/W (GEO-SLOPE, 1998). Bishop's method calculates the factor of safety by satisfying moment equilibrium.

Previous Stability Analysis and Results

Stability analyses performed previously (SRK 2003) for the breach side slopes were based on two different piezometric assumptions: an immediate post-construction condition and a long-term condition. The piezometric assumptions used were based on the geology, topography, dam cross-section, piezometric responses to past changes in the reservoir levels and engineering judgment. Based on the slow response of the piezometers within the core of the dam to lowering of the reservoir and the unknown conditions at the start of construction, the immediate post-construction piezometric conditions were conservatively chosen, assuming that the reservoir would be full immediately prior to initiation of reservoir drawdown.

Sideslopes of 2.5H:1V and 3H:1V were analyzed. The results of the analysis were compared to the required minimum factor of safety for the project (SRK 2003). The calculated factor of safety for 2.5H:1V sideslopes did not meet the required minimum factor of safety (F = 1.3) under the immediate post-construction condition, but the 3H:1V sideslope did. For all other conditions (including earthquakes) both the 2.5H:1V and the 3H:1V sideslopes met the minimum factor of safety requirements. Based on this analysis, the sideslopes of the breach were selected to be 3H:1V.

Revised Piezometric Conditions (Immediately post-construction)

The piezometric conditions used in the analysis conducted in April 2003 were conservatively assumed, given the unknown weather conditions for the year. At the present time, the immediate post-construction piezometric condition can be much more accurately estimated from the monitoring information that has been collected throughout 2003, i.e. during the period when the reservoir level has fluctuated significantly.

The reservoir level has been lowered and maintained at low levels throughout the spring, summer and fall. The reservoir elevation and the piezometric elevations for 2003 are shown on Figure 1. The piezometric elevations within the core of the FWS dam at the end of October/beginning of November can be used to represent the immediately post-construction piezometric conditions. Given that the reservoir was maintained at very low levels throughout the year, the measured piezometric elevations are almost the same as those assumed for the long term analysis.

Stability Criteria and Cases Considered

The minimum factors of safety against failure of the breach slide slopes into the excavation is 1.3, due to safety concerns related to men and equipment working within the breach and the potential financial implications associated with a slope failure during construction (SRK 2003).

As the previous stability analysis indicated that calculated factor of safety for the 2.5H:1V sideslopes exceeded the required minimums for all cases except the immediate post-construction, only the immediate post-construction (end of construction) condition was re-analyzed.

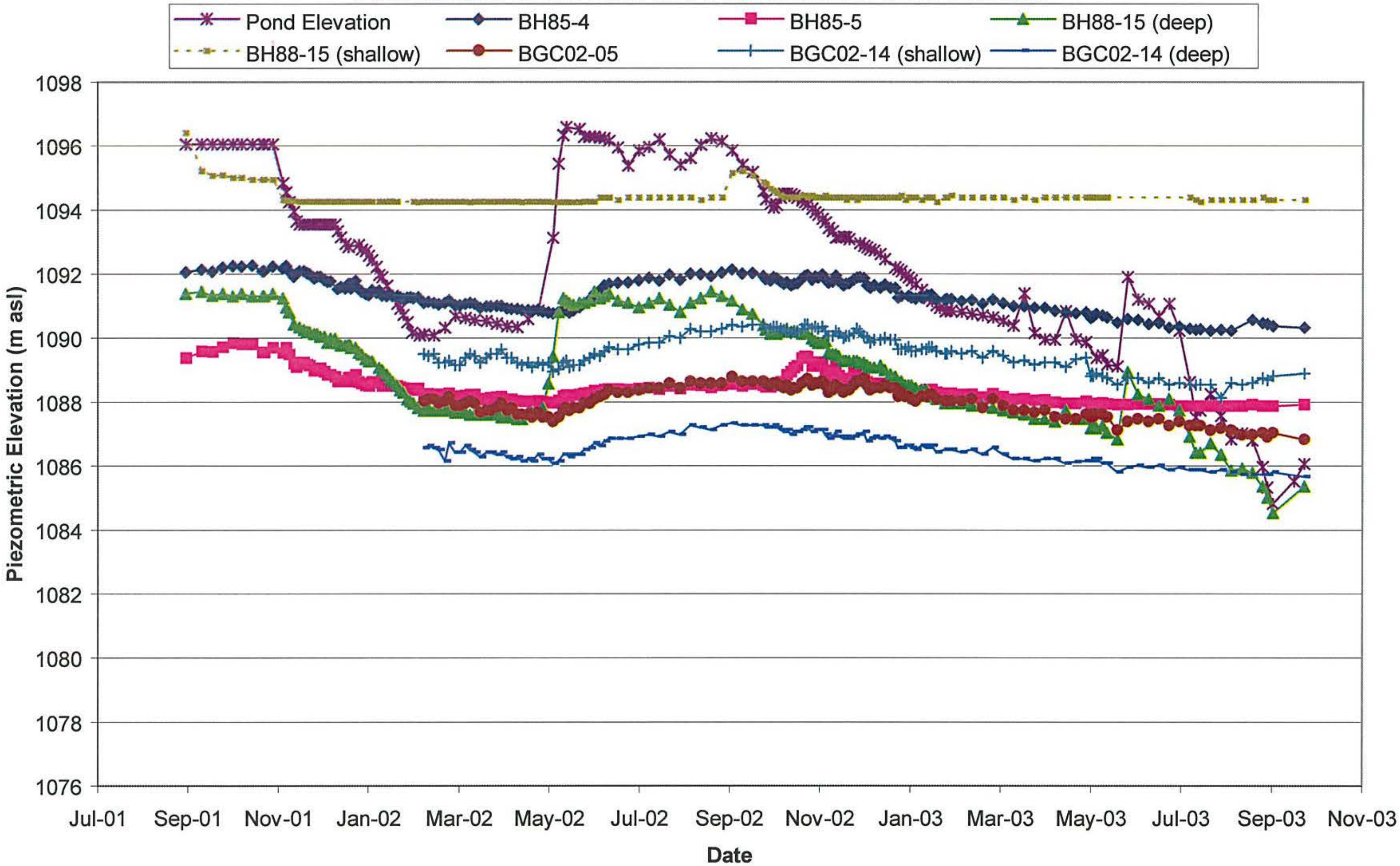
Material Properties

The material properties used in the analyses are summarized in Table 1. These parameters are the same as those used in the April analysis (SRK 2003).

Table 1
Material Properties

Material	Description	Effective Friction Angle (°)		Cohesion (kPa)	Unit Weight (kN/m³)
		Used in Analyses	Typical range (possible)		
Core (Zone 1)	Glacial till	30° & 33°	30° to 36°	0	20
Shell (Zone 2)	Sand and gravel	38°	32° to 40°	0	20
Foundation Till	Silty, sandy gravel	30°	28° to 36°	0	20

Figure 1
Piezometers in the Core and Foundation of the FWS Dam



BGC Engineering Inc.

Results

The results of the analysis on the breach sideslope for $\phi = 30°$ and $\phi = 33°$ are summarized in Table 2, along with the minimum factor of safety specified to govern the stability case. The outputs from individual results for these analyses ($\phi = 30°$ & $33°$) are attached.

Table 2
Results of Stability Analysis – Breach Sideslope of 2.5H:1V

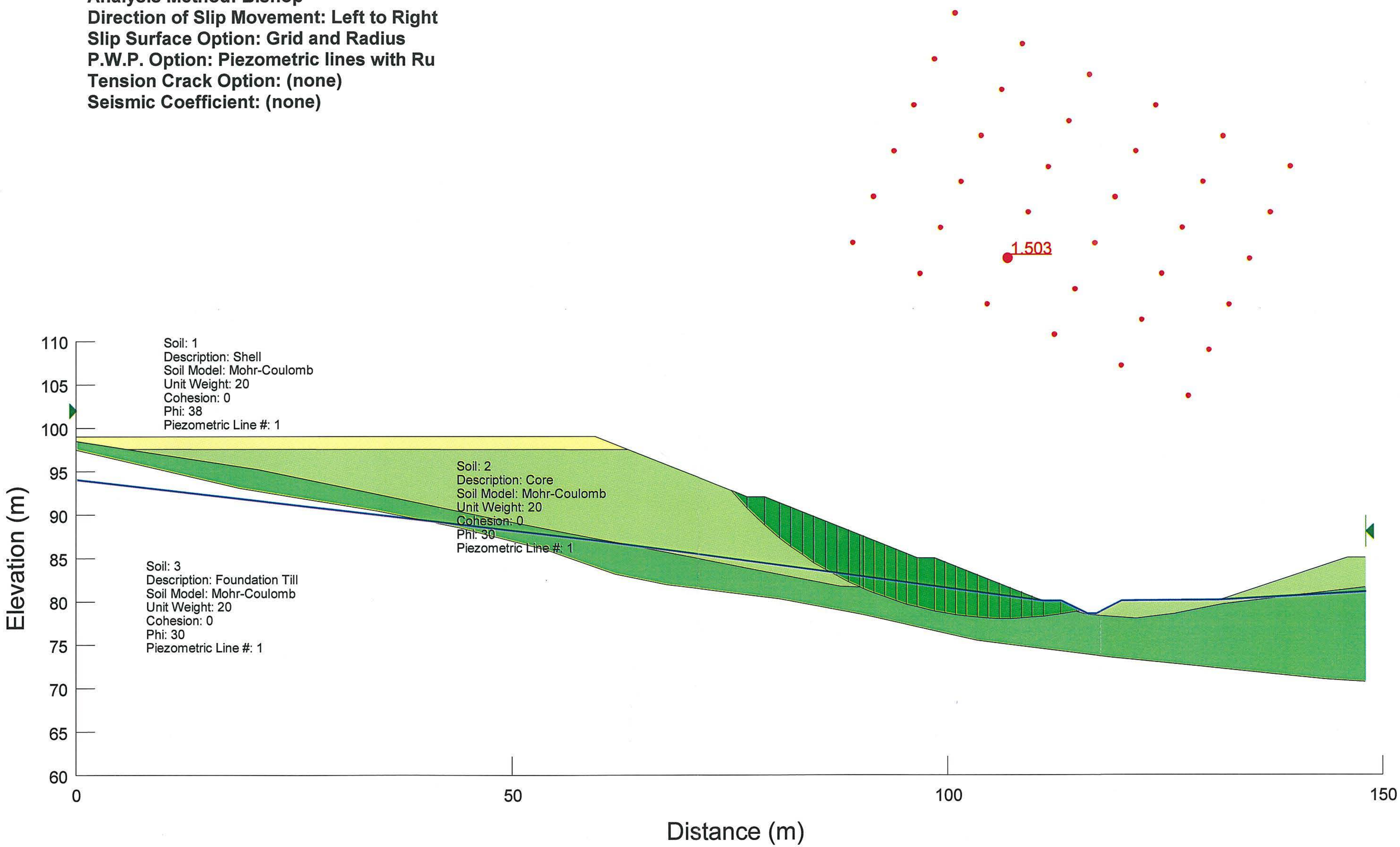
Condition Analysed	Calculated Factor of Safety Side Slope of Breach		Minimum Factor of Safety
	$\Phi = 30°$	$\Phi = 33°$	
Static, immediately post-construction	1.50	1.54	1.3

References

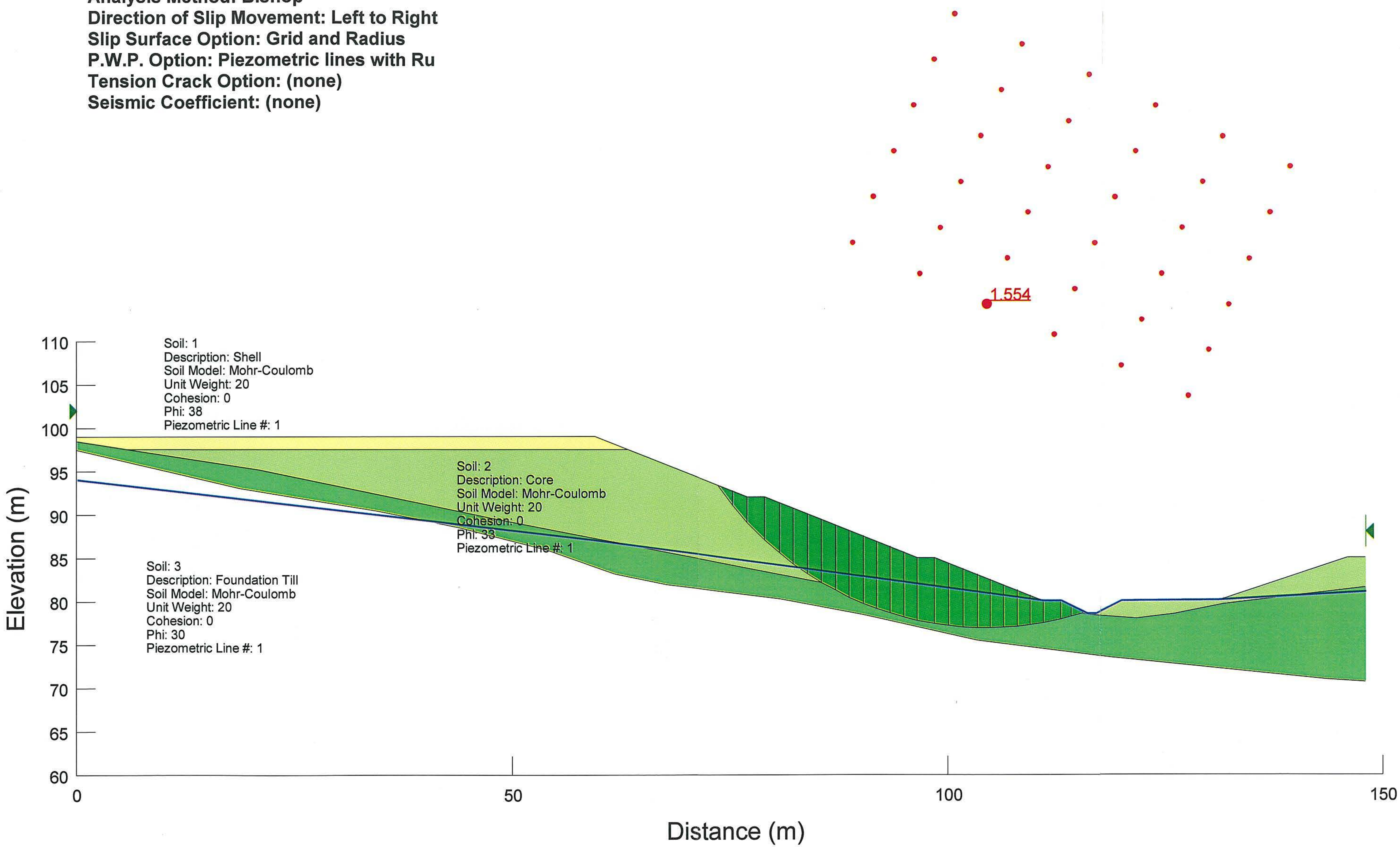
SRK Consulting Inc. 2003 Final Breach Design, Fresh Water Supply Dam, Faro Mine. Report prepared for Deloitte & Touche Inc.

Stability Analysis Results (Breach Sideslopes)

Fresh Water Storage Dam - Actual Section
Breached @ 2.5:1 Slope - Post Construction Water Table
File Name: Breach 2.5 to 1 Slope-Real-Post Con - 0.00g.slp
Last Saved Date: 12/02/2004
Analysis Method: Bishop
Direction of Slip Movement: Left to Right
Slip Surface Option: Grid and Radius
P.W.P. Option: Piezometric lines with Ru
Tension Crack Option: (none)
Seismic Coefficient: (none)



Fresh Water Storage Dam - Actual Section
Breached @ 2.5:1 Slope - Post Construction Water Table
File Name: Breach 2.5 to 1 Slope-Real-Post Con - 0.00g.slp
Last Saved Date: 12/02/2004
Analysis Method: Bishop
Direction of Slip Movement: Left to Right
Slip Surface Option: Grid and Radius
P.W.P. Option: Piezometric lines with Ru
Tension Crack Option: (none)
Seismic Coefficient: (none)



APPENDIX A2
Re-vegetation Program

ARCTIC ALPINE SEED LTD
RECLAMATION PLAN

ANVIL RANGE MINING COMPLEX
FARO, YUKON

FRESH WATER SUPPLY DAM 2003
FINAL REPORT

Prepared for:

Deloitte & Touche

October 1, 2003

Ph: 867-660-4054 Fx: 867-660-4057
mailto:rlewis@aaseed.com
Box 1220, Marsh lake Yukon, YOB 1Y1
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INTRODUCTION

The site is the Fresh Water Supply Dam (FWSD) at the Anvil Range Mining Complex, Faro, Yukon.

The water level was drawn down from May to September in preparation for mine closure and possible breech and removal of the dam.

PHASE I

Phase I seeding of shoreline, between elevation 1096 and 1090 m (area is 17.2 hectares), was seeded in June 2003 in 18 days.

- the area of shoreline seeded in Phase I – June, 2003 is showing an overall germination of 90%
- the vegetative cover is 90% and will continue to increase.
- The seeding methodology was very effective in establishing the vegetation and resulted in no further environmental disturbance to the site

PHASE II

Phase II seeding area was approximated at 17.5 ha of shoreline, between elevation 1090 and 1086 m. This area was seeded in September 2003 in 16 days.

- This exposed an area of a substantial amount of shoreline due to the contours of the valley. Most of the area to be revegetated in Phase II was relatively flat and dry on the east side.
- Recommended rate of seeding – 30 kg /hectare was maintained
- Seeding rate was based on site / soils analysis information and the methodology for installation.
- Seed Mixture:
    - Agropyron violaceum – Violet Wheatgrass
    - Deschampsia caespitosa – Tufted Hairgrass
    - Festuca ovina – Sheep Fescue
    - Poa alpina – Alpine Bluegrass
    - Agrostis scabra – Ticklegrass
    - Seed was already on site in storage from Phase I

PHASE III WILLOW BUNDLE TRANSPLANTS

Introduction

Ground stability and erosion control can effectively be maintained with the use of vegetation. Depth of root structures and below ground plant biomass will vary according to several factors: primarily soil composition including porosity, plant species and age.

The use of stem cuttings possessing dormant buds, as observed with willow bundles has previously shown to be an effective method of transplant.

Objectives:

To transplant stem cuttings of various trees and shrubs, primarily *Salix* sp. (willow) into different test areas within the former Fresh Water Supply Dam. The selected test sites consist of locations that have exhibited signs of water erosion since the retreating of the artificial lake. A test riparian buffer strip along Rose Creek was created in order to assess the viability in using such transplant methods for future reconstruction of the riparian zone adjacent to the Rose Creek portion, which had previously been submerged.

MATERIALS AND METHODS

Trees and shrubs found on the downstream side of the dam (northwest), between the access road and the existing riprap stockpile were harvested for this project. This area of vegetation was assigned for harvest, as it was to be the construction mobilization site during the future removal of the dam.

Willow species used were:

- *Salix planifolia var. pulchra*
- *Salix alexchensis var. longistylis*
- *Salix scouleriana*
- *Salix barclayi*

Other species found at the harvest site were also used in this test. These include:

- *Populus tremuloides*
- *Populus balsamifera*
- *Sheperdia canadensis*

Cuttings were obtained using a chainsaw, pruners, shears and hatchets. Only branches possessing buds were used which were then tied together using twine resulting in bundles approximately 30cm in length and 5cm in diameter. Bundles (approximately 975) were constructed and stockpiled Sept 21st – 23rd. Planting took place from Sept 24th –26th. All bundles were randomly constructed, potentially consisting of several of the species listed above. They were randomly planted at the selected test sites in order to create a natural pattern of the species harvested.

FWSD EROSION CONTROL TEST SITES

Mine Management selected four water erosion sites in consultation with Arctic Alpine Seed Ltd. These sites were all located on the southeast side of Rose Creek, within the boundaries of the former lake (approx. 1095-1090 meters in elevation). * Note: Test sites were located in Phase 1 areas.

- Site # 1 - First culvert 18 bundles planted
- Site # 2 - Second culvert 57 bundles planted
- Site # 3 - Southeast end of the valley lg. runoff w/ 2 channels 249 bundles planted
- Site # 4 - Far southeast runoff near the south fork of Rose Creek 99 bundles planted

FWSD Riparian Zone Willow Bundle Test Sites

The riparian zone willow Bundle test site selected was also situated at the south end of Rose Creek. Beginning at approximately 1091 meters in elevation, a 5-meter by 12-meter area on either side of Rose creek is now the experimental buffer zone. 250 bundles were planted on the eastern side and 300 bundles were planted on the western side.

FWSD Riparian Zone Rooted Plant Material Test Site

An additional test of rooted plant material found on the downstream side of the dam (northwest), between the access road and the existing riprap stockpile was harvested for this project. This area of vegetation was assigned for harvest as it is to be the construction mobilization site during the future removal of the dam.

Willow species used were:

- *Salix planifolia var. pulchra*
- *Salix alexchensis var. longistylis*
- *Salix scouleriana*
- *Salix barclayi*

Other species found at the harvest site were also used in this test. These include:

- *Populus tremuloides*
- *Populus balsamifera*
- *Sheperdia canadensis*

Approximately 50 rooted pieces of plant material were planted along the east and west side of Rose Creek in the Phase I seeding area. All test sites were then re-seeded using the same grass seed mix applied during Phase I and II of the Fresh Water Supply Dam Reclamation Project.

General Comments and Results

A review, monitoring and reporting will be conducted in 2004. All work in Phase I – II – III was completed within the time frames allocated.

Seed Inventory:

- There is approximately 500 kg of seed remaining in storage.
- At the recommended seeding rate this volume of seed can complete the final areas of the FWSD site (17 hectares approx).
- Seed has been covered and stored for the 2004 seeding program

Arctic Alpine Seed Ltd. acting as project manager ensured that the area was revegetated using 100% indigenous (native) species:

The site analysis determined site-specific requirements:

1) Due to the sensitivity of the site:
   a) Access for revegetation was restricted to currently existing access
      i) Access road on the dam.
      ii) Access road to lake half way along the east side.
      iii) Addition access to the site via a boat was not required.
2) No mechanical activity by the Reclamation Team occurred on the newly exposed shoreline.
3) All revegetation activity was limited to only manual labor.
4) 100% of grass and legume seed types were indigenous to the site and surrounding areas.
5) No fertilizer was used on this site, due to the proximity of the lake and creek.
6) Hydro seeding was not required or recommended for this site.
7) The reclamation project was time sensitive and was completed before September 30, 2003.

As Project Manager, Randy Lewis, Partner, Arctic Alpine Seed Ltd., was primarily responsible for ensuring that the Reclamation Plan was fully and completely implemented to the Owner's satisfaction including management and training of all labour forces and expediting of materials to complete the:

- Layout and design of key and all other planting areas at the Fresh Water Supply Dam
- Seeding of disturbed areas
- Photo documentation
- Verbal & written reporting throughout as required
- **Production of final written report including summary recommendations upon completion.**

A Ross River Dene Council Crew (4 persons) were hired to work with Arctic Alpine Seed Ltd. until project completion; the local crewmembers completed a Reclamation Technician Trainee Program and were fully trained to provide ongoing support for future reclamation projects.

Reclamation Activities Completed:

- Layout and design of areas to be seeded
- Reclamation Technician Crew Training Program for FWSD
- Site Supervision
- Site specific seed mixes for the lakeshore
- Hand seeding of disturbed areas
  - The seed was applied by broadcast spreading
  - Final raking - incorporated into the soil surface by hand raking.

This method was successful in significantly increasing the results of the reclamation plan as well as ensuring that the work was completed on schedule and on budget.

- Establishment of a willow Bundle cutting test site
  - Five (5) locations.
  - Coordinated with Mine Management

RECLAMATION AREAS

LOCATION	TREATMENTS
Fresh Water Supply Dam / Lake ▪ Shoreline Exposed Areas (see site sketch) ▪ Heavy Erosion Areas ▪ Test site establishment	Seeding / Hand raking Willow Bundle Preparation Willow Bundle Plantings Rooted Plant Material Plantings

APPENDIX A3
Fish Salvage Program

Fresh Water Supply Dam Breach Project: Fish Salvage Program

prepared for:

Deloitte & Touche Inc.
In their Capacity or Interim Receiver for the Inuit Range Mining Corporation

prepared by:

Gartner Lee Limited

reference: **GLL 23-696**

date: **February 2004**

distribution:

1 **Deloitte & Touche Inc. (plus electronic version)**
1 **Fisheries and Oceans Canada (Whitehorse)**
1 **Government of Yukon, Fish and Wildlife Branch**
1 **Gartner Lee Limited**

Gartner Lee

Gartner Lee Limited

February 10, 2004

Mr. Douglas Sedgewick
Deloitte and Touche Inc.
Suite 1900, 79 Wellington Street West
Toronto, Ontario M5K 1B9

Dear Doug:

Re: 23696 – Faro Fresh Water Supply Reservoir Fish Salvage Report

Please find enclosed two copies of the final version of this report. We have also circulated hard copies of this report to Aaron Foos of the Yukon Government and Steve Gotch of Fisheries and Oceans Canada (Whitehorse office). We have also provided Aaron with an electronic copy of the fisheries data we collected to facilitate the biological analysis of the fish that were collected and frozen for further analysis by the Yukon Government.

Gerry Ferris of BGC Engineering has also been provided an electronic copy for inclusion in the final report of the Fresh Water Supply Dam Breach required by the Yukon Water Board as part of the water licence issued for the project.

Thank you for giving us the opportunity to work on this project and we look forward to working with you as the Faro Mine proceeds to full decommissioning and closure.

Yours truly,
GARTNER LEE LIMITED

Bruce S. Ford

Bruce S. Ford, MRM, R.P.Bio
Senior Environmental Biologist

BSF/gc

(23696 Final Report 5-Feb-2004.doc)

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Letter of Transmittal

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Appendices

Acknowledgments

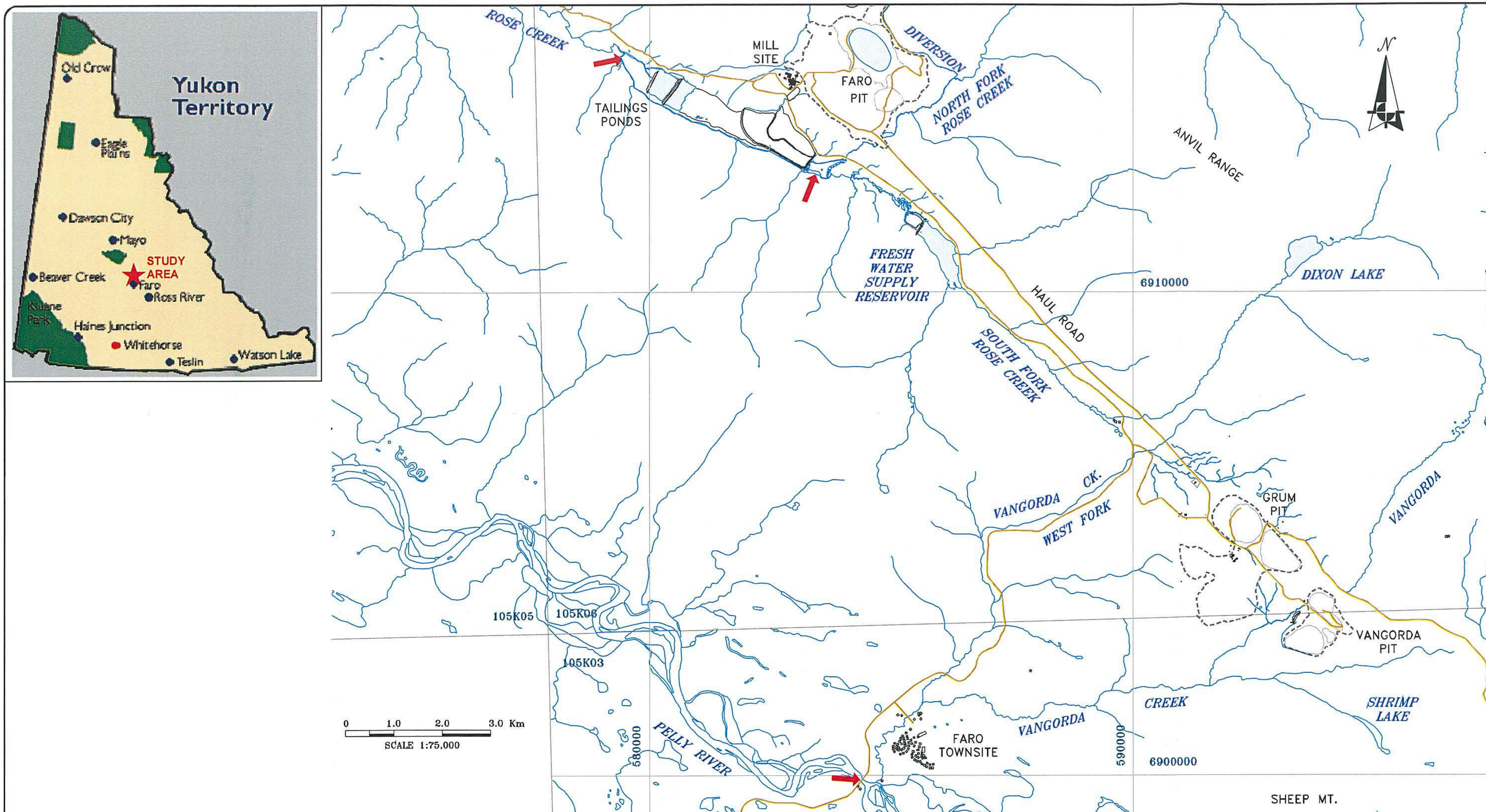
Gartner Lee would like to thank a number of individuals who contributed to the successful of this project. They include the field crew for conducting the project in conditions that at times were quite difficult: Brad Finnson of White Mountain Environmental Consulting as crew leader, Crystal Lambert of Gartner Lee field technician, plus Marie Sterriah and Priscilla Shorty of the Ross River Dena. Additional field support from employees at the mine site including Liz Williamson, Cathy Bork, Dean Bolton, Ronald Meers were provided by Dana Haggar. Paul Sparling of White Mountain also provided field assistance during the salvage. We would also like to thank Aaron Foos, of the Yukon Government, Fish and Wildlife Branch and Steve Gotch, of Fisheries and Oceans Canada, Habitat and Enhancement Branch for providing counsel during the course of the fish salvage. Aaron Foos provided additional gill nets for the salvage, the fish holding tank was supplied by Lawrence Bano of the Whitehorse Fish Hatchery and Mel Smith provided freezer space to store the fish samples.

1. Introduction

In 2000 the Interim Receiver for the Anvil Range Mining Corporation concluded that the Fresh Water Supply (FWS) Dam at the Faro mine site was a potential risk to the environment and human health. Given that the reservoir of water created by the dam was no longer needed for any future mining activity, a plan to breach the dam was developed between January and October 2003. The general location of the project area is provided in Figure 1. This process involved engineering design, environmental assessment and planning, and obtaining approvals from the Yukon and Federal governments. The excavation of the Breach (Figure 2) was carried out in November and December 2003. Benefits of breaching the dam include significant reduction in risk to environmental resources and mine structures downstream and return of the south fork of Rose Creek to its natural, pre-dam condition. Restoration of the South Fork of Rose Creek include the increased amount of stream habitat, removal of migration barriers and the re-establishment of the natural flow regime. However, the project also removes the lentic habitat provided by the reservoir. The reservoir was known to support a population of arctic grayling (*Thaymallus arcticus*), burbot (*Lota lota*) and slimy sculpin (*Cottus cognatus cognatus*). Before commencing the excavation of the breach, the reservoir had to be lowered and the majority of the fish population in the reservoir had to be collected and relocated. This report summarizes the work and results from collecting and relocating the fish from the reservoir.

The environmental assessment and approval process for this project included the completion of a screening level review under the Canadian Environmental Assessment Act (CEAA) and a hearing by the Yukon Water Board. The CEAA screening, was required before Fisheries and Oceans Canada (DFO) could consider issuing an Authorization under the federal *Fisheries Act* allowing for the destruction of fish habitat and the destruction of fish. DFO's approval of the project was given on the basis that the Environmental Management Plan for the Breaching of the Fresh Water Supply Dam at the Faro Mine (the EMP) prepared by Gartner Lee be followed (Gartner Lee Ltd. 2003a). This EMP included details for carrying out a fish salvage program which was developed from a set of guidelines prepared by DFO and the Yukon Territorial Government (YTG). The authorization allowed for mortalities that might occur during the capture and handling process carried out during the salvage or of fish that are not salvaged and subsequently become stranded as water flows decrease over the winter.

During the environmental review process an application for the Introduction, Transplant or Transport of Live Fish, Fish Eggs or Aquatic Invertebrates within the Yukon Territory was submitted to the Yukon Introductions and Transplant Committee. The application was subsequently approved by the committee to allow fish from the reservoir to be released in Rose Creek downstream of the reservoir and into the Pelly River near the town of Faro. The assessment and approval process also included an approval from Canadian Coast Guard allowing the loss of the navigable water provided by the reservoir. As



LEGEND:
- MAIN ROAD
- SURFACE DRAINAGE
- FOOTPRINT OF OPEN PITS AND ROCK DUMPS
- FISH RELEASE SITES

SOURCES OF INFORMATION:
1. DIGITAL COPY OF 1:50,000 TOPOGRAPHIC MAP SUPPLIED BY SRK CONSULTING.
2. MAP COORDINATES ARE UTM NAD83 ZONE 8; CONTOUR INTERVAL 100 FT.
3. FARO MINE DETAILS ADAPTED FROM DRAWINGS BY ROBERTSON GEOCONSULTANTS INC.

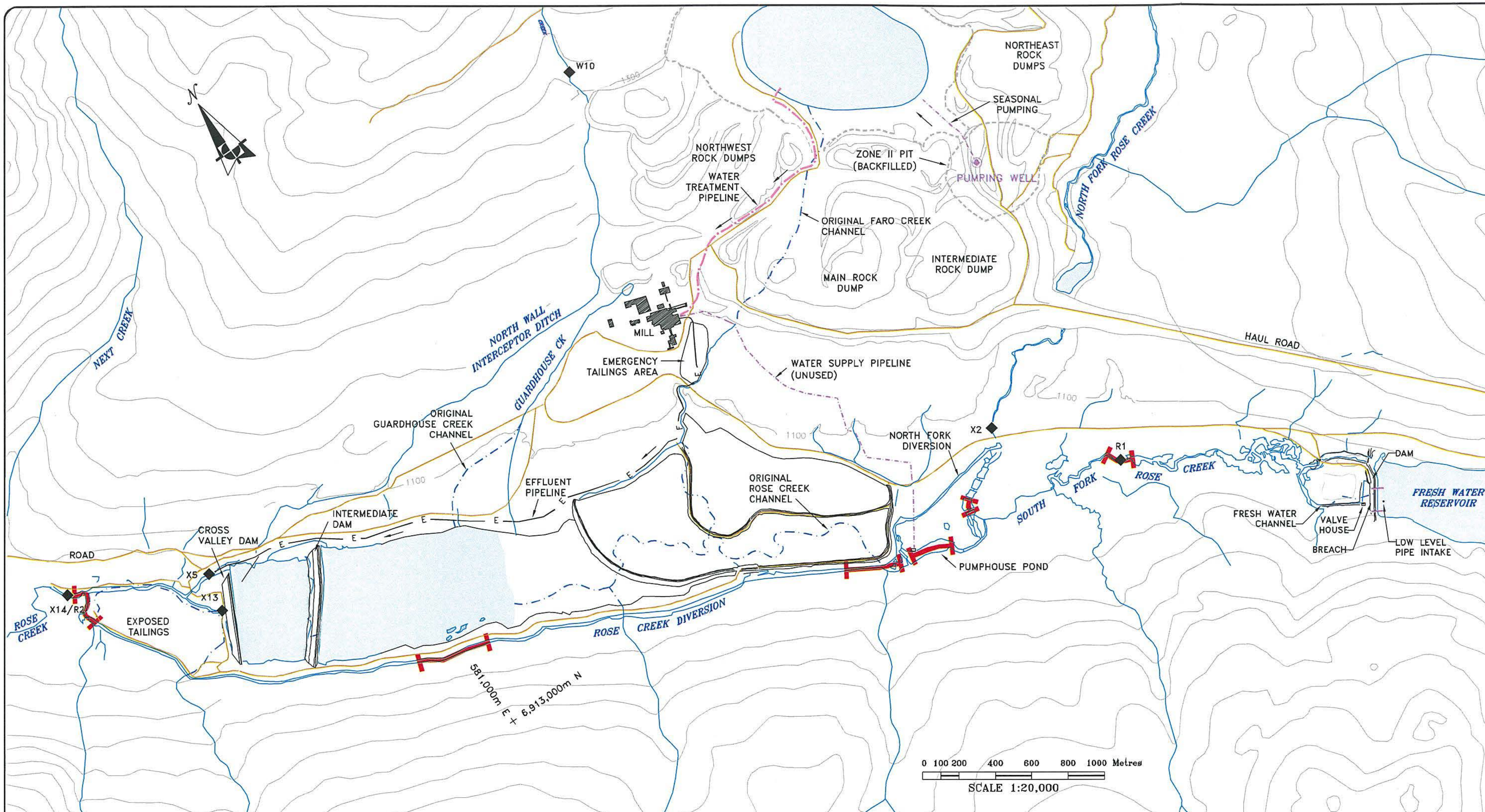
DRAWING INFORMATION:	
REVIEWED BY:	BF
DRAWN BY:	CPW
DATE ISSUED:	JANUARY, 2004
PROJECT NUMBER:	23-696
FILE NAME:	23696-2M-01.DWG
REVISION:	0

FARO FISH SALVAGE
FARO MINE, YUKON
ANVIL RANGE MINING CORPORATION
(INTERIM RECEIVER)

STUDY AREA AND FISH RELEASE SITES

Gartner Lee
Deloitte & Touche

FIGURE NO. 1



LEGEND:

	ROADS
	EXISTING SURFACE DRAINAGE
	PRE-MINE DRAINAGE
E	EFFLUENT PIPELINE
	PIPELINE
	WATER TREATMENT PIPELINE
	SURFACE WATER
X2 ◆	WATER QUALITY MONITORING SITE
	AREAS SNORKELED

SOURCES OF INFORMATION:

1. DIGITAL COPY OF 1:50,000 TOPOGRAPHIC MAP SUPPLIED BY SRK CONSULTING.
2. MAP COORDINATES ARE UTM NAD83 ZONE 8; CONTOUR INTERVAL 100 FT.
3. FARO MINE DETAILS ADAPTED FROM DRAWINGS BY ROBERTSON GEOCONSULTANTS INC.

DRAWING INFORMATION:	
REVIEWED BY:	BF
DRAWN BY:	CPW
DATE ISSUED:	JANUARY, 2004
PROJECT NUMBER:	23-696
FILE NAME:	23696-2D-02.DWG
REVISION:	0

FARO FISH SALVAGE
FARO MINE, YUKON
ANVIL RANGE MINING CORPORATION
(INTERIM RECEIVER)

SNORKEL SURVEY

Gartner Lee | Deloitte & Touche | FIGURE NO. 2

compensation, monies where made available to the Town of Faro to build and maintain a boat launching ramp on the Pelly River.

The Authorization issued by DFO and the approval of the application by the Transplant Committee constituted the approvals required to carry out the fish salvage. The preliminary field reconnaissance for the salvage work took place at the end of August and the main salvage effort began September 3 and was completed by September 27, 2003. Additional salvage work took place during the construction of the breach from November 10 to December 15, 2003.

2. Methods

2.1 Snorkel Survey

The EMP committed to conducting an initial survey of the South Fork of Rose Creek downstream of the reservoir and of other segments of Rose Creek that might provide potential opportunities for outplanting fish collected from the reservoir. Past fish sampling experience has not resulted in the capture of many adult size grayling in Rose Creek (Gartner Lee 2003b). This was thought to be a result of using electroshockers to sample fish. Larger grayling are likely to be found in pools and other deeper water areas, where fish capture is difficult using a backpack electroshocker. Therefore, snorkeling was chosen as the technique to gain information on the distribution and relative abundance of arctic grayling in Rose Creek watershed in the immediate vicinity of the Faro Mine.

The primary task was to determine if there were any differences in the relative abundance of fish throughout the study area. The program did not involve a rigorous methodology with repeat observations for accurate population estimates. The creek channels were small, ranging from 2 m to 6 m wide. With two observers this resulted in each observer passing over an area sequentially in the narrow channels and in the wider areas the observers drifted through a site side by side. Each observer tallied the number of fish seen in each section snorkeled.

2.2 Fish Salvage

The fish salvage program involved several steps as follows:

1. The first step was the capture and tagging of up to 100 arctic grayling in the 250+ mm[1] size range and then these fish were released back into the reservoir. As the fish salvage progressed, the numbers of these fish re-caught were tracked to provide information on the success of the capture program. The methods for capturing and tagging these fish are described below.
2. The capture, tagging and release of one hundred, 250+ mm size class grayling, 100 slimy sculpins and Burbot into Rose Creek below the reservoir.
3. The collection of up to 500 each of arctic grayling, slimy sculpins and burbot for biological analysis. These fish were labeled, frozen and turned over to YTG for further analysis
4. Final fish out of fish left in the reservoir after the above quotas for release to Rose Creek and collection for biological sampling were met. These fish were released into the Pelly River near the town of Faro.
5. Salvage of any remaining fish that become trapped or stranded during final lowering of the reservoir at the time of construction
6. Mortalities that occurred during the salvage and that were not required for YTG were frozen after length and weight data was recorded and were made available to local trappers for bait.
7. Fish salvage during the construction phase to keep fish out of construction areas and minimize the risk of stranding.
8. The final step will involve follow-up monitoring of the sites where fish were released into Rose Creek which is scheduled for early in the summer of 2004 and is therefore not covered in this report.

Previous studies of the reservoir had indicated that the fish salvage program would have to focus on the capture of three species of fish: arctic grayling, slimy sculpins and burbot. Fishing gear was selected to focus on these species and the variety of size classes that were expected.

2.2.1 Tagging

Generally arctic grayling greater than 250 mm in length were tagged using a Mark III Pistol Grip fish tagging gun and a standard size needle (2 mm OD needle). Tags were inserted through the back of the fish directly below the center of the dorsal fin. Colour and number-coded Floy tags were used for marking. Initial marking involved 100 orange tags ranging in numbers from 1 to 99 and 300 yellow tags ranging in numbers from 2,501 to 2,800 to mark adult-sized grayling that were released to the Pelly River.

[1] Note: through out the report the length of arctic grayling are reported as fork length and lengths of the sculpin and burbot reported as total length.

Initially a larger diameter needle was used but the tags were able to work free and a number of tags were lost. A smaller needle was acquired and used for marking the 300 orange tagged fish.

2.2.2 Capture Methods

Trap Net

One trap net was acquired for this salvage program. The net consisted of a 2 m square capture box made of 20 mm mesh. The net consisted of wing nets each 10 m long and 2.5 m deep and a lead net that was 50 m long and 2.5 m deep. The wings and the lead were 2.5 cm mesh and the entire net was equipped with sufficient floats so it would float. The trap net was set in shallow sloping areas of the reservoir, not much deeper than the height of the lead or wings. The lead was set from shore and extended perpendicular from the shore to intercept fish swimming parallel to the shore. The wings are set out at a 45 degree from the lead to direct fish into the heart where they are trapped. The net was checked on a daily basis to retrieve and process the captured fish. Due to problems such as abundance of debris including stumps 0.5 to 1 m in height and shrub willow on the floor of the reservoir and reservoir depth, locations for setting the trap net were limited.

Gill Nets

A variety of gill nets were used for the salvage and as the number of fish decreased, the amount of effort in terms of meters of gillnet deployed in the reservoir increased. A summary of the variety of nets used is provided in Table 1.

Table 1. Gill Net Used During the Salvage

Mesh Size	Mesh Material	Colour	Type	Total Length
48 mm	Monofilament	Clear	Floating	10 m
25 mm	Cotton	White	Sinking	75 m
24, 48 and 76 mm	Nylon	Green/white	Sinking	75 m (3 – 25 m panels)
25, 48 and 64 mm	Monofilament	White/green	Floating	75 m (3 – 25 m panels)
38, 64 and 76 mm	Cotton		Sinking	75 m (3 – 25 m panels)
25, 76, 51, 89, 38, 64 mm	Monofilament	Light green	1 Floating and 1 Sinking	90 m (6 – 15 m panels)

The mix of nets including cotton, nylon and monofilament, different colours, floating and sinking and the variety of mesh sizes were used to maximize the size range and species mix caught. Initially, gill net sets were of fairly short duration of 60 minutes or less but as the salvage progressed and numbers of fish and water temperatures dropped, the nets were set for longer periods of time. By the end of the salvage, nets were left to fish overnight with no significant mortalities. Problems encountered with the gill nets included the abundance of old stumps 0.5 – 1 m in height and shrub willow ground cover that existed on the bottom of the reservoir.

Seine Nets

Two beach seine nets were used by the project team in areas where it was free from debris and safe to get down to the shoreline. The seine nets were 2 m and 15 m in length and dark green in colour. Both nets were used from shore mainly to capture the slimy sculpins present in the reservoir, but larger sized arctic grayling were also captured using this method. Seine netting commenced on September 5, 2003 and continued to September 19.

Minnow traps

Twenty gee-style minnow traps were used in shallow areas of the reservoir. They were deployed along the shoreline and baited with salmon roe. Traps were checked daily and moved further into the reservoir area as water levels dropped. Initially, minnow traps were spread throughout the reservoir but as water levels dropped they were relocated around the area of the dam. Towards the end of the salvage and the reservoir began to freeze the minnow traps were removed.

Angling

Spin casting was also used to capture larger arctic grayling.

2.3 Transport and Outplanting

Once fish were removed from the nets, they were transported in buckets to a tank used for the live transportation of fish. The tank, on loan from the Whitehorse Fish Hatchery, was 0.6 m deep by 1 m by 1.2 m and held approximately 700 L of water. The tank was equipped with an aeration rock and 200 pound oxygen tank. The tank was refilled with fresh water at the start of each day. At the start of the project, fish were regularly transported to release points but as numbers of fish caught per day and daytime temperatures dropped, fish were transported to the release site only at the end of the day.

2.4 Water Sampling

Water samples were collected from the Reservoir at the end of the salvage program when reservoir levels were around the 1085 m elevation. A van Dorn sampler was used to collect water from the deepest part of the reservoir. Water was collected from just below the surface and just above the bottom. The samples were collected for general water chemistry, total and dissolved metals, and chlorophyll *a*. Samples were preserved as directed by the laboratory, placed in a cooler with ice packs to keep the water cool during transported to ALS Laboratory Services, in Vancouver. Field measures of temperature and dissolved oxygen were taken at the end of August.

3. Results

3.1 Snorkel Survey

On August 22 and 23, 2003, Gartner Lee carried out a pre-salvage survey of the south fork and the mainstem of Rose Creek to assess the arctic grayling population and select release sites for fish collected from the Fresh Water Supply Reservoir.

The sections snorkeled are indicated in Figure 2. Depending on the stream width at the sites, two people either went through the area one at a time separated by several minutes or side by side. Site lengths ranged from 100 m to 350 m and an approximate total of 5 hours of observation by the two snorkelers was spent on the creek. During the survey water clarity was not ideal with underwater visibility being approximately 0.8 to 1.0 meters under cloudy conditions. However, water depth ranged from 0.5 m to 1.5 m which allowed observers to see to the bottom in most locations. During the intermittent sunny periods visibility improved to 1.5 to 2 m.

During the survey only one Arctic Grayling (approximately 200 mm in length) was observed. This fish was seen at the upstream end of the most downstream snorkel site near water sample site X14 (Figure 2). The circumstances of this observation suggest that if fish were present in greater numbers they would have been visible under the light conditions during the survey. Therefore, the observers concluded that the number of adult size grayling in Rose Creek at the time of the survey, upstream of water sample site X14, was low. It was also concluded that there was no need to be concerned about selecting release sites for fish from the reservoir on the basis of fish density. Therefore, on the basis of the snorkel survey and consideration given to ease of access, two sites were used for the release of fish into Rose Creek. The release sites are noted on Figure 1.

3.2 Fish Capture and Release

The fish capture and release program began on September 2 and was completed on September 28 with a five-day break from September 20 to 25 due to cold temperatures and ice formation on the reservoir. During the first week of the program, air temperatures ranged up to 13°C but in the second week, temperatures began to drop below 0° C with snow and wind. Surface water temperatures were at 8.3° C on September 3rd and dropped to 4.4° C by September 10th. Ice began to form on the reservoir on September 13 and by the 19th, overnight ice formation threatened to freeze the gill nets in place. On many days, strong winds made it difficult to retrieve the gill nets without putting strain on the nets and the fish tangled in the nets. Data on the individual fish caught, kept and released are provided in Appendix A.

At the start of the salvage, the reservoir surface elevation was approximately 1,088 m. As the salvage progressed it was found that the large area of the reservoir at 1,088 m was affecting the success of the salvage. Water release from the reservoir was increased and the reservoir lowered to around the 1,084 m level. This reduced the surface area of the reservoir from approximately 26 ha to 14 ha which helped improve the efficiency of catching the fish.

During the initial days of fish capture a variety of gill nets, the trap net, minnow traps and beach seines were used. Gill nets were set throughout the reservoir to determine the distribution of fish in the reservoir. Nets were set for a maximum of one hour to minimize mortality and number caught. The initial projections estimated that 3,000 to 4,500 fish could be in the reservoir (Gartner Lee 2003a). Limiting the number or length of gill nets set at any one time was necessary to keep the capture rate at a level that could be handled by the crew and to minimize mortality during the relocation process. After the initial live-capture phase was complete, the salvage moved into the collection of fish for biological sampling when capture and handling mortality was not an issue. As nets were checked, fish were removed and placed in the fish transport tank for recovery, processing and relocation.

Initial fish capture from the one hour sets were low in all net types and set locations. It was soon realized that the arctic grayling were most active at night and showed a preference for the south end, where the South Fork of Rose Creek empties into the reservoir. As the salvage progressed and it was determined how well fish withstood being held in the gill nets, the length of the sets increased. It also appeared that as water temperatures dropped, the survival of fish caught in the gill nets increased. Night sets were used in conjunction with the daytime one hour sets to increase fishing effort and fish capture. The first overnight sets were put out over the night of September 6 – 7 with only a few mortalities, therefore, night sets were used from that time on.

The trap net was initially set September 3 and was used for a total of 16 days during the fish salvage project. The trap net was only moved once as the initial spot was quite productive and when the net was moved the catches diminished substantially and therefore was moved back to the original location. The trap net successfully captured arctic grayling and burbot in the 150 mm and larger size categories.

On the morning of September 12, 2003 it was discovered that a family of river otters (*Lutra canadensis*) had spent the night feeding on fish caught in the gill nets. The otters primarily targeted the gill nets, however, they also tried to get fish out of the trap net as well. With their strong feet and sharp claws, nets set out overnight suffered damage and some large holes had to be mended. While the otters killed and ate many fish, they also left many fish dead, in the nets. The length of these mortalities were recorded and are presented in Appendix A.

Seine nets were used along the shore of the reservoir in areas where the shoreline was not too steep or the mud too thick to work in. This limited most of the seining activity to areas near the south end of the reservoir but some seining took place near the dam. The seine nets were successful at capturing slimy sculpins and some arctic grayling.

The twenty minnow traps were used from September 3 to 17 and were checked daily and relocated as required. Slimy sculpins were the primary species captured in the minnow traps. Once the ice along the shore began to thicken, minnow trapping was discontinued.

Angling was not very successful. Several hours over a two day period resulted in the loss of several lures and the capture of one adult arctic grayling. Angling was not an efficient form of capture for this program and was discontinued after the initial effort.

3.2.1 Initial Capture and Marking

Initially 97 arctic grayling were captured, tagged with numbered orange floy tags and released back into the reservoir. The tagging took place from September 3, 2003 through to September 7. There were no apparent mortalities associated with the tagging based on observations of the fish held in the holding tank. However, there was obvious tag loss once fish were returned to the reservoir. One fish was caught with obvious marks from tagging but no tag and two tags were recovered with no fish. Also, the otters that fed on fish in the nets may have removed and eaten tagged fish. Between tag loss and the otters there would not have been 97 tagged fish to recover from the reservoir.

In total, 63 orange tagged fish were recovered from the reservoir between September 5 and 27. The 63 recovered fish represented 65% of the total number tagged. However, if the otter related mortality, tag loss and likely mortality of a few fish from handling and tagging was included, the overall recovery rate would be higher than 65%. Therefore, a minimum of 65% of the larger fish (240+ mm) were removed from the reservoir. Fifty-seven of these tagged fish were released at the sites in Rose Creek, two were released into the Pelly River and there were four mortalities associated with the second capture.

3.2.2 Live Capture and Release

The sampling gear used during this project was successfully applied for the live capture of burbot, arctic grayling and slimy sculpins. However, there was some selectivity of the gear types. Arctic grayling are not effectively caught in minnow traps while the sculpins were generally too small to be caught in the gill nets and trap net. The beach seining was the only method likely to capture juvenile arctic grayling but seining was confined to specific areas of the reservoir. Therefore, smaller grayling, up to approximately 100 mm, could have been under-represented in the catch because the gear used was not effective for catching fish in that size range.

A total of 212 arctic grayling were released into Rose Creek with 151 placed at the lower site and 61 were released at the upper site (Figure 1). Fifty-seven of these fish were marked with orange floy tags and were released at the upper site. 1035 arctic grayling were relocated to the Pelly River of which 750 were unmarked, 277 were yellow tagged and 2 had orange tags. The grayling ranged from 20 mm to 455 mm with the majority in the 151 to 200 mm size class.

Slimy sculpins were successfully captured using seine nets and minnow traps baited with salmon roe. A total of 71 were released at the lower Rose Cr. site, 29 at the upper site and 177 into the Pelly River. These sculpins ranged from 10 to 122 mm in length.

Burbot were captured using all four methods of capture and a wide range of fish sizes were captured (60 mm – 800 mm). A total of 27 burbot were released into the Pelly River and nine were released into the lower Rose Creek site. The largest burbot was caught in the trap net and was 800 mm long. This fish and the other larger burbot were released into the Pelly River while the mid-sized fish were released at the lower site on Rose Creek. Table 2 provides a summary, by size class of the fish released into Rose Creek and the Pelly River.

Table 2. Numbers and Size of Fish Released into Rose Creek and Pelly River

Species*	Relocation Site	Size Class (mm)	Number	Average Length (mm)	Average Weight (g)
AG	Rose Creek – upper	201 – 250	3	236	196
AG	Rose Creek – upper	250 – 300	42	257	232
AG	Rose Creek – upper	301 – 350	15	320	358
AG	Rose Creek – upper	351 +	1	360	500
CCG	Rose Creek – upper	1 – 50	29	19.68	N/A
AG	Rose Creek – lower	1 – 50	3	38	N/A
AG	Rose Creek – lower	51 – 100	3	63	N/A
AG	Rose Creek – lower	101 – 150	13	139	28
AG	Rose Creek – lower	151 – 200	80	192	67
AG	Rose Creek – lower	201 – 250	44	213	112
AG	Rose Creek – lower	251 – 300	7	267	246
BB	Rose Creek – lower	101 – 150	9	190	N/A
CCG	Rose Creek – lower	0 – 50	51	16	N/A
CCG	Rose Creek – lower	51 – 100	15	67	N/A
AG	Pelly River	0 – 50	2	13	5
AG	Pelly River	51 - 100	3	72	N/A
AG	Pelly River	101 – 150	157	127	22
AG	Pelly River	151 – 200	427	180	60
AG	Pelly River	201 – 250	132	227	127
AG	Pelly River	251 – 300	266	276	228
AG	Pelly River	301 – 350	41	319	339
AG	Pelly River	351 +	2	407	368
BB	Pelly River	51 – 100	2	65	N/A

Species*	Relocation Site	Size Class (mm)	Number	Average Length (mm)	Average Weight (g)
BB	Pelly River	101 – 150	1	110	N/A
BB	Pelly River	151 – 200	1	190	N/A
BB	Pelly River	201 – 250	5	245	N/A
BB	Pelly River	250 – 300	12	271	70
BB	Pelly River	300 +	6	505	N/A
CCG	Pelly River	1 – 50	83	39	N/A
CCG	Pelly River	51 – 100	92	75	N/A
CCG	Pelly River	101 – 150	2	115	N/A

**AG = Arctic grayling; BB = Burbot; CCG = Slimy sculpin.*

Observations by the field crew suggest that the mortality of the released fish was low. However, all fish were released into flowing water so any subsequent mortalities may not be evident at the release sites and no fish were held for extended periods of time to assess post handling mortality rates.

3.2.3 Capture for Biological Sampling

The target sample size for the biological sampling set a maximum of 500 fish per species with up to 50 fish per size class (1 - 50 mm, 51 – 100, 101-150, 151 – 200, 201 – 250, etc) but this was identified as a second priority to meeting the quotas for relocating fish into Rose Creek. For the most part the fish that contributed to the biological sampling were fish that died during the capture and handling process. However, for the more abundant grayling, mortalities exceeded the requirements for the biological sampling. The main source of mortality for the arctic grayling was stress associated with longer stays in the gill nets including exhaustion from struggling, and the additional strain on recovering fish from the gill nets during inclement weather. Also, predation by waterfowl and river otters contributed to the mortalities. The arctic grayling mortalities in excess of what was required for the biological sampling were measured and frozen and made available to the Kaska Dena First Nation as bait for trap lines. A total of 527 arctic grayling were set aside for trappers.

Table 3 provides a summary of the fish collected for biological sampling by YTG. Specific data for each fish can be found in Appendix A.

Table 3. Number and Size of Fish Collected for Biological Sampling

Species*	Size Class	Average Length (mm)	Average Weight (g)	Number
AG	1 – 50	42	N/A	19
AG	51 – 100	76	6	23
AG	101 – 150	130	21	67
AG	151 – 200	190	59	114
AG	201 – 250	225	103	57

Species*	Size Class	Average Length (mm)	Average Weight (g)	Number
AG	251 – 300	275	223	119
AG	300 +	297	272	33
Total				**432**
CCG	1 – 50	30	N/A	110
CCG	51 – 100	70	N/A	63
CCG	101 – 150	105	N/A	1
Total	**+ 12 fish with no length data available**			**186**
BB	201 – 250	250	N/A	2
BB	251 – 300	266	N/A	8
BB	300 +	335	N/A	2
Total				**12**

**AG = Arctic grayling; BB = Burbot; CCG = Slimy sculpin.*

The methods used for capturing sculpins resulted in few mortalities, therefore the fish collected for the biological sample had to be sacrificed by the project team. The quota of sculpins was generally achieved with over 50 fish caught in the dominant size classes of 1 to 50 and 51 to 100 mm total length found in the reservoir.

Burbot numbers in the reservoir were quite low and therefore fish were not sacrificed intentionally for the biological collection. Some burbot became well tangled in the gill nets and it was these fish that were usually found dead in the nets and were added to the biological sample.

3.3 Total Catch and Effort

Fishing effort started off at low rates and increased over the course of the salvage. During the first few days only two gill nets, the trap net, minnow traps and beach seines were used. The gill net sets were generally lasted around one hour. As the crew began to understand the activities of the fish and the likely catch rates, the number of gill nets were increased to four. In the second week of the salvage, gill nets were left to fish over night. The fishing effort during the first 17 days of the salvage started with less than 100 m of gill net and increased to 300 m of gill net, one trap net (fishing 24 hours a day) and 20 minnow traps and as much beach seining as could be accomplished by the crew. In the final three days of the salvage the minnow traps and trap net were not used but there was a significant increase in the length and variety (25 mm to 89 mm mesh size) of gill nets set during the day and overnight. On September 26 and 27, there was 600 m of gill net and on the 28th there was 800 m of gill net in a reservoir that had a surface area of approximately 14 ha.

The salvage was stopped on September 28th after 800 m of gill net captured half the number of fish from the previous day when 600 m of gill net was used (130 fish vs 260). A total of 2,804 fish had been captured of which 2,293[2] were arctic grayling, 463 slimy sculpins and 48 burbot. Also, of the 97 arctic grayling that were tagged at the start of the project and put back into the reservoir, 63 fish had been recaptured for a minimum capture rate of 65%. This recapture rate was likely higher as it does not account for post tagging mortality and tag loss. Figure 3 provides a summary of fish caught per day and shows the significant increase in total catch on September 27 and subsequent drop off in catch the next day. However, on September 28, there was consensus amongst the regulatory agencies and the fish salvage crew that a significant portion of fish had been removed from the reservoir and that the main salvage work was complete. There was also a commitment to undertake further salvage work, if necessary, during the actual breach excavation in November and December.

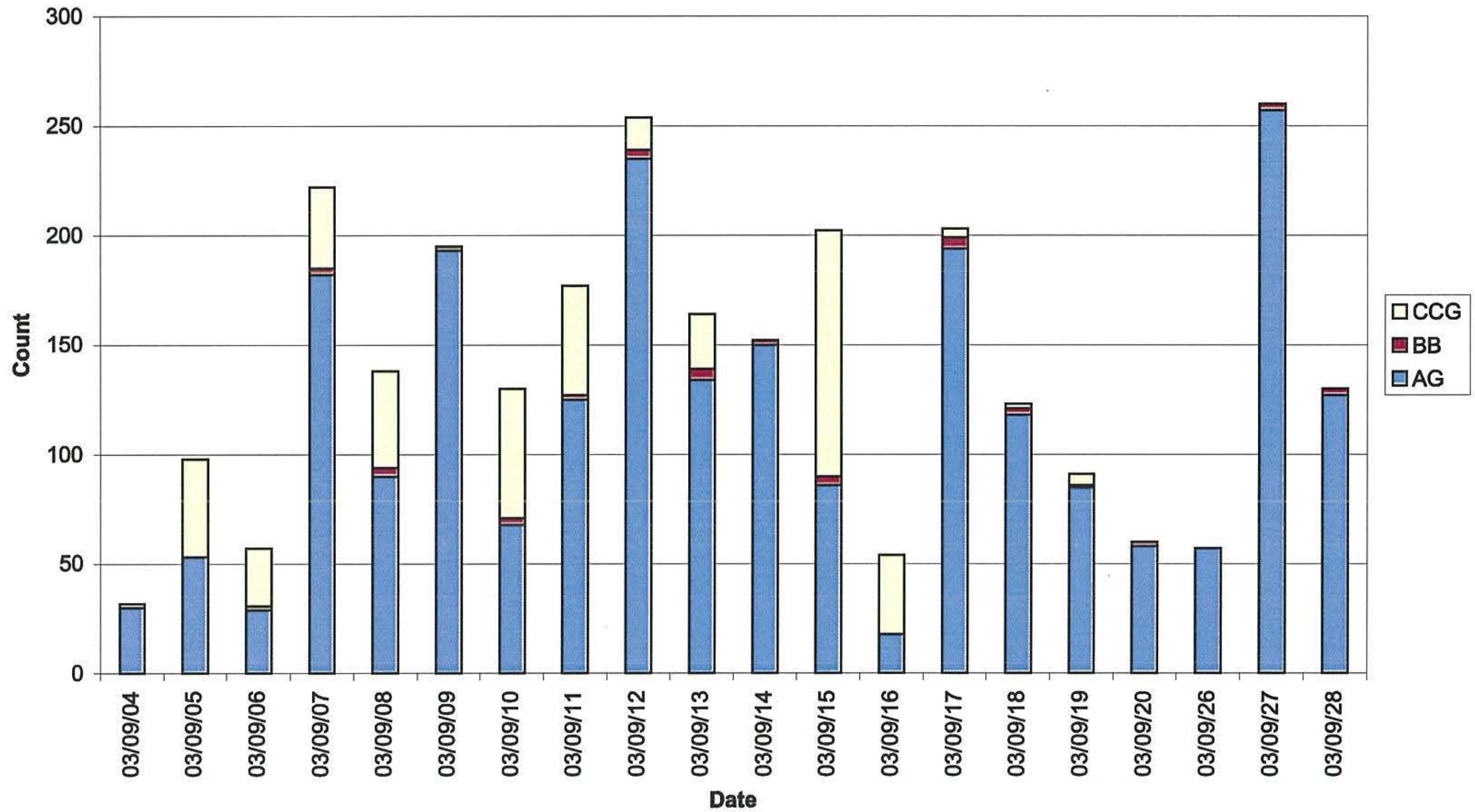
The trap net was first set out on September 3, 2003 and was left in the water 24 hrs a day but was out of operation for approximately one hour each day while the captured fish were removed. An estimated total of 465 arctic grayling were caught using the trap net over the 16 days it was set in the water. Therefore the trap net was set out for a total of 368 hrs giving an estimated average capture rate for the trap net of 1.3 fish per hour.

3.4 Population Estimate

The primary reason for marking arctic grayling and returning them to the reservoir at the start of the salvage program was to help gauge the success of removing fish from the reservoir. This assumed that the fish that were marked evenly redistributed themselves through out the reservoir and were as likely to be caught as the unmarked fish. These same assumptions apply to carrying out a mark-recapture study designed to estimate the overall size of a population. Additional assumptions of a mark-recapture study include that no fish can enter or escape from the population, no tags are lost during the recapture phase and the survival rate is the same for marked and unmarked fish. While it is not likely that these assumptions were perfectly met during the course of this study, it is reasonable to assume they were at least partially met and that any violations of the assumptions were not severe enough to totally negate the use of the data to estimate the total population.

[2] However, 34 grayling were captured, tagged, released back to the reservoir but not recaptured and removed.

Figure 3. Summary of Daily Fish Catch
Fresh Water Supply Reservoir
(Sept. 3 - 28, 2003)



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The marking program focused on arctic grayling in the 250 mm and longer size group with the smallest fish being 240 mm. Therefore, the mark-recapture data can only be applied as an estimate of the population in that size range. The appropriate model to estimate the population size for this type of mark-recapture program is the Peterson method (Ricker 1975). The formula is:

$$N = \frac{(C+1)(M+1)}{(R+1)} - 1 \qquad \text{(Eq. 1)}$$

Where:

N = estimate of population
C = number caught in the second round (1119)
R = number of marked fish recaptured in the second round (63)
M = number of fish marked in the first round (97)

This equation provides an estimate (N) of 1,714 arctic grayling in the 240+ mm size class.

The R value is assumed to be have a Poisson distribution, therefore the 95% confidence limits for the R value can be estimated using the following formula:

$$R + 1.92 \pm 1.960\sqrt{R + 1.0} \qquad \text{(Eq. 2, Ricker 1975)}$$

Therefore, the upper and lower 95% confidence interval for R is 49.2 and 80.6. Using these values in equation (1) provides the 95% confidence interval for the estimated population of 1,714 grayling in the 240+ mm category in the reservoir as 1,345 to 2,184 fish (or –22% and +27%).

We can apply the results of the mark-recapture program to generate an estimate of the total arctic grayling in the reservoir based on the following numbers and assumptions:

1. Total capture and removal of all size classes of arctic grayling from Sept. 3 to Sept. 28 was 2,259.
2. A total of 1,551 fish were 240 mm or longer or 32% of the captured fish.
3. Assuming that the ratio of 240+ mm size fish to smaller fish is the same in the total population as in the captured fish then mark-recapture estimate of 1,714 fish represents 32% of the total population.
4. Therefore, the total population estimate for the freshwater supply reservoir is 5,356 arctic grayling.
5. While not statistically precise, if the same relative confidence interval for the 240+ mm fish population is applied to the total population estimate, the population of arctic grayling in the reservoir has a 95% probability of being between 4,118 and 6,802 fish.

The total population estimate is again limited to a certain size range as the gear used to capture fish caught relatively few fish less than 100 mm in length. Arctic grayling in this size class were only caught during beach seining which received much less total fishing effort than the trap net and gill nets as these nets could be left fishing almost 24 hours a day. Therefore, the estimate likely under-represents the smaller size classes.

The estimated population of arctic grayling in the freshwater supply reservoir is larger than the population size generated by a productivity model using average fish size and the concentration of total phosphate in the water body. The productivity model estimate ranged from 3,000 to 4,500 fish (Gartner Lee 2003a). The two projections on the size of the arctic grayling population in the FWSR are not dissimilar as the 95% confidence level of the population based on the mark-recapture estimate does overlap with the productivity model estimate. The total number of fish removed from the reservoir during the salvage program was likely between 42% based on estimate of total population and 65% based on percentage of orange tags recaptured.

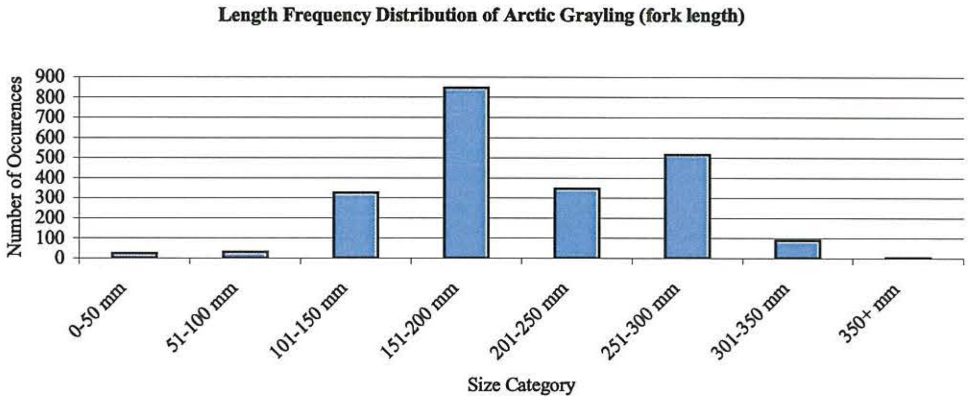
3.5 Preliminary Biological Data Summary

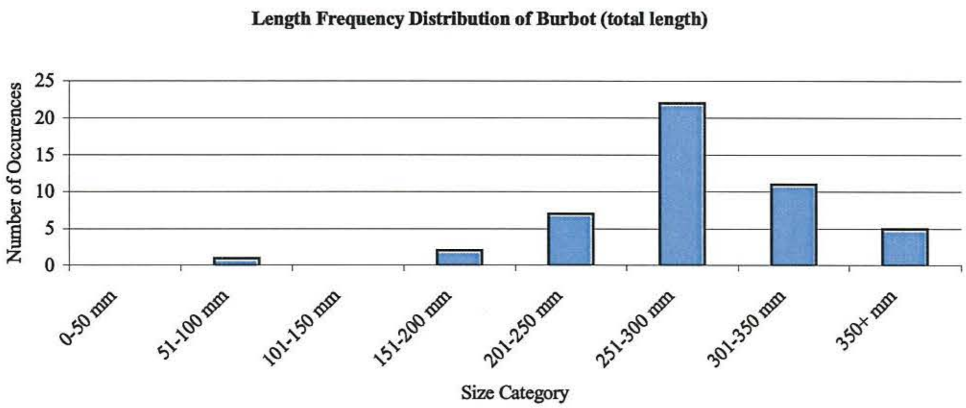
During the fish salvage, weight and length data was collected from the majority of the arctic grayling caught and length data was collected for the sculpins and burbot. The following is a preliminary summary of these data.

Arctic graying ranged from 13 mm to 455 mm in fork length and up to 500 g. The scale used for collecting weight data was not sensitive enough to provide accurate information on the smallest grayling caught. Figure 4 provides a histogram of the numbers of fish caught in each size category and indicates the dominant size class in the reservoir was 151 to 200 mm are likely to be two to three years old (Scott and Crossman 1973). Very few (51) fish caught were less than 100 mm which supports the reported general life history strategy of arctic grayling which is for young-of-the-year to remain in their natal streams for up to a year. Figure 5 provides the graphical relationship between length and weight of the arctic grayling found in the reservoir.

Figure 4 also provides histograms for the numbers of fish caught per size category for sculpins and burbot respectively. The largest sculpin was 122 mm and the dominant size class was the 0 to 50 mm category. The largest burbot was 800 mm and the dominant size class was 251 to 300 mm which would suggest that the majority of the population was around three years old (Ford *et al.* 1995).

Figure 4. Length Frequency Distribution of Fish Caught in the FWS Reservoir during the Pre-breach Salvage





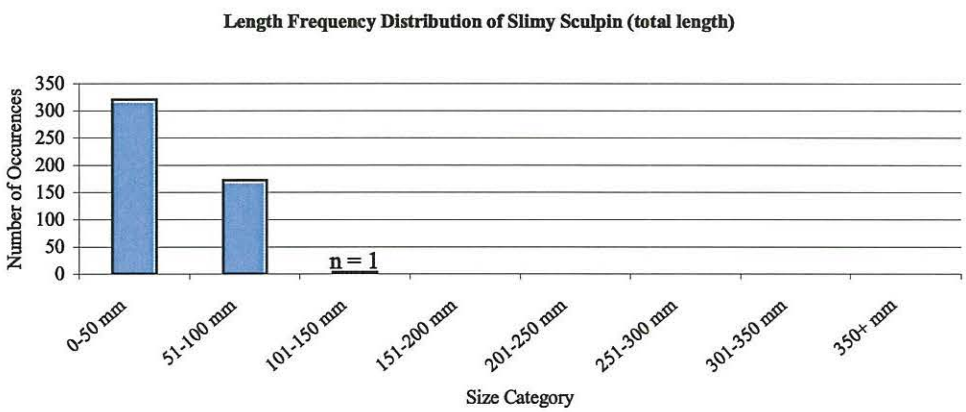
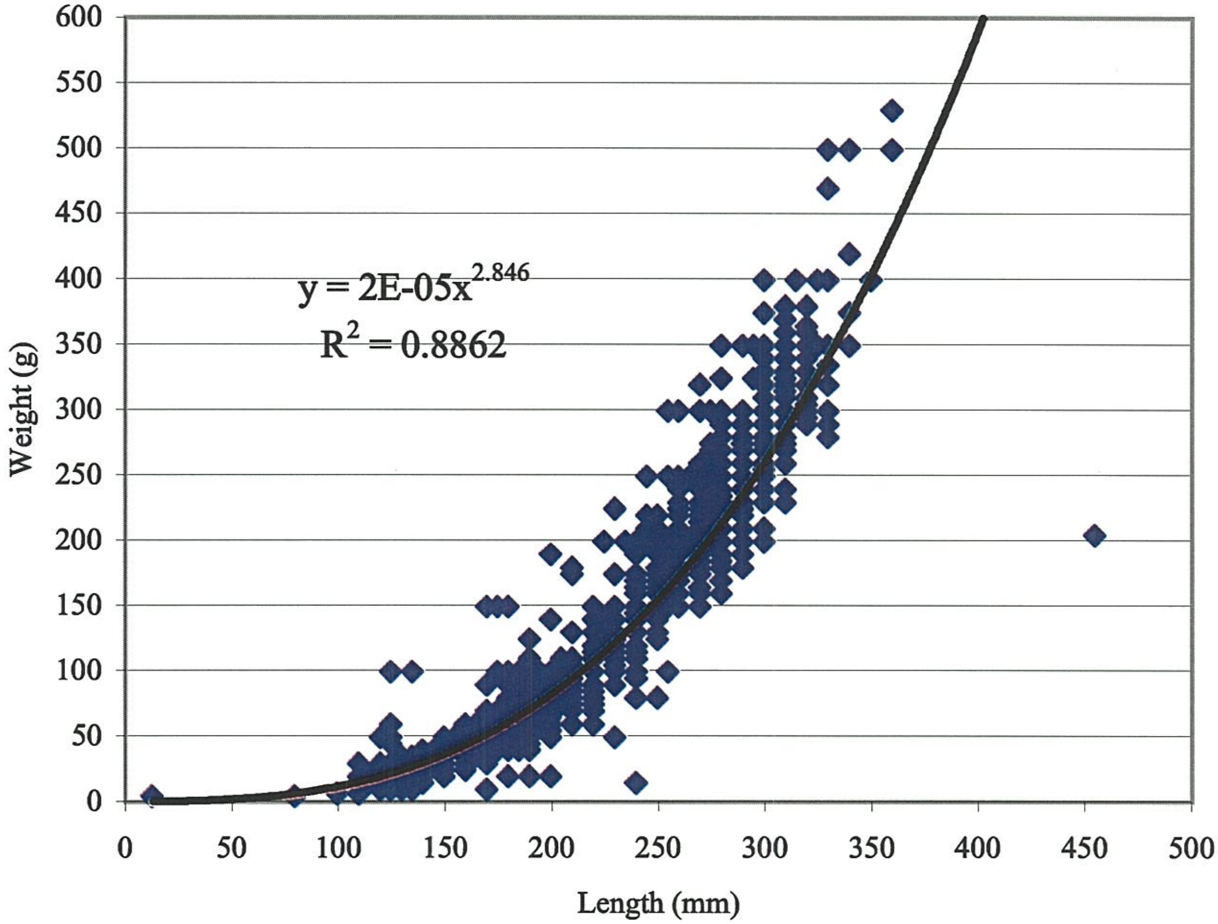


Figure 5. Length (mm) - Weight (g) Relationship for Artic Grayling Collected from the Faro Fresh Water Reservoir



3.6 Salvage During Construction

An environmental monitor was on site for most of the construction work between November 10 and December 15, 2003. During that time five salvages were carried out. The first occurred at the start of the project and was an effort to determine how effective the salvage work in September had been. A 30 m gill net with 3.8 cm mesh was set several times in the remaining reservoir immediately upstream of the dam. At the time the water level was around 1,082 m elevation. Nine arctic grayling were caught in the 170 to 220 mm size range. Also, during this work, no significant numbers of juvenile grayling were observed. This result confirmed that the September salvage removed a substantial portion of the fish from the reservoir.

The next salvage took place around the intake for the low level pipe (Figure 2) used to pass water through the dam. As the reservoir level dropped a pond formed around the intake and from November 17 to 20 a seine net was used to capture fish in this pond. In all, 34 slimy sculpins in the 22 to 40 mm range were removed. These fish were transported and released downstream of the project in the fresh water channel below the dam.

On December 8, the construction crew began dismantling the pipes and valves with in the valve house. During this process slimy sculpins were noted in ponded water within the valve house. A total of 313 slimy sculpins were removed from this pond. These fish were also released downstream of the project area.

On December 11, excavation equipment was used to partially dismantle the coffer dam that was situated approximately 50 m upstream of the main dam. When ice was removed from an isolated pond fish were observed. This pond was at the location of a barge that supported one of the pumps used to pass water around the construction area in the earlier stages of the excavation. A seine net was used to capture a total of 10 burbot (200 to 500 mm) 156 slimy sculpins (60 – 100 mm) and 592 artic grayling (100 to 300 mm) from the pond which was 10 m by 3 m and 1 m deep. These fish had been isolated from the main channel for several days by the time they were salvaged.

An additional salvage took place downstream of the reservoir on November 23 in the fresh water channel immediately downstream of the dam and valve house (Figure 2). Approximately 100 m of this channel was to be decommissioned as part of the construction of a new channel through the breach. Approximately 2,468 seconds of electroshocking was expended in the channel and 43 sculpins, three burbot and two arctic grayling were collected. The captured fish were released downstream of the construction area.

Table 4 provides a summary of additional fish that were removed from the reservoir area during the construction phase.

Table 4. Numbers of Fish Salvaged During the Construction of the Breach

Species	Number
Arctic Grayling	592
Slimy Sculpin	493*
Burbot	10

** 313 of these fish were removed from the valve house but could only get into the valve house by traveling from the reservoir through the low level pipe.*

3.7 Water Quality

Water quality data was collected from the reservoir in conjunction with the fish salvage program to augment data collected in 2002 (Gartner Lee 2003b). The results of the water analysis is provided in Table 5 along with the similar water quality data collected in 2002. The data collected in 2003 was generally consistent with the data collected in 2002 with the exception of zinc. Zinc concentrations were below detection levels (5 μg/L) in 2002 and were reported at as high as 23 μg/L for total zinc in the 2003 samples. The dissolved value was higher (31 μg/L) than the total value but this should not happen as the total concentration should account for zinc in all forms. The discrepancy can come from various sources including laboratory method variability or could be a result of how samples were collected in the field. This zinc concentration is higher than background values from Anvil and Rose Creek watersheds and less than maximum values recorded in surface water within the mine site (Deloitte & Touche and Gartner Lee 2002). The likely cause of this increased concentration is through mobilization of accumulated sediments that have naturally high levels of zinc. The higher value (31 μg/L) is at the criteria level set by the CCME for zinc (30 μg/L) but is likely still below a level that would likely have an effect on aquatic life.

Table 5. Zinc Concentrations in Sediments from the Fresh Water Supply Reservoir

Date	Location	Concentration
February 2003*	Mid Reservoir	162 mg/kg
	South End of Reservoir	209 mg/kg

** see SRK (2003) for additional details on this sampling.*

The elevated zinc concentration within the reservoir is not unexpected as zinc in sediment within the mine site and from nearby sites have been reported to exceed the interim freshwater sediment quality guidelines (ISQG) and often exceed the probable effects level (PEL) set in the CCME guidelines (CCME 1999). The ISQG for zinc is 123 μg/g and the PEL is 315 μg/g. In 2003 sediment samples collected from the reservoir exceeded the ISQG for zinc (Table 6). Any mobilization of these sediments through wave action on the shore or water flowing through the original creek channel could cause an increase in zinc concentrations in the water.

Data on dissolved oxygen and temperature were collected from the reservoir on August 21, 2003 when the surface elevation of the reservoir was at 1088 m and the maximum depth was just over 4 m. This data is summarized in Figure 6 and indicated a potential thermocline at the 3 m depth. Data collected in July and August 2002 showed a definite thermocline at approximately 4 to 5 m depth (Gartner Lee 2003b). However, this occurred when the reservoir surface elevation was at 1,095.5 m and the maximum water depth was 12 m at the time the data was collected (full pool was 1,096.0 m). Dissolved oxygen levels remained well above levels judged to be problematic for fish.

4. Summary

The salvage work removed a significant portion of the fish from the reservoir. Using arctic grayling as the indicator suggests that between 40 and 65% of the fish were removed from the reservoir during the salvage. The relatively low numbers of fish encountered during the construction phase suggest that the removal level was likely closer to upper end of the range. Table 7 provides a summary of the total number of fish removed from the reservoir.

Table 6. Water Chemistry of the FWS Reservoir

Sample ID Date Sampled	CCME Fresh Water Guideline	Surface 9/28/03	Bottom (4 m) 9/28/03	Surface 8/9/02	10 m depth 8/9/02
Physical Tests					
secchi depth	-	na	na	5 m	-
conductivity (µS/cm)	-	198	199	80	91
temperature (° C)	-	na	na	12.3	5.1
dissolved oxygen		na	na	9.7	6.2
Hardness (CaCO3)	-	98.8	97.8	48.9	59.1
pH	6.5 - 9.0	8.05	8.02	7.69	7.34
turbidity (NTU)	-	3.4	2.7	1	1
Total Suspended Solids	-	11	11	<3	<3
Alkalinity-Total CaCO3		82	79	na	na
Sulphate SO4		19	19	na	na
Nutrients					
Nitrate Nitrogen	-	0.045	0.046	<0.005	<0.005
Nitrite Nitrogen	0.06	<0.001	<0.001	<0.001	0.002
Total Dissolved Phosphate	-	0.002	0.002	0.002	0.003
Total Phosphate	-	0.011	0.016	0.003	0.002
Organic Parameters					
Chlorophyll α (mg/m^3)		0.386	0.798		
Total & Dissolved Metals[a]					
Aluminum	0.1[b]	0.07 (<)	0.11 (<)	0.047	0.073
Antimony	-	<0.0005 (<)	<0.0005 (<)	<0.0005	<0.0005
Arsenic	0.005	0.001 (<)	0.001 (<)	<0.0005	<0.0005
Barium	-	0.05 (0.05)	0.05 (0.05)	0.02	0.03
Beryllium	-	<0.005 (<)	<0.005 (<)	<0.001	<0.001
Boron	-	<0.1 (<)	<0.1 (<)	<0.1	<0.1
Cadmium	0.0011[b]	<0.00005 (<)	<0.00005 (<)	<0.00005	<0.00005
Calcium	-	29.8 (30.5)	29.9 (30)	15.1	17.8
Chromium	-	<0.0005 (<)	<0.0005 (<)	<0.001	0.001
Cobalt	-	<0.0005 (<)	<0.0005 (<)	<0.0003	<0.0003
Copper	0.002[b]	0.001 (<)	0.001 (<)	0.001	0.001
Iron	0.3	0.83 (0.41)	0.9 (0.38)	0.07	0.11
Lead	0.001[b]	**0.009 (0.005)**	**0.011 (0.005)**	**0.0014**	**0.0012**
Lithium	-	<0.05 (<)	<0.05 (<)	<0.005	<0.005
Magnesium	-	5.3 (5.5)	5.4 (5.5)	2.7	3.6
Manganese	-	0.33 (0.33)	0.34 (0.33)	0.0077	0.0118
Mercury	-	<0.0002 (<)	<0.0002 (<)	<0.00005	<0.00005
Molybdenum	0.073	<0.001 (<)	<0.001 (<)	<0.001	<0.001
Nickel	0.025[b]	<0.005 (<)	<0.005 (<)	<0.001	<0.001
Potassium	-	na	na	<2	<2
Selenium	0.001	<0.001 (<)	<0.001 (<)	<0.001	<0.001
Silver	0.0001	<0.00005 (<)	<0.00005 (<)	<0.00002	<0.00002
Sodium	-	2 (2)	2 (2)	<2	<2
Thallium	0.0008	<0.0002 (<)	<0.0002 (<)	<0.0002	<0.0002
Tin	-	na	na	<0.0005	<0.0005
Titanium	-	<0.05 (<)	<0.05 (<)	<0.01	<0.01
Uranium	-	0.0017 (0.0017)	0.0017 (0.0017)	0.0006	0.0008
Vanadium	-	<0.03 (<)	<0.03 (<)	<0.03	<0.03
Zinc	0.03	0.013 (0.023)	0.023 (0.031)	<0.005	<0.005

Notes:
Results are expressed as milligrams per litre except where noted.
< = Results are below detection limit.
a= values in ( ) are concentrations in mg/L for dissolved metals. (<) indicates value below detection limit.
b = These criteria are calculated based on hardness and pH of samples. Shaded/bold values indicate exceedence of the corresponding federal CCME guideline for freshwater aquatic life.

Figure 6. FWS Reservoir Dissolved Oxygen and Temperature Profile
August 21, 2003

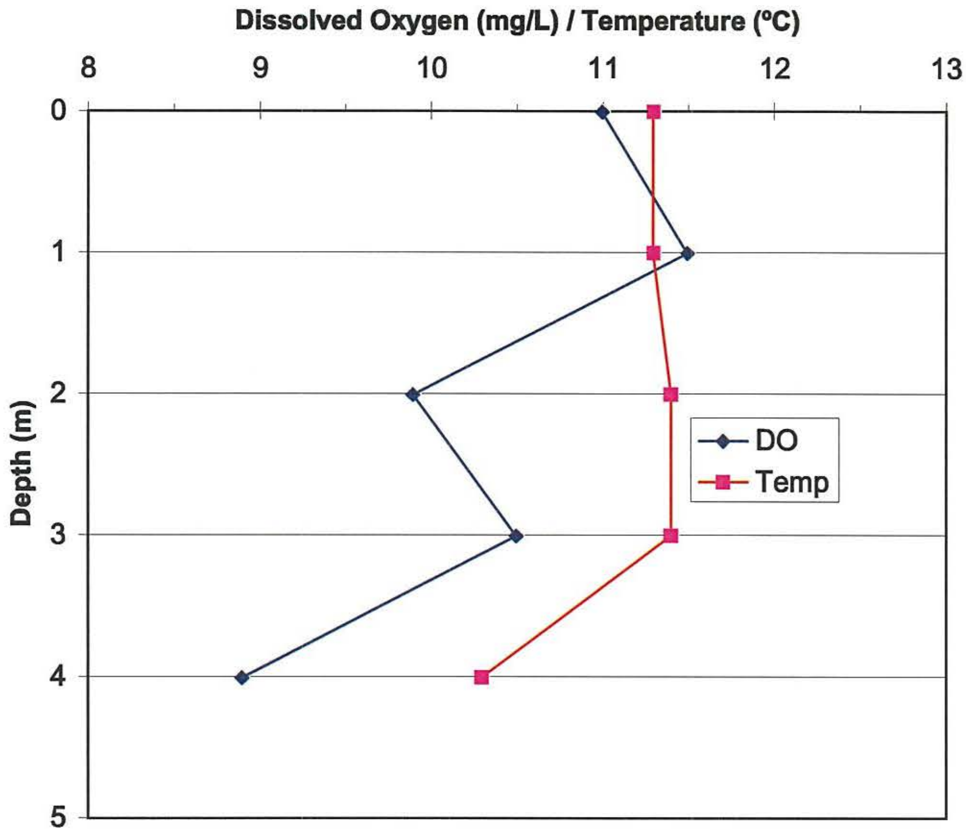


Table 7. Summary of fish removed from the Fresh Water Supply Reservoir

Species	Disposition	Number
Arctic Grayling		
	Released into Rose Cr.	212
	Released into Pelly R.	1035
	YTG Biological Sample	432
	Kept for Trappers	527
	Killed by otters	53
	Salvaged during Construction	592
	Total	2,851
Slimy Sculpins		
	Released into Rose Cr.	100
	Released into Pelly R.	177
	YTG Biological Sample	186
	Salvaged during Construction	493
	Total	956
Burbot		
	Released into Rose Cr.	9
	Released into Pelly R.	27
	YTG Biological Sample	12
	Salvaged during Construction	10
	Total	58
	Grand Total	**3,865**

The initial salvage program collected 83% of the arctic grayling and burbot ultimately removed from the reservoir but only 48% of the slimy sculpins with the remainder removed during the construction phase.

Based on the estimated total arctic grayling population in the reservoir of 5,356 fish the salvage removed 53% of the population.

Live capture and release of arctic grayling, slimy sculpins and burbot provided for the distribution of the genetic stock of the population resident in the reservoir into Rose Creek and the Pelly River. A total of 435 arctic grayling, 186 slimy sculpins and 12 burbot were turned over to the Yukon Territorial Government for further biological analysis. Another 525 arctic grayling were collected and offered to the Kaska Dena First Nation as bait for trap lines.

5. References

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Appendices

Appendix A

Fish Capture Numbers

- Arctic Grayling
- Slimy Sculpins
- Burbot

ARCTIC GRAYLING

A1 Released

Appendix A1. Arctic Grayling Released

Fish #	Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
1	AG	8-Sep-03	945	2751	290	200	Yellow	Released	Pelly R
2	AG	8-Sep-03	945	2752	280	250	Yellow	Released	Pelly R
3	AG	8-Sep-03	945	2753	280	230	Yellow	Released	Pelly R
4	AG	8-Sep-03	945	2754	280	230	Yellow	Released	Pelly R
5	AG	8-Sep-03	945	2755	250	160	Yellow	Released	Pelly R
6	AG	8-Sep-03	945	2756	250	180	Yellow	Released	Pelly R
7	AG	8-Sep-03	945	2757	260	180	Yellow	Released	Pelly R
8	AG	8-Sep-03	945	2758	250	140	Yellow	Released	Pelly R
9	AG	8-Sep-03	945	2759	250	130	Yellow	Released	Pelly R
10	AG	8-Sep-03	1125	2760	340	350	Yellow	Released	Pelly R
11	AG	8-Sep-03	1125	2761	300	240	Yellow	Released	Pelly R
12	AG	8-Sep-03	1125	2762	290	240	Yellow	Released	Pelly R
13	AG	8-Sep-03	1310	2763	330	320	Yellow	Released	Pelly R
14	AG	8-Sep-03	1330	2764	270	160	Yellow	Released	Pelly R
15	AG	8-Sep-03	1440	2765	290	210	Yellow	Released	Pelly R
16	AG	8-Sep-03	1440	2766	310	300	Yellow	Released	Pelly R
17	AG	8-Sep-03	1400	2767	300	210	Yellow	Released	Pelly R
18	AG	8-Sep-03	1545	2768	270	200	Yellow	Released	Pelly R
19	AG	8-Sep-03	1545	2769	270	200	Yellow	Released	Pelly R
20	AG	8-Sep-03	1545	2770	270	210	Yellow	Released	Pelly R
21	AG	8-Sep-03	1545	2771	260	190	Yellow	Released	Pelly R
22	AG	8-Sep-03	1545	2772	280	240	Yellow	Released	Pelly R
23	AG	8-Sep-03	1545	2773	280	230	Yellow	Released	Pelly R
24	AG	8-Sep-03	1545	2774	250	180	Yellow	Released	Pelly R
25	AG	8-Sep-03	1700	2775	300	250	Yellow	Released	Pelly R
26	AG	8-Sep-03	1700	2800	300	260	Yellow	Released	Pelly R
27	AG	9-Sep-03	930	2799	260	180	Yellow	Released	Pelly R
28	AG	9-Sep-03	930	2798	290	240	Yellow	Released	Pelly R
29	AG	9-Sep-03	930	2797	280	200	Yellow	Released	Pelly R
30	AG	9-Sep-03	930	2796	270	200	Yellow	Released	Pelly R
31	AG	9-Sep-03	930	2795	290	230	Yellow	Released	Pelly R
32	AG	9-Sep-03	930	2794	300	290	Yellow	Released	Pelly R
33	AG	9-Sep-03	930	2793	290	290	Yellow	Released	Pelly R
34	AG	9-Sep-03	930	2792	320	360	Yellow	Released	Pelly R
35	AG	9-Sep-03	930	2791	290	240	Yellow	Released	Pelly R
36	AG	9-Sep-03	930	2790	280	240	Yellow	Released	Pelly R
37	AG	9-Sep-03	930	2789	260	180	Yellow	Released	Pelly R
38	AG	9-Sep-03	930	2788	320	350	Yellow	Released	Pelly R
39	AG	9-Sep-03	930	2787	270	200	Yellow	Released	Pelly R
40	AG	9-Sep-03	930	2786	280	200	Yellow	Released	Pelly R
41	AG	9-Sep-03	930	2785	260	180	Yellow	Released	Pelly R
42	AG	9-Sep-03	1315	2784	290	290	Yellow	Released	Pelly R
43	AG	9-Sep-03	1315	2783	290	230	Yellow	Released	Pelly R
44	AG	9-Sep-03	1315	2782	310	350	Yellow	Released	Pelly R
45	AG	9-Sep-03	1315	2781	250	180	Yellow	Released	Pelly R
46	AG	9-Sep-03	1315	2780	320	350	Yellow	Released	Pelly R
47	AG	9-Sep-03	1315	2779	310	370	Yellow	Released	Pelly R
48	AG	9-Sep-03	1315	2778	270	260	Yellow	Released	Pelly R
49	AG	9-Sep-03	1315	2777	310	360	Yellow	Released	Pelly R
50	AG	9-Sep-03	1315	2776	310	360	Yellow	Released	Pelly R
51	AG	9-Sep-03	1315	2749	300	250	Yellow	Released	Pelly R
52	AG	9-Sep-03	1315	2748	280	280	Yellow	Released	Pelly R
53	AG	9-Sep-03	1315	2747	340	420	Yellow	Released	Pelly R
54	AG	9-Sep-03	1315	2746	300	330	Yellow	Released	Pelly R
55	AG	9-Sep-03	1315	2745	330	400	Yellow	Released	Pelly R
56	AG	9-Sep-03	1315	2744	290	300	Yellow	Released	Pelly R
57	AG	9-Sep-03	1315	2743	290	270	Yellow	Released	Pelly R
58	AG	9-Sep-03	1315	2742	270	240	Yellow	Released	Pelly R
59	AG	9-Sep-03	1315	2741	280	260	Yellow	Released	Pelly R
60	AG	9-Sep-03	1315	2740	270	200	Yellow	Released	Pelly R
61	AG	9-Sep-03	1315	2739	280	220	Yellow	Released	Pelly R

Appendix A1. Arctic Grayling Released

Fish #	Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
62	AG	9-Sep-03	1315	2738	290	280	Yellow	Released	Pelly R
63	AG	9-Sep-03	1315	2737	330	280	Yellow	Released	Pelly R
64	AG	9-Sep-03	1315	2736	260	220	Yellow	Released	Pelly R
65	AG	9-Sep-03	1315	2735	290	260	Yellow	Released	Pelly R
66	AG	9-Sep-03	1315	2734	270	200	Yellow	Released	Pelly R
67	AG	9-Sep-03	1315	2733	300	290	Yellow	Released	Pelly R
68	AG	9-Sep-03	1315	2732	320	360	Yellow	Released	Pelly R
69	AG	9-Sep-03	1315	2731	270	320	Yellow	Released	Pelly R
70	AG	9-Sep-03	1315	2730	300	300	Yellow	Released	Pelly R
71	AG	9-Sep-03	1315	2729	280	280	Yellow	Released	Pelly R
72	AG	9-Sep-03	1315	2728	290	260	Yellow	Released	Pelly R
73	AG	9-Sep-03	1315	2727	300	340	Yellow	Released	Pelly R
74	AG	9-Sep-03	1315	2726	250	200	Yellow	Released	Pelly R
75	AG	9-Sep-03	1315	2724	270	240	Yellow	Released	Pelly R
76	AG	9-Sep-03	1315	2723	290	270	Yellow	Released	Pelly R
77	AG	9-Sep-03	1315	2722	290	270	Yellow	Released	Pelly R
78	AG	9-Sep-03	1315	2721	290	290	Yellow	Released	Pelly R
79	AG	9-Sep-03	1315	2720	270	210	Yellow	Released	Pelly R
80	AG	9-Sep-03	1315	2719	280	240	Yellow	Released	Pelly R
81	AG	9-Sep-03	1315	2718	270	250	Yellow	Released	Pelly R
82	AG	9-Sep-03	1315	2717	300	260	Yellow	Released	Pelly R
83	AG	9-Sep-03	1515	2716	320	380	Yellow	Released	Pelly R
84	AG	9-Sep-03	1515	2715	310	310	Yellow	Released	Pelly R
85	AG	9-Sep-03	1515	2714	270	200	Yellow	Released	Pelly R
86	AG	9-Sep-03	1515	2713	300	300	Yellow	Released	Pelly R
87	AG	9-Sep-03	1515	2712	300	270	Yellow	Released	Pelly R
88	AG	9-Sep-03	1515	2711	290	270	Yellow	Released	Pelly R
89	AG	9-Sep-03	1515	2710	280	240	Yellow	Released	Pelly R
90	AG	9-Sep-03	1515	2709	290	290	Yellow	Released	Pelly R
91	AG	9-Sep-03	1630	2708	280	170	Yellow	Released	Pelly R
92	AG	10-Sep-03	1000	2707	330	300	Yellow	Released	Pelly R
93	AG	10-Sep-03	1000	2706	330	300	Yellow	Released	Pelly R
94	AG	10-Sep-03	1000	2705	260	180	Yellow	Released	Pelly R
95	AG	10-Sep-03	1100	2704	310	290	Yellow	Released	Pelly R
96	AG	10-Sep-03	1100	2703	250	80	Yellow	Released	Pelly R
97	AG	10-Sep-03	1215	2702	310	300	Yellow	Released	Pelly R
98	AG	10-Sep-03	1215	2701	310	310	Yellow	Released	Pelly R
99	AG	10-Sep-03	1215	2700	300	275	Yellow	Released	Pelly R
100	AG	11-Sep-03	930	2699	300	280	Yellow	Released	Pelly R
101	AG	11-Sep-03	930	2698	300	270	Yellow	Released	Pelly R
102	AG	11-Sep-03	930	2697	280	250	Yellow	Released	Pelly R
103	AG	11-Sep-03	930	2696	300	290	Yellow	Released	Pelly R
104	AG	11-Sep-03	930	2695	260	190	Yellow	Released	Pelly R
105	AG	11-Sep-03	1015	2694	300	230	Yellow	Released	Pelly R
106	AG	11-Sep-03	1015	2693	260	190	Yellow	Released	Pelly R
107	AG	11-Sep-03	1015	2692	270	210	Yellow	Released	Pelly R
108	AG	11-Sep-03	1015	2691	290	240	Yellow	Released	Pelly R
109	AG	11-Sep-03	1015	2690	310	300	Yellow	Released	Pelly R
110	AG	11-Sep-03	1015	2689	280	220	Yellow	Released	Pelly R
111	AG	11-Sep-03	1015	2688	290	270	Yellow	Released	Pelly R
112	AG	11-Sep-03	1015	2687	280	220	Yellow	Released	Pelly R
113	AG	11-Sep-03	1100	2686	300	250	Yellow	Released	Pelly R
114	AG	11-Sep-03	1100	2685	300	290	Yellow	Released	Pelly R
115	AG	11-Sep-03	1100	2684	310	330	Yellow	Released	Pelly R
116	AG	11-Sep-03	1100	2683	320	340	Yellow	Released	Pelly R
117	AG	11-Sep-03	1100	2682	290	240	Yellow	Released	Pelly R
118	AG	11-Sep-03	1100	2681	300	320	Yellow	Released	Pelly R
119	AG	11-Sep-03	1100	2680	310	300	Yellow	Released	Pelly R
120	AG	11-Sep-03	1100	2679	290	250	Yellow	Released	Pelly R
121	AG	11-Sep-03	1230	2678	270	180	Yellow	Released	Pelly R
122	AG	11-Sep-03	1530	2677	320	330	Yellow	Released	Pelly R

Appendix A1. Arctic Grayling Released

Fish #	Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
123	AG	11-Sep-03	1530	2676	290	240	Yellow	Released	Pelly R
124	AG	11-Sep-03	1530	2675	290	240	Yellow	Released	Pelly R
125	AG	11-Sep-03	1530	2674	280	260	Yellow	Released	Pelly R
126	AG	11-Sep-03	1530	2673	310	320	Yellow	Released	Pelly R
127	AG	11-Sep-03	1530	2672	280	220	Yellow	Released	Pelly R
128	AG	11-Sep-03	1530	2671	310	320	Yellow	Released	Pelly R
129	AG	11-Sep-03	1530	2670	300	300	Yellow	Released	Pelly R
130	AG	11-Sep-03	1530	2669	280	220	Yellow	Released	Pelly R
131	AG	11-Sep-03	1530	2668	270	190	Yellow	Released	Pelly R
132	AG	11-Sep-03	1530	2667	290	240	Yellow	Released	Pelly R
133	AG	11-Sep-03	1530	2666	280	230	Yellow	Released	Pelly R
134	AG	11-Sep-03	1530	2665	280	240	Yellow	Released	Pelly R
135	AG	11-Sep-03	1530	2664	290	260	Yellow	Released	Pelly R
136	AG	11-Sep-03	1530	2663	270	190	Yellow	Released	Pelly R
137	AG	12-Sep-03	1115	2662	310	240	Yellow	Released	Pelly R
138	AG	12-Sep-03	1115	2661	270	220	Yellow	Released	Pelly R
139	AG	12-Sep-03	1115	2660	260	220	Yellow	Released	Pelly R
140	AG	12-Sep-03	1115	2659	300	280	Yellow	Released	Pelly R
141	AG	12-Sep-03	1115	2658	310	330	Yellow	Released	Pelly R
142	AG	12-Sep-03	1115	2657	270	220	Yellow	Released	Pelly R
143	AG	12-Sep-03	1115	2656	260	220	Yellow	Released	Pelly R
144	AG	12-Sep-03	1115	2655	270	240	Yellow	Released	Pelly R
145	AG	12-Sep-03	1115	2654	Mortality	Mortality	Yellow	Released	Pelly R
146	AG	12-Sep-03	1115	2653	250	180	Yellow	Released	Pelly R
147	AG	12-Sep-03	1350	2652	300	240	Yellow	Released	Pelly R
148	AG	12-Sep-03	1350	2651	320	330	Yellow	Released	Pelly R
149	AG	12-Sep-03	1350	2650	320	330	Yellow	Released	Pelly R
150	AG	12-Sep-03	1350	2649	280	260	Yellow	Released	Pelly R
151	AG	12-Sep-03	1350	2648	280	260	Yellow	Released	Pelly R
152	AG	12-Sep-03	1350	2647	280	250	Yellow	Released	Pelly R
153	AG	12-Sep-03	1350	2645	310	310	Yellow	Released	Pelly R
154	AG	12-Sep-03	1350	2644	330	400	Yellow	Released	Pelly R
155	AG	12-Sep-03	1450	2643	270	230	Yellow	Released	Pelly R
156	AG	12-Sep-03	1450	2642	Mortality	Mortality	Yellow	Released	Pelly R
157	AG	12-Sep-03	1450	2641	280	200	Yellow	Released	Pelly R
158	AG	12-Sep-03	1450	2640	290	250	Yellow	Released	Pelly R
159	AG	12-Sep-03	1450	2639	270	250	Yellow	Released	Pelly R
160	AG	12-Sep-03	1450	2638	300	240	Yellow	Released	Pelly R
161	AG	12-Sep-03	1450	2637	290	240	Yellow	Released	Pelly R
162	AG	12-Sep-03	1450	2636	270	200	Yellow	Released	Pelly R
163	AG	12-Sep-03	1450	2635	280	230	Yellow	Released	Pelly R
164	AG	12-Sep-03	1450	2634	Mortality	Mortality	Yellow	Released	Pelly R
165	AG	12-Sep-03	1450	2633	Mortality	Mortality	Yellow	Released	Pelly R
166	AG	12-Sep-03	1450	2632	360	530	Yellow	Released	Pelly R
167	AG	12-Sep-03	1450	2631	270	200	Yellow	Released	Pelly R
168	AG	12-Sep-03	1450	2630	280	290	Yellow	Released	Pelly R
169	AG	12-Sep-03	1450	2629	280	260	Yellow	Released	Pelly R
170	AG	12-Sep-03	1450	2628	280	250	Yellow	Released	Pelly R
171	AG	12-Sep-03	1450	2627	270	210	Yellow	Released	Pelly R
172	AG	12-Sep-03	1450	2626	Mortality	Mortality	Yellow	Released	Pelly R
173	AG	13-Sep-03	1410	2625	290	200	Yellow	Released	Pelly R
174	AG	13-Sep-03	1410	2624	260	175	Yellow	Released	Pelly R
175	AG	13-Sep-03	1410	2623	270	220	Yellow	Released	Pelly R
176	AG	13-Sep-03	1410	2622	290	200	Yellow	Released	Pelly R
177	AG	13-Sep-03	1410	2620	290	230	Yellow	Released	Pelly R
178	AG	13-Sep-03	1410	2619	300	260	Yellow	Released	Pelly R
179	AG	13-Sep-03	1410	2618	280	180	Yellow	Released	Pelly R
180	AG	13-Sep-03	1410	2617	280	250	Yellow	Released	Pelly R
181	AG	13-Sep-03	1410	2616	310	230	Yellow	Released	Pelly R
182	AG	13-Sep-03	1410	2615	280	180	Yellow	Released	Pelly R
183	AG	13-Sep-03	1410	2614	270	175	Yellow	Released	Pelly R

Appendix A1. Arctic Grayling Released

Fish #	Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
184	AG	13-Sep-03	1410	2613	270	190	Yellow	Released	Pelly R
185	AG	13-Sep-03	1410	2612	270	165	Yellow	Released	Pelly R
186	AG	13-Sep-03	1410	2611	280	190	Yellow	Released	Pelly R
187	AG	13-Sep-03	1410	2610	270	200	Yellow	Released	Pelly R
188	AG	13-Sep-03	1410	2609	290	190	Yellow	Released	Pelly R
189	AG	13-Sep-03	1410	2608	300	200	Yellow	Released	Pelly R
190	AG	13-Sep-03	1410	2607	290	230	Yellow	Released	Pelly R
191	AG	13-Sep-03	1410	2606	270	200	Yellow	Released	Pelly R
192	AG	13-Sep-03	1410	2605	310	310	Yellow	Released	Pelly R
193	AG	13-Sep-03	1410	2604	270	200	Yellow	Released	Pelly R
194	AG	13-Sep-03	1410	2603	300	240	Yellow	Released	Pelly R
195	AG	13-Sep-03	1410	2602	260	150	Yellow	Released	Pelly R
196	AG	13-Sep-03	1410	2601	280	210	Yellow	Released	Pelly R
197	AG	13-Sep-03	1410	2600	270	150	Yellow	Released	Pelly R
198	AG	13-Sep-03	1410	2599	290	180	Yellow	Released	Pelly R
199	AG	14-Sep-03	1600	2598	280	180	Yellow	Released	Pelly R
200	AG	14-Sep-03	1600	2597	270	200	Yellow	Released	Pelly R
201	AG	14-Sep-03	1600	2596	270	230	Yellow	Released	Pelly R
202	AG	14-Sep-03	1600	2595	280	270	Yellow	Released	Pelly R
203	AG	14-Sep-03	1600	2594	280	270	Yellow	Released	Pelly R
204	AG	14-Sep-03	1600	2592	290	300	Yellow	Released	Pelly R
205	AG	14-Sep-03	1600	2591	270	210	Yellow	Released	Pelly R
206	AG	14-Sep-03	1600	2590	270	200	Yellow	Released	Pelly R
207	AG	14-Sep-03	1600	2589	270	200	Yellow	Released	Pelly R
208	AG	14-Sep-03	1600	2588	330	470	Yellow	Released	Pelly R
209	AG	14-Sep-03	1600	2587	260	230	Yellow	Released	Pelly R
210	AG	14-Sep-03	1600	2586	260	230	Yellow	Released	Pelly R
211	AG	14-Sep-03	1600	2585	270	250	Yellow	Released	Pelly R
212	AG	14-Sep-03	1600	2584	290	270	Yellow	Released	Pelly R
213	AG	14-Sep-03	1600	2583	260	250	Yellow	Released	Pelly R
214	AG	14-Sep-03	1600	2582	270	250	Yellow	Released	Pelly R
215	AG	14-Sep-03	1600	2581	270	250	Yellow	Released	Pelly R
216	AG	14-Sep-03	1600	2580	290	210	Yellow	Released	Pelly R
217	AG	14-Sep-03	1600	2579	320	360	Yellow	Released	Pelly R
218	AG	14-Sep-03	1600	2578	290	290	Yellow	Released	Pelly R
219	AG	14-Sep-03	1600	2577	260	190	Yellow	Released	Pelly R
220	AG	14-Sep-03	1600	2576	290	300	Yellow	Released	Pelly R
221	AG	14-Sep-03	1600	2573	270	240	Yellow	Released	Pelly R
222	AG	14-Sep-03	1600	2572	270	240	Yellow	Released	Pelly R
223	AG	14-Sep-03	1600	2571	250	180	Yellow	Released	Pelly R
224	AG	14-Sep-03	1600	2570	270	240	Yellow	Released	Pelly R
225	AG	14-Sep-03	1600	2569	270	230	Yellow	Released	Pelly R
226	AG	14-Sep-03	1600	2568	250	190	Yellow	Released	Pelly R
227	AG	14-Sep-03	1600	2567	290	230	Yellow	Released	Pelly R
228	AG	14-Sep-03	1600	2566	270	220	Yellow	Released	Pelly R
229	AG	14-Sep-03	1600	2565	280	250	Yellow	Released	Pelly R
230	AG	14-Sep-03	1600	2564	290	290	Yellow	Released	Pelly R
231	AG	14-Sep-03	1600	2563	250	180	Yellow	Released	Pelly R
232	AG	14-Sep-03	1600	2562	270	210	Yellow	Released	Pelly R
233	AG	14-Sep-03	1600	2561	250	200	Yellow	Released	Pelly R
234	AG	14-Sep-03	1600	2560	250	170	Yellow	Released	Pelly R
235	AG	14-Sep-03	1600	2559	280	260	Yellow	Released	Pelly R
236	AG	14-Sep-03	1600	2558	260	200	Yellow	Released	Pelly R
237	AG	14-Sep-03	1600	2557	270	220	Yellow	Released	Pelly R
238	AG	14-Sep-03	1600	2555	250	180	Yellow	Released	Pelly R
239	AG	15-Sep-03	1630	2554	260	250	Yellow	Released	Pelly R
240	AG	15-Sep-03	1630	2550	280	200	Yellow	Released	Pelly R
241	AG	15-Sep-03	1630	2549	290	275	Yellow	Released	Pelly R
242	AG	15-Sep-03	1630	2548	290	250	Yellow	Released	Pelly R
243	AG	15-Sep-03	1630	2547	280	200	Yellow	Released	Pelly R
244	AG	15-Sep-03	1630	2543	275	210	Yellow	Released	Pelly R

Appendix A1. Arctic Grayling Released

Fish #	Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
401	AG	5-Sep-03	1700		115	N/A		Released	Pelly R
402	AG	5-Sep-03	1700		75	N/A		Released	Pelly R
403	AG	5-Sep-03	1700		75	N/A		Released	Pelly R
404	AG	5-Sep-03	1700		65	N/A		Released	Pelly R
405	AG	5-Sep-03	1700		40	N/A		Released	Lower Rose
406	AG	5-Sep-03	1700		25	N/A		Released	Lower Rose
407	AG	6-Sep-03	1300		280	325		Released	Lower Rose
408	AG	6-Sep-03	1300		260	300		Released	Lower Rose
409	AG	6-Sep-03	1300		260	250		Released	Lower Rose
410	AG	6-Sep-03	1300		250	200		Released	Lower Rose
411	AG	6-Sep-03	1300		210	175		Released	Lower Rose
412	AG	6-Sep-03	1300		270	225		Released	Lower Rose
413	AG	6-Sep-03	1300		190	125		Released	Lower Rose
414	AG	6-Sep-03	1600		240	200		Released	Lower Rose
415	AG	6-Sep-03	1600		260	225		Released	Lower Rose
416	AG	6-Sep-03	1600		240	200		Released	Lower Rose
417	AG	6-Sep-03	1600		240	175		Released	Lower Rose
418	AG	6-Sep-03	1600		230	150		Released	Lower Rose
419	AG	6-Sep-03	1600		280	225		Released	Lower Rose
420	AG	6-Sep-03	1600		200	100		Released	Lower Rose
421	AG	6-Sep-03	1600		220	100		Released	Lower Rose
422	AG	6-Sep-03	1600		260	175		Released	Lower Rose
423	AG	6-Sep-03	1600		220	100		Released	Lower Rose
424	AG	6-Sep-03	1600		250	175		Released	Lower Rose
425	AG	6-Sep-03	1600		250	175		Released	Lower Rose
426	AG	6-Sep-03	1600		200	75		Released	Lower Rose
427	AG	6-Sep-03	1600		190	50		Released	Lower Rose
428	AG	6-Sep-03	1600		190	75		Released	Lower Rose
429	AG	6-Sep-03	1600		49	N/A		Released	Lower Rose
430	AG	6-Sep-03	1600		53	N/A		Released	Lower Rose
431	AG	6-Sep-03	1600		70	N/A		Released	Lower Rose
432	AG	7-Sep-03	1130		230	175		Released	Lower Rose
433	AG	7-Sep-03	1130		200	100		Released	Lower Rose
434	AG	7-Sep-03	1130		200	100		Released	Lower Rose
435	AG	7-Sep-03	1130		240	175		Released	Lower Rose
436	AG	7-Sep-03	1130		200	100		Released	Lower Rose
437	AG	7-Sep-03	1130		230	150		Released	Lower Rose
438	AG	7-Sep-03	1130		190	75		Released	Lower Rose
439	AG	7-Sep-03	1130		160	25		Released	Lower Rose
440	AG	7-Sep-03	1130		240	150		Released	Lower Rose
441	AG	7-Sep-03	1130		230	175		Released	Lower Rose
442	AG	7-Sep-03	1130		230	175		Released	Lower Rose
443	AG	7-Sep-03	1130		200	100		Released	Lower Rose
444	AG	7-Sep-03	1130		240	150		Released	Lower Rose
445	AG	7-Sep-03	1130		240	175		Released	Lower Rose
446	AG	7-Sep-03	1130		200	75		Released	Lower Rose
447	AG	7-Sep-03	1130		200	100		Released	Lower Rose
448	AG	7-Sep-03	1130		240	175		Released	Lower Rose
449	AG	7-Sep-03	1130		200	75		Released	Lower Rose
450	AG	7-Sep-03	1130		220	100		Released	Lower Rose
451	AG	7-Sep-03	1130		230	125		Released	Lower Rose
452	AG	7-Sep-03	1130		190	75		Released	Lower Rose
453	AG	7-Sep-03	1130		180	40		Released	Lower Rose
454	AG	7-Sep-03	1130		180	40		Released	Lower Rose
455	AG	7-Sep-03	1130		200	75		Released	Lower Rose
456	AG	7-Sep-03	1130		150	40		Released	Lower Rose
457	AG	7-Sep-03	1130		150	40		Released	Lower Rose
458	AG	7-Sep-03	1130		240	175		Released	Lower Rose
459	AG	7-Sep-03	1130		220	140		Released	Lower Rose
460	AG	7-Sep-03	1130		160	50		Released	Lower Rose
461	AG	7-Sep-03	1130		240	150		Released	Lower Rose

Appendix A1. Arctic Grayling Released

Fish #	Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
462	AG	7-Sep-03	1130		240	150		Released	Lower Rose
463	AG	7-Sep-03	1130		200	90		Released	Lower Rose
464	AG	7-Sep-03	1130		140	25		Released	Lower Rose
465	AG	7-Sep-03	1130		200	90		Released	Lower Rose
466	AG	7-Sep-03	1130		200	90		Released	Lower Rose
467	AG	7-Sep-03	1130		190	75		Released	Lower Rose
468	AG	7-Sep-03	1130		200	90		Released	Lower Rose
469	AG	7-Sep-03	1130		220	110		Released	Lower Rose
470	AG	7-Sep-03	1130		130	20		Released	Lower Rose
471	AG	7-Sep-03	1130		180	50		Released	Lower Rose
472	AG	7-Sep-03	1130		230	100		Released	Lower Rose
473	AG	7-Sep-03	1130		190	50		Released	Lower Rose
474	AG	7-Sep-03	1130		220	90		Released	Lower Rose
475	AG	7-Sep-03	1130		180	50		Released	Lower Rose
476	AG	7-Sep-03	1130		230	100		Released	Lower Rose
477	AG	7-Sep-03	1130		210	90		Released	Lower Rose
478	AG	7-Sep-03	1130		140	25		Released	Lower Rose
479	AG	7-Sep-03	1130		160	35		Released	Lower Rose
480	AG	7-Sep-03	1130		180	50		Released	Lower Rose
481	AG	7-Sep-03	1130		170	35		Released	Lower Rose
482	AG	7-Sep-03	1130		130	25		Released	Lower Rose
483	AG	7-Sep-03	1130		200	90		Released	Lower Rose
484	AG	7-Sep-03	1130		230	120		Released	Lower Rose
485	AG	7-Sep-03	1130		230	120		Released	Lower Rose
486	AG	7-Sep-03	1130		240	150		Released	Lower Rose
487	AG	7-Sep-03	1130		150	50		Released	Lower Rose
488	AG	7-Sep-03	1130		160	40		Released	Lower Rose
489	AG	7-Sep-03	1130		190	60		Released	Lower Rose
490	AG	7-Sep-03	1130		210	100		Released	Lower Rose
491	AG	7-Sep-03	1130		240	150		Released	Lower Rose
492	AG	7-Sep-03	1130		220	100		Released	Lower Rose
493	AG	7-Sep-03	1130		190	50		Released	Lower Rose
494	AG	7-Sep-03	1130		170	40		Released	Lower Rose
495	AG	7-Sep-03	1130		190	60		Released	Lower Rose
496	AG	7-Sep-03	1130		180	60		Released	Lower Rose
497	AG	7-Sep-03	1130		160	40		Released	Lower Rose
498	AG	7-Sep-03	1130		140	40		Released	Lower Rose
499	AG	7-Sep-03	1130		200	90		Released ·	Lower Rose
500	AG	7-Sep-03	1130		180	60		Released	Lower Rose
501	AG	7-Sep-03	1130		240	120		Released	Lower Rose
502	AG	7-Sep-03	1130		200	90		Released	Lower Rose
503	AG	7-Sep-03	1130		200	90		Released	Lower Rose
504	AG	7-Sep-03	1130		160	50		Released	Lower Rose
505	AG	7-Sep-03	1130		160	50		Released	Lower Rose
506	AG	7-Sep-03	1130		240	160		Released	Lower Rose
507	AG	7-Sep-03	1130		150	30		Released	Lower Rose
508	AG	7-Sep-03	1130		210	70		Released	Lower Rose
509	AG	7-Sep-03	1130		190	60		Released	Lower Rose
510	AG	7-Sep-03	1130		150	30		Released	Lower Rose
511	AG	7-Sep-03	1130		140	20		Released	Lower Rose
512	AG	7-Sep-03	1130		120	10		Released	Lower Rose
513	AG	7-Sep-03	1130		120	10		Released	Lower Rose
514	AG	7-Sep-03	1430		180	40		Released	Lower Rose
515	AG	7-Sep-03	1430		200	70		Released	Lower Rose
516	AG	7-Sep-03	1430		200	70		Released	Lower Rose
517	AG	7-Sep-03	1430		190	60		Released	Lower Rose
518	AG	7-Sep-03	1430		200	70		Released	Lower Rose
519	AG	7-Sep-03	1430		200	70		Released	Lower Rose
520	AG	7-Sep-03	1430		180	20		Released	Lower Rose
521	AG	7-Sep-03	1430		180	50		Released	Lower Rose
522	AG	7-Sep-03	1430		180	50		Released	Lower Rose

Appendix A1. Arctic Grayling Released

Fish #	Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
523	AG	7-Sep-03	1430		190	70		Released	Lower Rose
524	AG	7-Sep-03	1430		190	70		Released	Lower Rose
525	AG	7-Sep-03	1430		180	60		Released	Lower Rose
526	AG	7-Sep-03	1430		200	80		Released	Lower Rose
527	AG	7-Sep-03	1430		200	80		Released	Lower Rose
528	AG	7-Sep-03	1430		200	90		Released	Lower Rose
529	AG	7-Sep-03	1430		200	80		Released	Lower Rose
530	AG	7-Sep-03	1430		190	60		Released	Lower Rose
531	AG	7-Sep-03	1430		190	60		Released	Lower Rose
532	AG	7-Sep-03	1430		65	N/A		Released	Lower Rose
533	AG	9-Sep-03	1000		190	90		Released	Pelly R
534	AG	9-Sep-03	1000		190	90		Released	Pelly R
535	AG	9-Sep-03	1000		190	90		Released	Pelly R
536	AG	9-Sep-03	1000		190	90		Released	Pelly R
537	AG	9-Sep-03	1000		180	80		Released	Pelly R
538	AG	9-Sep-03	1000		190	90		Released	Pelly R
539	AG	9-Sep-03	1000		180	80		Released	Pelly R
540	AG	9-Sep-03	1000		180	80		Released	Pelly R
541	AG	9-Sep-03	1000		170	60		Released	Pelly R
542	AG	9-Sep-03	1000		190	90		Released	Pelly R
543	AG	9-Sep-03	1000		180	80		Released	Pelly R
544	AG	9-Sep-03	1000		170	60		Released	Pelly R
545	AG	9-Sep-03	1000		160	50		Released	Pelly R
546	AG	9-Sep-03	1000		190	70		Released	Pelly R
547	AG	9-Sep-03	1530		190	70		Released	Pelly R
548	AG	9-Sep-03	1530		185	60		Released	Pelly R
549	AG	9-Sep-03	1530		190	60		Released	Pelly R
550	AG	9-Sep-03	1530		170	50		Released	Pelly R
551	AG	9-Sep-03	1530		180	65		Released	Pelly R
552	AG	9-Sep-03	1530		175	55		Released	Pelly R
553	AG	9-Sep-03	1530		170	50		Released	Pelly R
554	AG	9-Sep-03	1530		190	45		Released	Pelly R
555	AG	9-Sep-03	1530		180	40		Released	Pelly R
556	AG	9-Sep-03	1530		190	50		Released	Pelly R
557	AG	9-Sep-03	1530		190	50		Released	Pelly R
558	AG	10-Sep-03	1130		240	130		Released	Lower Rose
559	AG	10-Sep-03	1130		200	70		Released	Lower Rose
560	AG	10-Sep-03	1130		210	85		Released	Lower Rose
561	AG	10-Sep-03	1130		180	60		Released	Lower Rose
562	AG	10-Sep-03	1130		180	65		Released	Lower Rose
563	AG	10-Sep-03	1130		200	75		Released	Lower Rose
564	AG	10-Sep-03	1130		200	75		Released	Lower Rose
565	AG	10-Sep-03	1400		190	60		Released	Lower Rose
566	AG	10-Sep-03	1400		200	75		Released	Lower Rose
567	AG	10-Sep-03	1400		190	60		Released	Lower Rose
568	AG	10-Sep-03	1400		200	75		Released	Lower Rose
569	AG	10-Sep-03	1400		200	75		Released	Lower Rose
570	AG	10-Sep-03	1400		190	60		Released	Lower Rose
571	AG	10-Sep-03	1400		180	55		Released	Lower Rose
572	AG	10-Sep-03	1400		180	55		Released	Lower Rose
573	AG	10-Sep-03	1400		210	70		Released	Lower Rose
574	AG	10-Sep-03	1400		200	70		Released	Lower Rose
575	AG	10-Sep-03	1400		240	80		Released	Lower Rose
576	AG	10-Sep-03	1400		220	100		Released	Lower Rose
577	AG	10-Sep-03	1400		190	60		Released	Lower Rose
578	AG	10-Sep-03	1400		190	55		Released	Lower Rose
579	AG	10-Sep-03	1730		200	60		Released	Lower Rose
580	AG	11-Sep-03	1100		210	100		Released	Pelly R
581	AG	11-Sep-03	1100		190	60		Released	Pelly R
582	AG	11-Sep-03	1100		190	60		Released	Pelly R
583	AG	11-Sep-03	1100		190	60		Released	Pelly R

Appendix A1. Arctic Grayling Released

Fish #	Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
584	AG	11-Sep-03	1100		190	65		Released	Pelly R
585	AG	11-Sep-03	1100		180	50		Released	Pelly R
586	AG	11-Sep-03	1100		180	50		Released	Pelly R
587	AG	11-Sep-03	1100		220	90		Released	Pelly R
588	AG	11-Sep-03	1100		180	50		Released	Pelly R
589	AG	11-Sep-03	1730		230	100		Released	Pelly R
590	AG	11-Sep-03	1730		210	90		Released	Pelly R
591	AG	11-Sep-03	1730		190	40		Released	Pelly R
592	AG	11-Sep-03	1730		210	80		Released	Pelly R
593	AG	11-Sep-03	1730		200	70		Released	Pelly R
594	AG	11-Sep-03	1730		190	50		Released	Pelly R
595	AG	11-Sep-03	1730		190	50		Released	Pelly R
596	AG	11-Sep-03	1730		190	50		Released	Pelly R
597	AG	11-Sep-03	1730		190	50		Released	Pelly R
598	AG	11-Sep-03	1730		190	40		Released	Pelly R
599	AG	11-Sep-03	1730		200	75		Released	Pelly R
600	AG	11-Sep-03	1730		220	100		Released	Pelly R
601	AG	11-Sep-03	1730		170	50		Released	Pelly R
602	AG	11-Sep-03	1730		160	35		Released	Pelly R
603	AG	11-Sep-03	1730		130	20		Released	Pelly R
604	AG	11-Sep-03	1730		130	15		Released	Pelly R
605	AG	11-Sep-03	1730		170	45		Released	Pelly R
606	AG	11-Sep-03	1730		140	15		Released	Pelly R
607	AG	11-Sep-03	1730		190	50		Released	Pelly R
608	AG	12-Sep-03	1630		240	160		Released	Pelly R
609	AG	12-Sep-03	1630		230	130		Released	Pelly R
610	AG	12-Sep-03	1630		220	80		Released	Pelly R
611	AG	12-Sep-03	1630		240	100		Released	Pelly R
612	AG	12-Sep-03	1630		220	100		Released	Pelly R
613	AG	12-Sep-03	1630		190	60		Released	Pelly R
614	AG	12-Sep-03	1630		200	70		Released	Pelly R
615	AG	12-Sep-03	1630		200	70		Released	Pelly R
616	AG	12-Sep-03	1630		190	60		Released	Pelly R
617	AG	12-Sep-03	1630		190	60		Released	Pelly R
618	AG	12-Sep-03	1630		180	40		Released	Pelly R
619	AG	12-Sep-03	1630		180	60		Released	Pelly R
620	AG	12-Sep-03	1630		200	75		Released	Pelly R
621	AG	12-Sep-03	1630		180	60		Released	Pelly R
622	AG	12-Sep-03	1630		200	75		Released	Pelly R
623	AG	12-Sep-03	1630		200	75		Released	Pelly R
624	AG	12-Sep-03	1630		180	60		Released	Pelly R
625	AG	12-Sep-03	1630		180	65		Released	Pelly R
626	AG	12-Sep-03	1630		180	60		Released	Pelly R
627	AG	12-Sep-03	1630		220	90		Released	Pelly R
628	AG	12-Sep-03	1630		210	70		Released	Pelly R
629	AG	12-Sep-03	1630		200	75		Released	Pelly R
630	AG	12-Sep-03	1630		200	90		Released	Pelly R
631	AG	12-Sep-03	1630		200	85		Released	Pelly R
632	AG	12-Sep-03	1630		170	40		Released	Pelly R
633	AG	12-Sep-03	1630		190	60		Released	Pelly R
634	AG	12-Sep-03	1630		210	180		Released	Pelly R
635	AG	12-Sep-03	1630		200	75		Released	Pelly R
636	AG	12-Sep-03	1630		200	75		Released	Pelly R
637	AG	13-Sep-03	1430		240	110		Released	Pelly R
638	AG	13-Sep-03	1430		170	40		Released	Pelly R
639	AG	13-Sep-03	1430		150	25		Released	Pelly R
640	AG	13-Sep-03	1430		230	110		Released	Pelly R
641	AG	13-Sep-03	1430		170	50		Released	Pelly R
642	AG	13-Sep-03	1430		180	55		Released	Pelly R
643	AG	13-Sep-03	1430		240	100		Released	Pelly R
644	AG	13-Sep-03	1430		190	60		Released	Pelly R

Appendix A1. Arctic Grayling Released

Fish #	Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
645	AG	13-Sep-03	1430		150	35		Released	Pelly R
646	AG	13-Sep-03	1430		200	100		Released	Pelly R
647	AG	13-Sep-03	1430		190	60		Released	Pelly R
648	AG	13-Sep-03	1430		190	65		Released	Pelly R
649	AG	13-Sep-03	1430		160	45		Released	Pelly R
650	AG	13-Sep-03	1430		180	50		Released	Pelly R
651	AG	13-Sep-03	1430		180	50		Released	Pelly R
652	AG	13-Sep-03	1430		190	65		Released	Pelly R
653	AG	13-Sep-03	1430		160	30		Released	Pelly R
654	AG	13-Sep-03	1430		240	95		Released	Pelly R
655	AG	13-Sep-03	1430		180	50		Released	Pelly R
656	AG	13-Sep-03	1430		190	50		Released	Pelly R
657	AG	13-Sep-03	1430		190	50		Released	Pelly R
658	AG	13-Sep-03	1430		170	50		Released	Pelly R
659	AG	13-Sep-03	1430		180	65		Released	Pelly R
660	AG	13-Sep-03	1430		170	50		Released	Pelly R
661	AG	13-Sep-03	1430		180	50		Released	Pelly R
662	AG	13-Sep-03	1430		190	55		Released	Pelly R
663	AG	13-Sep-03	1430		180	55		Released	Pelly R
664	AG	13-Sep-03	1430		170	45		Released	Pelly R
665	AG	13-Sep-03	1430		180	55		Released	Pelly R
666	AG	13-Sep-03	1430		180	55		Released	Pelly R
667	AG	13-Sep-03	1430		190	60		Released	Pelly R
668	AG	13-Sep-03	1430		170	45		Released	Pelly R
669	AG	13-Sep-03	1430		190	65		Released	Pelly R
670	AG	13-Sep-03	1430		170	40		Released	Pelly R
671	AG	13-Sep-03	1430		180	50		Released	Pelly R
672	AG	13-Sep-03	1430		170	40		Released	Pelly R
673	AG	13-Sep-03	1430		210	100		Released	Pelly R
674	AG	13-Sep-03	1430		180	55		Released	Pelly R
675	AG	13-Sep-03	1430		210	90		Released	Pelly R
676	AG	13-Sep-03	1430		180	55		Released	Pelly R
677	AG	13-Sep-03	1430		210	90		Released	Pelly R
678	AG	13-Sep-03	1430		170	40		Released	Pelly R
679	AG	13-Sep-03	1430		170	40		Released	Pelly R
680	AG	13-Sep-03	1430		190	55		Released	Pelly R
681	AG	13-Sep-03	1430		200	70		Released	Pelly R
682	AG	13-Sep-03	1430		170	45		Released	Pelly R
683	AG	13-Sep-03	1430		160	40		Released	Pelly R
684	AG	13-Sep-03	1430		180	50		Released	Pelly R
685	AG	13-Sep-03	1430		200	65		Released	Pelly R
686	AG	13-Sep-03	1430		200	65		Released	Pelly R
687	AG	13-Sep-03	1430		190	60		Released	Pelly R
688	AG	13-Sep-03	1430		190	65		Released	Pelly R
689	AG	14-Sep-03	1600		240	190		Released	Pelly R
690	AG	14-Sep-03	1600		180	70		Released	Pelly R
691	AG	14-Sep-03	1600		150	40		Released	Pelly R
692	AG	14-Sep-03	1600		200	90		Released	Pelly R
693	AG	14-Sep-03	1600		170	50		Released	Pelly R
694	AG	14-Sep-03	1600		220	110		Released	Pelly R
695	AG	14-Sep-03	1600		180	55		Released	Pelly R
696	AG	14-Sep-03	1600		180	50		Released	Pelly R
697	AG	14-Sep-03	1600		190	60		Released	Pelly R
698	AG	14-Sep-03	1600		230	140		Released	Pelly R
699	AG	14-Sep-03	1600		170	45		Released	Pelly R
700	AG	14-Sep-03	1600		190	55		Released	Pelly R
701	AG	14-Sep-03	1600		170	50		Released	Pelly R
702	AG	14-Sep-03	1600		230	140		Released	Pelly R
703	AG	14-Sep-03	1600		230	140		Released	Pelly R
704	AG	14-Sep-03	1600		240	160		Released	Pelly R
705	AG	14-Sep-03	1600		210	130		Released	Pelly R

Appendix A1. Arctic Grayling Released

Fish #	Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
245	AG	15-Sep-03	1630	2542	280	210	Yellow	Released	Pelly R
246	AG	15-Sep-03	1630	2537	280	230	Yellow	Released	Pelly R
247	AG	15-Sep-03	1630	2532	280	280	Yellow	Released	Pelly R
248	AG	15-Sep-03	1630	2531	250	190	Yellow	Released	Pelly R
249	AG	15-Sep-03	1630	2530	260	175	Yellow	Released	Pelly R
250	AG	16-Sep-03	1630	2529	280	230	Yellow	Released	Pelly R
251	AG	17-Sep-03	1600	2528	260	200	Yellow	Released	Pelly R
252	AG	17-Sep-03	1600	2527	280	230	Yellow	Released	Pelly R
253	AG	17-Sep-03	1600	2526	270	175	Yellow	Released	Pelly R
254	AG	17-Sep-03	1600	2524	280	250	Yellow	Released	Pelly R
255	AG	17-Sep-03	1600	2523	270	200	Yellow	Released	Pelly R
256	AG	17-Sep-03	1600	2522	260	200	Yellow	Released	Pelly R
257	AG	17-Sep-03	1600	2521	270	230	Yellow	Released	Pelly R
258	AG	17-Sep-03	1600	2520	280	240	Yellow	Released	Pelly R
259	AG	17-Sep-03	1600	2519	280	280	Yellow	Released	Pelly R
260	AG	17-Sep-03	1600	2518	260	230	Yellow	Released	Pelly R
261	AG	17-Sep-03	1600	2517	260	220	Yellow	Released	Pelly R
262	AG	17-Sep-03	1600	2516	270	250	Yellow	Released	Pelly R
263	AG	17-Sep-03	1600	2515	270	220	Yellow	Released	Pelly R
264	AG	17-Sep-03	1600	2514	270	220	Yellow	Released	Pelly R
265	AG	17-Sep-03	1600	2513	250	210	Yellow	Released	Pelly R
266	AG	17-Sep-03	1600	2512	280	240	Yellow	Released	Pelly R
267	AG	17-Sep-03	1600	2511	290	250	Yellow	Released	Pelly R
268	AG	17-Sep-03	1600	2510	260	230	Yellow	Released	Pelly R
269	AG	18-Sep-03	1630	2509	260	200	Yellow	Released	Pelly R
270	AG	18-Sep-03	1630	2508	250	210	Yellow	Released	Pelly R
271	AG	18-Sep-03	1630	2507	270	240	Yellow	Released	Pelly R
272	AG	18-Sep-03	1630	2506	260	200	Yellow	Released	Pelly R
273	AG	19-Sep-03	1600	2505	280	250	Yellow	Released	Pelly R
274	AG	19-Sep-03	1600	2504	280	240	Yellow	Released	Pelly R
275	AG	19-Sep-03	1600	2503	260	190	Yellow	Released	Pelly R
276	AG	19-Sep-03	1600	2502	270	220	Yellow	Released	Pelly R
277	AG	19-Sep-03	1600	2501	280	230	Yellow	Released	Pelly R
346	AG	7-Sep-03	1000	71	270	200	Orange	Released	Pelly R
369	AG	7-Sep-03	1700	81	310	300	Orange	Released	Pelly R
375	AG	4-Sep-03	1930		13	5		Released	Pelly R
376	AG	4-Sep-03	1930		240	150		Released	Pelly R
377	AG	4-Sep-03	1930		200	100		Released	Pelly R
378	AG	4-Sep-03	1930		13	5		Released	Pelly R
379	AG	4-Sep-03	1930		200	100		Released	Pelly R
380	AG	4-Sep-03	1930		225	125		Released	Pelly R
381	AG	4-Sep-03	1930		200	100		Released	Pelly R
382	AG	5-Sep-03	1800		125	100		Released	Pelly R
383	AG	5-Sep-03	1800		135	100		Released	Pelly R
384	AG	5-Sep-03	1800		230	225		Released	Pelly R
385	AG	5-Sep-03	1800		220	150		Released	Pelly R
386	AG	5-Sep-03	1800		240	200		Released	Pelly R
387	AG	5-Sep-03	1800		240	200		Released	Pelly R
388	AG	5-Sep-03	1800		260	225		Released	Pelly R
389	AG	5-Sep-03	1800		245	250		Released	Pelly R
390	AG	5-Sep-03	1800		225	200		Released	Pelly R
391	AG	5-Sep-03	1800		175	100		Released	Pelly R
392	AG	5-Sep-03	1800		255	250		Released	Pelly R
393	AG	5-Sep-03	1800		175	150		Released	Pelly R
394	AG	5-Sep-03	1800		240	200		Released	Pelly R
395	AG	5-Sep-03	1800		240	200		Released	Pelly R
396	AG	5-Sep-03	1800		235	200		Released	Pelly R
397	AG	5-Sep-03	1800		225	200		Released	Pelly R
398	AG	5-Sep-03	1800		240	200		Released	Pelly R
399	AG	5-Sep-03	1800		190	75		Released	Pelly R
400	AG	5-Sep-03	1700		200	100		Released	Pelly R

Appendix A1. Arctic Grayling Released

Fish #	Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
706	AG	14-Sep-03	1600		180	55		Released	Pelly R
707	AG	14-Sep-03	1600		220	130		Released	Pelly R
708	AG	14-Sep-03	1600		180	55		Released	Pelly R
709	AG	14-Sep-03	1600		160	40		Released	Pelly R
710	AG	14-Sep-03	1600		170	50		Released	Pelly R
711	AG	14-Sep-03	1600		150	40		Released	Pelly R
712	AG	14-Sep-03	1630		210	100		Released	Pelly R
713	AG	14-Sep-03	1630		210	100		Released	Pelly R
714	AG	14-Sep-03	1630		180	55		Released	Pelly R
715	AG	14-Sep-03	1630		180	55		Released	Pelly R
716	AG	14-Sep-03	1630		180	55		Released	Pelly R
717	AG	14-Sep-03	1630		180	55		Released	Pelly R
718	AG	14-Sep-03	1630		190	60		Released	Pelly R
719	AG	14-Sep-03	1630		190	80		Released	Pelly R
720	AG	14-Sep-03	1630		240	150		Released	Pelly R
721	AG	14-Sep-03	1630		170	55		Released	Pelly R
722	AG	14-Sep-03	1630		180	60		Released	Pelly R
723	AG	14-Sep-03	1630		220	115		Released	Pelly R
724	AG	14-Sep-03	1630		180	55		Released	Pelly R
725	AG	14-Sep-03	1630		170	50		Released	Pelly R
726	AG	14-Sep-03	1630		180	70		Released	Pelly R
727	AG	14-Sep-03	1630		190	70		Released	Pelly R
728	AG	14-Sep-03	1630		200	75		Released	Pelly R
729	AG	14-Sep-03	1630		200	70		Released	Pelly R
730	AG	14-Sep-03	1630		170	50		Released	Pelly R
731	AG	14-Sep-03	1630		190	70		Released	Pelly R
732	AG	14-Sep-03	1630		170	55		Released	Pelly R
733	AG	14-Sep-03	1630		220	90		Released	Pelly R
734	AG	14-Sep-03	1630		180	65		Released	Pelly R
735	AG	14-Sep-03	1630		170	45		Released	Pelly R
736	AG	14-Sep-03	1630		180	50		Released	Pelly R
737	AG	15-Sep-03	1730		270	250		Released	Pelly R
738	AG	15-Sep-03	1730		270	230		Released	Pelly R
739	AG	15-Sep-03	1730		260	220		Released	Pelly R
740	AG	15-Sep-03	1730		255	200		Released	Pelly R
741	AG	15-Sep-03	1730		260	160		Released	Pelly R
742	AG	15-Sep-03	1730		240	150		Released	Pelly R
743	AG	15-Sep-03	1730		265	250		Released	Pelly R
744	AG	15-Sep-03	1730		250	200		Released	Pelly R
745	AG	15-Sep-03	1730		260	240		Released	Pelly R
746	AG	15-Sep-03	1730		280	280		Released	Pelly R
747	AG	15-Sep-03	1730		220	130		Released	Pelly R
748	AG	15-Sep-03	1730		190	110		Released	Pelly R
749	AG	15-Sep-03	1730		170	90		Released	Pelly R
750	AG	15-Sep-03	1730		200	140		Released	Pelly R
751	AG	15-Sep-03	1730		170	90		Released	Pelly R
752	AG	15-Sep-03	1730		180	90		Released	Pelly R
753	AG	15-Sep-03	1730		170	70		Released	Pelly R
754	AG	15-Sep-03	1730		180	90		Released	Pelly R
755	AG	15-Sep-03	1730		270	230		Released	Pelly R
756	AG	15-Sep-03	1730		260	220		Released	Pelly R
757	AG	15-Sep-03	1730		255	200		Released	Pelly R
758	AG	15-Sep-03	1730		260	160		Released	Pelly R
759	AG	15-Sep-03	1730		265	250		Released	Pelly R
760	AG	15-Sep-03	1730		250	200		Released	Pelly R
761	AG	15-Sep-03	1730		260	240		Released	Pelly R
762	AG	16-Sep-03	1600		220	80		Released	Pelly R
763	AG	16-Sep-03	1600		200	80		Released	Pelly R
764	AG	16-Sep-03	1600		210	100		Released	Pelly R
765	AG	16-Sep-03	1630		210	110		Released	Pelly R
766	AG	16-Sep-03	1630		190	75		Released	Pelly R

Appendix A1. Arctic Grayling Released

Fish #	Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
767	AG	16-Sep-03	1630		200	90		Released	Pelly R
768	AG	17-Sep-03	1600		230	150		Released	Pelly R
769	AG	17-Sep-03	1600		170	55		Released	Pelly R
770	AG	17-Sep-03	1600		200	90		Released	Pelly R
771	AG	17-Sep-03	1600		220	120		Released	Pelly R
772	AG	17-Sep-03	1600		180	65		Released	Pelly R
773	AG	17-Sep-03	1600		135	35		Released	Pelly R
774	AG	17-Sep-03	1600		180	50		Released	Pelly R
775	AG	17-Sep-03	1600		180	50		Released	Pelly R
776	AG	17-Sep-03	1600		160	40		Released	Pelly R
777	AG	17-Sep-03	1600		160	40		Released	Pelly R
778	AG	17-Sep-03	1600		180	50		Released	Pelly R
779	AG	17-Sep-03	1600		120	10		Released	Pelly R
780	AG	17-Sep-03	1600		170	55		Released	Pelly R
781	AG	17-Sep-03	1600		180	60		Released	Pelly R
782	AG	17-Sep-03	1600		160	40		Released	Pelly R
783	AG	17-Sep-03	1600		190	45		Released	Pelly R
784	AG	17-Sep-03	1600		110	15		Released	Pelly R
785	AG	17-Sep-03	1600		180	65		Released	Pelly R
786	AG	17-Sep-03	1600		140	25		Released	Pelly R
787	AG	17-Sep-03	1600		170	50		Released	Pelly R
788	AG	17-Sep-03	1600		120	20		Released	Pelly R
789	AG	17-Sep-03	1600		220	100		Released	Pelly R
790	AG	17-Sep-03	1600		180	55		Released	Pelly R
791	AG	17-Sep-03	1600		190	65		Released	Pelly R
792	AG	17-Sep-03	1600		220	100		Released	Pelly R
793	AG	17-Sep-03	1600		170	50		Released	Pelly R
794	AG	17-Sep-03	1600		140	15		Released	Pelly R
795	AG	17-Sep-03	1600		230	130		Released	Pelly R
796	AG	17-Sep-03	1600		240	150		Released	Pelly R
797	AG	17-Sep-03	1600		220	130		Released	Pelly R
798	AG	17-Sep-03	1600		200	70		Released	Pelly R
799	AG	17-Sep-03	1600		210	100		Released	Pelly R
800	AG	17-Sep-03	1600		200	80		Released	Pelly R
801	AG	17-Sep-03	1600		210	80		Released	Pelly R
802	AG	17-Sep-03	1600		180	60		Released	Pelly R
803	AG	17-Sep-03	1600		180	55		Released	Pelly R
804	AG	17-Sep-03	1600		170	50		Released	Pelly R
805	AG	17-Sep-03	1600		170	50		Released	Pelly R
806	AG	17-Sep-03	1600		180	55		Released	Pelly R
807	AG	17-Sep-03	1600		150	35		Released	Pelly R
808	AG	17-Sep-03	1600		190	60		Released	Pelly R
809	AG	17-Sep-03	1600		160	40		Released	Pelly R
810	AG	17-Sep-03	1600		180	50		Released	Pelly R
811	AG	17-Sep-03	1600		160	50		Released	Pelly R
812	AG	17-Sep-03	1600		180	60		Released	Pelly R
813	AG	17-Sep-03	1600		180	60		Released	Pelly R
814	AG	17-Sep-03	1600		170	55		Released	Pelly R
815	AG	17-Sep-03	1600		160	50		Released	Pelly R
816	AG	17-Sep-03	1600		170	55		Released	Pelly R
817	AG	17-Sep-03	1600		170	55		Released	Pelly R
818	AG	17-Sep-03	1600		130	25		Released	Pelly R
819	AG	17-Sep-03	1600		140	30		Released	Pelly R
820	AG	17-Sep-03	1600		150	35		Released	Pelly R
821	AG	17-Sep-03	1600		130	25		Released	Pelly R
822	AG	17-Sep-03	1600		120	20		Released	Pelly R
823	AG	17-Sep-03	1600		130	25		Released	Pelly R
824	AG	18-Sep-03	1530		180	55		Released	Pelly R
825	AG	18-Sep-03	1530		130	25		Released	Pelly R
826	AG	18-Sep-03	1530		240	160		Released	Pelly R
827	AG	18-Sep-03	1530		160	45		Released	Pelly R

Appendix A1. Arctic Grayling Released

Fish #	Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
828	AG	18-Sep-03	1530		120	20		Released	Pelly R
829	AG	18-Sep-03	1530		130	25		Released	Pelly R
830	AG	18-Sep-03	1530		190	65		Released	Pelly R
831	AG	18-Sep-03	1530		130	25		Released	Pelly R
832	AG	18-Sep-03	1530		180	55		Released	Pelly R
833	AG	18-Sep-03	1530		180	60		Released	Pelly R
834	AG	18-Sep-03	1530		160	45		Released	Pelly R
835	AG	18-Sep-03	1530		170	50		Released	Pelly R
836	AG	18-Sep-03	1530		120	15		Released	Pelly R
837	AG	18-Sep-03	1530		180	70		Released	Pelly R
838	AG	18-Sep-03	1530		160	50		Released	Pelly R
839	AG	18-Sep-03	1530		130	20		Released	Pelly R
840	AG	18-Sep-03	1530		120	15		Released	Pelly R
841	AG	18-Sep-03	1530		240	140		Released	Pelly R
842	AG	18-Sep-03	1530		180	60		Released	Pelly R
843	AG	18-Sep-03	1530		170	45		Released	Pelly R
844	AG	18-Sep-03	1530		130	25		Released	Pelly R
845	AG	18-Sep-03	1530		190	70		Released	Pelly R
846	AG	18-Sep-03	1530		180	60		Released	Pelly R
847	AG	18-Sep-03	1530		130	25		Released	Pelly R
848	AG	18-Sep-03	1530		130	25		Released	Pelly R
849	AG	18-Sep-03	1600		170	55		Released	Pelly R
850	AG	18-Sep-03	1600		170	55		Released	Pelly R
851	AG	18-Sep-03	1600		170	50		Released	Pelly R
852	AG	18-Sep-03	1600		180	65		Released	Pelly R
853	AG	18-Sep-03	1600		170	55		Released	Pelly R
854	AG	18-Sep-03	1600		130	20		Released	Pelly R
855	AG	18-Sep-03	1600		200	80		Released	Pelly R
856	AG	18-Sep-03	1600		170	60		Released	Pelly R
857	AG	18-Sep-03	1600		130	25		Released	Pelly R
858	AG	18-Sep-03	1600		230	110		Released	Pelly R
859	AG	18-Sep-03	1600		200	80		Released	Pelly R
860	AG	18-Sep-03	1600		180	75		Released	Pelly R
861	AG	18-Sep-03	1600		190	75		Released	Pelly R
862	AG	18-Sep-03	1600		220	110		Released	Pelly R
863	AG	18-Sep-03	1600		200	90		Released	Pelly R
864	AG	18-Sep-03	1600		200	100		Released	Pelly R
865	AG	18-Sep-03	1600		240	160		Released	Pelly R
866	AG	18-Sep-03	1600		200	190		Released	Pelly R
867	AG	18-Sep-03	1600		170	60		Released	Pelly R
868	AG	18-Sep-03	1600		120	20		Released	Pelly R
869	AG	18-Sep-03	1600		180	65		Released	Pelly R
870	AG	18-Sep-03	1600		170	60		Released	Pelly R
871	AG	18-Sep-03	1600		120	15		Released	Pelly R
872	AG	18-Sep-03	1600		140	30		Released	Pelly R
873	AG	18-Sep-03	1600		180	70		Released	Pelly R
874	AG	18-Sep-03	1600		190	75		Released	Pelly R
875	AG	18-Sep-03	1600		190	75		Released	Pelly R
876	AG	18-Sep-03	1600		190	75		Released	Pelly R
877	AG	18-Sep-03	1600		170	65		Released	Pelly R
878	AG	19-Sep-03	1500		180	50		Released	Pelly R
879	AG	19-Sep-03	1500		280	240		Released	Pelly R
880	AG	19-Sep-03	1500		170	55		Released	Pelly R
881	AG	19-Sep-03	1500		190	70		Released	Pelly R
882	AG	19-Sep-03	1500		170	50		Released	Pelly R
883	AG	19-Sep-03	1500		180	55		Released	Pelly R
884	AG	19-Sep-03	1500		120	15		Released	Pelly R
885	AG	19-Sep-03	1500		300	280		Released	Pelly R
886	AG	19-Sep-03	1500		170	45		Released	Pelly R
887	AG	19-Sep-03	1500		120	15		Released	Pelly R
888	AG	19-Sep-03	1500		210	85		Released	Pelly R

Appendix A1. Arctic Grayling Released

Fish #	Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
889	AG	19-Sep-03	1500		170	55		Released	Pelly R
890	AG	19-Sep-03	1500		120	15		Released	Pelly R
891	AG	19-Sep-03	1500		120	15		Released	Pelly R
892	AG	19-Sep-03	1500		180	55		Released	Pelly R
893	AG	19-Sep-03	1500		160	50		Released	Pelly R
894	AG	19-Sep-03	1500		120	15		Released	Pelly R
895	AG	19-Sep-03	1500		260	230		Released	Pelly R
896	AG	19-Sep-03	1500		190	65		Released	Pelly R
897	AG	19-Sep-03	1500		160	45		Released	Pelly R
898	AG	19-Sep-03	1500		120	15		Released	Pelly R
899	AG	19-Sep-03	1500		180	60		Released	Pelly R
900	AG	19-Sep-03	1500		150	50		Released	Pelly R
901	AG	19-Sep-03	1500		120	15		Released	Pelly R
902	AG	19-Sep-03	1500		120	15		Released	Pelly R
903	AG	19-Sep-03	1500		120	15		Released	Pelly R
904	AG	19-Sep-03	1500		120	15		Released	Pelly R
905	AG	19-Sep-03	1500		120	15		Released	Pelly R
906	AG	19-Sep-03	1500		120	15		Released	Pelly R
907	AG	19-Sep-03	1500		280	250		Released	Pelly R
908	AG	19-Sep-03	1500		160	50		Released	Pelly R
909	AG	19-Sep-03	1500		120	15		Released	Pelly R
910	AG	19-Sep-03	1500		280	240		Released	Pelly R
911	AG	19-Sep-03	1500		180	60		Released	Pelly R
912	AG	19-Sep-03	1500		240	150		Released	Pelly R
913	AG	19-Sep-03	1500		170	55		Released	Pelly R
914	AG	19-Sep-03	1500		140	25		Released	Pelly R
915	AG	19-Sep-03	1500		240	150		Released	Pelly R
916	AG	19-Sep-03	1500		170	45		Released	Pelly R
917	AG	19-Sep-03	1500		190	65		Released	Pelly R
918	AG	19-Sep-03	1500		120	15		Released	Pelly R
919	AG	19-Sep-03	1500		190	60		Released	Pelly R
920	AG	19-Sep-03	1500		160	40		Released	Pelly R
921	AG	19-Sep-03	1500		190	65		Released	Pelly R
922	AG	19-Sep-03	1500		190	60		Released	Pelly R
923	AG	19-Sep-03	1500		120	15		Released	Pelly R
924	AG	19-Sep-03	1500		160	45		Released	Pelly R
925	AG	19-Sep-03	1500		270	220		Released	Pelly R
926	AG	19-Sep-03	1500		300	270		Released	Pelly R
927	AG	19-Sep-03	1500		160	50		Released	Pelly R
928	AG	19-Sep-03	1500		120	15		Released	Pelly R
929	AG	19-Sep-03	1500		140	30		Released	Pelly R
930	AG	19-Sep-03	1500		200	70		Released	Pelly R
931	AG	19-Sep-03	1500		200	75		Released	Pelly R
932	AG	19-Sep-03	1500		170	50		Released	Pelly R
933	AG	19-Sep-03	1500		120	15		Released	Pelly R
934	AG	20-Sep-03	1500		330	350		Released	Pelly R
935	AG	20-Sep-03	1500		180	50		Released	Pelly R
936	AG	20-Sep-03	1500		270	210		Released	Pelly R
937	AG	20-Sep-03	1500		180	50		Released	Pelly R
938	AG	20-Sep-03	1500		180	50		Released	Pelly R
939	AG	20-Sep-03	1500		270	200		Released	Pelly R
940	AG	20-Sep-03	1500		180	60		Released	Pelly R
941	AG	20-Sep-03	1500		190	65		Released	Pelly R
942	AG	20-Sep-03	1500		270	200		Released	Pelly R
943	AG	20-Sep-03	1500		160	40		Released	Pelly R
944	AG	20-Sep-03	1500		230	140		Released	Pelly R
945	AG	20-Sep-03	1500		160	40		Released	Pelly R
946	AG	20-Sep-03	1500		160	40		Released	Pelly R
947	AG	20-Sep-03	1500		170	50		Released	Pelly R
948	AG	20-Sep-03	1500		190	65		Released	Pelly R
949	AG	20-Sep-03	1500		270	200		Released	Pelly R

Appendix A1. Arctic Grayling Released

Fish #	Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
950	AG	20-Sep-03	1500		270	200		Released	Pelly R
951	AG	20-Sep-03	1500		190	60		Released	Pelly R
952	AG	20-Sep-03	1500		170	50		Released	Pelly R
953	AG	20-Sep-03	1500		130	25		Released	Pelly R
954	AG	26-Sep-03	1350		290	230		Released	Pelly R
955	AG	26-Sep-03	1350		260	175		Released	Pelly R
956	AG	26-Sep-03	1350		190	60		Released	Pelly R
957	AG	26-Sep-03	1350		260	180		Released	Pelly R
958	AG	26-Sep-03	1350		290	230		Released	Pelly R
959	AG	26-Sep-03	1350		140	25		Released	Pelly R
960	AG	26-Sep-03	1350		290	250		Released	Pelly R
961	AG	26-Sep-03	1350		170	50		Released	Pelly R
962	AG	26-Sep-03	1350		180	55		Released	Pelly R
963	AG	26-Sep-03	1350		200	85		Released	Pelly R
964	AG	26-Sep-03	1350		180	60		Released	Pelly R
965	AG	26-Sep-03	1350		170	50		Released	Pelly R
966	AG	26-Sep-03	1350		170	50		Released	Pelly R
967	AG	26-Sep-03	1350		170	45		Released	Pelly R
968	AG	26-Sep-03	1350		180	50		Released	Pelly R
969	AG	26-Sep-03	1350		160	50		Released	Pelly R
970	AG	26-Sep-03	1350		140	25		Released	Pelly R
971	AG	26-Sep-03	1350		130	20		Released	Pelly R
972	AG	26-Sep-03	1350		180	50		Released	Pelly R
973	AG	26-Sep-03	1350		180	55		Released	Pelly R
974	AG	26-Sep-03	1350		170	45		Released	Pelly R
975	AG	26-Sep-03	1350		180	50		Released	Pelly R
976	AG	26-Sep-03	1350		160	35		Released	Pelly R
977	AG	26-Sep-03	1350		130	20		Released	Pelly R
978	AG	26-Sep-03	1350		240	165		Released	Pelly R
979	AG	26-Sep-03	1350		180	55		Released	Pelly R
980	AG	26-Sep-03	1350		120	15		Released	Pelly R
981	AG	26-Sep-03	1730		455	205		Released	Pelly R
982	AG	26-Sep-03	1730		160	30		Released	Pelly R
983	AG	26-Sep-03	1730		170	35		Released	Pelly R
984	AG	26-Sep-03	1730		205	100		Released	Pelly R
985	AG	26-Sep-03	1730		195	80		Released	Pelly R
986	AG	26-Sep-03	1730		245	220		Released	Pelly R
987	AG	26-Sep-03	1730		185	65		Released	Pelly R
988	AG	26-Sep-03	1730		180	55		Released	Pelly R
989	AG	26-Sep-03	1730		180	50		Released	Pelly R
990	AG	26-Sep-03	1730		160	50		Released	Pelly R
991	AG	26-Sep-03	1730		170	55		Released	Pelly R
992	AG	26-Sep-03	1730		250	195		Released	Pelly R
993	AG	26-Sep-03	1730		175	50		Released	Pelly R
994	AG	26-Sep-03	1730		195	80		Released	Pelly R
995	AG	26-Sep-03	1730		170	50		Released	Pelly R
996	AG	26-Sep-03	1730		170	50		Released	Pelly R
997	AG	26-Sep-03	1730		275	270		Released	Pelly R
998	AG	26-Sep-03	1730		275	230		Released	Pelly R
999	AG	26-Sep-03	1730		260	220		Released	Pelly R
1000	AG	26-Sep-03	1730		165	50		Released	Pelly R
1001	AG	26-Sep-03	1730		170	60		Released	Pelly R
1002	AG	26-Sep-03	1730		225	140		Released	Pelly R
1003	AG	26-Sep-03	1730		185	80		Released	Pelly R
1004	AG	26-Sep-03	1730		190	90		Released	Pelly R
1005	AG	26-Sep-03	1730		160	50		Released	Pelly R
1006	AG	27-Sep-03	1530		180	60		Released	Pelly R
1007	AG	27-Sep-03	1530		185	50		Released	Pelly R
1008	AG	27-Sep-03	1530		175	50		Released	Pelly R
1009	AG	27-Sep-03	1530		125	30		Released	Pelly R
1010	AG	27-Sep-03	1530		205	75		Released	Pelly R

Appendix A1. Arctic Grayling Released

Fish #	Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
1011	AG	27-Sep-03	1530		155	50		Released	Pelly R
1012	AG	27-Sep-03	1530		140	30		Released	Pelly R
1013	AG	27-Sep-03	1530		180	80		Released	Pelly R
1014	AG	27-Sep-03	1530		175	60		Released	Pelly R
1015	AG	27-Sep-03	1530		190	70		Released	Pelly R
1016	AG	27-Sep-03	1530		190	80		Released	Pelly R
1017	AG	27-Sep-03	1530		180	60		Released	Pelly R
1018	AG	27-Sep-03	1530		165	60		Released	Pelly R
1019	AG	27-Sep-03	1530		165	50		Released	Pelly R
1020	AG	27-Sep-03	1530		200	100		Released	Pelly R
1021	AG	27-Sep-03	1530		175	60		Released	Pelly R
1022	AG	27-Sep-03	1530		180	60		Released	Pelly R
1023	AG	27-Sep-03	1530		210	110		Released	Pelly R
1024	AG	27-Sep-03	1530		115	20		Released	Pelly R
1025	AG	27-Sep-03	1530		185	60		Released	Pelly R
1026	AG	27-Sep-03	1530		205	100		Released	Pelly R
1027	AG	27-Sep-03	1530		170	50		Released	Pelly R
1028	AG	27-Sep-03	1530		115	20		Released	Pelly R
1029	AG	27-Sep-03	1530		115	15		Released	Pelly R
1030	AG	27-Sep-03	1530		140	40		Released	Pelly R
1031	AG	27-Sep-03	1530		175	50		Released	Pelly R
1032	AG	27-Sep-03	1530		160	50		Released	Pelly R
1033	AG	27-Sep-03	1530		175	60		Released	Pelly R
1034	AG	27-Sep-03	1530		180	60		Released	Pelly R
1035	AG	27-Sep-03	1530		185	60		Released	Pelly R
1036	AG	27-Sep-03	1530		195	100		Released	Pelly R
1037	AG	27-Sep-03	1530		175	60		Released	Pelly R
1038	AG	27-Sep-03	1530		125	30		Released	Pelly R
1039	AG	27-Sep-03	1530		180	70		Released	Pelly R
1040	AG	27-Sep-03	1530		160	50		Released	Pelly R
1041	AG	27-Sep-03	1530		220	150		Released	Pelly R
1042	AG	27-Sep-03	1530		125	25		Released	Pelly R
1043	AG	27-Sep-03	1530		185	70		Released	Pelly R
1044	AG	27-Sep-03	1530		110	20		Released	Pelly R
1045	AG	27-Sep-03	1530		180	70		Released	Pelly R
1046	AG	27-Sep-03	1530		145	40		Released	Pelly R
1047	AG	27-Sep-03	1530		180	60		Released	Pelly R
1048	AG	27-Sep-03	1530		165	50		Released	Pelly R
1049	AG	27-Sep-03	1530		190	80		Released	Pelly R
1050	AG	27-Sep-03	1530		110	30		Released	Pelly R
1051	AG	27-Sep-03	1530		180	80		Released	Pelly R
1052	AG	27-Sep-03	1530		125	25		Released	Pelly R
1053	AG	27-Sep-03	1530		160	50		Released	Pelly R
1054	AG	27-Sep-03	1530		165	55		Released	Pelly R
1055	AG	27-Sep-03	1530		195	100		Released	Pelly R
1056	AG	27-Sep-03	1530		130	20		Released	Pelly R
1057	AG	27-Sep-03	1530		110	20		Released	Pelly R
1058	AG	27-Sep-03	1530		180	70		Released	Pelly R
1059	AG	27-Sep-03	1530		180	60		Released	Pelly R
1060	AG	27-Sep-03	1530		120	30		Released	Pelly R
1061	AG	27-Sep-03	1530		175	70		Released	Pelly R
1062	AG	27-Sep-03	1530		185	90		Released	Pelly R
1063	AG	27-Sep-03	1530		160	60		Released	Pelly R
1064	AG	27-Sep-03	1530		180	100		Released	Pelly R
1065	AG	27-Sep-03	1530		175	60		Released	Pelly R
1066	AG	27-Sep-03	1530		110	30		Released	Pelly R
1067	AG	27-Sep-03	1530		185	100		Released	Pelly R
1068	AG	27-Sep-03	1530		180	60		Released	Pelly R
1069	AG	27-Sep-03	1530		170	60		Released	Pelly R
1070	AG	27-Sep-03	1530		210	110		Released	Pelly R
1071	AG	27-Sep-03	1530		180	60		Released	Pelly R

Appendix A1. Arctic Grayling Released

Fish #	Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
1072	AG	27-Sep-03	1530		160	60		Released	Pelly R
1073	AG	27-Sep-03	1530		175	60		Released	Pelly R
1074	AG	27-Sep-03	1530		175	60		Released	Pelly R
1075	AG	27-Sep-03	1530		175	70		Released	Pelly R
1076	AG	27-Sep-03	1530		180	60		Released	Pelly R
1077	AG	27-Sep-03	1530		170	60		Released	Pelly R
1078	AG	27-Sep-03	1530		115	15		Released	Pelly R
1079	AG	27-Sep-03	1530		190	80		Released	Pelly R
1080	AG	27-Sep-03	1530		155	50		Released	Pelly R
1081	AG	27-Sep-03	1530		125	20		Released	Pelly R
1082	AG	27-Sep-03	1530		125	30		Released	Pelly R
1083	AG	27-Sep-03	1530		125	20		Released	Pelly R
1084	AG	27-Sep-03	1530		245	210		Released	Pelly R
1085	AG	27-Sep-03	1530		185	70		Released	Pelly R
1086	AG	27-Sep-03	1530		120	20		Released	Pelly R
1087	AG	27-Sep-03	1530		125	30		Released	Pelly R
1088	AG	27-Sep-03	1530		110	20		Released	Pelly R
1089	AG	27-Sep-03	1530		225	140		Released	Pelly R
1090	AG	27-Sep-03	1530		170	150		Released	Pelly R
1091	AG	27-Sep-03	1530		190	80		Released	Pelly R
1092	AG	27-Sep-03	1530		125	30		Released	Pelly R
1093	AG	27-Sep-03	1530		190	85		Released	Pelly R
1094	AG	27-Sep-03	1530		180	60		Released	Pelly R
1095	AG	27-Sep-03	1530		190	70		Released	Pelly R
1096	AG	27-Sep-03	1530		165	50		Released	Pelly R
1097	AG	27-Sep-03	1530		130	35		Released	Pelly R
1098	AG	27-Sep-03	1530		130	35		Released	Pelly R
1099	AG	27-Sep-03	1530		125	20		Released	Pelly R
1100	AG	27-Sep-03	1530		220	150		Released	Pelly R
1101	AG	27-Sep-03	1530		225	140		Released	Pelly R
1102	AG	27-Sep-03	1530		125	20		Released	Pelly R
1103	AG	27-Sep-03	1530		170	50		Released	Pelly R
1104	AG	27-Sep-03	1530		170	60		Released	Pelly R
1105	AG	27-Sep-03	1530		120	30		Released	Pelly R
1106	AG	27-Sep-03	1530		170	50		Released	Pelly R
1107	AG	27-Sep-03	1530		180	60		Released	Pelly R
1108	AG	27-Sep-03	1530		115	15		Released	Pelly R
1109	AG	27-Sep-03	1530		180	60		Released	Pelly R
1110	AG	27-Sep-03	1530		185	70		Released	Pelly R
1111	AG	27-Sep-03	1530		175	60		Released	Pelly R
1112	AG	27-Sep-03	1530		180	50		Released	Pelly R
1113	AG	27-Sep-03	1530		255	180		Released	Pelly R
1114	AG	27-Sep-03	1530		120	15		Released	Pelly R
1115	AG	27-Sep-03	1530		110	15		Released	Pelly R
1116	AG	27-Sep-03	1530		180	70		Released	Pelly R
1117	AG	27-Sep-03	1530		230	110		Released	Pelly R
1118	AG	27-Sep-03	1530		200	80		Released	Pelly R
1119	AG	27-Sep-03	1530		190	90		Released	Pelly R
1120	AG	27-Sep-03	1530		175	70		Released	Pelly R
1121	AG	27-Sep-03	1530		185	40		Released	Pelly R
1122	AG	27-Sep-03	1530		190	100		Released	Pelly R
1123	AG	27-Sep-03	1530		185	100		Released	Pelly R
1124	AG	27-Sep-03	1530		180	60		Released	Pelly R
1125	AG	27-Sep-03	1530		120	15		Released	Pelly R
1126	AG	27-Sep-03	1530		260	200		Released	Pelly R
1127	AG	27-Sep-03	1530		185	60		Released	Pelly R
1128	AG	27-Sep-03	1530		185	60		Released	Pelly R
1129	AG	27-Sep-03	1530		170	50		Released	Pelly R
1130	AG	27-Sep-03	1530		185	60		Released	Pelly R
1131	AG	27-Sep-03	1530		190	60		Released	Pelly R
1132	AG	27-Sep-03	1530		240	150		Released	Pelly R

Appendix A1. Arctic Grayling Released

Fish #	Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
1133	AG	27-Sep-03	1530		195	60		Released	Pelly R
1134	AG	27-Sep-03	1530		270	240		Released	Pelly R
1135	AG	27-Sep-03	1530		120	15		Released	Pelly R
1136	AG	27-Sep-03	1530		255	100		Released	Pelly R
1137	AG	27-Sep-03	1530		190	60		Released	Pelly R
1138	AG	27-Sep-03	1530		230	110		Released	Pelly R
1139	AG	27-Sep-03	1530		180	60		Released	Pelly R
1140	AG	27-Sep-03	1530		130	15		Released	Pelly R
1141	AG	27-Sep-03	1530		180	50		Released	Pelly R
1142	AG	27-Sep-03	1530		170	50		Released	Pelly R
1143	AG	27-Sep-03	1530		180	50		Released	Pelly R
1144	AG	27-Sep-03	1530		160	40		Released	Pelly R
1145	AG	27-Sep-03	1530		130	20		Released	Pelly R
1146	AG	27-Sep-03	1530		210	110		Released	Pelly R
1147	AG	27-Sep-03	1530		180	50		Released	Pelly R
1148	AG	27-Sep-03	1530		260	220		Released	Pelly R
1149	AG	27-Sep-03	1530		185	60		Released	Pelly R
1150	AG	27-Sep-03	1530		180	50		Released	Pelly R
1151	AG	27-Sep-03	1530		245	200		Released	Pelly R
1152	AG	27-Sep-03	1530		180	60		Released	Pelly R
1153	AG	27-Sep-03	1845		180	60		Released	Pelly R
1154	AG	27-Sep-03	1845		120	15		Released	Pelly R
1155	AG	27-Sep-03	1845		220	110		Released	Pelly R
1156	AG	27-Sep-03	1845		180	55		Released	Pelly R
1157	AG	27-Sep-03	1845		230	120		Released	Pelly R
1158	AG	27-Sep-03	1845		200	80		Released	Pelly R
1159	AG	27-Sep-03	1845		310	380		Released	Pelly R
1160	AG	27-Sep-03	1845		190	70		Released	Pelly R
1161	AG	27-Sep-03	1845		190	60		Released	Pelly R
1162	AG	27-Sep-03	1845		230	140		Released	Pelly R
1163	AG	27-Sep-03	1845		220	110		Released	Pelly R
1164	AG	27-Sep-03	1845		180	55		Released	Pelly R
1165	AG	27-Sep-03	1845		130	20		Released	Pelly R
1166	AG	27-Sep-03	1845		220	120		Released	Pelly R
1167	AG	27-Sep-03	1845		125	15		Released	Pelly R
1168	AG	27-Sep-03	1845		260	230		Released	Pelly R
1169	AG	27-Sep-03	1845		180	65		Released	Pelly R
1170	AG	27-Sep-03	1845		240	170		Released	Pelly R
1171	AG	27-Sep-03	1845		280	280		Released	Pelly R
1172	AG	27-Sep-03	1845		180	60		Released	Pelly R
1173	AG	27-Sep-03	1845		260	190		Released	Pelly R
1174	AG	27-Sep-03	1845		190	75		Released	Pelly R
1175	AG	27-Sep-03	1845		210	105		Released	Pelly R
1176	AG	27-Sep-03	1845		200	90		Released	Pelly R
1177	AG	27-Sep-03	1845		240	190		Released	Pelly R
1178	AG	27-Sep-03	1845		170	55		Released	Pelly R
1179	AG	27-Sep-03	1845		210	85		Released	Pelly R
1180	AG	27-Sep-03	1845		180	40		Released	Pelly R
1181	AG	27-Sep-03	1845		140	35		Released	Pelly R
1182	AG	27-Sep-03	1845		230	140		Released	Pelly R
1183	AG	27-Sep-03	1845		220	115		Released	Pelly R
1184	AG	27-Sep-03	1845		270	240		Released	Pelly R
1185	AG	27-Sep-03	1845		180	60		Released	Pelly R
1186	AG	27-Sep-03	1845		230	120		Released	Pelly R
1187	AG	28-Sep-03	1800		160	45		Released	Pelly R
1188	AG	28-Sep-03	1800		120	10		Released	Pelly R
1189	AG	28-Sep-03	1800		240	15		Released	Pelly R
1190	AG	28-Sep-03	1800		130	20		Released	Pelly R
1191	AG	28-Sep-03	1800		120	15		Released	Pelly R
1192	AG	28-Sep-03	1800		135	20		Released	Pelly R
1193	AG	28-Sep-03	1800		270	230		Released	Pelly R

Appendix A1. Arctic Grayling Released

Fish #	Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
1194	AG	28-Sep-03	1800		160	50		Released	Pelly R
1195	AG	28-Sep-03	1800		190	65		Released	Pelly R
1196	AG	28-Sep-03	1800		280	240		Released	Pelly R
1197	AG	28-Sep-03	1800		230	125		Released	Pelly R
1198	AG	28-Sep-03	1800		120	15		Released	Pelly R
1199	AG	28-Sep-03	1800		125	15		Released	Pelly R
1200	AG	28-Sep-03	1800		110	7		Released	Pelly R
1201	AG	28-Sep-03	1800		120	15		Released	Pelly R
1202	AG	28-Sep-03	1800		120	15		Released	Pelly R
1203	AG	28-Sep-03	1800		125	50		Released	Pelly R
1204	AG	28-Sep-03	1800		135	30		Released	Pelly R
1205	AG	28-Sep-03	1800		230	90		Released	Pelly R
1206	AG	28-Sep-03	1800		220	85		Released	Pelly R
1207	AG	28-Sep-03	1800		170	55		Released	Pelly R
1208	AG	28-Sep-03	1800		120	15		Released	Pelly R
1209	AG	28-Sep-03	1800		120	15		Released	Pelly R
1210	AG	28-Sep-03	1800		130	25		Released	Pelly R
1211	AG	28-Sep-03	1800		170	55		Released	Pelly R
1212	AG	28-Sep-03	1800		130	25		Released	Pelly R
1213	AG	28-Sep-03	1800		270	215		Released	Pelly R
1214	AG	28-Sep-03	1800		185	55		Released	Pelly R
1215	AG	28-Sep-03	1800		195	75		Released	Pelly R
1216	AG	28-Sep-03	1800		135	25		Released	Pelly R
1217	AG	28-Sep-03	1800		125	20		Released	Pelly R
1218	AG	28-Sep-03	1800		125	20		Released	Pelly R
1219	AG	28-Sep-03	1800		130	25		Released	Pelly R
1220	AG	28-Sep-03	1800		120	15		Released	Pelly R
1221	AG	28-Sep-03	1800		185	60		Released	Pelly R
1222	AG	28-Sep-03	1800		210	75		Released	Pelly R
1223	AG	28-Sep-03	1800		190	60		Released	Pelly R
1224	AG	28-Sep-03	1800		230	110		Released	Pelly R
1225	AG	28-Sep-03	1800		210	75		Released	Pelly R
1226	AG	28-Sep-03	1800		170	50		Released	Pelly R
1227	AG	28-Sep-03	1800		135	25		Released	Pelly R
1228	AG	28-Sep-03	1800		120	15		Released	Pelly R
1229	AG	28-Sep-03	1800		135	20		Released	Pelly R
1230	AG	28-Sep-03	1800		120	15		Released	Pelly R
1231	AG	28-Sep-03	1800		130	25		Released	Pelly R
1232	AG	28-Sep-03	1800		185	65		Released	Pelly R
1233	AG	28-Sep-03	1800		120	15		Released	Pelly R
1234	AG	28-Sep-03	1800		130	20		Released	Pelly R
1235	AG	28-Sep-03	1800		165	40		Released	Pelly R
1236	AG	28-Sep-03	1800		120	15		Released	Pelly R
1237	AG	28-Sep-03	1800		125	20		Released	Pelly R
1238	AG	28-Sep-03	1800		120	15		Released	Pelly R
1239	AG	28-Sep-03	1800		190	65		Released	Pelly R
1240	AG	28-Sep-03	1800		170	50		Released	Pelly R
1241	AG	28-Sep-03	1800		280	280		Released	Pelly R
1242	AG	28-Sep-03	1800		130	25		Released	Pelly R
1243	AG	28-Sep-03	1800		120	15		Released	Pelly R
1244	AG	28-Sep-03	1800		250	200		Released	Pelly R
1245	AG	28-Sep-03	1800		170	45		Released	Pelly R
1246	AG	28-Sep-03	1800		130	20		Released	Pelly R
1247	AG	28-Sep-03	1800		135	25		Released	Pelly R
1248	AG	28-Sep-03	1800		200	20		Released	Pelly R
1249	AG	28-Sep-03	1800		120	15		Released	Pelly R
1250	AG	28-Sep-03	1800		135	15		Released	Pelly R
1251	AG	28-Sep-03	1800		110	20		Released	Pelly R
1252	AG	28-Sep-03	1800		190	20		Released	Pelly R
1253	AG	28-Sep-03	1800		170	10		Released	Pelly R
1254	AG	28-Sep-03	1800		125	60		Released	Pelly R

Appendix A1. Arctic Grayling Released

Fish #	Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
1255	AG	28-Sep-03	1800		120	50		Released	Pelly R
1256	AG	28-Sep-03	1800		125	15		Released	Pelly R
1257	AG	28-Sep-03	1800		120	15		Released	Pelly R
1258	AG	28-Sep-03	1800		125	15		Released	Pelly R
1259	AG	28-Sep-03	1800		120	15		Released	Pelly R
1260	AG	28-Sep-03	1800		170	50		Released	Pelly R
1261	AG	28-Sep-03	1800		165	50		Released	Pelly R
1262	AG	28-Sep-03	1800		210	100		Released	Pelly R
1263	AG	28-Sep-03	1800		220	110		Released	Pelly R
1264	AG	28-Sep-03	1800		210	100		Released	Pelly R
1265	AG	28-Sep-03	1800		190	65		Released	Pelly R
1266	AG	28-Sep-03	1800		180	60		Released	Pelly R
1267	AG	28-Sep-03	1800		270	220		Released	Pelly R
1268	AG	28-Sep-03	1800		125	15		Released	Pelly R
1269	AG	28-Sep-03	1800		185	55		Released	Pelly R
1270	AG	28-Sep-03	1800		170	45		Released	Pelly R
1271	AG	28-Sep-03	1800		125	45		Released	Pelly R
1272	AG	28-Sep-03	1800		135	20		Released	Pelly R
1273	AG	28-Sep-03	1800		130	20		Released	Pelly R
1274	AG	28-Sep-03	1800		120	15		Released	Pelly R
1275	AG	28-Sep-03	1800		130	20		Released	Pelly R
1276	AG	28-Sep-03	1800		180	50		Released	Pelly R
1277	AG	28-Sep-03	1800		120	15		Released	Pelly R
1278	AG	28-Sep-03	1800		120	15		Released	Pelly R
1279	AG	28-Sep-03	1800		145	30		Released	Pelly R
1280	AG	28-Sep-03	1800		120	15		Released	Pelly R

ARCTIC GRAYLING

A2 Kept for Biological Analysis

Appendix A2. Actic Grayling Kept for Biological Sample

Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
AG	3-Sep-03	1715		280	220		Bio Sample	
AG	4-Sep-03	1630		300	300		Bio Sample	
AG	4-Sep-03	1630		275	200		Bio Sample	
AG	4-Sep-03	1630		260	200		Bio Sample	
AG	6-Sep-03	1400		220	110		Bio Sample	
AG	7-Sep-03	1200		280	210		Bio Sample	
AG	7-Sep-03	1200		200	60		Bio Sample	
AG	7-Sep-03	1200		190	50		Bio Sample	
AG	7-Sep-03	1200		200	60		Bio Sample	
AG	7-Sep-03	1200		190	60		Bio Sample	
AG	7-Sep-03	1200		190	60		Bio Sample	
AG	7-Sep-03	1200		200	70		Bio Sample	
AG	7-Sep-03	1200		200	70		Bio Sample	
AG	7-Sep-03	1200		170	50		Bio Sample	
AG	7-Sep-03	1200		250	150		Bio Sample	
AG	7-Sep-03	1200		200	60		Bio Sample	
AG	7-Sep-03	1200		200	70		Bio Sample	
AG	7-Sep-03	1200		180	60		Bio Sample	
AG	7-Sep-03	1200		200	70		Bio Sample	
AG	7-Sep-03	1200		240	140		Bio Sample	
AG	7-Sep-03	1200		200	70		Bio Sample	
AG	7-Sep-03	1200		190	60		Bio Sample	
AG	7-Sep-03	1200		180	60		Bio Sample	
AG	7-Sep-03	1200		280	160		Bio Sample	
AG	7-Sep-03	1200		190	60		Bio Sample	
AG	7-Sep-03	1200		190	60		Bio Sample	
AG	7-Sep-03	1200		180	50		Bio Sample	
AG	7-Sep-03	1200		200	70		Bio Sample	
AG	7-Sep-03	1200		210	80		Bio Sample	
AG	7-Sep-03	1200		200	70		Bio Sample	
AG	7-Sep-03	1200		180	50		Bio Sample	
AG	7-Sep-03	1200		190	70		Bio Sample	
AG	7-Sep-03	1200		190	60		Bio Sample	
AG	7-Sep-03	1200		190	60		Bio Sample	
AG	7-Sep-03	1200		180	40		Bio Sample	
AG	7-Sep-03	1200		180	40		Bio Sample	
AG	7-Sep-03	1200		180	40		Bio Sample	
AG	7-Sep-03	1200		200	60		Bio Sample	
AG	7-Sep-03	1200		190	50		Bio Sample	
AG	7-Sep-03	1200		190	60		Bio Sample	
AG	7-Sep-03	1200		180	50		Bio Sample	
AG	7-Sep-03	1200		180	50		Bio Sample	
AG	7-Sep-03	1300		200	80		Bio Sample	
AG	7-Sep-03	1300		200	80		Bio Sample	
AG	8-Sep-03	945		240	120		Bio Sample	
AG	8-Sep-03	945		200	50		Bio Sample	
AG	8-Sep-03	945		210	70		Bio Sample	
AG	8-Sep-03	945		210	70		Bio Sample	
AG	8-Sep-03	945		190	50		Bio Sample	
AG	8-Sep-03	945		210	70		Bio Sample	
AG	8-Sep-03	945		210	80		Bio Sample	
AG	8-Sep-03	945		200	60		Bio Sample	
AG	8-Sep-03	945		190	50		Bio Sample	

Appendix A2. Actic Grayling Kept for Biological Sample

Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
AG	8-Sep-03	945		210	60		Bio Sample	
AG	8-Sep-03	945		210	60		Bio Sample	
AG	8-Sep-03	945		220	80		Bio Sample	
AG	8-Sep-03	945		210	70		Bio Sample	
AG	8-Sep-03	945		160	25		Bio Sample	
AG	8-Sep-03	945		230	100		Bio Sample	
AG	8-Sep-03	945		190	50		Bio Sample	
AG	8-Sep-03	945		230	115		Bio Sample	
AG	8-Sep-03	945		170	35		Bio Sample	
AG	8-Sep-03	945		190	50		Bio Sample	
AG	8-Sep-03	945		190	50		Bio Sample	
AG	8-Sep-03	945		240	110		Bio Sample	
AG	8-Sep-03	945		190	40		Bio Sample	
AG	8-Sep-03	945		170	30		Bio Sample	
AG	8-Sep-03	945		220	75		Bio Sample	
AG	8-Sep-03	945		210	70		Bio Sample	
AG	8-Sep-03	945		135	10		Bio Sample	
AG	8-Sep-03	945		210	70		Bio Sample	
AG	8-Sep-03	945		175	40		Bio Sample	
AG	8-Sep-03	945		140	20		Bio Sample	
AG	8-Sep-03	945		140	15		Bio Sample	
AG	8-Sep-03	945		130	10		Bio Sample	
AG	8-Sep-03	945		165	35		Bio Sample	
AG	8-Sep-03	1125		280	170		Bio Sample	
AG	8-Sep-03	1125		200	60		Bio Sample	
AG	8-Sep-03	1125		220	90		Bio Sample	
AG	8-Sep-03	1300		210	95		Bio Sample	
AG	8-Sep-03	1340		240	110		Bio Sample	
AG	8-Sep-03	1440		290	210		Bio Sample	
AG	8-Sep-03	1440		200	70		Bio Sample	
AG	8-Sep-03	1440		265	200		Bio Sample	
AG	8-Sep-03	1515		200	55		Bio Sample	
AG	8-Sep-03	1515		220	90		Bio Sample	
AG	8-Sep-03	1515		200	80		Bio Sample	
AG	8-Sep-03	1515		180	50		Bio Sample	
AG	8-Sep-03	1545		205	110		Bio Sample	
AG	8-Sep-03	1545		240	150		Bio Sample	
AG	8-Sep-03	1545		220	70		Bio Sample	
AG	8-Sep-03	1545		280	200		Bio Sample	
AG	8-Sep-03	1545		280	200		Bio Sample	
AG	8-Sep-03	1700		270	190		Bio Sample	
AG	8-Sep-03	1700		165	35		Bio Sample	
AG	8-Sep-03	1700		80	N/A		Bio Sample	
AG	8-Sep-03	1700		55	N/A		Bio Sample	
AG	8-Sep-03	1700		70	N/A		Bio Sample	
AG	8-Sep-03	1700		40	N/A		Bio Sample	
AG	8-Sep-03	1700		40	N/A		Bio Sample	
AG	8-Sep-03	1700		40	N/A		Bio Sample	
AG	8-Sep-03	1700		35	N/A		Bio Sample	
AG	8-Sep-03	1700		50	N/A		Bio Sample	
AG	8-Sep-03	1700		45	N/A		Bio Sample	
AG	9-Sep-03	1015		250	125		Bio Sample	
AG	9-Sep-03	1015		230	105		Bio Sample	

Appendix A2. Actic Grayling Kept for Biological Sample

Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
AG	9-Sep-03	1015		230	100		Bio Sample	
AG	9-Sep-03	1015		240	115		Bio Sample	
AG	9-Sep-03	1015		240	110		Bio Sample	
AG	9-Sep-03	1015		210	90		Bio Sample	
AG	9-Sep-03	1015		230	110		Bio Sample	
AG	9-Sep-03	1015		220	80		Bio Sample	
AG	9-Sep-03	1015		140	20		Bio Sample	
AG	9-Sep-03	1015		140	20		Bio Sample	
AG	9-Sep-03	1015		140	25		Bio Sample	
AG	9-Sep-03	1015		150	30		Bio Sample	
AG	9-Sep-03	1015		140	25		Bio Sample	
AG	9-Sep-03	1015		150	30		Bio Sample	
AG	9-Sep-03	1015		130	20		Bio Sample	
AG	9-Sep-03	1015		150	30		Bio Sample	
AG	9-Sep-03	1015		120	20		Bio Sample	
AG	9-Sep-03	1115		320	320		Bio Sample	
AG	9-Sep-03	1115		300	230		Bio Sample	
AG	9-Sep-03	1115		300	260		Bio Sample	
AG	9-Sep-03	1115		290	210		Bio Sample	
AG	9-Sep-03	1115		290	240		Bio Sample	
AG	9-Sep-03	1115		310	260		Bio Sample	
AG	9-Sep-03	1115		300	240		Bio Sample	
AG	9-Sep-03	1115		290	210		Bio Sample	
AG	9-Sep-03	1115		260	170		Bio Sample	
AG	9-Sep-03	1115		280	220		Bio Sample	
AG	9-Sep-03	1115		280	200		Bio Sample	
AG	9-Sep-03	1115		280	240		Bio Sample	
AG	9-Sep-03	1115		300	260		Bio Sample	
AG	9-Sep-03	1115		330	335		Bio Sample	
AG	9-Sep-03	1115		270	200		Bio Sample	
AG	9-Sep-03	1115		310	260		Bio Sample	
AG	9-Sep-03	1115		190	60		Bio Sample	
AG	9-Sep-03	1115		190	50		Bio Sample	
AG	9-Sep-03	1115		200	60		Bio Sample	
AG	9-Sep-03	1115		210	75		Bio Sample	
AG	9-Sep-03	1115		210	75		Bio Sample	
AG	9-Sep-03	1115		200	65		Bio Sample	
AG	9-Sep-03	1115		190	50		Bio Sample	
AG	9-Sep-03	1245		320	320		Bio Sample	
AG	9-Sep-03	1245		300	280		Bio Sample	
AG	9-Sep-03	1245		300	250		Bio Sample	
AG	9-Sep-03	1245		330	290		Bio Sample	
AG	9-Sep-03	1245		350	400		Bio Sample	
AG	9-Sep-03	1245		300	250		Bio Sample	
AG	9-Sep-03	1245		310	280		Bio Sample	
AG	9-Sep-03	1245		300	260		Bio Sample	
AG	9-Sep-03	1245		310	240		Bio Sample	
AG	9-Sep-03	1245		320	295		Bio Sample	
AG	9-Sep-03	1245		290	225		Bio Sample	
AG	9-Sep-03	1245		320	310		Bio Sample	
AG	9-Sep-03	1245		290	240		Bio Sample	
AG	9-Sep-03	1245		280	210		Bio Sample	
AG	9-Sep-03	1245		300	255		Bio Sample	

Appendix A2. Actic Grayling Kept for Biological Sample

Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
AG	9-Sep-03	1245		290	260		Bio Sample	
AG	9-Sep-03	1245		280	200		Bio Sample	
AG	9-Sep-03	1245		310	270		Bio Sample	
AG	9-Sep-03	1245		240	145		Bio Sample	
AG	9-Sep-03	1245		280	230		Bio Sample	
AG	9-Sep-03	1245		300	270		Bio Sample	
AG	9-Sep-03	1245		280	200		Bio Sample	
AG	9-Sep-03	1245		230	50		Bio Sample	
AG	9-Sep-03	1245		280	200		Bio Sample	
AG	9-Sep-03	1245		230	110		Bio Sample	
AG	9-Sep-03	1245		220	100		Bio Sample	
AG	9-Sep-03	1245		190	60		Bio Sample	
AG	9-Sep-03	1245		210	100		Bio Sample	
AG	9-Sep-03	1245		200	75		Bio Sample	
AG	9-Sep-03	1245		190	60		Bio Sample	
AG	9-Sep-03	1245		200	75		Bio Sample	
AG	9-Sep-03	1245		180	50		Bio Sample	
AG	9-Sep-03	1245		200	75		Bio Sample	
AG	9-Sep-03	1245		190	60		Bio Sample	
AG	9-Sep-03	1245		190	65		Bio Sample	
AG	9-Sep-03	1245		180	50		Bio Sample	
AG	9-Sep-03	1245		300	310		Bio Sample	
AG	9-Sep-03	1245		310	330		Bio Sample	
AG	9-Sep-03	1245	90	300	240	Orange	Bio Sample	
AG	9-Sep-03	1245		280	260		Bio Sample	
AG	9-Sep-03	1245	26	300	350	Orange	Bio Sample	
AG	9-Sep-03	1245		280	235		Bio Sample	
AG	9-Sep-03	1245		190	70		Bio Sample	
AG	9-Sep-03	1245		170	65		Bio Sample	
AG	9-Sep-03	1245		190	70		Bio Sample	
AG	9-Sep-03	1245		165	40		Bio Sample	
AG	9-Sep-03	1245		180	60		Bio Sample	
AG	9-Sep-03	1245		185	60		Bio Sample	
AG	9-Sep-03	1245		180	50		Bio Sample	
AG	9-Sep-03	1245		185	65		Bio Sample	
AG	9-Sep-03	1245		170	40		Bio Sample	
AG	9-Sep-03	1245		340	N/A		Bio Sample	
AG	9-Sep-03	1245		290	220		Bio Sample	
AG	9-Sep-03	1630		45	N/A		Bio Sample	
AG	9-Sep-03	1630		45	N/A		Bio Sample	
AG	9-Sep-03	1630		45	N/A		Bio Sample	
AG	9-Sep-03	1630		60	N/A		Bio Sample	
AG	9-Sep-03	1630		60	N/A		Bio Sample	
AG	9-Sep-03	1700		60	N/A		Bio Sample	
AG	9-Sep-03	1700		70	N/A		Bio Sample	
AG	9-Sep-03	1700		70	N/A		Bio Sample	
AG	9-Sep-03	1700		100	N/A		Bio Sample	
AG	9-Sep-03	1700		110	N/A		Bio Sample	
AG	10-Sep-03	1000		280	210		Bio Sample	
AG	10-Sep-03	1000		320	305		Bio Sample	
AG	10-Sep-03	1000		300	260		Bio Sample	
AG	10-Sep-03	1000		320	300		Bio Sample	
AG	10-Sep-03	1000		320	290		Bio Sample	

Appendix A2. Actic Grayling Kept for Biological Sample

Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
AG	10-Sep-03	1000		tag # 036	tag # 036		Bio Sample	
AG	10-Sep-03	1000		280	200		Bio Sample	
AG	10-Sep-03	1000		310	290		Bio Sample	
AG	10-Sep-03	1000		310	260		Bio Sample	
AG	10-Sep-03	1000		310	270		Bio Sample	
AG	10-Sep-03	1000		270	200		Bio Sample	
AG	10-Sep-03	1000		300	270		Bio Sample	
AG	10-Sep-03	1000		270	200		Bio Sample	
AG	10-Sep-03	1000		280	200		Bio Sample	
AG	10-Sep-03	1000		200	60		Bio Sample	
AG	10-Sep-03	1000		190	50		Bio Sample	
AG	10-Sep-03	1000		200	75		Bio Sample	
AG	10-Sep-03	1000		190	50		Bio Sample	
AG	10-Sep-03	1000		190	50		Bio Sample	
AG	10-Sep-03	1000		190	55		Bio Sample	
AG	10-Sep-03	1000		190	55		Bio Sample	
AG	10-Sep-03	1000		270	190		Bio Sample	
AG	10-Sep-03	1000		270	185		Bio Sample	
AG	10-Sep-03	1000		180	150		Bio Sample	
AG	10-Sep-03	1100		200	65		Bio Sample	
AG	10-Sep-03	1100		190	60		Bio Sample	
AG	10-Sep-03	1100		180	50		Bio Sample	
AG	10-Sep-03	1100		180	60		Bio Sample	
AG	10-Sep-03	1315		200	55		Bio Sample	
AG	10-Sep-03	1645		260	160		Bio Sample	
AG	10-Sep-03	1645		170	40		Bio Sample	
AG	10-Sep-03	1700		110	N/A		Bio Sample	
AG	10-Sep-03	1700		80	N/A		Bio Sample	
AG	10-Sep-03	1700		65	N/A		Bio Sample	
AG	10-Sep-03	1700		70	N/A		Bio Sample	
AG	10-Sep-03	1700		55	N/A		Bio Sample	
AG	10-Sep-03	1700		43	N/A		Bio Sample	
AG	10-Sep-03	1700		43	N/A		Bio Sample	
AG	11-Sep-03	1130		290	220		Bio Sample	
AG	11-Sep-03	1130		300	260		Bio Sample	
AG	11-Sep-03	1130		300	240		Bio Sample	
AG	11-Sep-03	1130		300	250		Bio Sample	
AG	11-Sep-03	1130		290	210		Bio Sample	
AG	11-Sep-03	1130		290	240		Bio Sample	
AG	11-Sep-03	1130		220	60		Bio Sample	
AG	11-Sep-03	1130		310	280		Bio Sample	
AG	11-Sep-03	1130		300	260		Bio Sample	
AG	11-Sep-03	1130		290	280		Bio Sample	
AG	11-Sep-03	1130		270	220		Bio Sample	
AG	11-Sep-03	1130		230	110		Bio Sample	
AG	11-Sep-03	1130		210	90		Bio Sample	
AG	11-Sep-03	1130		210	100		Bio Sample	
AG	11-Sep-03	1130		260	160		Bio Sample	
AG	11-Sep-03	1130		190	70		Bio Sample	
AG	11-Sep-03	1130		280	210		Bio Sample	
AG	11-Sep-03	1130		320	300		Bio Sample	
AG	11-Sep-03	1130		290	250		Bio Sample	
AG	11-Sep-03	1130		280	250		Bio Sample	

Appendix A2. Actic Grayling Kept for Biological Sample

Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
AG	11-Sep-03	1130		280	220		Bio Sample	
AG	11-Sep-03	1130		210	100		Bio Sample	
AG	11-Sep-03	1130		300	280		Bio Sample	
AG	11-Sep-03	1130		190	60		Bio Sample	
AG	11-Sep-03	1130		200	80		Bio Sample	
AG	11-Sep-03	1130		180	50		Bio Sample	
AG	11-Sep-03	1130		200	80		Bio Sample	
AG	11-Sep-03	1130		190	80		Bio Sample	
AG	11-Sep-03	1130		200	70		Bio Sample	
AG	11-Sep-03	1130		180	45		Bio Sample	
AG	11-Sep-03	1130		210	80		Bio Sample	
AG	11-Sep-03	1130		190	70		Bio Sample	
AG	11-Sep-03	1130		190	60		Bio Sample	
AG	11-Sep-03	1130		280	200		Bio Sample	
AG	11-Sep-03	1130		200	75		Bio Sample	
AG	11-Sep-03	1130		280	185		Bio Sample	
AG	11-Sep-03	1130		200	70		Bio Sample	
AG	11-Sep-03	1130		190	60		Bio Sample	
AG	11-Sep-03	1130		200	65		Bio Sample	
AG	11-Sep-03	1130		190	65		Bio Sample	
AG	11-Sep-03	1130		190	60		Bio Sample	
AG	11-Sep-03	1130		200	70		Bio Sample	
AG	11-Sep-03	1130		210	80		Bio Sample	
AG	11-Sep-03	1130		190	65		Bio Sample	
AG	11-Sep-03	1130		210	85		Bio Sample	
AG	11-Sep-03	1130		200	80		Bio Sample	
AG	11-Sep-03	1130		180	55		Bio Sample	
AG	11-Sep-03	1130		200	70		Bio Sample	
AG	11-Sep-03	1130		200	70		Bio Sample	
AG	11-Sep-03	1130		200	75		Bio Sample	
AG	11-Sep-03	1630		43	N/A		Bio Sample	
AG	11-Sep-03	1630		70	N/A		Bio Sample	
AG	11-Sep-03	1630		41	N/A		Bio Sample	
AG	11-Sep-03	1630		61	N/A		Bio Sample	
AG	11-Sep-03	1630		51	N/A		Bio Sample	
AG	11-Sep-03	1630		44	N/A		Bio Sample	
AG	11-Sep-03	1630		45	N/A		Bio Sample	
AG	11-Sep-03	1630		52	N/A		Bio Sample	
AG	11-Sep-03	1630		36	N/A		Bio Sample	
AG	12-Sep-03	1630		150	30		Bio Sample	
AG	12-Sep-03	1130		150	25		Bio Sample	
AG	12-Sep-03	1130		140	25		Bio Sample	
AG	12-Sep-03	1130		125	10		Bio Sample	
AG	12-Sep-03	1130		125	15		Bio Sample	
AG	12-Sep-03	1130		130	20		Bio Sample	
AG	12-Sep-03	1130		130	15		Bio Sample	
AG	12-Sep-03	1130		80	5		Bio Sample	
AG	12-Sep-03	1130		100	7		Bio Sample	
AG	12-Sep-03	1130		150	35		Bio Sample	
AG	12-Sep-03	1130		150	20		Bio Sample	
AG	12-Sep-03	1130		150	25		Bio Sample	
AG	12-Sep-03	1130		150	25		Bio Sample	
AG	12-Sep-03	1130		310	340		Bio Sample	

Appendix A2. Actic Grayling Kept for Biological Sample

Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
AG	12-Sep-03	1130		270	240		Bio Sample	
AG	12-Sep-03	1450		310	290		Bio Sample	
AG	12-Sep-03	1450		270	210		Bio Sample	
AG	12-Sep-03	1450		280	240		Bio Sample	
AG	12-Sep-03	1450		320	300		Bio Sample	
AG	12-Sep-03	1450		310	315		Bio Sample	
AG	12-Sep-03	1450		300	270		Bio Sample	
AG	12-Sep-03	1450		280	200		Bio Sample	
AG	12-Sep-03	1450		290	210		Bio Sample	
AG	12-Sep-03	1450		290	250		Bio Sample	
AG	12-Sep-03	1450		300	260		Bio Sample	
AG	12-Sep-03	1450		260	180		Bio Sample	
AG	12-Sep-03	1450		260	150		Bio Sample	
AG	12-Sep-03	1450		200	60		Bio Sample	
AG	12-Sep-03	1450		310	300		Bio Sample	
AG	12-Sep-03	1450		320	300		Bio Sample	
AG	12-Sep-03	1530		68	N/A		Bio Sample	
AG	12-Sep-03	1530		40	N/A		Bio Sample	
AG	12-Sep-03	1530		40	N/A		Bio Sample	
AG	12-Sep-03	1630		255	150		Bio Sample	
AG	13-Sep-03	1430		290	240		Bio Sample	
AG	13-Sep-03	1430		Tag # 089	Tag # 089		Bio Sample	
AG	13-Sep-03	1430		290	280		Bio Sample	
AG	13-Sep-03	1430		280	210		Bio Sample	
AG	13-Sep-03	1430		270	200		Bio Sample	
AG	13-Sep-03	1430		280	220		Bio Sample	
AG	13-Sep-03	1430		280	240		Bio Sample	
AG	13-Sep-03	1430		250	190		Bio Sample	
AG	13-Sep-03	1430		280	270		Bio Sample	
AG	13-Sep-03	1430		260	200		Bio Sample	
AG	13-Sep-03	1430		Tag # 046	Tag # 046		Bio Sample	
AG	13-Sep-03	1430		280	240		Bio Sample	
AG	13-Sep-03	1430		300	270		Bio Sample	
AG	13-Sep-03	1430		270	200		Bio Sample	
AG	14-Sep-03	1730		270	240		Bio Sample	
AG	14-Sep-03	1730		250	165		Bio Sample	
AG	14-Sep-03	1730		310	300		Bio Sample	
AG	14-Sep-03	1730		320	365		Bio Sample	
AG	14-Sep-03	1730		290	260		Bio Sample	
AG	14-Sep-03	1730		270	240		Bio Sample	
AG	14-Sep-03	1730		290	275		Bio Sample	
AG	14-Sep-03	1730		250	190		Bio Sample	
AG	14-Sep-03	1730		120	N/A		Bio Sample	
AG	15-Sep-03	1800		230	150		Bio Sample	
AG	15-Sep-03	1800		270	200		Bio Sample	
AG	15-Sep-03	1800		250	150		Bio Sample	
AG	15-Sep-03	1800		290	250		Bio Sample	
AG	15-Sep-03	1800		290	250		Bio Sample	
AG	15-Sep-03	1800		300	300		Bio Sample	
AG	15-Sep-03	1800		260	200		Bio Sample	
AG	15-Sep-03	1800		250	190		Bio Sample	
AG	15-Sep-03	1800		290	300		Bio Sample	
AG	15-Sep-03	1800		270	220		Bio Sample	

Appendix A2. Actic Grayling Kept for Biological Sample

Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
AG	15-Sep-03	1800		270	260		Bio Sample	
AG	15-Sep-03	1800		280	240		Bio Sample	
AG	N/A	N/A		N/A	N/A		Bio Sample	
AG	N/A	N/A		N/A	N/A		Bio Sample	
AG	N/A	N/A		N/A	N/A		Bio Sample	
AG	16-Sep-03	1600		52	N/A		Bio Sample	
AG	16-Sep-03	1600		220	110		Bio Sample	
AG	17-Sep-03	1600		280	230		Bio Sample	
AG	17-Sep-03	1600		260	210		Bio Sample	
AG	17-Sep-03	1600		290	240		Bio Sample	
AG	17-Sep-03	1600		280	220		Bio Sample	
AG	17-Sep-03	1600		250	160		Bio Sample	
AG	17-Sep-03	1600		120	N/A		Bio Sample	
AG	17-Sep-03	1600		130	N/A		Bio Sample	
AG	17-Sep-03	1600		130	N/A		Bio Sample	
AG	17-Sep-03	1600		130	N/A		Bio Sample	
AG	17-Sep-03	1600		120	N/A		Bio Sample	
AG	17-Sep-03	1600		120	N/A		Bio Sample	
AG	17-Sep-03	1600		120	N/A		Bio Sample	
AG	17-Sep-03	1600		120	N/A		Bio Sample	
AG	17-Sep-03	1600		120	N/A		Bio Sample	
AG	17-Sep-03	1600		120	N/A		Bio Sample	
AG	17-Sep-03	1600		120	N/A		Bio Sample	
AG	17-Sep-03	1600		130	N/A		Bio Sample	
AG	17-Sep-03	1600		125	N/A		Bio Sample	
AG	17-Sep-03	1600		120	N/A		Bio Sample	
AG	17-Sep-03	1600		130	N/A		Bio Sample	
AG	17-Sep-03	1600		270	210		Bio Sample	
AG	17-Sep-03	1600		125	N/A		Bio Sample	
AG	17-Sep-03	1600		125	N/A		Bio Sample	
AG	17-Sep-03	1600		120	N/A		Bio Sample	
AG	17-Sep-03	1600		120	N/A		Bio Sample	
AG	17-Sep-03	1600		130	N/A		Bio Sample	
AG	17-Sep-03	1600		60	N/A		Bio Sample	
AG	17-Sep-03	1600		60	N/A		Bio Sample	
AG	17-Sep-03	1600		130	N/A		Bio Sample	
AG	17-Sep-03	1600		120	N/A		Bio Sample	
AG	17-Sep-03	1600		120	N/A		Bio Sample	
AG	17-Sep-03	1600		270	180		Bio Sample	
AG	17-Sep-03	1600		130	N/A		Bio Sample	
AG	17-Sep-03	1600		120	N/A		Bio Sample	
AG	17-Sep-03	1600		130	N/A		Bio Sample	
AG	17-Sep-03	1600		120	N/A		Bio Sample	
AG	17-Sep-03	1600		120	N/A		Bio Sample	
AG	18-Sep-03	1500		280	260		Bio Sample	
AG	18-Sep-03	1500		310	350		Bio Sample	
AG	18-Sep-03	1500		270	240		Bio Sample	
AG	18-Sep-03	1500		270	230		Bio Sample	
AG	18-Sep-03	1500		265	250		Bio Sample	
AG	18-Sep-03	1500		120	N/A		Bio Sample	
AG	18-Sep-03	1500		130	N/A		Bio Sample	
AG	18-Sep-03	1500		125	N/A		Bio Sample	
AG	18-Sep-03	1500		125	N/A		Bio Sample	

Appendix A2. Actic Grayling Kept for Biological Sample

Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
AG	18-Sep-03	1500		130	N/A		Bio Sample	
AG	18-Sep-03	1500		130	N/A		Bio Sample	
AG	18-Sep-03	1500		135	N/A		Bio Sample	
AG	18-Sep-03	1500		135	N/A		Bio Sample	
AG	18-Sep-03	1500		130	N/A		Bio Sample	
AG	18-Sep-03	1500		130	N/A		Bio Sample	
AG	18-Sep-03	1500		42	N/A		Bio Sample	
AG	18-Sep-03	1500		130	N/A		Bio Sample	
AG	19-Sep-03	1500		280	225		Bio Sample	
AG	19-Sep-03	1500		290	260		Bio Sample	
AG	19-Sep-03	1500		120	15		Bio Sample	

ARCTIC GRAYLING

A3 Mortalities

Kept for Trappers

Killed by River Otters

Appendix A3. Other Mortalities

Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
AG	12-Sep-03			290			Other Morts	Trapper Fish
AG	12-Sep-03			270			Other Morts	Trapper Fish
AG	12-Sep-03			210			Other Morts	Trapper Fish
AG	12-Sep-03			210			Other Morts	Trapper Fish
AG	12-Sep-03			210			Other Morts	Trapper Fish
AG	12-Sep-03			200			Other Morts	Trapper Fish
AG	12-Sep-03			240			Other Morts	Trapper Fish
AG	12-Sep-03			190			Other Morts	Trapper Fish
AG	12-Sep-03			200			Other Morts	Trapper Fish
AG	12-Sep-03			190			Other Morts	Trapper Fish
AG	12-Sep-03			190			Other Morts	Trapper Fish
AG	12-Sep-03			180			Other Morts	Trapper Fish
AG	12-Sep-03			180			Other Morts	Trapper Fish
AG	12-Sep-03			200			Other Morts	Trapper Fish
AG	12-Sep-03			180			Other Morts	Trapper Fish
AG	12-Sep-03			190			Other Morts	Trapper Fish
AG	12-Sep-03			190			Other Morts	Trapper Fish
AG	12-Sep-03			190			Other Morts	Trapper Fish
AG	12-Sep-03			270			Other Morts	Trapper Fish
AG	12-Sep-03			280			Other Morts	Trapper Fish
AG	12-Sep-03			260			Other Morts	Trapper Fish
AG	12-Sep-03			180			Other Morts	Trapper Fish
AG	12-Sep-03			280			Other Morts	Trapper Fish
AG	12-Sep-03			230			Other Morts	Trapper Fish
AG	12-Sep-03			260			Other Morts	Trapper Fish
AG	12-Sep-03			260			Other Morts	Trapper Fish
AG	12-Sep-03			250			Other Morts	Trapper Fish
AG	12-Sep-03			260			Other Morts	Trapper Fish
AG	12-Sep-03			250			Other Morts	Trapper Fish
AG	12-Sep-03			220			Other Morts	Trapper Fish
AG	12-Sep-03			200			Other Morts	Trapper Fish
AG	12-Sep-03			300			Other Morts	Trapper Fish
AG	12-Sep-03			190			Other Morts	Trapper Fish
AG	12-Sep-03			230			Other Morts	Trapper Fish
AG	12-Sep-03			230			Other Morts	Trapper Fish
AG	12-Sep-03			290			Other Morts	Trapper Fish
AG	12-Sep-03			300			Other Morts	Trapper Fish
AG	12-Sep-03			190			Other Morts	Trapper Fish
AG	12-Sep-03			250			Other Morts	Trapper Fish
AG	12-Sep-03			240			Other Morts	Trapper Fish
AG	12-Sep-03			170			Other Morts	Trapper Fish
AG	12-Sep-03			240			Other Morts	Trapper Fish
AG	12-Sep-03			190			Other Morts	Trapper Fish
AG	12-Sep-03			220			Other Morts	Trapper Fish
AG	12-Sep-03			250			Other Morts	Trapper Fish
AG	12-Sep-03			270			Other Morts	Trapper Fish
AG	12-Sep-03			230			Other Morts	Trapper Fish
AG	12-Sep-03			290			Other Morts	Trapper Fish
AG	12-Sep-03			270			Other Morts	Trapper Fish
AG	12-Sep-03			270			Other Morts	Trapper Fish
AG	12-Sep-03			300			Other Morts	Trapper Fish
AG	12-Sep-03			240			Other Morts	Trapper Fish
AG	12-Sep-03			270			Other Morts	Trapper Fish
AG	12-Sep-03			250			Other Morts	Trapper Fish
AG	12-Sep-03			240			Other Morts	Trapper Fish
AG	12-Sep-03			190			Other Morts	Trapper Fish
AG	12-Sep-03			280			Other Morts	Trapper Fish
AG	12-Sep-03			170			Other Morts	Trapper Fish
AG	12-Sep-03			230			Other Morts	Trapper Fish
AG	12-Sep-03			190			Other Morts	Trapper Fish
AG	12-Sep-03			300			Other Morts	Trapper Fish
AG	12-Sep-03			300			Other Morts	Trapper Fish
AG	12-Sep-03			290			Other Morts	Trapper Fish
AG	12-Sep-03			270			Other Morts	Trapper Fish
AG	12-Sep-03			260			Other Morts	Trapper Fish

Appendix A3. Other Mortalities

Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
AG	12-Sep-03			280			Other Morts	Trapper Fish
AG	12-Sep-03			280			Other Morts	Trapper Fish
AG	12-Sep-03			280			Other Morts	Trapper Fish
AG	12-Sep-03			290			Other Morts	Trapper Fish
AG	12-Sep-03			270			Other Morts	Trapper Fish
AG	12-Sep-03			220			Other Morts	Trapper Fish
AG	12-Sep-03			270			Other Morts	Trapper Fish
AG	12-Sep-03			220			Other Morts	Trapper Fish
AG	12-Sep-03			190			Other Morts	Trapper Fish
AG	12-Sep-03			210			Other Morts	Trapper Fish
AG	12-Sep-03			190			Other Morts	Trapper Fish
AG	12-Sep-03			190			Other Morts	Trapper Fish
AG	12-Sep-03			180			Other Morts	Trapper Fish
AG	12-Sep-03			210			Other Morts	Trapper Fish
AG	12-Sep-03			230			Other Morts	Trapper Fish
AG	12-Sep-03			290			Other Morts	Trapper Fish
AG	12-Sep-03			290			Other Morts	Trapper Fish
AG	12-Sep-03			200			Other Morts	Trapper Fish
AG	12-Sep-03			190			Other Morts	Trapper Fish
AG	12-Sep-03			210			Other Morts	Trapper Fish
AG	12-Sep-03			180			Other Morts	Trapper Fish
AG	12-Sep-03			180			Other Morts	Trapper Fish
AG	12-Sep-03			180			Other Morts	Trapper Fish
AG	12-Sep-03			180			Other Morts	Trapper Fish
AG	12-Sep-03			190			Other Morts	Trapper Fish
AG	12-Sep-03			190			Other Morts	Trapper Fish
AG	12-Sep-03			180			Other Morts	Trapper Fish
AG	12-Sep-03			200			Other Morts	Trapper Fish
AG	12-Sep-03			190			Other Morts	Trapper Fish
AG	12-Sep-03			180			Other Morts	Trapper Fish
AG	12-Sep-03			180			Other Morts	Trapper Fish
AG	12-Sep-03			180			Other Morts	Trapper Fish
AG	12-Sep-03			190			Other Morts	Trapper Fish
AG	12-Sep-03			190			Other Morts	Trapper Fish
AG	12-Sep-03			190			Other Morts	Trapper Fish
AG	12-Sep-03			170			Other Morts	Trapper Fish
AG	12-Sep-03			170			Other Morts	Trapper Fish
AG	12-Sep-03			180			Other Morts	Trapper Fish
AG	12-Sep-03			180			Other Morts	Trapper Fish
AG	12-Sep-03			190			Other Morts	Trapper Fish
AG	12-Sep-03			290			Other Morts	Trapper Fish
AG	12-Sep-03			220			Other Morts	Trapper Fish
AG	12-Sep-03			260			Other Morts	Trapper Fish
AG	12-Sep-03			300			Other Morts	Trapper Fish
AG	12-Sep-03			270			Other Morts	Trapper Fish
AG	12-Sep-03			200			Other Morts	Trapper Fish
AG	12-Sep-03			270			Other Morts	Trapper Fish
AG	12-Sep-03			200			Other Morts	Trapper Fish
AG	12-Sep-03			200			Other Morts	Trapper Fish
AG	13-Sep-03			240			Other Morts	Trapper Fish
AG	13-Sep-03			200			Other Morts	Trapper Fish
AG	13-Sep-03			200			Other Morts	Trapper Fish
AG	13-Sep-03			210			Other Morts	Trapper Fish
AG	13-Sep-03			240			Other Morts	Trapper Fish
AG	13-Sep-03			180			Other Morts	Trapper Fish
AG	13-Sep-03			180			Other Morts	Trapper Fish
AG	13-Sep-03			190			Other Morts	Trapper Fish
AG	13-Sep-03			240			Other Morts	Trapper Fish
AG	13-Sep-03			190			Other Morts	Trapper Fish
AG	13-Sep-03			190			Other Morts	Trapper Fish
AG	13-Sep-03			180			Other Morts	Trapper Fish
AG	13-Sep-03			210			Other Morts	Trapper Fish
AG	13-Sep-03			190			Other Morts	Trapper Fish
AG	13-Sep-03			170			Other Morts	Trapper Fish
AG	13-Sep-03			180			Other Morts	Trapper Fish

Appendix A3. Other Mortalities

Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
AG	13-Sep-03			180			Other Morts	Trapper Fish
AG	13-Sep-03			180			Other Morts	Trapper Fish
AG	13-Sep-03			180			Other Morts	Trapper Fish
AG	13-Sep-03			190			Other Morts	Trapper Fish
AG	13-Sep-03			170			Other Morts	Trapper Fish
AG	13-Sep-03			230			Other Morts	Trapper Fish
AG	13-Sep-03			210			Other Morts	Trapper Fish
AG	13-Sep-03			190			Other Morts	Trapper Fish
AG	13-Sep-03			190			Other Morts	Trapper Fish
AG	13-Sep-03			220			Other Morts	Trapper Fish
AG	13-Sep-03			190			Other Morts	Trapper Fish
AG	13-Sep-03			180			Other Morts	Trapper Fish
AG	13-Sep-03			190			Other Morts	Trapper Fish
AG	13-Sep-03			190			Other Morts	Trapper Fish
AG	13-Sep-03			200			Other Morts	Trapper Fish
AG	13-Sep-03			180			Other Morts	Trapper Fish
AG	13-Sep-03			200			Other Morts	Trapper Fish
AG	13-Sep-03			170			Other Morts	Trapper Fish
AG	13-Sep-03			160			Other Morts	Trapper Fish
AG	13-Sep-03			150			Other Morts	Trapper Fish
AG	13-Sep-03			200			Other Morts	Trapper Fish
AG	13-Sep-03			180			Other Morts	Trapper Fish
AG	13-Sep-03			200			Other Morts	Trapper Fish
AG	13-Sep-03			190			Other Morts	Trapper Fish
AG	13-Sep-03			190			Other Morts	Trapper Fish
AG	13-Sep-03			180			Other Morts	Trapper Fish
AG	14-Sep-03			220			Other Morts	Trapper Fish
AG	14-Sep-03			190			Other Morts	Trapper Fish
AG	14-Sep-03			180			Other Morts	Trapper Fish
AG	14-Sep-03			180			Other Morts	Trapper Fish
AG	14-Sep-03			190			Other Morts	Trapper Fish
AG	14-Sep-03			200			Other Morts	Trapper Fish
AG	14-Sep-03			190			Other Morts	Trapper Fish
AG	14-Sep-03			190			Other Morts	Trapper Fish
AG	14-Sep-03			150			Other Morts	Trapper Fish
AG	14-Sep-03			170			Other Morts	Trapper Fish
AG	14-Sep-03			190			Other Morts	Trapper Fish
AG	14-Sep-03			170			Other Morts	Trapper Fish
AG	14-Sep-03			190			Other Morts	Trapper Fish
AG	14-Sep-03			170			Other Morts	Trapper Fish
AG	14-Sep-03			210			Other Morts	Trapper Fish
AG	14-Sep-03			180			Other Morts	Trapper Fish
AG	14-Sep-03			180			Other Morts	Trapper Fish
AG	14-Sep-03			180			Other Morts	Trapper Fish
AG	14-Sep-03			180			Other Morts	Trapper Fish
AG	14-Sep-03			190			Other Morts	Trapper Fish
AG	14-Sep-03			170			Other Morts	Trapper Fish
AG	14-Sep-03			190			Other Morts	Trapper Fish
AG	14-Sep-03			180			Other Morts	Trapper Fish
AG	14-Sep-03			200			Other Morts	Trapper Fish
AG	14-Sep-03			170			Other Morts	Trapper Fish
AG	14-Sep-03			170			Other Morts	Trapper Fish
AG	14-Sep-03			190			Other Morts	Trapper Fish
AG	14-Sep-03			180			Other Morts	Trapper Fish
AG	14-Sep-03			180			Other Morts	Trapper Fish
AG	14-Sep-03			180			Other Morts	Trapper Fish
AG	14-Sep-03			150			Other Morts	Trapper Fish
AG	14-Sep-03			220			Other Morts	Trapper Fish
AG	14-Sep-03			170			Other Morts	Trapper Fish
AG	14-Sep-03			170			Other Morts	Trapper Fish
AG	14-Sep-03			200			Other Morts	Trapper Fish
AG	14-Sep-03			190			Other Morts	Trapper Fish
AG	14-Sep-03			140			Other Morts	Trapper Fish
AG	14-Sep-03			180			Other Morts	Trapper Fish
AG	14-Sep-03			150			Other Morts	Trapper Fish

Appendix A3. Other Mortalities

Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
AG	14-Sep-03			160			Other Morts	Trapper Fish
AG	14-Sep-03			180			Other Morts	Trapper Fish
AG	14-Sep-03			180			Other Morts	Trapper Fish
AG	14-Sep-03			190			Other Morts	Trapper Fish
AG	14-Sep-03			170			Other Morts	Trapper Fish
AG	14-Sep-03			200			Other Morts	Trapper Fish
AG	14-Sep-03			190			Other Morts	Trapper Fish
AG	14-Sep-03			170			Other Morts	Trapper Fish
AG	14-Sep-03			180			Other Morts	Trapper Fish
AG	14-Sep-03			180			Other Morts	Trapper Fish
AG	14-Sep-03			180			Other Morts	Trapper Fish
AG	14-Sep-03			200			Other Morts	Trapper Fish
AG	14-Sep-03			190			Other Morts	Trapper Fish
AG	14-Sep-03			230			Other Morts	Trapper Fish
AG	15-Sep-03			230			Other Morts	Trapper Fish
AG	15-Sep-03			230			Other Morts	Trapper Fish
AG	15-Sep-03			240			Other Morts	Trapper Fish
AG	15-Sep-03			230			Other Morts	Trapper Fish
AG	15-Sep-03			220			Other Morts	Trapper Fish
AG	15-Sep-03			240			Other Morts	Trapper Fish
AG	15-Sep-03			150			Other Morts	Trapper Fish
AG	15-Sep-03			190			Other Morts	Trapper Fish
AG	16-Sep-03			210			Other Morts	Trapper Fish
AG	16-Sep-03			160			Other Morts	Trapper Fish
AG	16-Sep-03			200			Other Morts	Trapper Fish
AG	16-Sep-03			220			Other Morts	Trapper Fish
AG	16-Sep-03			180			Other Morts	Trapper Fish
AG	16-Sep-03			210			Other Morts	Trapper Fish
AG	16-Sep-03			200			Other Morts	Trapper Fish
AG	16-Sep-03			190			Other Morts	Trapper Fish
AG	16-Sep-03			230			Other Morts	Trapper Fish
AG	17-Sep-03			205			Other Morts	Trapper Fish
AG	17-Sep-03			120			Other Morts	Trapper Fish
AG	17-Sep-03			110			Other Morts	Trapper Fish
AG	17-Sep-03			140			Other Morts	Trapper Fish
AG	17-Sep-03			190			Other Morts	Trapper Fish
AG	17-Sep-03			200			Other Morts	Trapper Fish
AG	17-Sep-03			190			Other Morts	Trapper Fish
AG	17-Sep-03			180			Other Morts	Trapper Fish
AG	17-Sep-03			200			Other Morts	Trapper Fish
AG	17-Sep-03			200			Other Morts	Trapper Fish
AG	17-Sep-03			180			Other Morts	Trapper Fish
AG	17-Sep-03			120			Other Morts	Trapper Fish
AG	17-Sep-03			180			Other Morts	Trapper Fish
AG	17-Sep-03			140			Other Morts	Trapper Fish
AG	17-Sep-03			140			Other Morts	Trapper Fish
AG	17-Sep-03			140			Other Morts	Trapper Fish
AG	17-Sep-03			120			Other Morts	Trapper Fish
AG	17-Sep-03			100			Other Morts	Trapper Fish
AG	17-Sep-03			130			Other Morts	Trapper Fish
AG	17-Sep-03			130			Other Morts	Trapper Fish
AG	17-Sep-03			140			Other Morts	Trapper Fish
AG	17-Sep-03			170			Other Morts	Trapper Fish
AG	17-Sep-03			170			Other Morts	Trapper Fish
AG	17-Sep-03			150			Other Morts	Trapper Fish
AG	17-Sep-03			170			Other Morts	Trapper Fish
AG	17-Sep-03			180			Other Morts	Trapper Fish
AG	17-Sep-03			140			Other Morts	Trapper Fish
AG	17-Sep-03			130			Other Morts	Trapper Fish
AG	17-Sep-03			200			Other Morts	Trapper Fish
AG	17-Sep-03			190			Other Morts	Trapper Fish
AG	17-Sep-03			200			Other Morts	Trapper Fish
AG	17-Sep-03			190			Other Morts	Trapper Fish
AG	17-Sep-03			170			Other Morts	Trapper Fish
AG	17-Sep-03			180			Other Morts	Trapper Fish

Appendix A3. Other Mortalities

Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
AG	17-Sep-03			240			Other Morts	Trapper Fish
AG	17-Sep-03			230			Other Morts	Trapper Fish
AG	17-Sep-03			190			Other Morts	Trapper Fish
AG	17-Sep-03			200			Other Morts	Trapper Fish
AG	17-Sep-03			180			Other Morts	Trapper Fish
AG	17-Sep-03			190			Other Morts	Trapper Fish
AG	17-Sep-03			200			Other Morts	Trapper Fish
AG	17-Sep-03			230			Other Morts	Trapper Fish
AG	17-Sep-03			180			Other Morts	Trapper Fish
AG	17-Sep-03			190			Other Morts	Trapper Fish
AG	17-Sep-03			190			Other Morts	Trapper Fish
AG	17-Sep-03			190			Other Morts	Trapper Fish
AG	17-Sep-03			190			Other Morts	Trapper Fish
AG	17-Sep-03			170			Other Morts	Trapper Fish
AG	17-Sep-03			120			Other Morts	Trapper Fish
AG	17-Sep-03			100			Other Morts	Trapper Fish
AG	17-Sep-03			100			Other Morts	Trapper Fish
AG	17-Sep-03			190			Other Morts	Trapper Fish
AG	17-Sep-03			200			Other Morts	Trapper Fish
AG	17-Sep-03			190			Other Morts	Trapper Fish
AG	17-Sep-03			190			Other Morts	Trapper Fish
AG	17-Sep-03			200			Other Morts	Trapper Fish
AG	17-Sep-03			200			Other Morts	Trapper Fish
AG	17-Sep-03			190			Other Morts	Trapper Fish
AG	17-Sep-03			170			Other Morts	Trapper Fish
AG	17-Sep-03			180			Other Morts	Trapper Fish
AG	17-Sep-03			210			Other Morts	Trapper Fish
AG	17-Sep-03			190			Other Morts	Trapper Fish
AG	17-Sep-03			230			Other Morts	Trapper Fish
AG	17-Sep-03			180			Other Morts	Trapper Fish
AG	17-Sep-03			210			Other Morts	Trapper Fish
AG	17-Sep-03			160			Other Morts	Trapper Fish
AG	17-Sep-03			180			Other Morts	Trapper Fish
AG	17-Sep-03			210			Other Morts	Trapper Fish
AG	17-Sep-03			180			Other Morts	Trapper Fish
AG	17-Sep-03			160			Other Morts	Trapper Fish
AG	17-Sep-03			180			Other Morts	Trapper Fish
AG	17-Sep-03			180			Other Morts	Trapper Fish
AG	17-Sep-03			120			Other Morts	Trapper Fish
AG	17-Sep-03			130			Other Morts	Trapper Fish
AG	17-Sep-03			120			Other Morts	Trapper Fish
AG	17-Sep-03			130			Other Morts	Trapper Fish
AG	17-Sep-03			230			Other Morts	Trapper Fish
AG	17-Sep-03			190			Other Morts	Trapper Fish
AG	17-Sep-03			170			Other Morts	Trapper Fish
AG	17-Sep-03			180			Other Morts	Trapper Fish
AG	17-Sep-03			190			Other Morts	Trapper Fish
AG	17-Sep-03			180			Other Morts	Trapper Fish
AG	17-Sep-03			170			Other Morts	Trapper Fish
AG	18-Sep-03			180			Other Morts	Trapper Fish
AG	18-Sep-03			130			Other Morts	Trapper Fish
AG	18-Sep-03			130			Other Morts	Trapper Fish
AG	18-Sep-03			120			Other Morts	Trapper Fish
AG	18-Sep-03			130			Other Morts	Trapper Fish
AG	18-Sep-03			130			Other Morts	Trapper Fish
AG	18-Sep-03			120			Other Morts	Trapper Fish
AG	18-Sep-03			170			Other Morts	Trapper Fish
AG	18-Sep-03			140			Other Morts	Trapper Fish
AG	18-Sep-03			200			Other Morts	Trapper Fish
AG	18-Sep-03			220			Other Morts	Trapper Fish
AG	18-Sep-03			190			Other Morts	Trapper Fish
AG	18-Sep-03			200			Other Morts	Trapper Fish
AG	18-Sep-03			200			Other Morts	Trapper Fish
AG	18-Sep-03			190			Other Morts	Trapper Fish
AG	18-Sep-03			180			Other Morts	Trapper Fish

Appendix A3. Other Mortalities

Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
AG	18-Sep-03			200			Other Morts	Trapper Fish
AG	18-Sep-03			210			Other Morts	Trapper Fish
AG	18-Sep-03			200			Other Morts	Trapper Fish
AG	18-Sep-03			180			Other Morts	Trapper Fish
AG	18-Sep-03			230			Other Morts	Trapper Fish
AG	18-Sep-03			220			Other Morts	Trapper Fish
AG	18-Sep-03			180			Other Morts	Trapper Fish
AG	18-Sep-03			210			Other Morts	Trapper Fish
AG	18-Sep-03			130			Other Morts	Trapper Fish
AG	18-Sep-03			200			Other Morts	Trapper Fish
AG	18-Sep-03			120			Other Morts	Trapper Fish
AG	18-Sep-03			190			Other Morts	Trapper Fish
AG	18-Sep-03			140			Other Morts	Trapper Fish
AG	18-Sep-03			190			Other Morts	Trapper Fish
AG	18-Sep-03			180			Other Morts	Trapper Fish
AG	18-Sep-03			200			Other Morts	Trapper Fish
AG	18-Sep-03			190			Other Morts	Trapper Fish
AG	18-Sep-03			120			Other Morts	Trapper Fish
AG	18-Sep-03			190			Other Morts	Trapper Fish
AG	18-Sep-03			180			Other Morts	Trapper Fish
AG	18-Sep-03			180			Other Morts	Trapper Fish
AG	18-Sep-03			120			Other Morts	Trapper Fish
AG	18-Sep-03			120			Other Morts	Trapper Fish
AG	18-Sep-03			190			Other Morts	Trapper Fish
AG	18-Sep-03			190			Other Morts	Trapper Fish
AG	18-Sep-03			130			Other Morts	Trapper Fish
AG	18-Sep-03			190			Other Morts	Trapper Fish
AG	19-Sep-03			180			Other Morts	Trapper Fish
AG	19-Sep-03			170			Other Morts	Trapper Fish
AG	19-Sep-03			190			Other Morts	Trapper Fish
AG	19-Sep-03			160			Other Morts	Trapper Fish
AG	19-Sep-03			180			Other Morts	Trapper Fish
AG	19-Sep-03			200			Other Morts	Trapper Fish
AG	19-Sep-03			210			Other Morts	Trapper Fish
AG	19-Sep-03			190			Other Morts	Trapper Fish
AG	19-Sep-03			180			Other Morts	Trapper Fish
AG	19-Sep-03			190			Other Morts	Trapper Fish
AG	19-Sep-03			180			Other Morts	Trapper Fish
AG	19-Sep-03			200			Other Morts	Trapper Fish
AG	19-Sep-03			200			Other Morts	Trapper Fish
AG	19-Sep-03			210			Other Morts	Trapper Fish
AG	19-Sep-03			200			Other Morts	Trapper Fish
AG	19-Sep-03			190			Other Morts	Trapper Fish
AG	19-Sep-03			180			Other Morts	Trapper Fish
AG	19-Sep-03			190			Other Morts	Trapper Fish
AG	19-Sep-03			190			Other Morts	Trapper Fish
AG	19-Sep-03			180			Other Morts	Trapper Fish
AG	19-Sep-03			200			Other Morts	Trapper Fish
AG	20-Sep-03			220			Other Morts	Trapper Fish
AG	20-Sep-03			170			Other Morts	Trapper Fish
AG	20-Sep-03			120			Other Morts	Trapper Fish
AG	20-Sep-03			130			Other Morts	Trapper Fish
AG	20-Sep-03			120			Other Morts	Trapper Fish
AG	20-Sep-03			120			Other Morts	Trapper Fish
AG	20-Sep-03			120			Other Morts	Trapper Fish
AG	20-Sep-03			190			Other Morts	Trapper Fish
AG	20-Sep-03			130			Other Morts	Trapper Fish
AG	20-Sep-03			180			Other Morts	Trapper Fish
AG	20-Sep-03			130			Other Morts	Trapper Fish
AG	20-Sep-03			190			Other Morts	Trapper Fish
AG	20-Sep-03			120			Other Morts	Trapper Fish
AG	20-Sep-03			130			Other Morts	Trapper Fish
AG	20-Sep-03			200			Other Morts	Trapper Fish
AG	20-Sep-03			180			Other Morts	Trapper Fish
AG	20-Sep-03			170			Other Morts	Trapper Fish

Appendix A3. Other Mortalities

Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
AG	20-Sep-03			210			Other Morts	Trapper Fish
AG	20-Sep-03			200			Other Morts	Trapper Fish
AG	20-Sep-03			130			Other Morts	Trapper Fish
AG	20-Sep-03			120			Other Morts	Trapper Fish
AG	20-Sep-03			120			Other Morts	Trapper Fish
AG	20-Sep-03			130			Other Morts	Trapper Fish
AG	20-Sep-03			180			Other Morts	Trapper Fish
AG	20-Sep-03			200			Other Morts	Trapper Fish
AG	20-Sep-03			210			Other Morts	Trapper Fish
AG	20-Sep-03			180			Other Morts	Trapper Fish
AG	20-Sep-03			190			Other Morts	Trapper Fish
AG	20-Sep-03			190			Other Morts	Trapper Fish
AG	20-Sep-03			210			Other Morts	Trapper Fish
AG	20-Sep-03			180			Other Morts	Trapper Fish
AG	20-Sep-03			180			Other Morts	Trapper Fish
AG	20-Sep-03			130			Other Morts	Trapper Fish
AG	20-Sep-03			140			Other Morts	Trapper Fish
AG	20-Sep-03			180			Other Morts	Trapper Fish
AG	20-Sep-03			170			Other Morts	Trapper Fish
AG	20-Sep-03			190			Other Morts	Trapper Fish
AG	20-Sep-03			120			Other Morts	Trapper Fish
AG	26-Sep-03			180			Other Morts	Trapper Fish
AG	26-Sep-03			150			Other Morts	Trapper Fish
AG	26-Sep-03			180			Other Morts	Trapper Fish
AG	26-Sep-03			185			Other Morts	Trapper Fish
AG	26-Sep-03			218			Other Morts	Trapper Fish
AG	27-Sep-03			180			Other Morts	Trapper Fish
AG	27-Sep-03			200			Other Morts	Trapper Fish
AG	27-Sep-03			165			Other Morts	Trapper Fish
AG	27-Sep-03			190			Other Morts	Trapper Fish
AG	27-Sep-03			175			Other Morts	Trapper Fish
AG	27-Sep-03			190			Other Morts	Trapper Fish
AG	27-Sep-03			180			Other Morts	Trapper Fish
AG	27-Sep-03			190			Other Morts	Trapper Fish
AG	27-Sep-03			220			Other Morts	Trapper Fish
AG	27-Sep-03			180			Other Morts	Trapper Fish
AG	27-Sep-03			180			Other Morts	Trapper Fish
AG	27-Sep-03			175			Other Morts	Trapper Fish
AG	27-Sep-03			175			Other Morts	Trapper Fish
AG	27-Sep-03			185			Other Morts	Trapper Fish
AG	27-Sep-03			200			Other Morts	Trapper Fish
AG	27-Sep-03			180			Other Morts	Trapper Fish
AG	27-Sep-03			190			Other Morts	Trapper Fish
AG	27-Sep-03			150			Other Morts	Trapper Fish
AG	27-Sep-03			230			Other Morts	Trapper Fish
AG	27-Sep-03			175			Other Morts	Trapper Fish
AG	27-Sep-03			190			Other Morts	Trapper Fish
AG	27-Sep-03			190			Other Morts	Trapper Fish
AG	27-Sep-03			185			Other Morts	Trapper Fish
AG	27-Sep-03			190			Other Morts	Trapper Fish
AG	27-Sep-03			125			Other Morts	Trapper Fish
AG	27-Sep-03			190			Other Morts	Trapper Fish
AG	27-Sep-03			180			Other Morts	Trapper Fish
AG	27-Sep-03			190			Other Morts	Trapper Fish
AG	27-Sep-03			175			Other Morts	Trapper Fish
AG	27-Sep-03			175			Other Morts	Trapper Fish
AG	27-Sep-03			180			Other Morts	Trapper Fish
AG	27-Sep-03			190			Other Morts	Trapper Fish
AG	27-Sep-03			170			Other Morts	Trapper Fish
AG	27-Sep-03			200			Other Morts	Trapper Fish
AG	27-Sep-03			190			Other Morts	Trapper Fish
AG	27-Sep-03			190			Other Morts	Trapper Fish
AG	27-Sep-03			190			Other Morts	Trapper Fish
AG	27-Sep-03			195			Other Morts	Trapper Fish
AG	27-Sep-03			200			Other Morts	Trapper Fish

Appendix A3. Other Mortalities

Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
AG	27-Sep-03			190			Other Morts	Trapper Fish
AG	27-Sep-03			195			Other Morts	Trapper Fish
AG	27-Sep-03			195			Other Morts	Trapper Fish
AG	27-Sep-03			180			Other Morts	Trapper Fish
AG	27-Sep-03			205			Other Morts	Trapper Fish
AG	27-Sep-03			200			Other Morts	Trapper Fish
AG	27-Sep-03			215			Other Morts	Trapper Fish
AG	27-Sep-03			195			Other Morts	Trapper Fish
AG	27-Sep-03			170			Other Morts	Trapper Fish
AG	27-Sep-03			175			Other Morts	Trapper Fish
AG	27-Sep-03			200			Other Morts	Trapper Fish
AG	27-Sep-03			190			Other Morts	Trapper Fish
AG	27-Sep-03			150			Other Morts	Trapper Fish
AG	27-Sep-03			185			Other Morts	Trapper Fish
AG	27-Sep-03			185			Other Morts	Trapper Fish
AG	27-Sep-03			170			Other Morts	Trapper Fish
AG	27-Sep-03			185			Other Morts	Trapper Fish
AG	27-Sep-03			190			Other Morts	Trapper Fish
AG	27-Sep-03			145			Other Morts	Trapper Fish
AG	27-Sep-03			120			Other Morts	Trapper Fish
AG	27-Sep-03			130			Other Morts	Trapper Fish
AG	27-Sep-03			140			Other Morts	Trapper Fish
AG	27-Sep-03			120			Other Morts	Trapper Fish
AG	27-Sep-03			125			Other Morts	Trapper Fish
AG	27-Sep-03			150			Other Morts	Trapper Fish
AG	27-Sep-03			195			Other Morts	Trapper Fish
AG	27-Sep-03			120			Other Morts	Trapper Fish
AG	27-Sep-03			190			Other Morts	Trapper Fish
AG	27-Sep-03			195			Other Morts	Trapper Fish
AG	27-Sep-03			125			Other Morts	Trapper Fish
AG	27-Sep-03			190			Other Morts	Trapper Fish
AG	27-Sep-03			230			Other Morts	Trapper Fish
AG	27-Sep-03			210			Other Morts	Trapper Fish
AG	27-Sep-03			225			Other Morts	Trapper Fish
AG	27-Sep-03			130			Other Morts	Trapper Fish
AG	27-Sep-03			180			Other Morts	Trapper Fish
AG	27-Sep-03			115			Other Morts	Trapper Fish
AG	28-Sep-03			190			Other Morts	Trapper Fish
AG	28-Sep-03			250			Other Morts	Trapper Fish
AG	28-Sep-03			180			Other Morts	Trapper Fish
AG	28-Sep-03			130			Other Morts	Trapper Fish
AG	28-Sep-03			190			Other Morts	Trapper Fish
AG	28-Sep-03			165			Other Morts	Trapper Fish
AG	28-Sep-03			170			Other Morts	Trapper Fish
AG	28-Sep-03			120			Other Morts	Trapper Fish
AG	28-Sep-03			135			Other Morts	Trapper Fish
AG	28-Sep-03			140			Other Morts	Trapper Fish
AG	28-Sep-03			145			Other Morts	Trapper Fish
AG	28-Sep-03			130			Other Morts	Trapper Fish
AG	28-Sep-03			195			Other Morts	Trapper Fish
AG	28-Sep-03			190			Other Morts	Trapper Fish
AG	28-Sep-03			210			Other Morts	Trapper Fish
AG	28-Sep-03			170			Other Morts	Trapper Fish
AG	28-Sep-03			135			Other Morts	Trapper Fish
AG	28-Sep-03			120			Other Morts	Trapper Fish
AG	28-Sep-03			180			Other Morts	Trapper Fish
AG	28-Sep-03			130			Other Morts	Trapper Fish
AG	28-Sep-03			195			Other Morts	Trapper Fish
AG	28-Sep-03			195			Other Morts	Trapper Fish
AG	28-Sep-03			185			Other Morts	Trapper Fish
AG	28-Sep-03			130			Other Morts	Trapper Fish
AG	28-Sep-03			125			Other Morts	Trapper Fish
AG	28-Sep-03			180			Other Morts	Trapper Fish
AG	28-Sep-03			130			Other Morts	Trapper Fish
AG	28-Sep-03			125			Other Morts	Trapper Fish

Appendix A3. Other Mortalities

Species	Date	Time	Tag #	Length (mm)	Weight (g)	Tag Colour	Status 1	Status 2
AG	28-Sep-03			175			Other Morts	Trapper Fish
AG	28-Sep-03			125			Other Morts	Trapper Fish
AG	28-Sep-03			115			Other Morts	Trapper Fish
AG	28-Sep-03			130			Other Morts	Trapper Fish
AG	28-Sep-03			140			Other Morts	Trapper Fish
AG	12-Sep-03			280			Other Morts	Otter Mortalities
AG	12-Sep-03			250			Other Morts	Otter Mortalities
AG	12-Sep-03			220			Other Morts	Otter Mortalities
AG	12-Sep-03			290			Other Morts	Otter Mortalities
AG	12-Sep-03			210			Other Morts	Otter Mortalities
AG	12-Sep-03			270			Other Morts	Otter Mortalities
AG	12-Sep-03			210			Other Morts	Otter Mortalities
AG	12-Sep-03			270			Other Morts	Otter Mortalities
AG	12-Sep-03			260			Other Morts	Otter Mortalities
AG	12-Sep-03			220			Other Morts	Otter Mortalities
AG	12-Sep-03			210			Other Morts	Otter Mortalities
AG	12-Sep-03			190			Other Morts	Otter Mortalities
AG	12-Sep-03			250			Other Morts	Otter Mortalities
AG	12-Sep-03			250			Other Morts	Otter Mortalities
AG	12-Sep-03			280			Other Morts	Otter Mortalities
AG	12-Sep-03			240			Other Morts	Otter Mortalities
AG	12-Sep-03			260			Other Morts	Otter Mortalities
AG	12-Sep-03			260			Other Morts	Otter Mortalities
AG	12-Sep-03			220			Other Morts	Otter Mortalities
AG	12-Sep-03			220			Other Morts	Otter Mortalities
AG	12-Sep-03			220			Other Morts	Otter Mortalities
AG	12-Sep-03			210			Other Morts	Otter Mortalities
AG	15-Sep-03			210			Other Morts	Otter Mortalities
AG	15-Sep-03			180			Other Morts	Otter Mortalities
AG	15-Sep-03			280			Other Morts	Otter Mortalities
AG	15-Sep-03			250			Other Morts	Otter Mortalities
AG	15-Sep-03			200			Other Morts	Otter Mortalities
AG	15-Sep-03			260			Other Morts	Otter Mortalities
AG	15-Sep-03			270			Other Morts	Otter Mortalities
AG	15-Sep-03			270			Other Morts	Otter Mortalities
AG	15-Sep-03			290			Other Morts	Otter Mortalities
AG	15-Sep-03			170			Other Morts	Otter Mortalities
AG	15-Sep-03			280			Other Morts	Otter Mortalities
AG	15-Sep-03			260			Other Morts	Otter Mortalities
AG	15-Sep-03			270			Other Morts	Otter Mortalities
AG	15-Sep-03			260			Other Morts	Otter Mortalities
AG	15-Sep-03			190			Other Morts	Otter Mortalities
AG	15-Sep-03			250			Other Morts	Otter Mortalities
AG	15-Sep-03			240			Other Morts	Otter Mortalities
AG	15-Sep-03			200			Other Morts	Otter Mortalities
AG	15-Sep-03			250			Other Morts	Otter Mortalities
AG	15-Sep-03			220			Other Morts	Otter Mortalities
AG	15-Sep-03			200			Other Morts	Otter Mortalities
AG	15-Sep-03			260			Other Morts	Otter Mortalities
AG	15-Sep-03			270			Other Morts	Otter Mortalities
AG	15-Sep-03			220			Other Morts	Otter Mortalities
AG	15-Sep-03			170			Other Morts	Otter Mortalities
AG	15-Sep-03			180			Other Morts	Otter Mortalities
AG	15-Sep-03			160			Other Morts	Otter Mortalities
AG	15-Sep-03			160			Other Morts	Otter Mortalities
AG	15-Sep-03			170			Other Morts	Otter Mortalities
AG	15-Sep-03			240			Other Morts	Otter Mortalities

SLIMY SCULPINS

A4 Released

Appendix A4. Slimy Sculpins Released

Species	Date	Time	Length (mm)	Weight (g)	Method	Status 1	Status 2
CCG	6-Sep-03	1600	9			Released	Lower Rose
CCG	6-Sep-03	1600	9			Released	Lower Rose
CCG	6-Sep-03	1600	61			Released	Lower Rose
CCG	6-Sep-03	1600	21			Released	Lower Rose
CCG	6-Sep-03	1600	9			Released	Lower Rose
CCG	6-Sep-03	1600	9			Released	Lower Rose
CCG	6-Sep-03	1600	9			Released	Lower Rose
CCG	6-Sep-03	1600	9			Released	Lower Rose
CCG	6-Sep-03	1600	61			Released	Lower Rose
CCG	6-Sep-03	1600	15			Released	Lower Rose
CCG	6-Sep-03	1600	15			Released	Lower Rose
CCG	6-Sep-03	1600	15			Released	Lower Rose
CCG	6-Sep-03	1600	15			Released	Lower Rose
CCG	6-Sep-03	1600	15			Released	Lower Rose
CCG	6-Sep-03	1600	9			Released	Lower Rose
CCG	6-Sep-03	1600	9			Released	Lower Rose
CCG	6-Sep-03	1600	61			Released	Lower Rose
CCG	6-Sep-03	1600	55			Released	Lower Rose
CCG	6-Sep-03	1600	65			Released	Lower Rose
CCG	6-Sep-03	1600	65			Released	Lower Rose
CCG	6-Sep-03	1600	65			Released	Lower Rose
CCG	7-Sep-03	1430	65			Released	Lower Rose
CCG	7-Sep-03	1430	9			Released	Lower Rose
CCG	7-Sep-03	1430	70			Released	Lower Rose
CCG	7-Sep-03	1430	50			Released	Lower Rose
CCG	7-Sep-03	1430	10			Released	Lower Rose
CCG	7-Sep-03	1430	50			Released	Lower Rose
CCG	7-Sep-03	1430	9			Released	Lower Rose
CCG	7-Sep-03	1430	9			Released	Lower Rose
CCG	7-Sep-03	1430	55			Released	Lower Rose
CCG	7-Sep-03	1430	50			Released	Lower Rose
CCG	7-Sep-03	1430	65			Released	Lower Rose
CCG	7-Sep-03	1430	15			Released	Lower Rose
CCG	7-Sep-03	1430	15			Released	Lower Rose
CCG	7-Sep-03	1430	15			Released	Lower Rose
CCG	7-Sep-03	1430	15			Released	Lower Rose
CCG	7-Sep-03	1430	15			Released	Lower Rose
CCG	7-Sep-03	1430	15			Released	Lower Rose
CCG	7-Sep-03	1430	75			Released	Lower Rose
CCG	7-Sep-03	1430	15			Released	Lower Rose
CCG	7-Sep-03	1430	15			Released	Lower Rose
CCG	7-Sep-03	1430	10			Released	Lower Rose
CCG	7-Sep-03	1430	10			Released	Lower Rose
CCG	7-Sep-03	1430	80			Released	Lower Rose
CCG	7-Sep-03	1430	75			Released	Lower Rose
CCG	7-Sep-03	1430	10			Released	Lower Rose
CCG	7-Sep-03	1430	15			Released	Lower Rose
CCG	12-Sep-03	1630	70			Released	Pelly R
CCG	12-Sep-03	1630	70			Released	Pelly R
CCG	12-Sep-03	1630	70			Released	Pelly R
CCG	12-Sep-03	1630	65			Released	Pelly R
CCG	12-Sep-03	1630	60			Released	Pelly R
CCG	12-Sep-03	1630	20			Released	Pelly R

Appendix A4. Slimy Sculpins Released

Species	Date	Time	Length (mm)	Weight (g)	Method	Status 1	Status 2
CCG	3-Sep-03	1635	61			Released	Upper Rose
CCG	4-Sep-03	1930	15			Released	Upper Rose
CCG	4-Sep-03	1930	50			Released	Upper Rose
CCG	5-Sep-03	1700	15			Released	Upper Rose
CCG	5-Sep-03	1700	15			Released	Upper Rose
CCG	5-Sep-03	1700	15			Released	Upper Rose
CCG	5-Sep-03	1700	15			Released	Upper Rose
CCG	5-Sep-03	1700	15			Released	Upper Rose
CCG	5-Sep-03	1700	21			Released	Upper Rose
CCG	5-Sep-03	1700	21			Released	Upper Rose
CCG	5-Sep-03	1700	21			Released	Upper Rose
CCG	5-Sep-03	1700	21			Released	Upper Rose
CCG	5-Sep-03	1700	70			Released	Upper Rose
CCG	5-Sep-03	1700	10			Released	Upper Rose
CCG	5-Sep-03	1700	21			Released	Upper Rose
CCG	5-Sep-03	1700	21			Released	Upper Rose
CCG	5-Sep-03	1700	21			Released	Upper Rose
CCG	5-Sep-03	1700	21			Released	Upper Rose
CCG	5-Sep-03	1700	21			Released	Upper Rose
CCG	5-Sep-03	1700	21			Released	Upper Rose
CCG	5-Sep-03	1700	21			Released	Upper Rose
CCG	5-Sep-03	1700	21			Released	Upper Rose
CCG	5-Sep-03	1700	21			Released	Upper Rose
CCG	5-Sep-03	1700	9			Released	Upper Rose
CCG	5-Sep-03	1700	9			Released	Upper Rose
CCG	5-Sep-03	1700	9			Released	Upper Rose
CCG	5-Sep-03	1700	9			Released	Upper Rose
CCG	5-Sep-03	1700	11			Released	Upper Rose
CCG	5-Sep-03	1700	11			Released	Upper Rose
CCG	5-Sep-03	1700	15			Released	Lower Rose
CCG	5-Sep-03	1700	15			Released	Lower Rose
CCG	5-Sep-03	1700	15			Released	Lower Rose
CCG	5-Sep-03	1700	18			Released	Lower Rose
CCG	5-Sep-03	1700	21			Released	Lower Rose
CCG	5-Sep-03	1700	15			Released	Lower Rose
CCG	5-Sep-03	1700	10			Released	Lower Rose
CCG	5-Sep-03	1700	9			Released	Lower Rose
CCG	5-Sep-03	1700	9			Released	Lower Rose
CCG	5-Sep-03	1700	9			Released	Lower Rose
CCG	5-Sep-03	1700	9			Released	Lower Rose
CCG	5-Sep-03	1700	9			Released	Lower Rose
CCG	5-Sep-03	1700	9			Released	Lower Rose
CCG	5-Sep-03	1700	10			Released	Lower Rose
CCG	5-Sep-03	1700	15			Released	Lower Rose
CCG	5-Sep-03	1700	15			Released	Lower Rose
CCG	5-Sep-03	1700	10			Released	Lower Rose
CCG	5-Sep-03	1700	7			Released	Lower Rose
CCG	5-Sep-03	1700	7			Released	Lower Rose
CCG	6-Sep-03	1100	7			Released	Lower Rose
CCG	6-Sep-03	1600	61			Released	Lower Rose
CCG	6-Sep-03	1600	15			Released	Lower Rose
CCG	6-Sep-03	1600	15			Released	Lower Rose
CCG	6-Sep-03	1600	9			Released	Lower Rose

Appendix A4. Slimy Sculpins Released

Species	Date	Time	Length (mm)	Weight (g)	Method	Status 1	Status 2
CCG	12-Sep-03	1630	20			Released	Pelly R
CCG	12-Sep-03	1630	55			Released	Pelly R
CCG	12-Sep-03	1630	45			Released	Pelly R
CCG	12-Sep-03	1630	50			Released	Pelly R
CCG	12-Sep-03	1630	20			Released	Pelly R
CCG	12-Sep-03	1630	50			Released	Pelly R
CCG	12-Sep-03	1630	20			Released	Pelly R
CCG	12-Sep-03	1630	20			Released	Pelly R
CCG	12-Sep-03	1630	40			Released	Pelly R
CCG	13-Sep-03	1430	20			Released	Pelly R
CCG	13-Sep-03	1430	20			Released	Pelly R
CCG	13-Sep-03	1430	20			Released	Pelly R
CCG	13-Sep-03	1430	20			Released	Pelly R
CCG	13-Sep-03	1430	20			Released	Pelly R
CCG	13-Sep-03	1430	20			Released	Pelly R
CCG	13-Sep-03	1430	20			Released	Pelly R
CCG	13-Sep-03	1430	20			Released	Pelly R
CCG	13-Sep-03	1430	20			Released	Pelly R
CCG	13-Sep-03	1430	20			Released	Pelly R
CCG	13-Sep-03	1430	20			Released	Pelly R
CCG	13-Sep-03	1430	20			Released	Pelly R
CCG	13-Sep-03	1430	20			Released	Pelly R
CCG	13-Sep-03	1430	20			Released	Pelly R
CCG	13-Sep-03	1430	70			Released	Pelly R
CCG	13-Sep-03	1430	70			Released	Pelly R
CCG	13-Sep-03	1430	90			Released	Pelly R
CCG	13-Sep-03	1430	70			Released	Pelly R
CCG	13-Sep-03	1430	50			Released	Pelly R
CCG	13-Sep-03	1430	75			Released	Pelly R
CCG	13-Sep-03	1430	40			Released	Pelly R
CCG	13-Sep-03	1430	26			Released	Pelly R
CCG	13-Sep-03	1430	51			Released	Pelly R
CCG	13-Sep-03	1430	43			Released	Pelly R
CCG	13-Sep-03	1430	40			Released	Pelly R
CCG	15-Sep-03	1630	80			Released	Pelly R
CCG	15-Sep-03	1630	90			Released	Pelly R
CCG	15-Sep-03	1630	70			Released	Pelly R
CCG	15-Sep-03	1630	50			Released	Pelly R
CCG	15-Sep-03	1630	80			Released	Pelly R
CCG	15-Sep-03	1630	110			Released	Pelly R
CCG	15-Sep-03	1630	65			Released	Pelly R
CCG	15-Sep-03	1630	80			Released	Pelly R
CCG	15-Sep-03	1630	55			Released	Pelly R
CCG	15-Sep-03	1630	80			Released	Pelly R
CCG	15-Sep-03	1630	50			Released	Pelly R
CCG	15-Sep-03	1630	50			Released	Pelly R
CCG	15-Sep-03	1630	60			Released	Pelly R
CCG	15-Sep-03	1630	80			Released	Pelly R
CCG	15-Sep-03	1630	85			Released	Pelly R
CCG	15-Sep-03	1630	85			Released	Pelly R
CCG	15-Sep-03	1630	80			Released	Pelly R
CCG	15-Sep-03	1630	45			Released	Pelly R
CCG	15-Sep-03	1630	75			Released	Pelly R

Appendix A4. Slimy Sculpins Released

Species	Date	Time	Length (mm)	Weight (g)	Method	Status 1	Status 2
CCG	15-Sep-03	1630	40			Released	Pelly R
CCG	15-Sep-03	1630	80			Released	Pelly R
CCG	15-Sep-03	1630	83			Released	Pelly R
CCG	15-Sep-03	1630	53			Released	Pelly R
CCG	15-Sep-03	1630	42			Released	Pelly R
CCG	15-Sep-03	1630	82			Released	Pelly R
CCG	15-Sep-03	1630	45			Released	Pelly R
CCG	15-Sep-03	1630	81			Released	Pelly R
CCG	15-Sep-03	1630	40			Released	Pelly R
CCG	15-Sep-03	1630	81			Released	Pelly R
CCG	15-Sep-03	1630	50			Released	Pelly R
CCG	15-Sep-03	1630	65			Released	Pelly R
CCG	15-Sep-03	1630	46			Released	Pelly R
CCG	15-Sep-03	1630	50			Released	Pelly R
CCG	15-Sep-03	1630	77			Released	Pelly R
CCG	15-Sep-03	1630	55			Released	Pelly R
CCG	15-Sep-03	1630	77			Released	Pelly R
CCG	15-Sep-03	1630	54			Released	Pelly R
CCG	15-Sep-03	1630	60			Released	Pelly R
CCG	15-Sep-03	1630	47			Released	Pelly R
CCG	15-Sep-03	1630	70			Released	Pelly R
CCG	15-Sep-03	1630	90			Released	Pelly R
CCG	15-Sep-03	1630	48			Released	Pelly R
CCG	15-Sep-03	1630	51			Released	Pelly R
CCG	15-Sep-03	1630	64			Released	Pelly R
CCG	15-Sep-03	1630	54			Released	Pelly R
CCG	15-Sep-03	1630	57			Released	Pelly R
CCG	15-Sep-03	1630	77			Released	Pelly R
CCG	15-Sep-03	1630	75			Released	Pelly R
CCG	15-Sep-03	1630	53			Released	Pelly R
CCG	15-Sep-03	1630	55			Released	Pelly R
CCG	15-Sep-03	1630	45			Released	Pelly R
CCG	15-Sep-03	1630	51			Released	Pelly R
CCG	15-Sep-03	1630	50			Released	Pelly R
CCG	15-Sep-03	1630	55			Released	Pelly R
CCG	15-Sep-03	1630	100			Released	Pelly R
CCG	15-Sep-03	1630	60			Released	Pelly R
CCG	15-Sep-03	1630	70			Released	Pelly R
CCG	15-Sep-03	1630	45			Released	Pelly R
CCG	15-Sep-03	1630	55			Released	Pelly R
CCG	15-Sep-03	1630	55			Released	Pelly R
CCG	15-Sep-03	1630	45			Released	Pelly R
CCG	15-Sep-03	1630	52			Released	Pelly R
CCG	15-Sep-03	1630	47			Released	Pelly R
CCG	15-Sep-03	1630	50			Released	Pelly R
CCG	15-Sep-03	1630	75			Released	Pelly R
CCG	15-Sep-03	1630	55			Released	Pelly R
CCG	15-Sep-03	1630	57			Released	Pelly R
CCG	15-Sep-03	1630	55			Released	Pelly R
CCG	15-Sep-03	1630	47			Released	Pelly R
CCG	15-Sep-03	1630	43			Released	Pelly R
CCG	15-Sep-03	1630	83			Released	Pelly R
CCG	15-Sep-03	1630	77			Released	Pelly R

Appendix A4. Slimy Sculpins Released

Species	Date	Time	Length (mm)	Weight (g)	Method	Status 1	Status 2
CCG	15-Sep-03	1630	55			Released	Pelly R
CCG	15-Sep-03	1630	49			Released	Pelly R
CCG	15-Sep-03	1630	78			Released	Pelly R
CCG	15-Sep-03	1630	49			Released	Pelly R
CCG	15-Sep-03	1630	61			Released	Pelly R
CCG	15-Sep-03	1630	87			Released	Pelly R
CCG	15-Sep-03	1630	60			Released	Pelly R
CCG	15-Sep-03	1630	52			Released	Pelly R
CCG	15-Sep-03	1630	43			Released	Pelly R
CCG	15-Sep-03	1630	47			Released	Pelly R
CCG	15-Sep-03	1630	53			Released	Pelly R
CCG	15-Sep-03	1630	47			Released	Pelly R
CCG	15-Sep-03	1630	90			Released	Pelly R
CCG	15-Sep-03	1630	87			Released	Pelly R
CCG	15-Sep-03	1630	80			Released	Pelly R
CCG	15-Sep-03	1630	100			Released	Pelly R
CCG	15-Sep-03	1630	91			Released	Pelly R
CCG	15-Sep-03	1630	86			Released	Pelly R
CCG	15-Sep-03	1630	70			Released	Pelly R
CCG	15-Sep-03	1630	56			Released	Pelly R
CCG	15-Sep-03	1630	43			Released	Pelly R
CCG	15-Sep-03	1630	60			Released	Pelly R
CCG	15-Sep-03	1630	70			Released	Pelly R
CCG	15-Sep-03	1630	45			Released	Pelly R
CCG	15-Sep-03	1630	45			Released	Pelly R
CCG	15-Sep-03	1630	76			Released	Pelly R
CCG	15-Sep-03	1630	57			Released	Pelly R
CCG	15-Sep-03	1630	60			Released	Pelly R
CCG	15-Sep-03	1630	51			Released	Pelly R
CCG	15-Sep-03	1630	122			Released	Pelly R
CCG	16-Sep-03	1600	71			Released	Pelly R
CCG	16-Sep-03	1600	84			Released	Pelly R
CCG	16-Sep-03	1600	72			Released	Pelly R
CCG	16-Sep-03	1600	63			Released	Pelly R
CCG	16-Sep-03	1600	75			Released	Pelly R
CCG	16-Sep-03	1600	52			Released	Pelly R
CCG	16-Sep-03	1600	62			Released	Pelly R
CCG	16-Sep-03	1600	49			Released	Pelly R
CCG	16-Sep-03	1600	62			Released	Pelly R
CCG	16-Sep-03	1600	44			Released	Pelly R
CCG	16-Sep-03	1600	52			Released	Pelly R
CCG	16-Sep-03	1600	35			Released	Pelly R
CCG	16-Sep-03	1600	27			Released	Pelly R
CCG	16-Sep-03	1600	27			Released	Pelly R
CCG	16-Sep-03	1600	25			Released	Pelly R
CCG	16-Sep-03	1600	25			Released	Pelly R
CCG	16-Sep-03	1600	25			Released	Pelly R
CCG	16-Sep-03	1600	25			Released	Pelly R
CCG	16-Sep-03	1600	25			Released	Pelly R
CCG	16-Sep-03	1600	25			Released	Pelly R
CCG	16-Sep-03	1600	25			Released	Pelly R
CCG	16-Sep-03	1600	25			Released	Pelly R
CCG	16-Sep-03	1600	25			Released	Pelly R

Appendix A4. Slimy Sculpins Released

Species	Date	Time	Length (mm)	Weight (g)	Method	Status 1	Status 2
CCG	16-Sep-03	1600	25			Released	Pelly R
CCG	16-Sep-03	1600	25			Released	Pelly R
CCG	16-Sep-03	1600	25			Released	Pelly R
CCG	16-Sep-03	1600	25			Released	Pelly R
CCG	16-Sep-03	1600	25			Released	Pelly R
CCG	16-Sep-03	1600	25			Released	Pelly R
CCG	16-Sep-03	1600	25			Released	Pelly R
CCG	16-Sep-03	1600	25			Released	Pelly R
CCG	16-Sep-03	1600	25			Released	Pelly R
CCG	16-Sep-03	1600	25			Released	Pelly R
CCG	16-Sep-03	1600	25			Released	Pelly R
CCG	16-Sep-03	1600	25			Released	Pelly R

SLIMY SCULPINS

A5 Biological Sampling

Appendix A5. Slimy Sculpins Kept for Biological Sample

Species	Date	Time	Tag #	Length (mm)	Weight (g)	Method	Tag Colour	Status 1	Status 2
CCG	7-Sep-03			NA		Seine/Minnow Trap		Bio Sample	
CCG	7-Sep-03			NA		Seine/Minnow Trap		Bio Sample	
CCG	7-Sep-03			NA		Seine/Minnow Trap		Bio Sample	
CCG	7-Sep-03			NA		Seine/Minnow Trap		Bio Sample	
CCG	7-Sep-03			NA		Seine/Minnow Trap		Bio Sample	
CCG	7-Sep-03			NA		Seine/Minnow Trap		Bio Sample	
CCG	7-Sep-03			NA		Seine/Minnow Trap		Bio Sample	
CCG	7-Sep-03			NA		Seine/Minnow Trap		Bio Sample	
CCG	7-Sep-03			NA		Seine/Minnow Trap		Bio Sample	
CCG	7-Sep-03			NA		Seine/Minnow Trap		Bio Sample	
CCG	7-Sep-03			NA		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			70		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			75		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			80		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			55		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			60		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			60		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			50		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			50		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			55		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			50		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			50		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			50		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			50		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			50		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			50		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			35		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			25		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			25		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			25		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			25		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			25		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			25		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			25		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			25		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			25		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			25		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			25		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			25		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			25		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			25		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			25		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			25		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			25		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			25		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			25		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			25		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			25		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			25		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			25		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			50		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			45		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			20		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			20		Seine/Minnow Trap		Bio Sample	
CCG	8-Sep-03			20		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			20		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			40		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			60		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			50		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			70		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			60		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			70		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			90		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			20		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			100		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			100		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			100		Seine/Minnow Trap		Bio Sample	

Appendix A5. Slimy Sculpins Kept for Biological Sample

Species	Date	Time	Tag #	Length (mm)	Weight (g)	Method	Tag Colour	Status 1	Status 2
CCG	10-Sep-03			20		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			20		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			20		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			20		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			20		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			20		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			20		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			20		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			20		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			20		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			20		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			80		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			20		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			20		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			20		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			20		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			20		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			20		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			20		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			20		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			90		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			75		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			75		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			70		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			92		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			75		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			78		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			70		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			60		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			65		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			55		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			60		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			62		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			60		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			50		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			38		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			40		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			35		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			40		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			47		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			45		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			45		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			58		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			46		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			26		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			20		Seine/Minnow Trap		Bio Sample	
CCG	10-Sep-03			16		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			105		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			68		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			63		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			82		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			61		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			75		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			56		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			46		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			53		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			76		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			77		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			69		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			43		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			40		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			51		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			47		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			75		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			84		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			67		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			48		Seine/Minnow Trap		Bio Sample	

Appendix A5. Slimy Sculpins Kept for Biological Sample

Species	Date	Time	Tag #	Length (mm)	Weight (g)	Method	Tag Colour	Status 1	Status 2
CCG	11-Sep-03			39		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			47		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			52		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			49		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			65		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			45		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			55		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			50		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			70		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			88		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			90		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			45		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			24		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			24		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			24		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			24		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			24		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			24		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			24		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			19		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			19		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			19		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			19		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			19		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			19		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			19		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			19		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			19		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			19		Seine/Minnow Trap		Bio Sample	
CCG	11-Sep-03			NA		Seine/Minnow Trap		Bio Sample	
CCG	15-Sep-03			25		Seine/Minnow Trap		Bio Sample	
CCG	15-Sep-03			46		Seine/Minnow Trap		Bio Sample	
CCG	15-Sep-03			18		Seine/Minnow Trap		Bio Sample	
CCG	15-Sep-03			20		Seine/Minnow Trap		Bio Sample	
CCG	15-Sep-03			55		Seine/Minnow Trap		Bio Sample	
CCG	15-Sep-03			55		Seine/Minnow Trap		Bio Sample	
CCG	15-Sep-03			84		Seine/Minnow Trap		Bio Sample	
CCG	15-Sep-03			47		Seine/Minnow Trap		Bio Sample	
CCG	15-Sep-03			65		Seine/Minnow Trap		Bio Sample	
CCG	15-Sep-03			45		Seine/Minnow Trap		Bio Sample	
CCG	16-Sep-03			51		Seine/Minnow Trap		Bio Sample	
CCG	17-Sep-03			50		Seine/Minnow Trap		Bio Sample	
CCG	17-Sep-03			79		Seine/Minnow Trap		Bio Sample	
CCG	17-Sep-03			52		Seine/Minnow Trap		Bio Sample	
CCG	17-Sep-03			25		Seine/Minnow Trap		Bio Sample	
CCG	18-Sep-03			60		Seine/Minnow Trap		Bio Sample	
CCG	18-Sep-03			55		Seine/Minnow Trap		Bio Sample	
CCG	19-Sep-03			42		Seine/Minnow Trap		Bio Sample	
CCG	19-Sep-03			95		Seine/Minnow Trap		Bio Sample	
CCG	19-Sep-03			52		Seine/Minnow Trap		Bio Sample	
CCG	19-Sep-03			70		Seine/Minnow Trap		Bio Sample	
CCG	19-Sep-03			50		Seine/Minnow Trap		Bio Sample	

BURBOT

A6 Released

Appendix A6. Burbot Released

Species	Date	Time	Length (mm)	Weight (g)	Method	Status 1	Status 2
BB	6-Sep-03	1100	800			Released	Pelly R
BB	6-Sep-03	1300	530			Released	Pelly R
BB	7-Sep-03	1130	320			Released	Lower Rose
BB	7-Sep-03	1130	240			Released	Lower Rose
BB	7-Sep-03	1130	300			Released	Lower Rose
BB	8-Sep-03	1430	260			Released	Lower Rose
BB	8-Sep-03	1430	320			Released	Lower Rose
BB	8-Sep-03	1430	230			Released	Lower Rose
BB	8-Sep-03	1430	200			Released	Lower Rose
BB	10-Sep-03	1400	260			Released	Lower Rose
BB	10-Sep-03	1400	180			Released	Lower Rose
BB	10-Sep-03	1530	500			Released	Pelly R
BB	11-Sep-03	1730	360			Released	Pelly R
BB	11-Sep-03	1730	110			Released	Pelly R
BB	13-Sep-03	1430	270			Released	Pelly R
BB	13-Sep-03	1430	250			Released	Pelly R
BB	13-Sep-03	1430	270			Released	Pelly R
BB	13-Sep-03	1430	60			Released	Pelly R
BB	14-Sep-03	1430	340			Released	Pelly R
BB	15-Sep-03	1730	190			Released	Pelly R
BB	17-Sep-03	1600	500			Released	Pelly R
BB	17-Sep-03	1600	300			Released	Pelly R
BB	17-Sep-03	1600	260			Released	Pelly R
BB	17-Sep-03	1600	270			Released	Pelly R
BB	17-Sep-03	1600	260			Released	Pelly R
BB	18-Sep-03	1600	280			Released	Pelly R
BB	18-Sep-03	1600	260			Released	Pelly R
BB	18-Sep-03	1600	270			Released	Pelly R
BB	19-Sep-03	1500	70			Released	Pelly R
BB	20-Sep-03	1500	290			Released	Pelly R
BB	20-Sep-03	1500	260			Released	Pelly R
BB	27-Sep-03	1530	270			Released	Pelly R
BB	27-Sep-03	1530	260			Released	Pelly R
BB	28-Sep-03	1800	240			Released	Pelly R
BB	28-Sep-03	1800	250			Released	Pelly R
BB	28-Sep-03	1800	240			Released	Pelly R

BURBOT

A7 Biological Sampling

Appendix A7. Burbot Kept for Biological Sample

Species	Date	Time	Length (mm)	Weight (g)	Method	Status 1	Status 2
BB	15-Sep-03		240			Bio Sample	Otter Mortality
BB	9-Sep-03	1115	330			Bio Sample	
BB	9-Sep-03	1630	280			Bio Sample	
BB	12-Sep-03	1500	260			Bio Sample	
BB	12-Sep-03	1500	270			Bio Sample	
BB	12-Sep-03	1500	340			Bio Sample	
BB	12-Sep-03	1500	260			Bio Sample	
BB	13-Sep-03	1400	265			Bio Sample	
BB	14-Sep-03	1730	270			Bio Sample	
BB	15-Sep-03	1700	245			Bio Sample	
BB	15-Sep-03	1700	255			Bio Sample	
BB	27-Sep-03	1530	260			Bio Sample	

Appendix B

Laboratory Results of Water Analysis

Project	FWR-23696 Water Analysis
Report to	Gartner Lee Ltd.
ALS File No.	T4669
Date Received	9/30/03
Date:	10/14/03

RESULTS OF ANALYSIS

Sample ID	FWR-S1- Surf	FWR-S1- 4m
Date Sampled	9/28/03	9/28/03
Time Sampled		
ALS Sample ID	1	2
Nature	Water	Water
Physical Tests		
Conductivity (uS/cm)	198	199
Total Dissolved Solids	113	115
Hardness CaCO3	98.8	97.8
pH	8.05	8.02
Total Suspended Solids	11	11
Turbidity (NTU)	3.4	2.7
Dissolved Anions		
Alkalinity-Total CaCO3	82	79
Sulphate SO4	19	19
Nutrients		
Ammonia Nitrogen N	0.04	0.07
Nitrate Nitrogen N	0.045	0.046
Nitrite Nitrogen N	<0.001	<0.001
Total Dissolved Phosphate P	0.002	0.002
Total Phosphate P	0.011	0.016
Total Metals		
Aluminum T-Al	0.07	0.11
Antimony T-Sb	<0.0005	<0.0005
Arsenic T-As	0.001	0.001
Barium T-Ba	0.05	0.05
Beryllium T-Be	<0.005	<0.005
Boron T-B	<0.1	<0.1
Cadmium T-Cd	<0.00005	<0.00005
Calcium T-Ca	29.8	29.9
Chromium T-Cr	<0.0005	<0.0005
Cobalt T-Co	<0.0005	<0.0005
Copper T-Cu	0.001	0.001
Iron T-Fe	0.83	0.9
Lead T-Pb	0.009	0.011
Lithium T-Li	<0.05	<0.05
Magnesium T-Mg	5.3	5.4
Manganese T-Mn	0.33	0.34
Mercury T-Hg	<0.0002	<0.0002
Molybdenum T-Mo	<0.001	<0.001
Nickel T-Ni	<0.005	<0.005
Selenium T-Se	<0.001	<0.001
Silver T-Ag	<0.00005	<0.00005
Sodium T-Na	2	2
Thallium T-Tl	<0.0002	<0.0002

Project	FWR-23696 Water Analysis
Report to	Gartner Lee Ltd.
ALS File No.	T4669
Date Received	9/30/03
Date:	10/14/03

RESULTS OF ANALYSIS

Sample ID	FWR-S1- Surf	FWR-S1- 4m
Date Sampled	9/28/03	9/28/03
Time Sampled		
ALS Sample ID	1	2
Nature	Water	Water
Titanium T-Ti	<0.05	<0.05
Uranium T-U	0.0017	0.0017
Vanadium T-V	<0.03	<0.03
Zinc T-Zn	0.013	0.023
Dissolved Metals		
Aluminum D-Al	<0.01	<0.01
Antimony D-Sb	<0.0005	<0.0005
Arsenic D-As	<0.001	<0.001
Barium D-Ba	0.05	0.05
Beryllium D-Be	<0.005	<0.005
Boron D-B	<0.1	<0.1
Cadmium D-Cd	<0.00005	<0.00005
Calcium D-Ca	30.5	30
Chromium D-Cr	<0.0005	<0.0005
Cobalt D-Co	<0.0005	<0.0005
Copper D-Cu	<0.001	<0.001
Iron D-Fe	0.41	0.38
Lead D-Pb	0.005	0.005
Lithium D-Li	<0.05	<0.05
Magnesium D-Mg	5.5	5.5
Manganese D-Mn	0.33	0.33
Mercury D-Hg	<0.0002	<0.0002
Molybdenum D-Mo	<0.001	<0.001
Nickel D-Ni	<0.005	<0.005
Selenium D-Se	<0.001	<0.001
Silver D-Ag	<0.00005	<0.00005
Sodium D-Na	2	2
Thallium D-Tl	<0.0002	<0.0002
Titanium D-Ti	<0.05	<0.05
Uranium D-U	0.0017	0.0017
Vanadium D-V	<0.03	<0.03
Zinc D-Zn	0.023	0.031
Organic Parameters (a)		
Chlorophyll a	0.386	0.798

Footnotes:
Results are expressed as milligrams per litre except where noted.
< = Less than the detection limit indicated.
(a) Results are expressed as milligrams per cubic metre.

Project	FWR-23696 Water Analysis
Report to	Gartner Lee Ltd.
ALS File No.	T4669
Date Received	9/30/03
Date:	10/14/03

DETECTION LIMITS

Sample ID	FWR-S1- Surface	FWR-S1- 4m
Date Sampled	9/28/03	9/28/03
Time Sampled		
ALS Sample ID	1	2
Nature	Water	Water
Physical Tests		
Conductivity (uS/cm)	2	2
Total Dissolved Solids	10	10
Hardness CaCO3	0.7	0.7
pH	0.01	0.01
Total Suspended Solids	3	3
Turbidity (NTU)	0.1	0.1
Dissolved Anions		
Alkalinity-Total CaCO3	1	1
Sulphate SO4	1	1
Nutrients		
Ammonia Nitrogen N	0.02	0.02
Nitrate Nitrogen N	0.005	0.005
Nitrite Nitrogen N	0.001	0.001
Total Dissolved Phosphate P	0.002	0.002
Total Phosphate P	0.002	0.002
Total Metals		
Aluminum T-Al	0.01	0.01
Antimony T-Sb	0.0005	0.0005
Arsenic T-As	0.001	0.001
Barium T-Ba	0.02	0.02
Beryllium T-Be	0.005	0.005
Boron T-B	0.1	0.1
Cadmium T-Cd	0.00005	0.00005
Calcium T-Ca	0.1	0.1
Chromium T-Cr	0.0005	0.0005
Cobalt T-Co	0.0005	0.0005
Copper T-Cu	0.001	0.001
Iron T-Fe	0.03	0.03
Lead T-Pb	0.001	0.001
Lithium T-Li	0.05	0.05
Magnesium T-Mg	0.1	0.1
Manganese T-Mn	0.01	0.01
Mercury T-Hg	0.0002	0.0002
Molybdenum T-Mo	0.001	0.001
Nickel T-Ni	0.005	0.005
Selenium T-Se	0.001	0.001
Silver T-Ag	0.00005	0.00005
Sodium T-Na	2	2
Thallium T-Tl	0.0002	0.0002

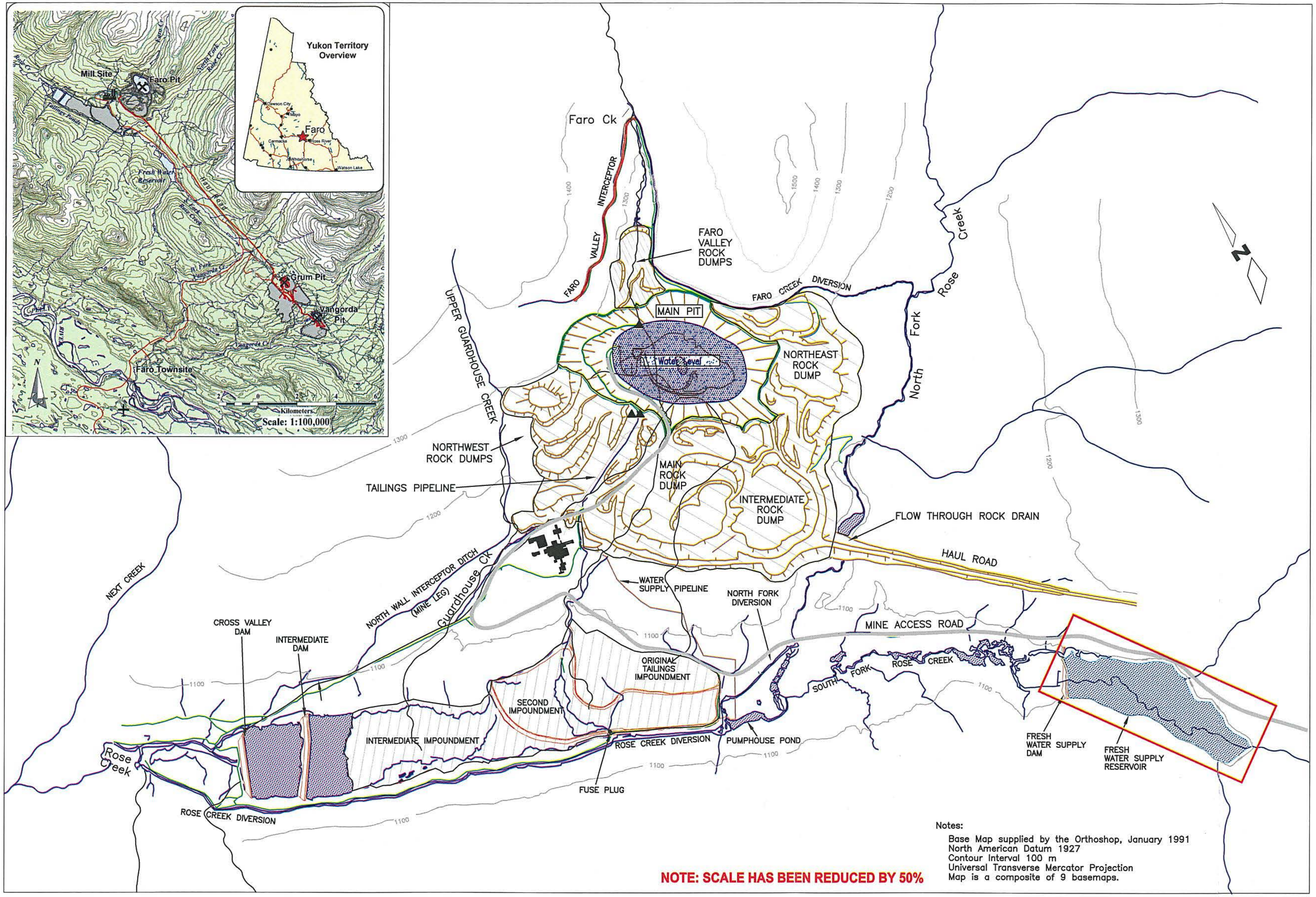
Project	FWR-23696 Water Analysis
Report to	Gartner Lee Ltd.
ALS File No.	T4669
Date Received	9/30/03
Date:	10/14/03

DETECTION LIMITS

Sample ID	FWR-S1- Surface	FWR-S1- 4m
Date Sampled	9/28/03	9/28/03
Time Sampled		
ALS Sample ID	1	2
Nature	Water	Water
Titanium T-Ti	0.05	0.05
Uranium T-U	0.0002	0.0002
Vanadium T-V	0.03	0.03
Zinc T-Zn	0.005	0.005
Dissolved Metals		
Aluminum D-Al	0.01	0.01
Antimony D-Sb	0.0005	0.0005
Arsenic D-As	0.001	0.001
Barium D-Ba	0.02	0.02
Beryllium D-Be	0.005	0.005
Boron D-B	0.1	0.1
Cadmium D-Cd	0.00005	0.00005
Calcium D-Ca	0.1	0.1
Chromium D-Cr	0.0005	0.0005
Cobalt D-Co	0.0005	0.0005
Copper D-Cu	0.001	0.001
Iron D-Fe	0.03	0.03
Lead D-Pb	0.001	0.001
Lithium D-Li	0.05	0.05
Magnesium D-Mg	0.1	0.1
Manganese D-Mn	0.01	0.01
Mercury D-Hg	0.0002	0.0002
Molybdenum D-Mo	0.001	0.001
Nickel D-Ni	0.005	0.005
Selenium D-Se	0.001	0.001
Silver D-Ag	0.00005	0.00005
Sodium D-Na	2	2
Thallium D-Tl	0.0002	0.0002
Titanium D-Ti	0.05	0.05
Uranium D-U	0.0002	0.0002
Vanadium D-V	0.03	0.03
Zinc D-Zn	0.005	0.005
Organic Parameters		
Chlorophyll a	0.0006	0.0006

APPENDIX B
Contract Documents

APPENDIX B1
Construction Drawings



Notes:

Base Map supplied by the Orthoshop, January 1991
North American Datum 1927
Contour Interval 100 m
Universal Transverse Mercator Projection
Map is a composite of 9 basemaps.

NOTE: SCALE HAS BEEN REDUCED BY 50%

DRAWING INDEX:

- DRAWING 1.: COVER SHEET
- DRAWING 2.: FWSD EXISTING CONDITIONS
- DRAWING 3.: FWSD DETAILS: EXISTING CONDITIONS
- DRAWING 4.: RESERVOIR SITE PLAN
- DRAWING 5.: FWSD BREACH GENERAL ARRANGEMENT
- DRAWING 6.: FWSD BREACH SECTIONS
- DRAWING 7.: FWSD BREACH PLAN AND PROFILE
- DRAWING 8.: REHABILATED CHANNEL PLAN
- DRAWING 9.: FWSD INLET DETAILS
- DRAWING 10.: FWSD CHANNEL DETAILS
- DRAWING 11.: LOW LEVEL OUTLET ABANDONMENT
- DRAWING 12.: WATER MANAGEMENT
- DRAWING 13.: CONSTRUCTION AREA AND REVEGETATION PLAN

REFERENCE DRAWINGS

DRAWING NO.	DRAWING TITLE

REVISIONS

NO.	DESCRIPTION	CHK'D	APP'D	DATE

ISSUE AUTHORIZATION

REV.	ISSUE PURPOSE	AUTH. BY	DATE
D	ISSUED FOR CONSTRUCTION	CCS	OCT. 30/03
C	ISSUED TO WATER BOARD	GWF	APR. 17/03
B	FINAL DESIGN	GWF	APR. 03/03
A	PRELIMINARY DESIGN	GWF	FEB 3/03

Gartner Lee Limited

BGC Engineering Inc. AN APPLIED EARTH SCIENCES COMPANY

SRK Consulting Engineers and Scientists

CONSTRUCTION

DESIGNED BY: GWF	DRAWN BY: DC/JM
DATE: JAN. 2003	DATE: JAN. 2003
CHECKED BY: CCS	DISCIP. ENGR.
DATE: JAN. 2003	DATE:
PROJ. MGR:	PROJ. ENGR.
DATE	DATE

SRK PROJECT NUMBER: 1CD003.22

Deloitte & Touche Inc.

FRESH WATER SUPPLY DAM BREACH
ANVIL RANGE MINING COMPLEX, YT

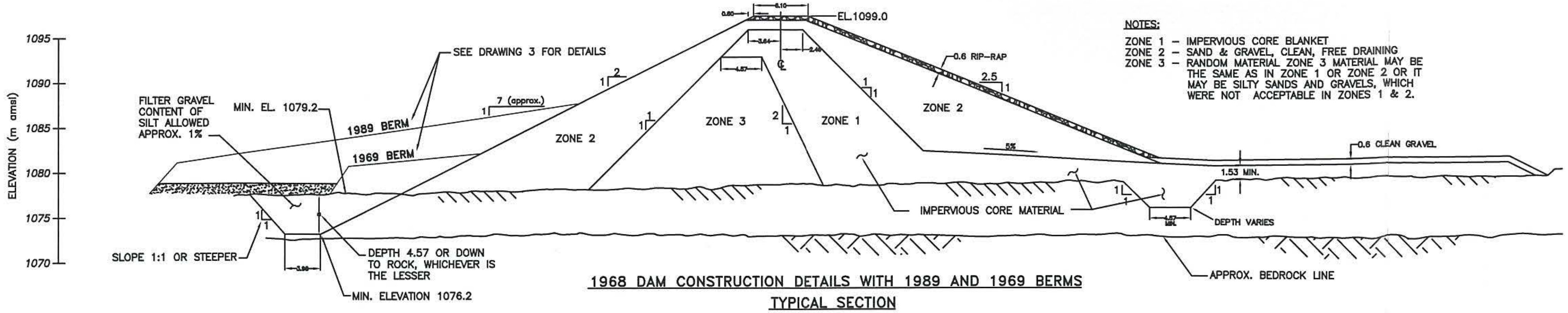
SCALE: 1:15,000 — 0 200 400 600 800 1000

COVER SHEET

DRAWING NUMBER: 1

REV.: D

FILE NAME: F:\Deloitte_touche\Aosd drawings-Faro\faro FWSD\Figure 1.dwg



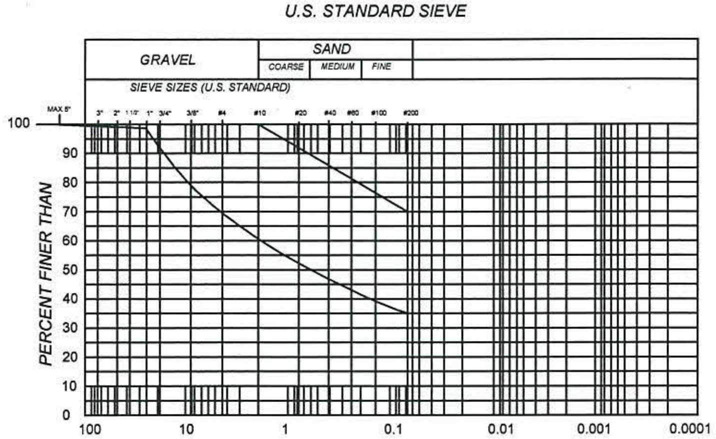
NOTES:

ZONE 1 – IMPERVIOUS CORE BLANKET
ZONE 2 – SAND & GRAVEL, CLEAN, FREE DRAINING
ZONE 3 – RANDOM MATERIAL ZONE 3 MATERIAL MAY BE THE SAME AS IN ZONE 1 OR ZONE 2 OR IT MAY BE SILTY SANDS AND GRAVELS, WHICH WERE NOT ACCEPTABLE IN ZONES 1 & 2.

Scale 1:300

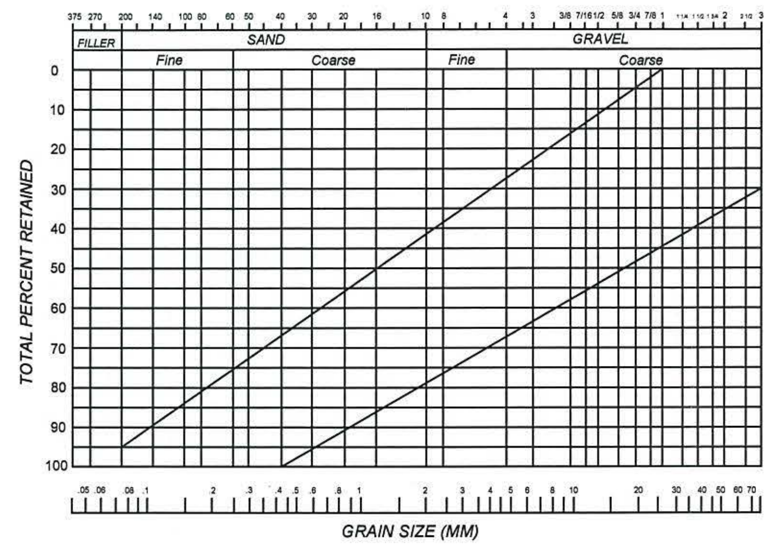
1968 DAM CONSTRUCTION DETAILS WITH 1989 AND 1969 BERMS
TYPICAL SECTION

SOURCE: AS BUILT DRAWING NO. D1575–058–006, REV.06 PARSONS–JURDEN CORPORATION, OCT. 1968



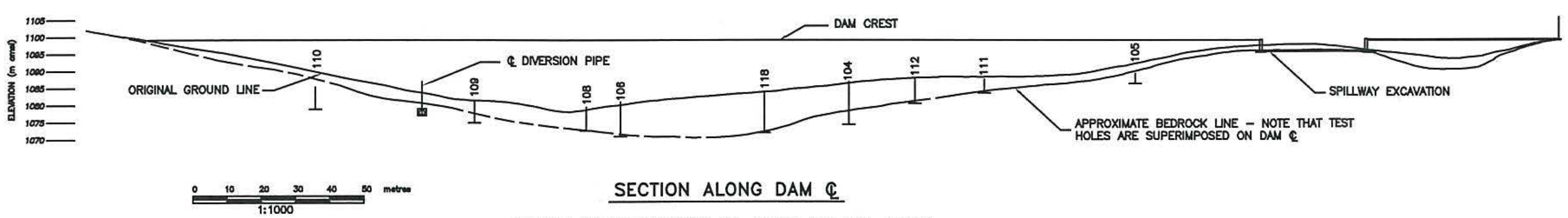
DESIGN GRADATION CURVE LIMITS - ZONE 1

SOURCE: AS BUILT DRAWING NO. D1575–058–006, REV.06 PARSONS–JURDEN CORPORATION, OCT. 1968



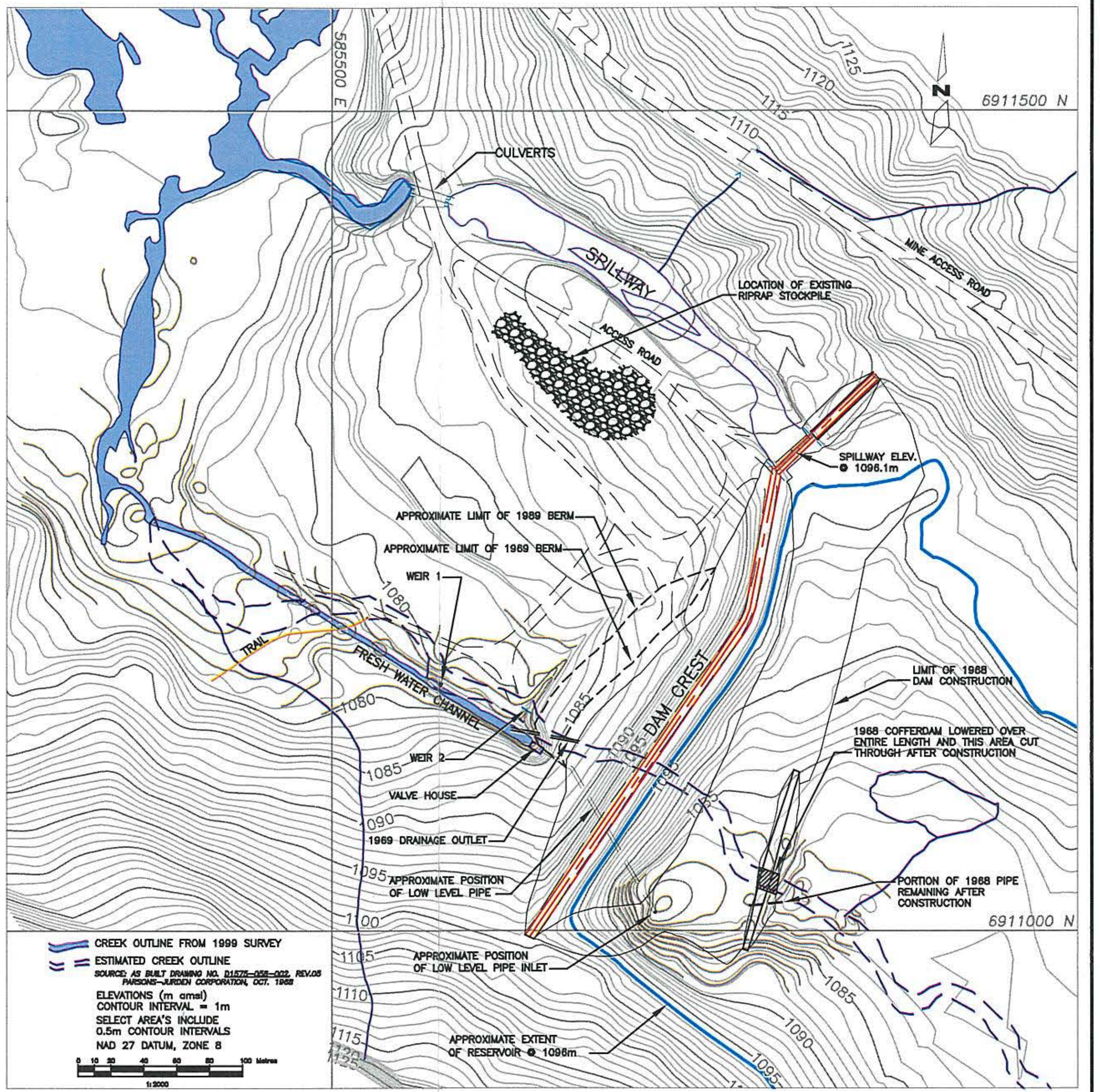
DESIGN GRADATION CURVE LIMITS - ZONE 2

SOURCE: AS BUILT DRAWING NO. D1575–058–006, REV.06 PARSONS–JURDEN CORPORATION, OCT. 1968



SECTION ALONG DAM ℄

SOURCE: AS BUILT DRAWING NO. D1575–058–004, REV.05 PARSONS–JURDEN CORPORATION, OCT. 1968



NOTE: SCALE HAS BEEN REDUCED BY 50%

NO.	DESCRIPTION	CHK'D	APP'D	DATE

REFERENCE DRAWINGS (DRAWING NO. / DRAWING TITLE) — REVISIONS

ISSUE AUTHORIZATION

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D	ISSUED FOR CONSTRUCTION	CCS	OCT. 30/03
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A	PRELIMINARY DESIGN	GWF	FEB 3/03

Gartner Lee Limited

BGC Engineering Inc. AN APPLIED EARTH SCIENCES COMPANY

CONSTRUCTION

SRK Consulting Engineers and Scientists

DESIGNED BY: GWF	DRAWN BY: DC/JM
DATE: JAN. 2003	DATE:
CHECKED BY: CCS	DISCIP. ENGR.
DATE: JAN. 2003	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE

SRK PROJECT NUMBER: 1CD003.22

Deloitte & Touche Inc.

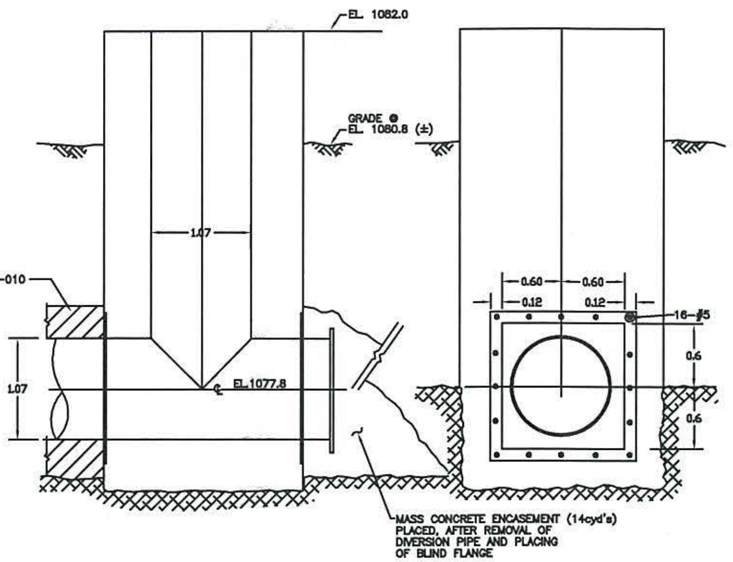
FRESH WATER SUPPLY DAM BREACH
ANVIL RANGE MINING COMPLEX, YT

SCALE: AS SHOWN

FWSD EXISTING CONDITIONS

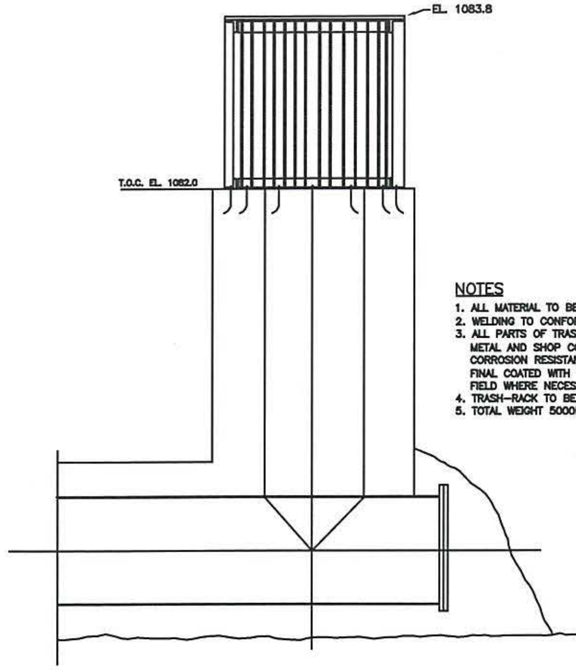
DRAWING NUMBER: 2

REV. D



LOW-LEVEL PIPE INLET
SECTION ELEVATION
CONCRETE OUTLINE

SOURCE: AS BUILT DRAWING NO. D1575-058-013, REV.04
PARSONS-JURDEN CORPORATION, OCT. 1968

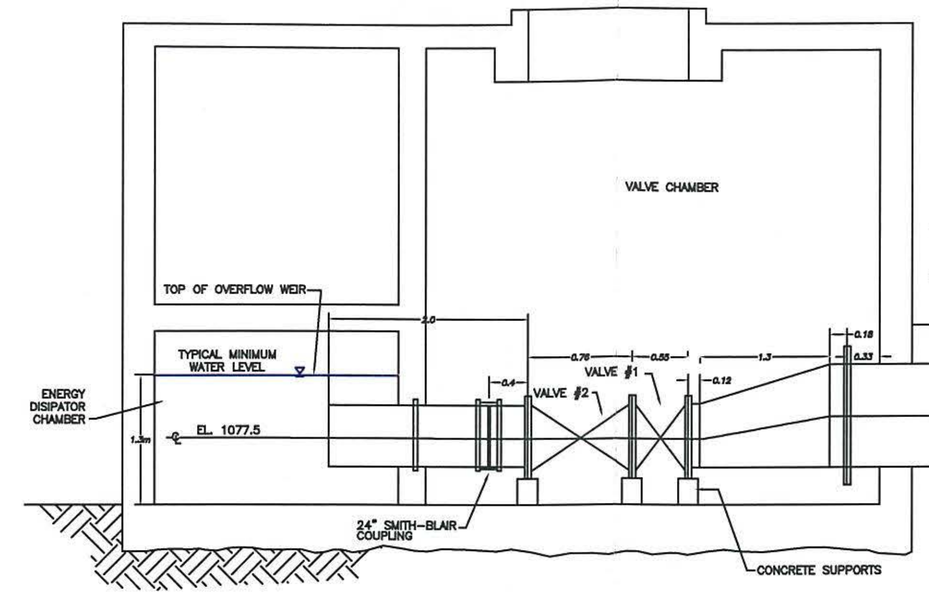


NOTES
1. ALL MATERIAL TO BE MILD STEEL.
2. WELDING TO CONFORM TO CSA STANDARDS. S16-1965.
3. ALL PARTS OF TRASH-RACK TO BE SAND-BLASTED TO WHITE METAL AND SHOP COATED WITH PCE-414 'FLINTGUARD' CORROSION RESISTANT COATING TO 20 MIL. THICKNESS AND FINAL COATED WITH 'CHEMROX' VINYL ENAMEL. TOUCH UP IN FIELD WHERE NECESSARY.
4. TRASH-RACK TO BE 4 PANELS AS SHOWN
5. TOTAL WEIGHT 5000LB.

TRASH RACK DETAILS

SOURCE: AS BUILT DRAWING NO. D1575-058-017, REV.04
PARSONS-JURDEN CORPORATION, OCT. 1968

0 .5 1 1.5 2 2.5 Metres
1:40



VALVE #1: 24" – 150lb CAST STEEL GATE VALVE "SELLA" TYPE IIII, WITH BEVEL GEARING. (WEIGHT: 3,260lb.)

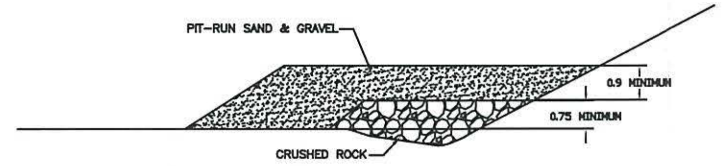
VALVE #2: 24" – 150lb CAST STEEL "ROCKWELL-NORDSTROM" FIG. 4169 PLUG VALVE WITH WORM GEAR OPERATOR. (APPROX. WEIGHT: 3,500lb.)

NOTE:
1. DURING A DEC. 2002 SITE VISIT, A 0.37m LONG SPOOL PIECE OF 24" PIPE WAS ENCOUNTERED BETWEEN VALVE 1 AND VALVE 2
2. IN MARCH 2003, THE 24" PIPE EXTENDING INTO THE ENERGY DISSIPATOR CHAMBER WAS CUT, 12" OF PIPE WERE REMOVED, AND A HUB FLANGE AND ORIFACE PLATE WERE INSTALLED. A THRUST PLATE WAS INSTALLED ON THE UPSTREAM SIDE OF THE ENERGY DISSIPATOR CHAMBER WALL AND NEW SUPPORTS FOR THE VALVES WERE INSTALLED WITHIN THE VALVE CHAMBER.

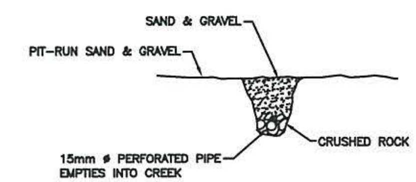
VALVE HOUSE ARRANGEMENT

SOURCE: AS BUILT DRAWING NO. D1575-058-014, REV.05
PARSONS-JURDEN CORPORATION, OCT. 1968

0 2 Metres
1:125



TYPICAL SECTION THROUGH DRAIN AND BERM

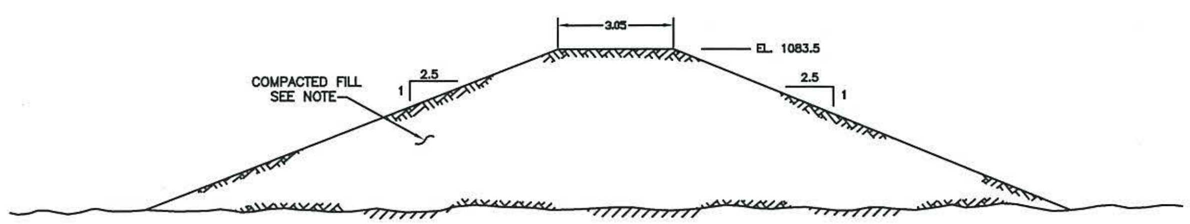


TYPICAL SECTION THROUGH
1969 DRAINAGE OUTLET DITCH

1969 TOE BERM CONSTRUCTION DETAILS

RECOMMENDED TOE DRAINAGE DRAWING B-1223-C
ACCOMPANING LETTER OF JUNE 16, 1969
SOURCE: RIPLEY,KLOHN & LEONOFF INTERNATIONAL LTD.

0 1 2 3 4 5 Metres
1:100

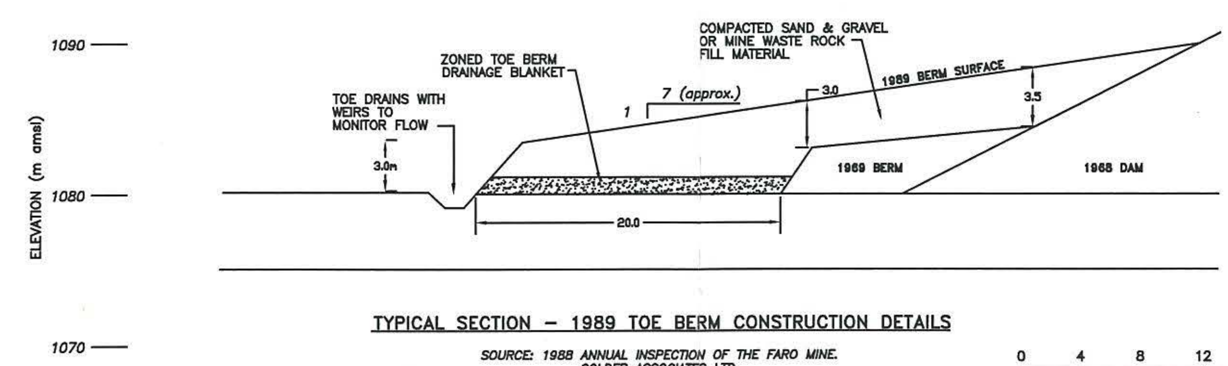


NOTES
1. ALL OVERBURDEN COMPOSED OF ORGANIC SOIL, DEBRIS, AND MUSKEG AND TO A MIN.2' DEPTH TO BE REMOVED OVER ENTIRE COFFERDAM.
2. COFFERDAM FILL MATERIAL TO BE COMPOSED OF ZONE 1 MATERIAL.
3. COFFERDAM FILL TO BE PLACED IN LIFTS OF 12 MEASURED AFTER COMPACTION TO 97% STANDARD PROCTOR DENSITY, BY FOUR PASSES OF A 50 TON STANDARD RUBBER TIRED ROLLER. (ALTERNATIVELY PLACE 6" LIFTS AND COMPACT TO ABOVE DENSITY USING A "SHEEPS FOOT ROLLER"

0 1 2 3 4 5 Metres
1:100

UPSTREAM COFFERDAM TYPICAL DETAIL

SOURCE: AS BUILT DRAWING NO. D1575-058-011, REV.06
PARSONS-JURDEN CORPORATION, OCT. 1968



TYPICAL SECTION – 1989 TOE BERM CONSTRUCTION DETAILS

SOURCE: 1988 ANNUAL INSPECTION OF THE FARO MINE.
GOLDER ASSOCIATES LTD.

0 4 8 12 16 20 Metres
1:250

NOTE: SCALE HAS BEEN REDUCED BY 50%

REV.	ISSUE PURPOSE	AUTH. BY	DATE
D	ISSUED FOR CONSTRUCTION	CCS	OCT. 30/03
C	ISSUED TO WATER BOARD	GWF	APR. 17/03
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A	PRELIMINARY DESIGN	GWF	FEB 3/03

DRAWING NO. | DRAWING TITLE — REFERENCE DRAWINGS
NO. | DESCRIPTION | CHK'D | APP'D | DATE — REVISIONS
ISSUE AUTHORIZATION

Gartner Lee Limited
BGC Engineering Inc. AN APPLIED EARTH SCIENCES COMPANY
SRK Consulting Engineers and Scientists

CONSTRUCTION

DESIGNED BY: GWF | DATE: Jan. 2003
DRAWN BY: DC/JM | DATE:
CHECKED BY: CCS | DATE: JAN. 2003
DISCIP. ENGR. | DATE
PROJ. DES. COORD. | DATE
PROJ. ENGR. | DATE
SRK PROJECT NUMBER: 1CD003.22

Deloitte & Touche Inc.

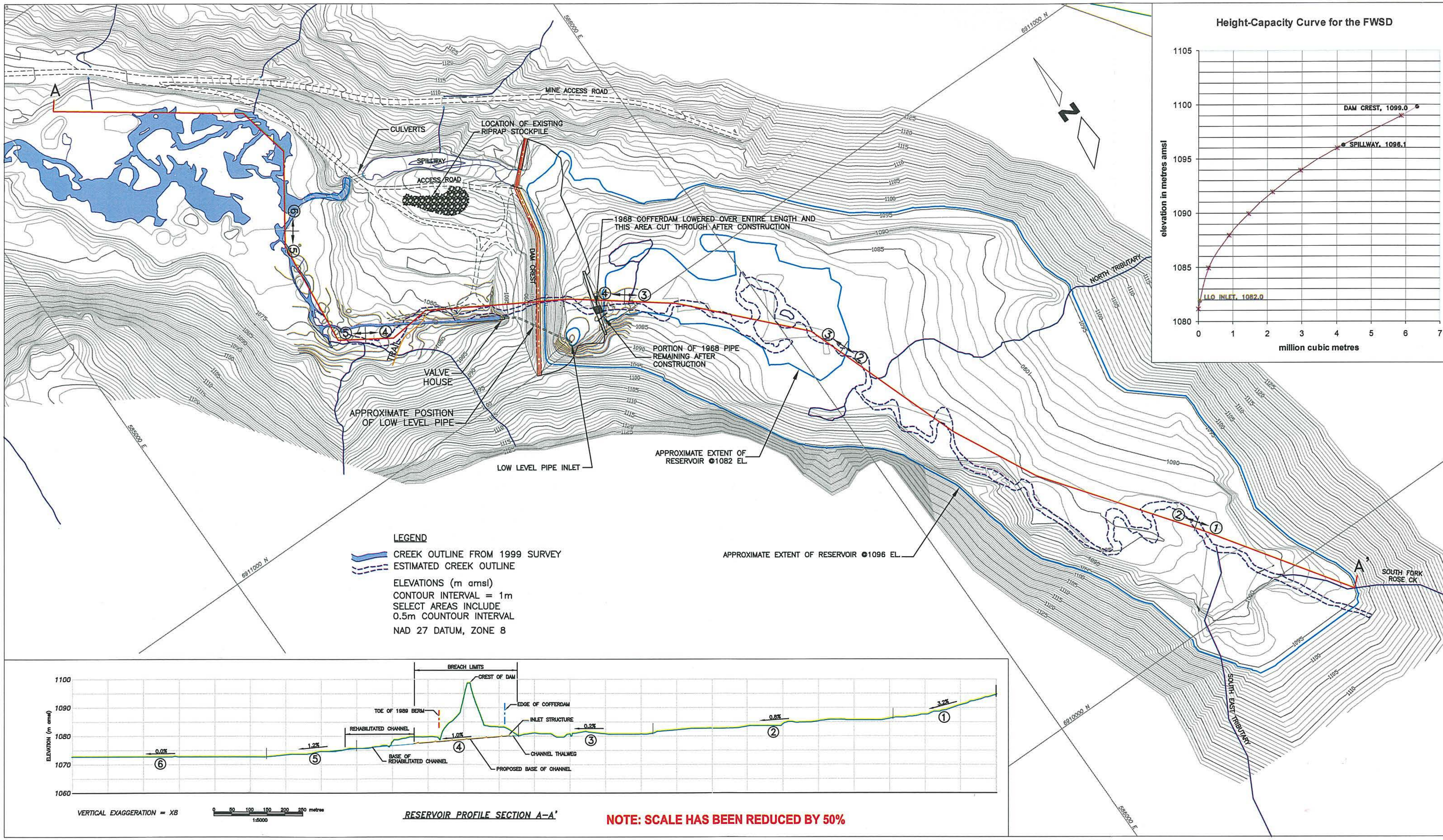
FRESH WATER SUPPLY DAM BREACH
ANVIL RANGE MINING COMPLEX, YT

SCALE: 1:15,000
0 100 200 300 400 500m

FWSD DETAILS: EXISTING CONDITIONS

DRAWING NUMBER 3
REV. D

FILE NAME: F:\Deloitte_touche\Acad drawings-Faro\faro FWSD\Figure 3.dwg



DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	REV.	ISSUE PURPOSE	AUTH. BY	DATE
							D	ISSUED FOR CONSTRUCTION	CCS	OCT. 30/03
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REFERENCE DRAWINGS | REVISIONS | ISSUE AUTHORIZATION

Gartner Lee Limited

BGC Engineering Inc. AN APPLIED EARTH SCIENCES COMPANY

SRK Consulting Engineers and Scientists

CONSTRUCTION

DESIGNED BY: GWF | DRAWN BY: DC/JM
DATE: Jan. 2003 | DATE:
CHECKED BY: CCS | DISCIP. ENGR.
DATE: JAN. 2003 | DATE
PROJ. DES. COORD. | PROJ. ENGR.
DATE | DATE
SRK PROJECT NUMBER: 1CD003.22

Deloitte & Touche Inc.

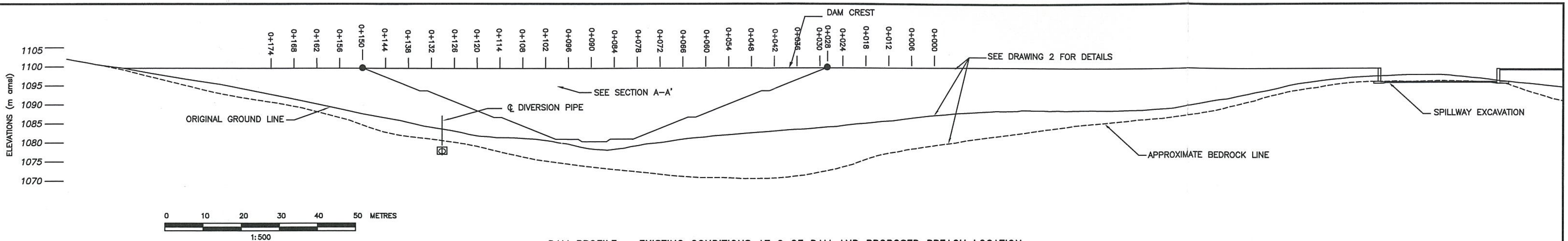
FRESH WATER SUPPLY DAM BREACH
ANVIL RANGE MINING COMPLEX, YT

SCALE: 1:3000
0 50 100 150 200 250 metres

RESERVOIR SITE PLAN

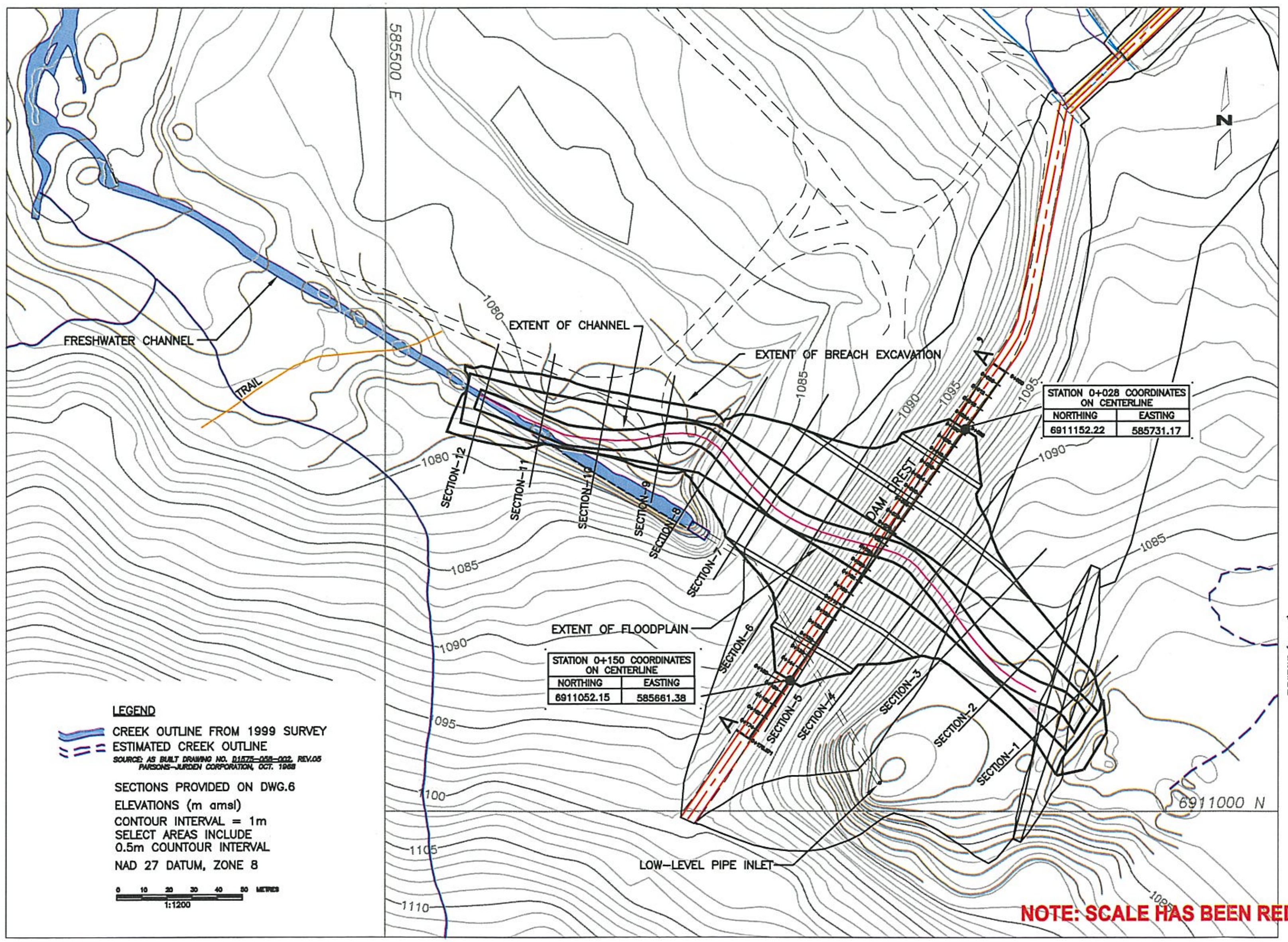
DRAWING NUMBER: 4

REV. D

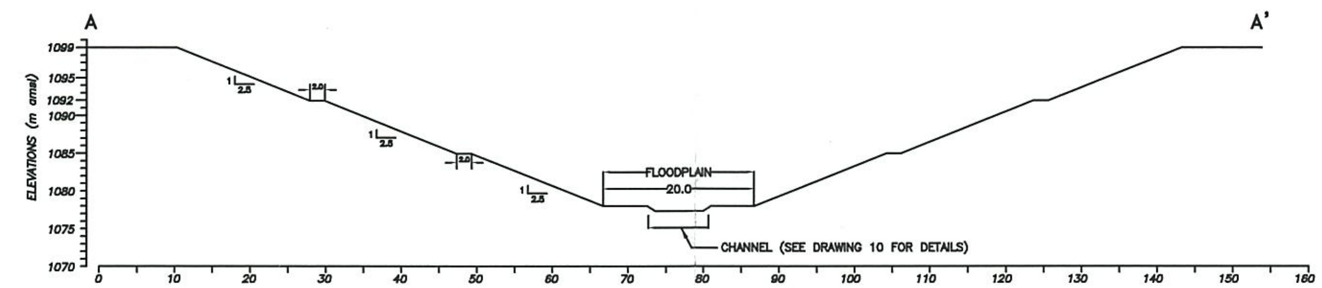


DAM PROFILE – EXISTING CONDITIONS AT ℄ OF DAM AND PROPOSED BREACH LOCATION

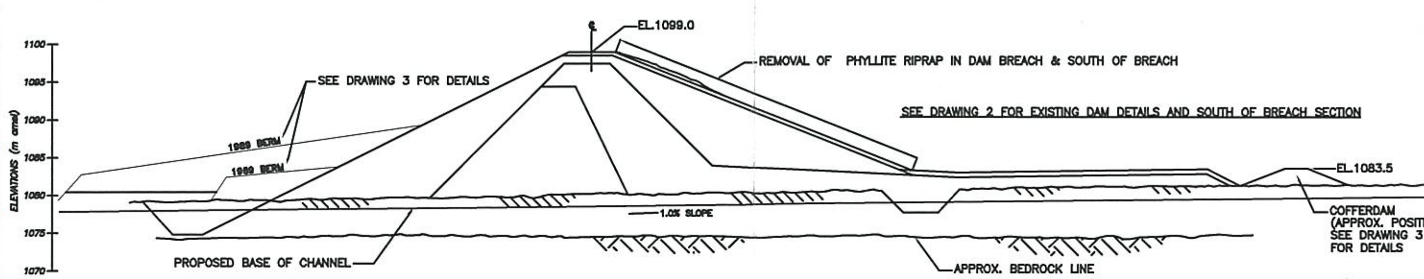
SOURCE: AS BUILT DRAWING NO. D1575-058-004, REV.05
PARSONS-JURDEN CORPORATION, OCT. 1968



NOTE: SCALE HAS BEEN REDUCED BY 50%



SECTION A–A' – PROPOSED BREACH
GENERAL EXCAVATION DETAIL



TYPICAL DAM SECTION
PROPOSED CHANNEL BASE

REV.	ISSUE PURPOSE	AUTH. BY	DATE
D	ISSUED FOR CONSTRUCTION	CCS	APR. 17/03
C	ISSUED TO WATER BOARD	GWF	APR. 17/03
B	FINAL DESIGN	GWF	APR. 03/03
A	PRELIMINARY DESIGN	GWF	FEB 3/03

DRAWING NO. | DRAWING TITLE — REFERENCE DRAWINGS
NO. | DESCRIPTION | CHK'D | APP'D | DATE — REVISIONS
ISSUE AUTHORIZATION

Gartner Lee Limited
BGC Engineering Inc. AN APPLIED EARTH SCIENCES COMPANY
SRK Consulting Engineers and Scientists

CONSTRUCTION

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DATE: Jan. 2003	DATE:
CHECKED BY: CCS	DISCIP. ENGR.
DATE: JAN. 2003	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
SRK PROJECT NUMBER: 1CD003.22	

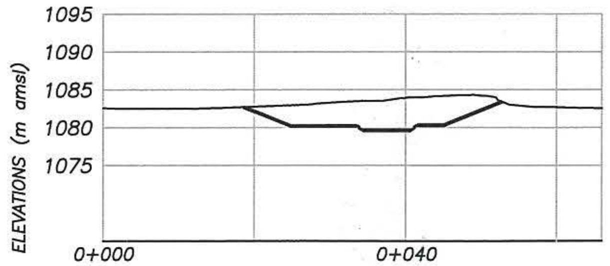
Deloitte & Touche Inc.

FRESH WATER SUPPLY DAM BREACH
ANVIL RANGE MINING COMPLEX, YT

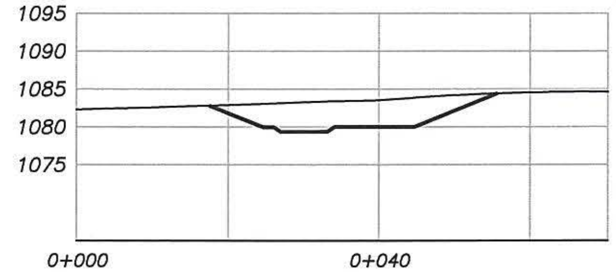
SCALE: AS SHOWN

FWSD BREACH GENERAL ARRANGEMENT

DRAWING NUMBER: 5
REV. D



Section–1



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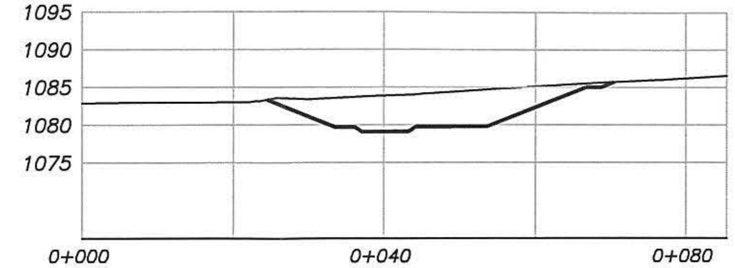
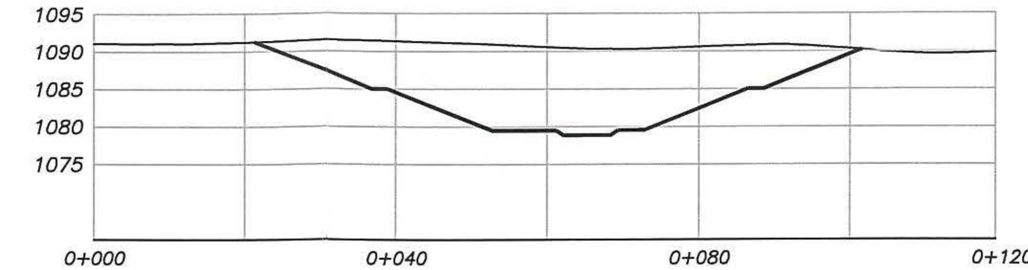


Section–3



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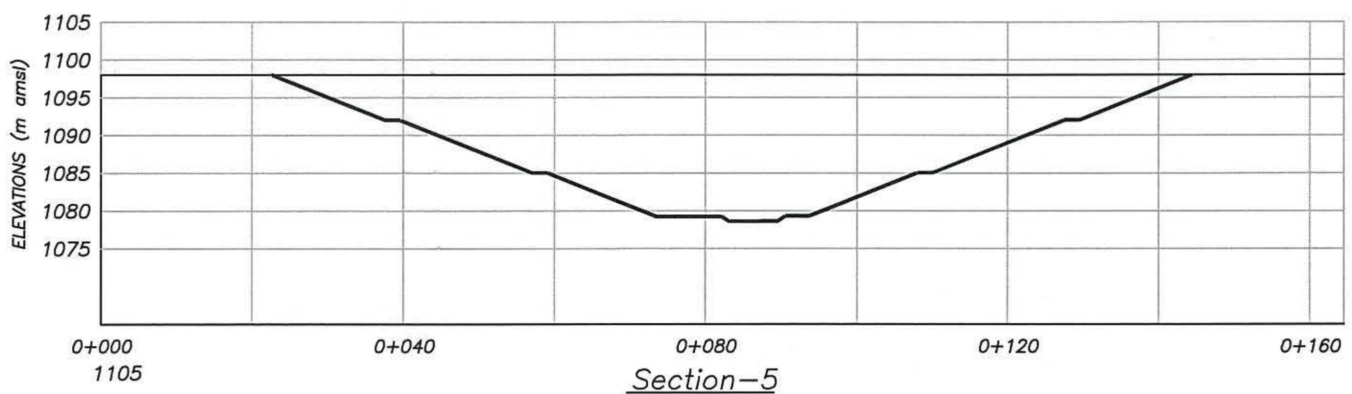

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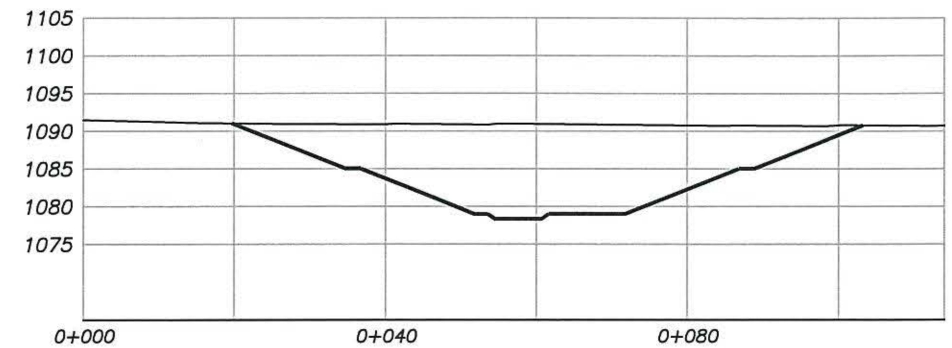

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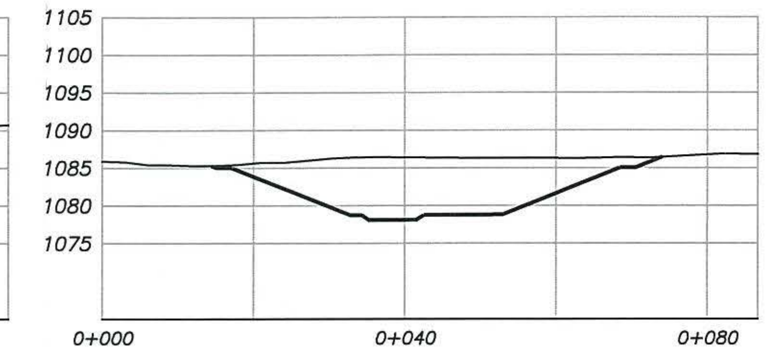

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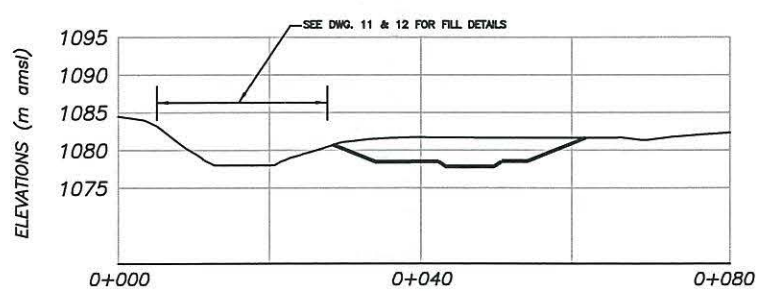

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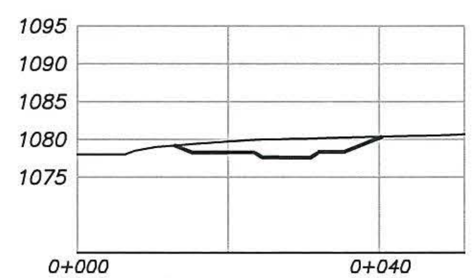

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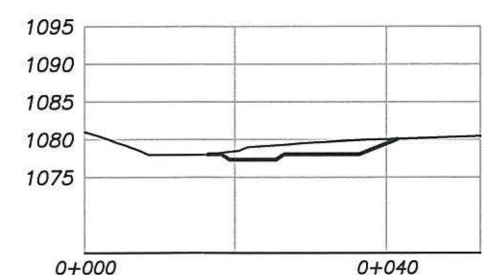

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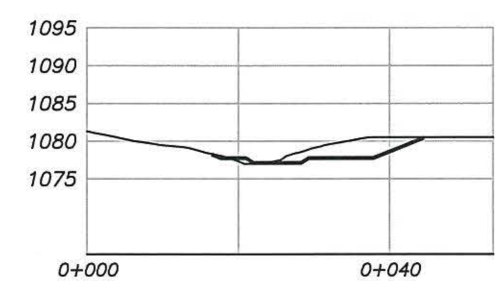

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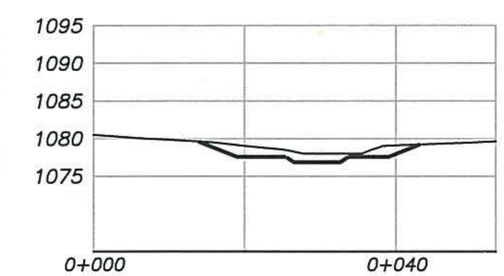

Section–12

LEGEND

EXISTING SURFACE

FINISHED DESIGN GRADE

NOTE: SCALE HAS BEEN REDUCED BY 50%

REV.	ISSUE PURPOSE	AUTH. BY	DATE
D	ISSUED FOR CONSTRUCTION	CCS	OCT. 30/03
C	ISSUED TO WATER BOARD	GWF	APR. 17/03
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DRAWING NO. | DRAWING TITLE — REFERENCE DRAWINGS

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CHECKED BY: CCS | DISCIP. ENGR.
DATE: JAN. 2003 | DATE
PROJ. DES. COORD. | PROJ. ENGR.
DATE | DATE
SRK PROJECT NUMBER: 1CD003.22

Deloitte & Touche Inc.

FRESH WATER SUPPLY DAM BREACH
ANVIL RANGE MINING COMPLEX, YT

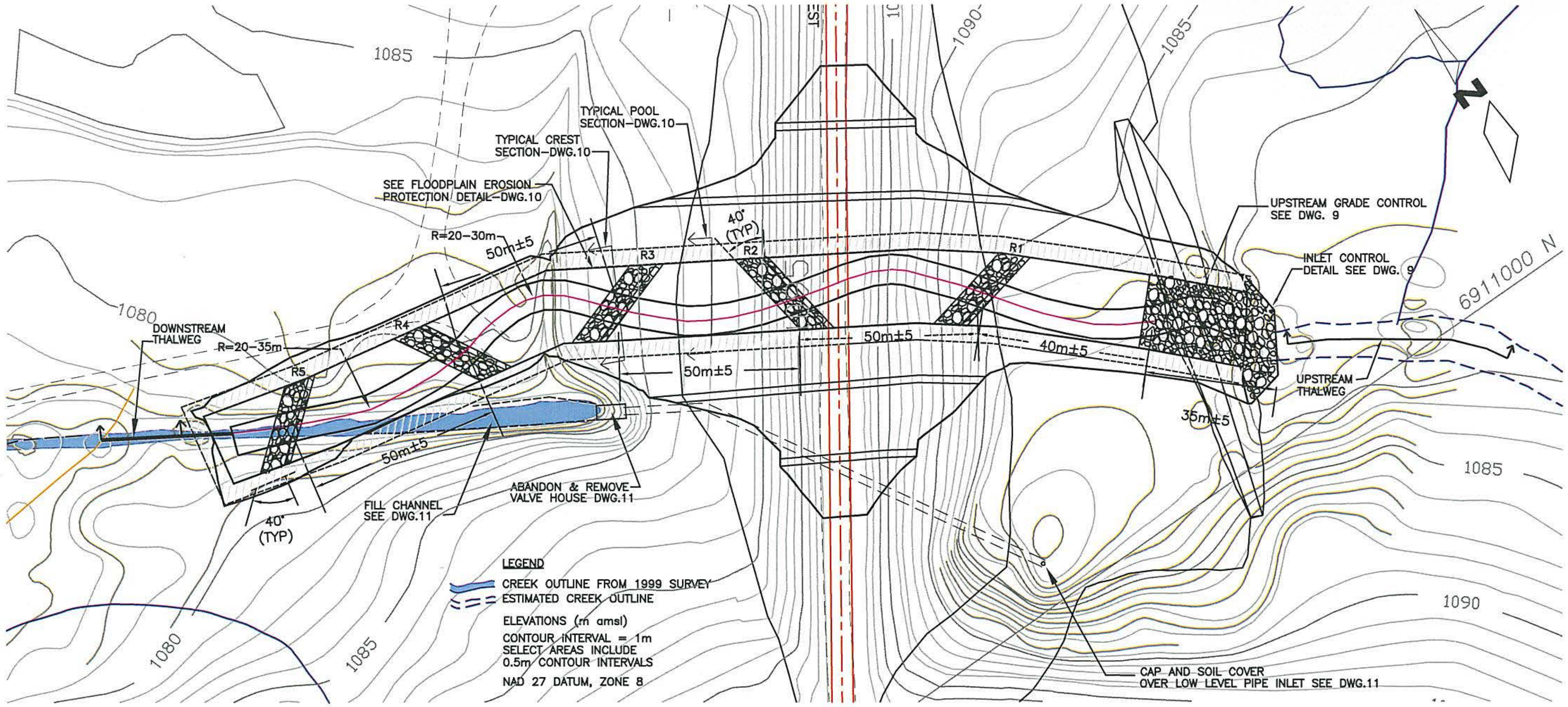
SCALE: 1:750
0 10 20 30 40 50
Metres

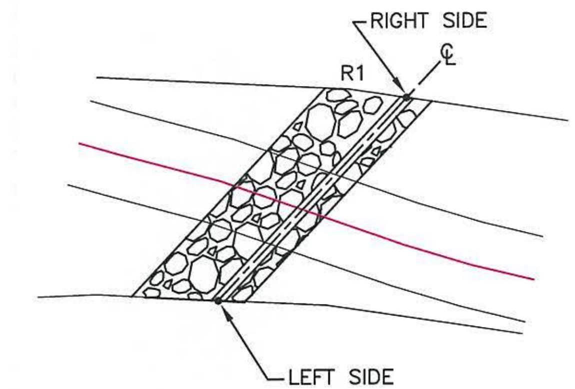
FWSD BREACH SECTIONS

DRAWING NUMBER 6

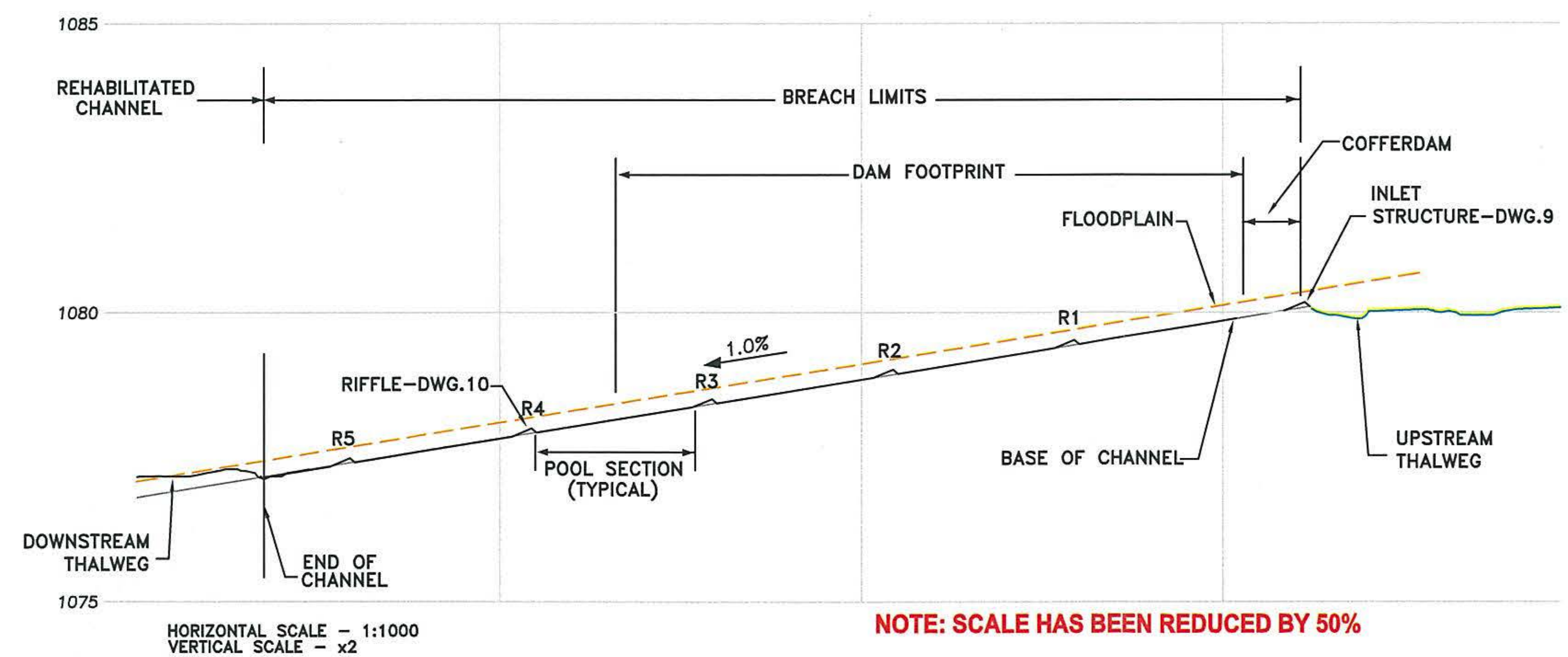
REV. D

FILE NAME: F:\Deloitte_touche\Anvil drawings-Faro\faro FWSD\figure 6.dwg





RIFFLE STRUCTURE	ELEVATION OF RIFFLE CREST
INLET STRUCTURE	1080.50
RIFFLE R1	1079.92
RIFFLE R2	1079.32
RIFFLE R3	1078.72
RIFFLE R4	1078.12
RIFFLE R5	1077.50



RIFFLE STRUCTURE STARTING AT UPSTREAM END	COORDINATES OF RIFFLE CREST CENTERLINE			
	LEFT SIDE		RIGHT SIDE	
	NORTHING	EASTING	NORTHING	EASTING
INLET STRUCTURE	6911014.50	585767.65	6911043.84	585785.96
RIFFLE R1	6911077.04	585715.55	6911082.38	585740.35
RIFFLE R2	6911096.99	585685.72	6911122.80	585682.05
RIFFLE R3	6911129.75	585632.90	6911137.91	585657.70
RIFFLE R4	6911137.96	585607.90	6911160.71	585595.15
RIFFLE R5	6911151.16	585544.05	6911166.77	585563.10

NOTE: SEE ALSO DRAWINGS 9 AND 10 FOR LOCATION IN SECTION

NOTE: SCALE HAS BEEN REDUCED BY 50%

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DATE | DATE
SRK PROJECT NUMBER: 1CD003.22

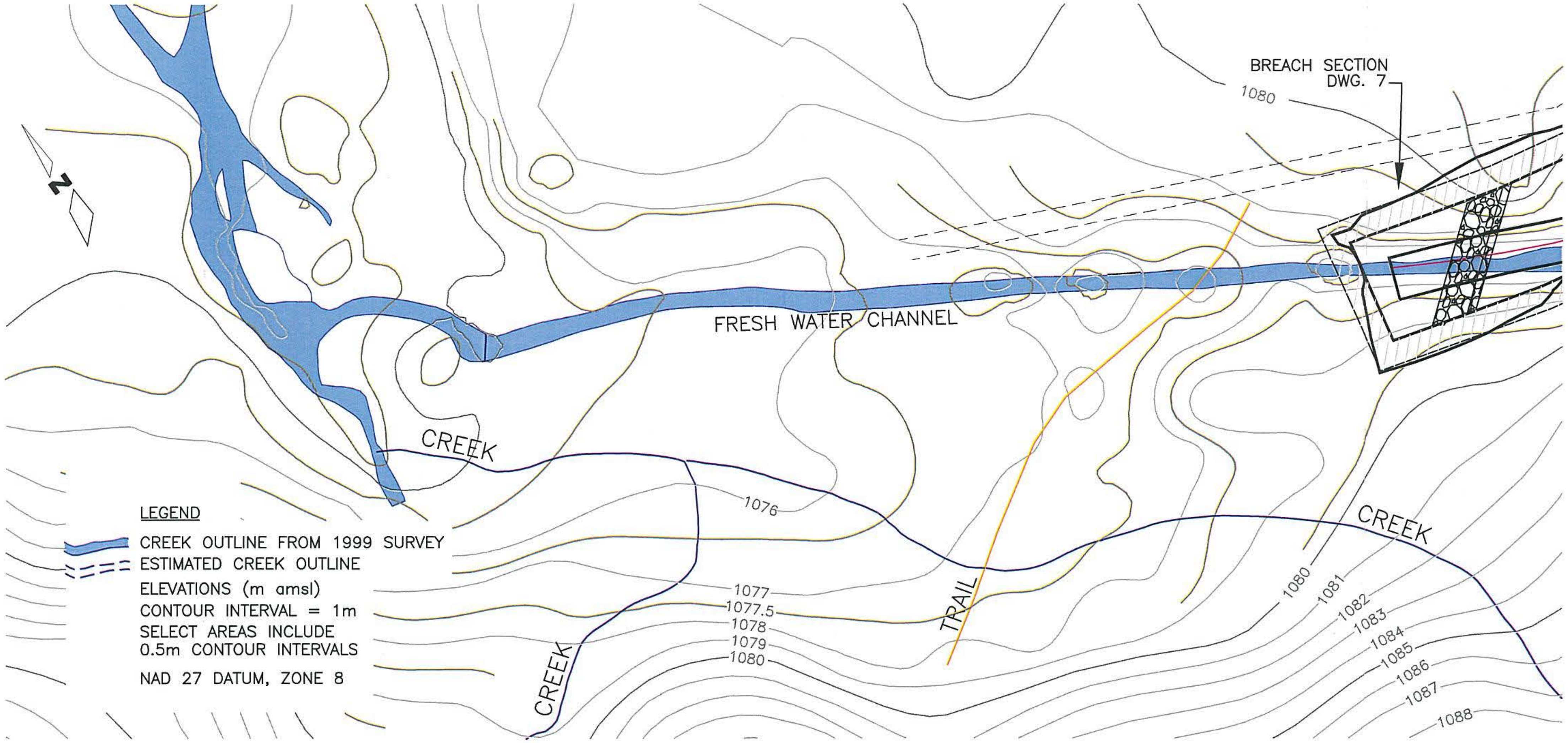
Deloitte & Touche Inc.

FRESH WATER SUPPLY DAM BREACH
ANVIL RANGE MINING COMPLEX, YT

SCALE: 1:750
0 10 20 30 40 50 Metres

FWSD BREACH PLAN AND PROFILE

DRAWING NUMBER: 7
REV. D



Note:
Downstream of the breach is the segment of the works referred to as the rehabilitated channel. The rehabilitated channel shall be left untouched so that the natural flows in the South Fork of Rose Creek will be allowed initially to re-work the channel.

NOTE: SCALE HAS BEEN REDUCED BY 50%

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DATE	DATE

SRK PROJECT NUMBER: 1CD003.22

Deloitte & Touche Inc.

FRESH WATER SUPPLY DAM BREACH
ANVIL RANGE MINING COMPLEX, YT

SCALE: 1:500

0 10 20 30 40 50 Metres

REHABILITATED CHANNEL PLAN

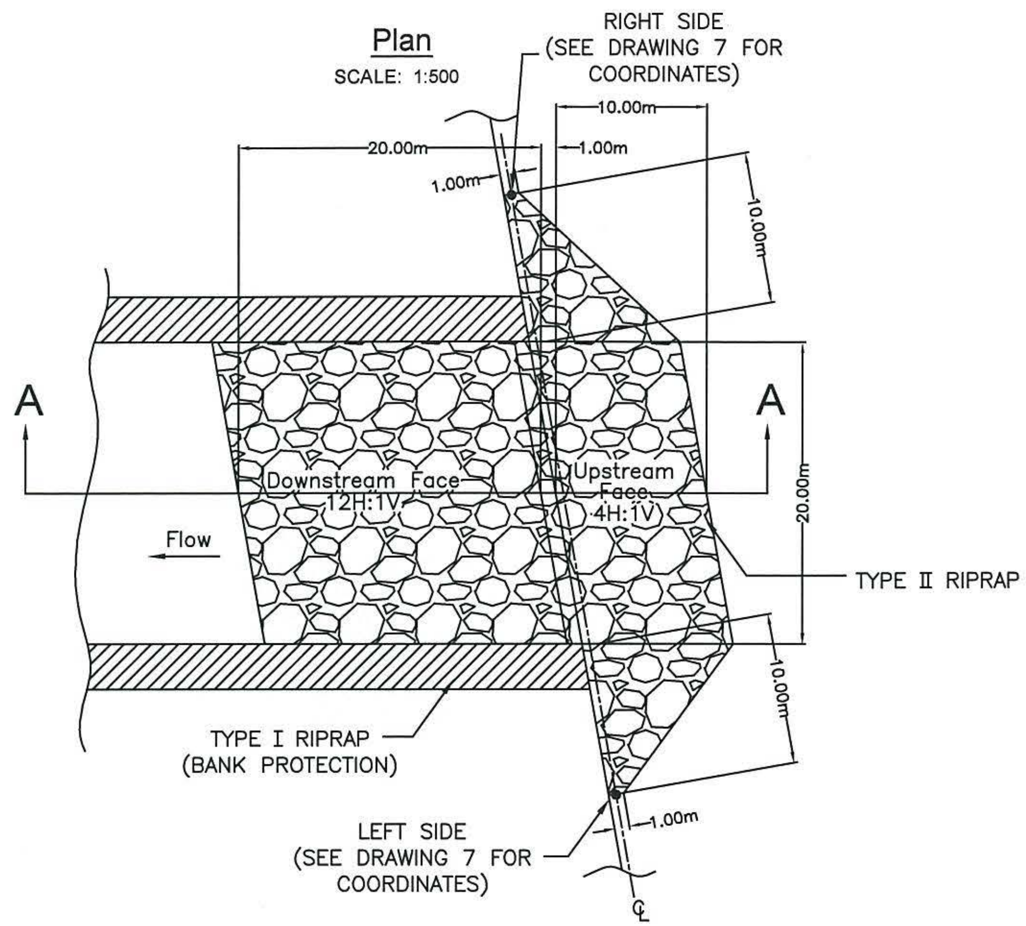
DRAWING NUMBER: 8

REV.: D

FILE NAME: F:\Deloitte_touche\Acad drawings-Faro\faro FWSD\Figure 8.dwg

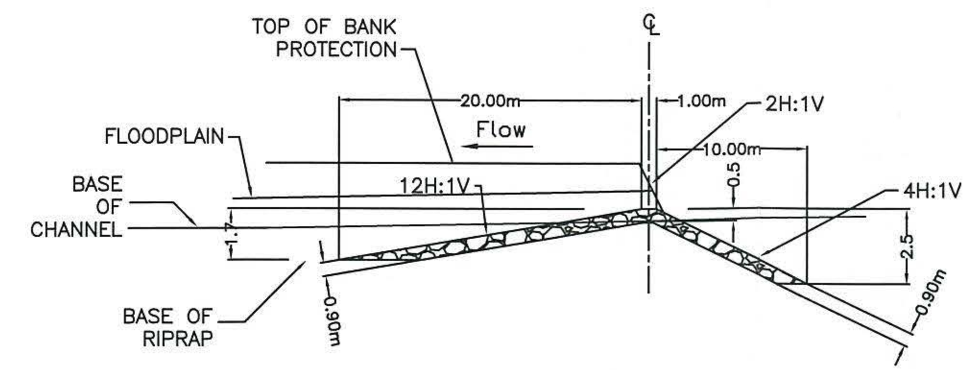
Plan

SCALE: 1:500



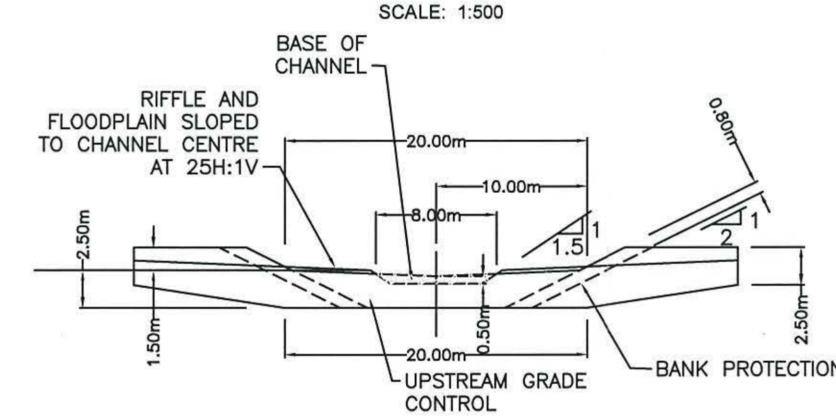
Profile A-A

SCALE: 1:500 HORIZ. 1:250 VERT.



Front View

SCALE: 1:500



Construction Notes:

1) Inlet structure constructed of Type II riprap. (See Dwg.10)
2) Floodplain erosion protection constructed of Type I riprap. (See Dwg.10)
3) Key riffle 2.5 m into channel bed and extend to floodplain erosion protection.
4) Concentrate flow in centre third of channel by sloping rock up towards top of banks (4%) and leaving gaps between the rocks of the middle third of the riffle crest.
5) Concentrate larger stones at riffle crest and space 0.2m to 0.3m apart on downstream slope to dissipate energy.
6) Construct riffle with crest 0.5 m above channel bed elevation.
7) Align face of inlet structure with face of existing Cofferdam.

NOTE: SCALE HAS BEEN REDUCED BY 50%

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Deloitte & Touche Inc.

FRESH WATER SUPPLY DAM BREACH
ANVIL RANGE MINING COMPLEX, YT

SCALE: 1:250

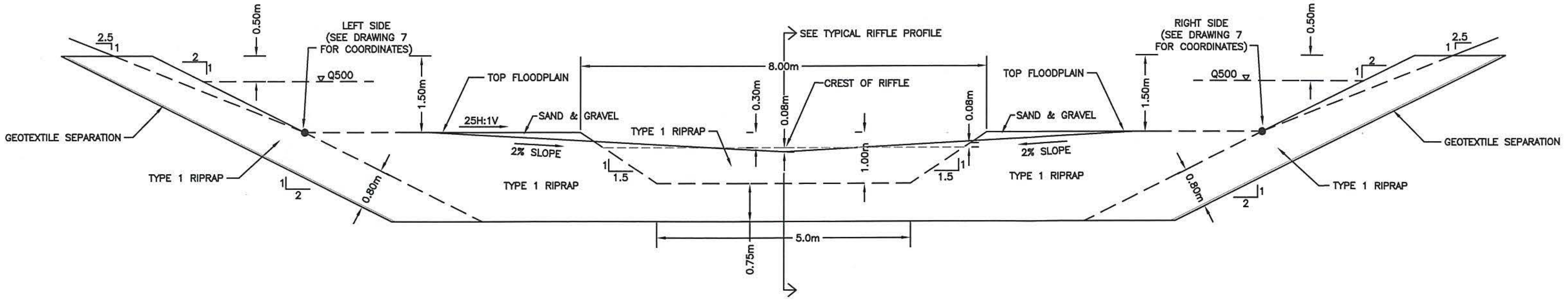
0 1 2 3 4 5 METRES

FWSD INLET DETAILS

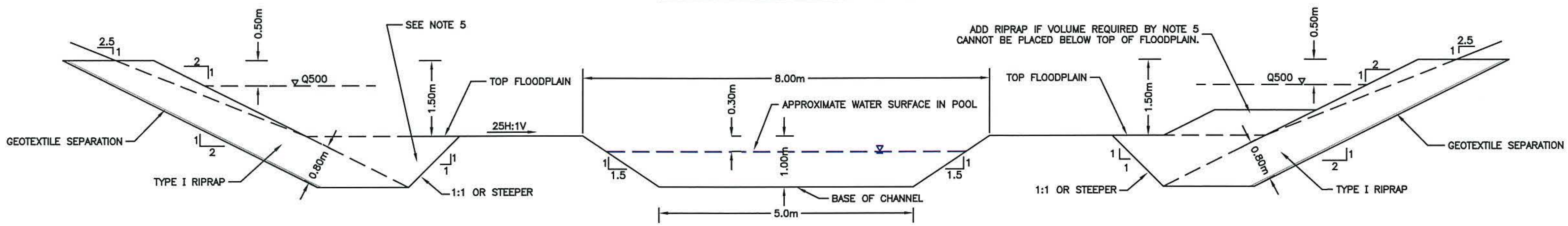
DRAWING NUMBER 9

REV. D

FILE NAME: F:\Deloitte_touche\Anvil drawings-Faro\faro FWSD\Figure 8.dwg



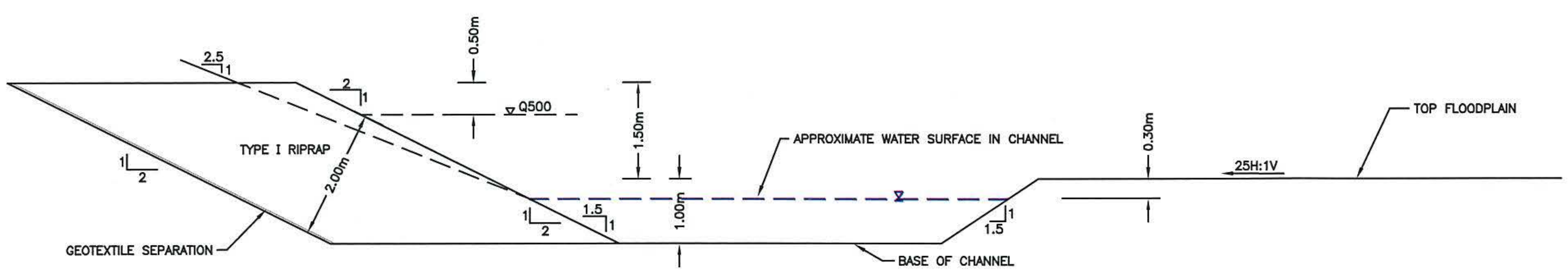
TYPICAL RIFFLE CREST SECTION



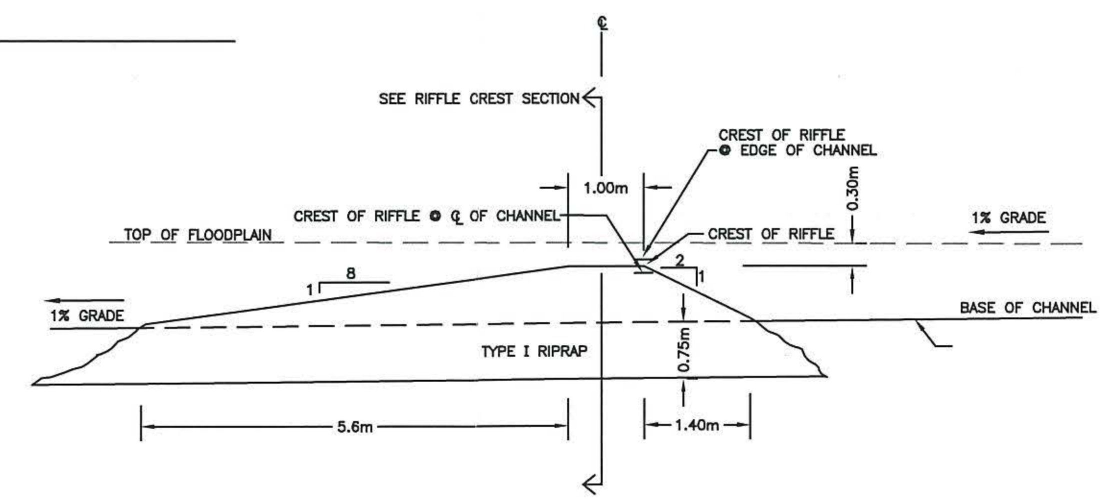
TYPICAL FLOODPLAIN EROSION PROTECTION BETWEEN RIFFLES (POOL SECTION)

Construction Notes:

1) Type I riprap – D50 = 0.40m.
2) Type II riprap – D50 = 0.45m.
3) Riffles to be constructed from Type I riprap.
4) Floodplain erosion protection to be constructed from Type I riprap.
5) Maintain a minimum volume of $4.5m^3$ per lineal m of floodplain erosion protection below the top of floodplain.
6) Over excavated areas beyond the lines and grades shown can be backfilled with common fill.
7) Geotextile to be used to separate Type I riprap from excavated soils on backslope of floodplain erosion protection.
8) Over excavated areas beyond the lines and grades shown can be backfilled with common fill. If available, the backfill on the upstream side of the riffles should consist of 150 mm minus alluvial gravels.
9) The channel sideslopes may be constructed with a parabolic shape rather than the straight lines shown in the sections.



TYPICAL FLOODPLAIN EROSION PROTECTION WITH CHANNEL AT FLOODPLAIN LIMIT (POOL SECTION)



TYPICAL RIFFLE PROFILE

NOTE: SCALE HAS BEEN REDUCED BY 50%

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Deloitte & Touche Inc.

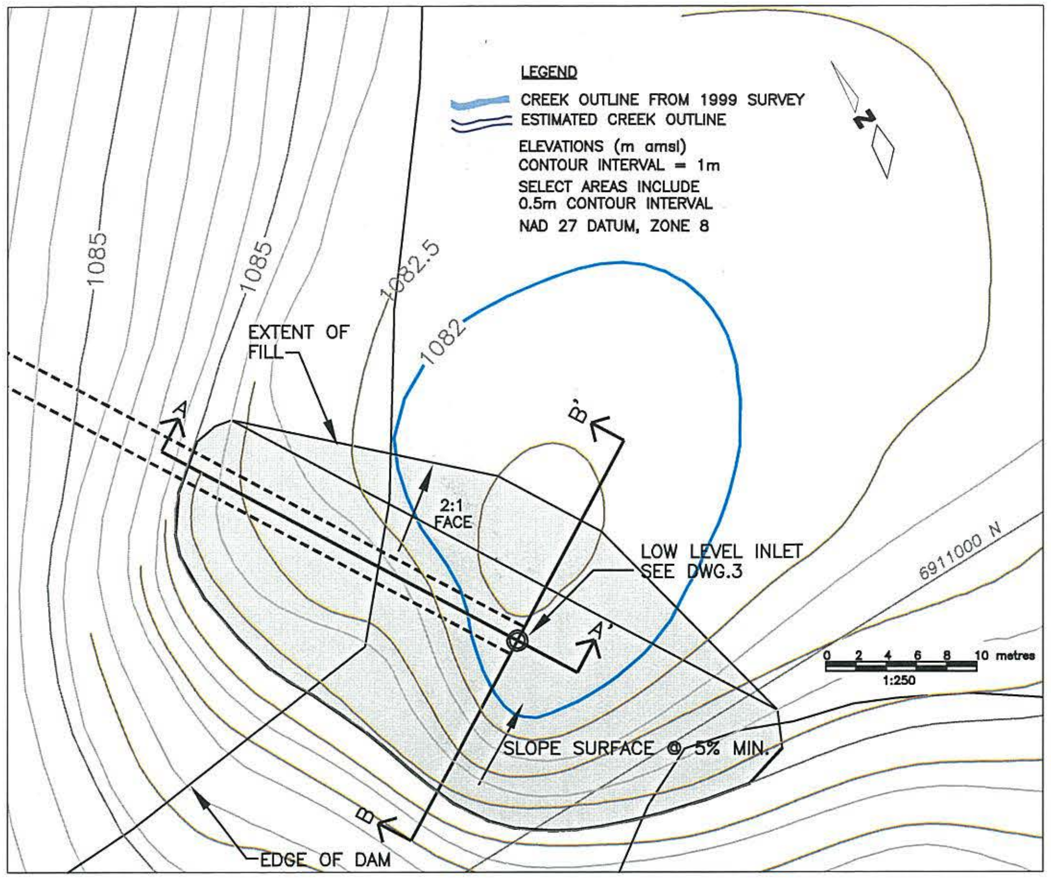
FRESH WATER SUPPLY DAM BREACH
ANVIL RANGE MINING COMPLEX, YT

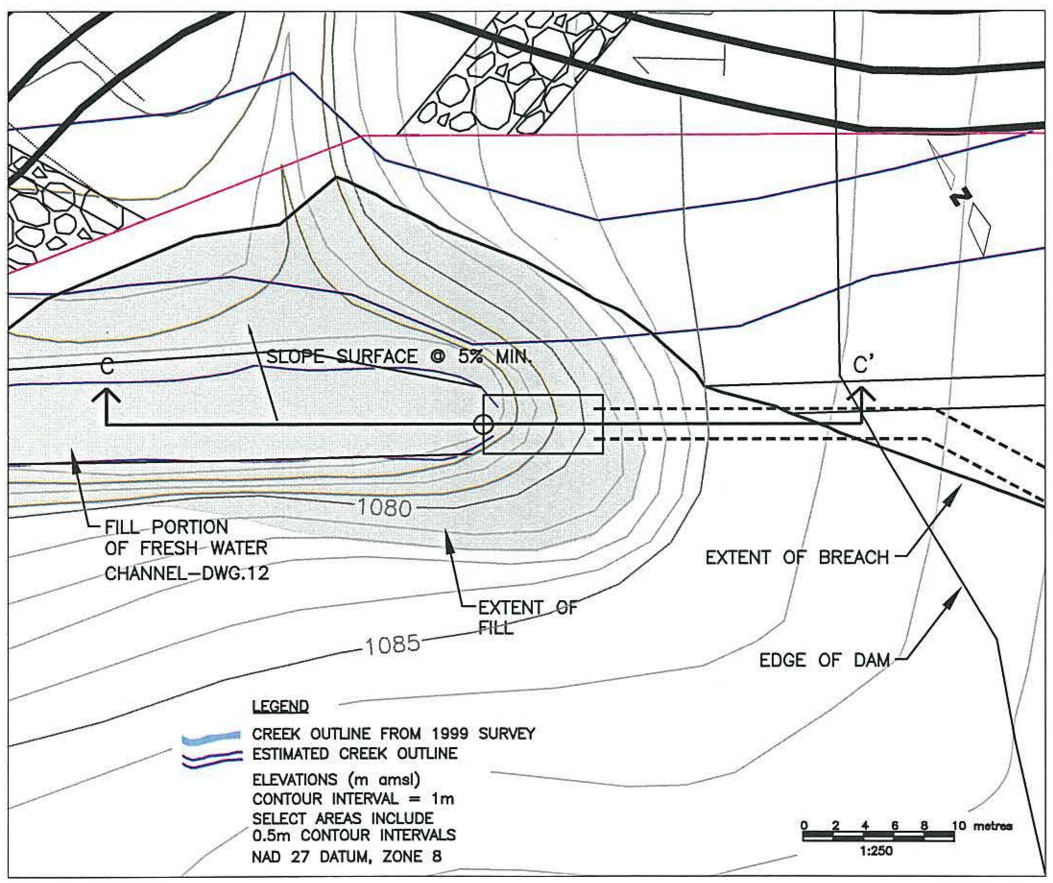
SCALE: 1:50 — 0 1 2 3 4 5 METRES

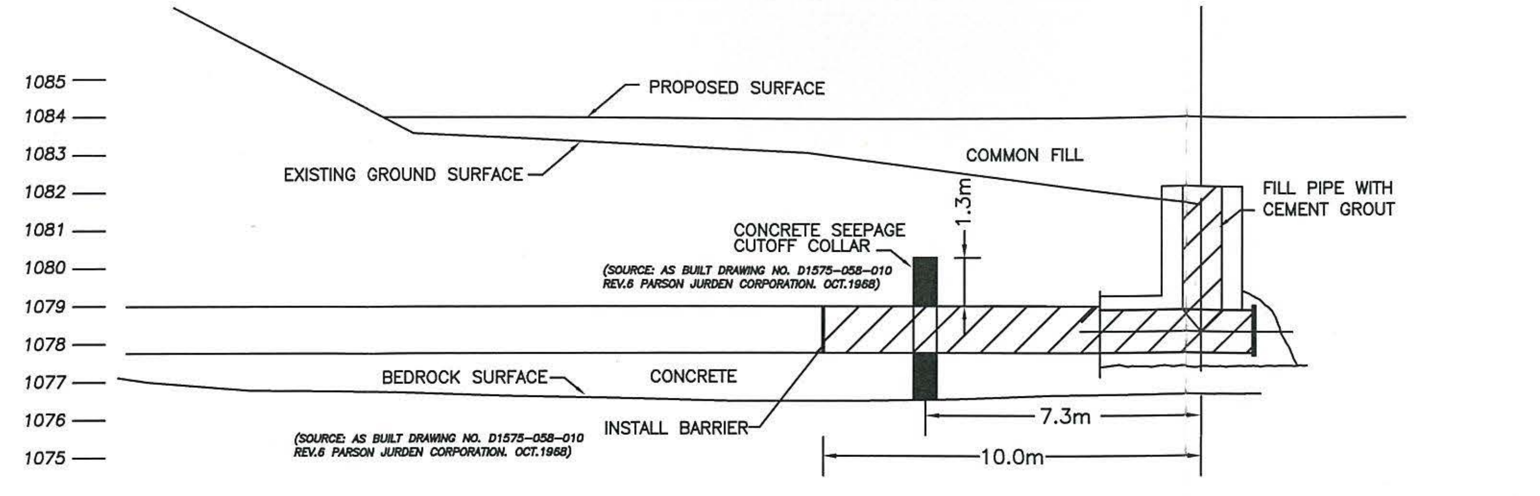
FWSD CHANNEL DETAILS

DRAWING NUMBER 10

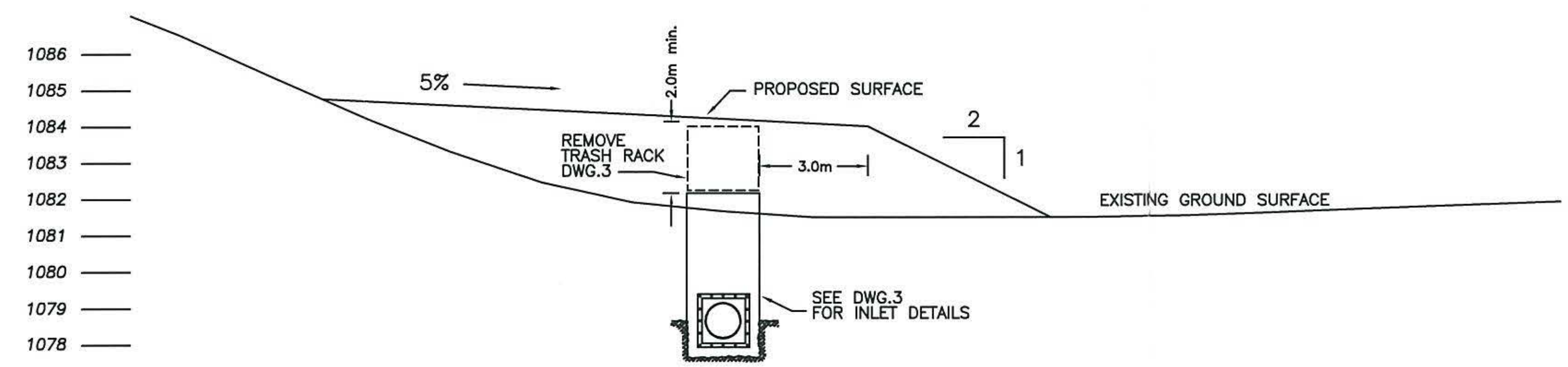
REV. D



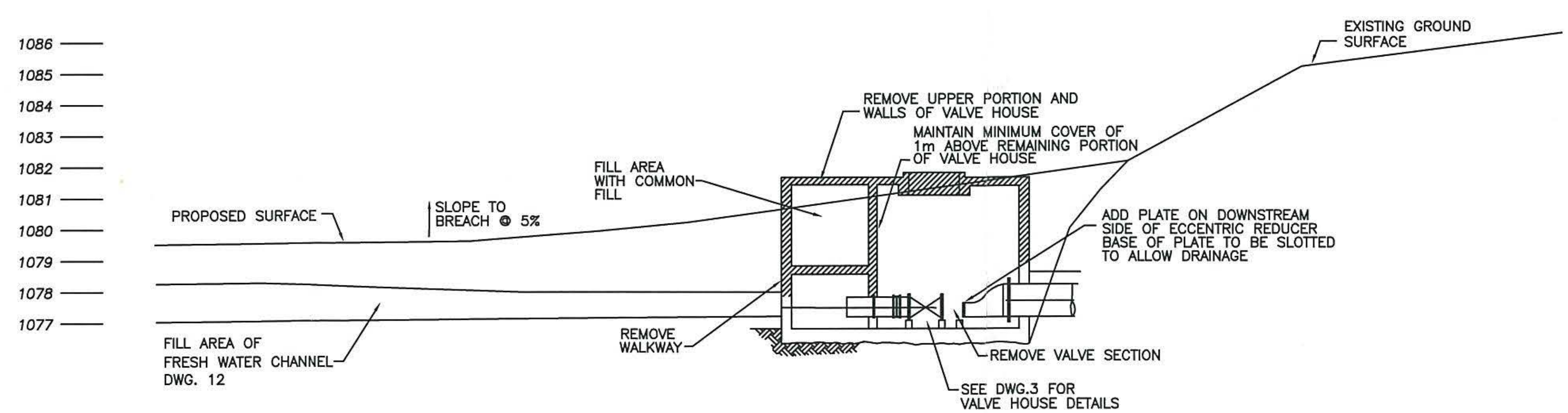




SECTION A – A' INLET – GROUT BACKFILL DETAIL



SECTION B – B' INLET – CROSS SECTION DETAIL



SECTION C – C' OUTLET – LONGITUDINAL SECTION

0 1 2 3 4 5 Metres
1:100

NOTE: SCALE HAS BEEN REDUCED BY 50%

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Deloitte & Touche Inc.

FRESH WATER SUPPLY DAM BREACH
ANVIL RANGE MINING COMPLEX, YT

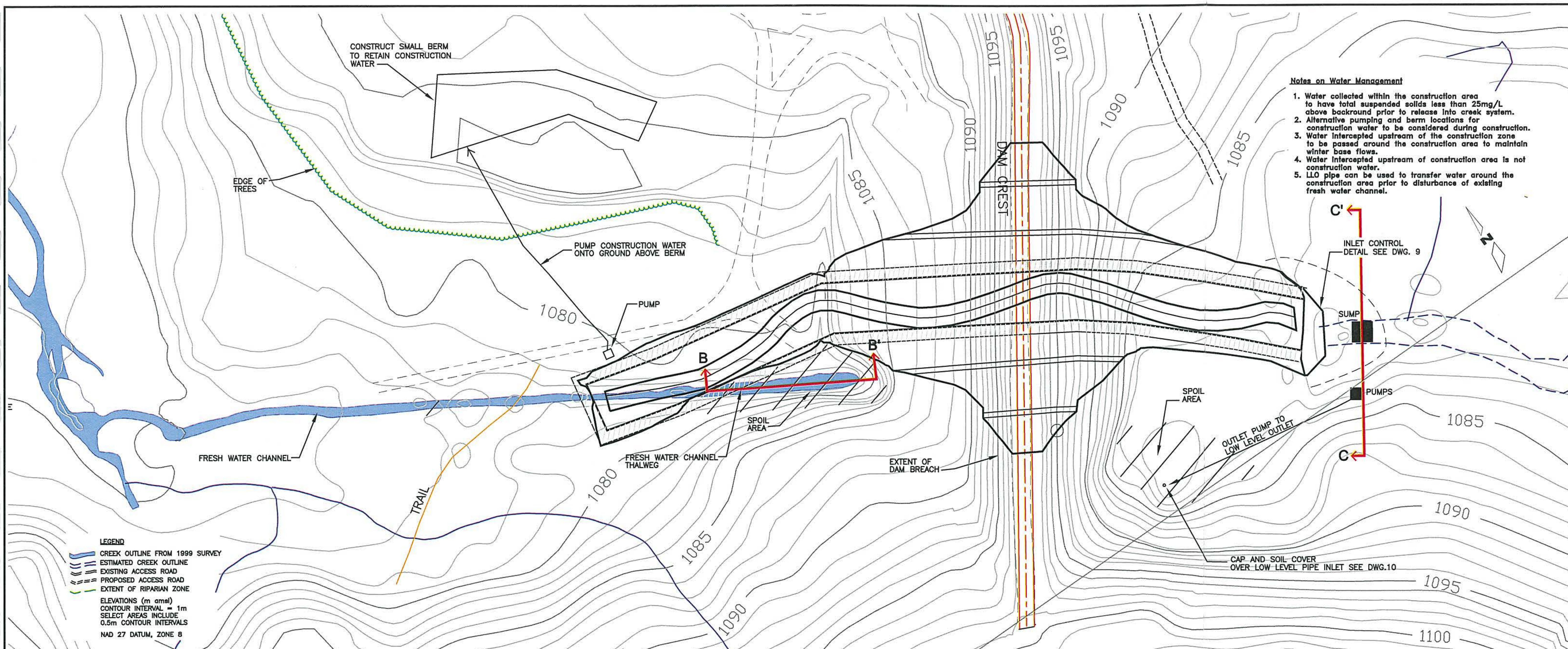
SCALE: 1:750
0 10 20 30 40 50 Metres

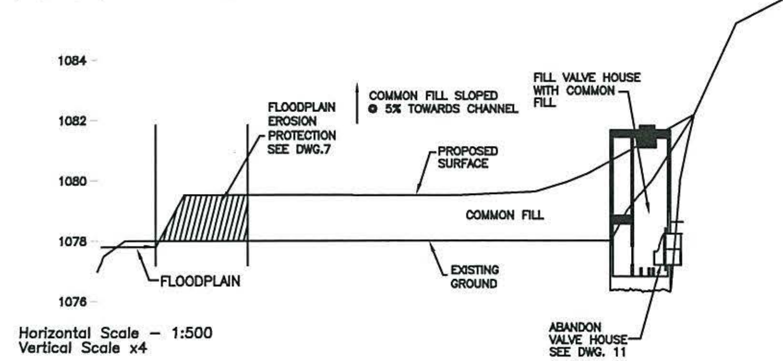
LOW LEVEL OUTLET ABANDONMENT

DRAWING NUMBER: 11

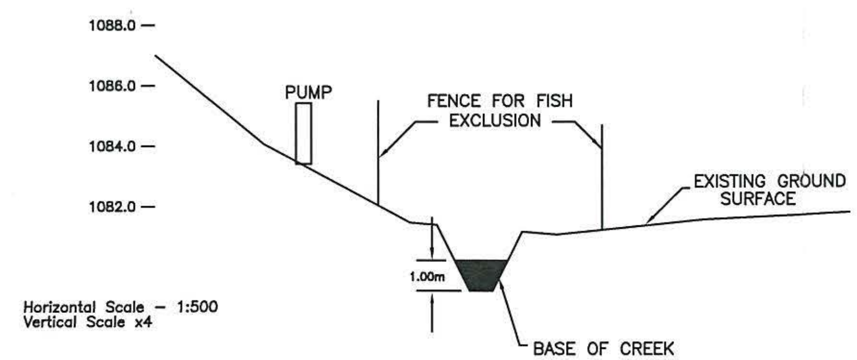
REV. D

FILE NAME: P:\Deloitte_touche\..\figure 11.dwg





PROFILE B-B' – FRESH WATER CHANNEL NEAR VALVE HOUSE



SECTION C-C' – SUMP DETAIL

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Deloitte & Touche Inc.

FRESH WATER SUPPLY DAM BREACH
ANVIL RANGE MINING COMPLEX, YT

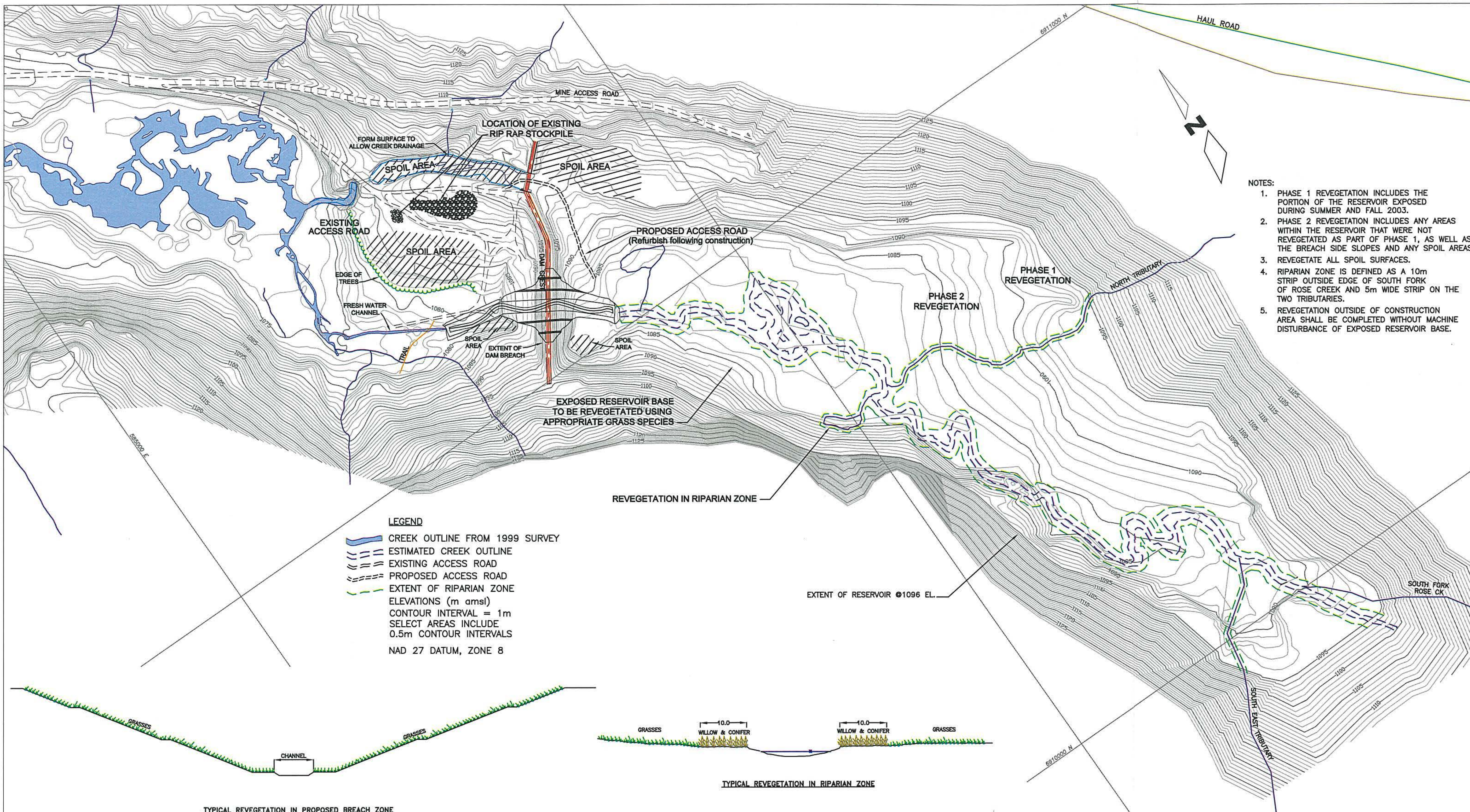
SCALE: 1:750

0 10 20 30 40 50 metres

WATER MANAGEMENT

DRAWING NUMBER: 12

REV.: D



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Deloitte & Touche Inc.

FRESH WATER SUPPLY DAM BREACH
ANVIL RANGE MINING COMPLEX, YT

SCALE: 1:3000
0 50 100 150 200 250 metres

CONSTRUCTION AREA AND REVEGETATION PLAN

DRAWING NUMBER 13

REV. D

FILE NAME: F:\Deloitte_touche\Acad drawings-Faro\faro FWSD\Figure 13.dwg

APPENDIX B2
Environmental Management Plan

Environmental Management Plan for the Breaching of the Fresh Water Supply Dam at the Faro Mine

Prepared for:

Deloitte & Touche Inc.
In their capacity as Interim Receiver for
Anvil Range Mining Corporation

Prepared by:

Gartner Lee Limited

Reference:
GLL 23025

Date:
August, 2003

Gartner Lee

Table of Contents

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List of Tables

List of Drawings

Appendices

1. Introduction

This document provides guidance for protecting the environment during the Faro Freshwater Supply Dam Breaching Project and the associated draining of the reservoir. The document will provide a brief description of the approach to construction methods and sequencing, the associated environmental issues and details of mitigation and compensation plans and the monitoring requirements to ensure that environmental standards are met. An adaptive management plan is included in the program that will be used to ensure that any unexpected impacts to fish or fish habitat are addressed and appropriate mitigation or compensation measures are developed to offset them. The adaptive management approach is required as it will not be possible to fully assess the impact of restoring the stream channel within the reservoir until the reservoir is removed and inflows are provided a chance to re-establish a channel. The detailed baseline information, design, construction and environmental assessment can be found in *"Final Breach Design, Fresh Water Supply Dam, Faro Mine"*(SRK 2003a). Drawing 1 provides a layout of the Faro mine site with the freshwater supply dam and reservoir.

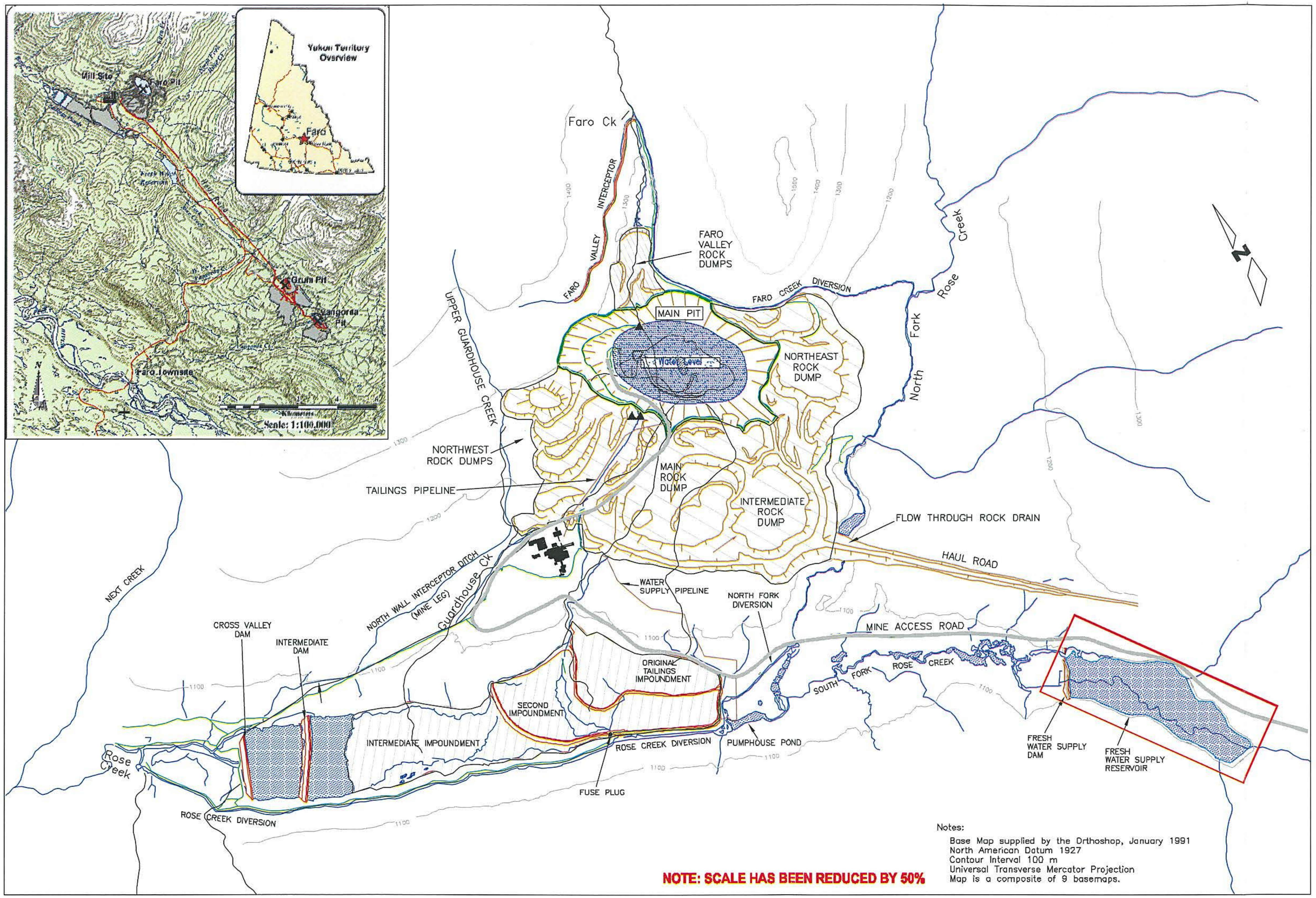
2. The Project

2.1 The Breach

The breach will be a notch excavated through the existing dam. The base of the notch will be 25.4 m wide and the sides will be armoured with rip rap leaving a 20 m wide flood plain through the dam. The flood plain has been sized to safely convey a 500-year return period flood. The notch design includes side slopes of 3H:1V provides slope stability to meet the required factor of safety. However, if additional piezometric data collected just prior to construction indicates that side slopes of 2.5H:1V will meet the required factor of safety for the conditions immediately post construction, the breach side slopes may be steepened.

Other aspects of the breach include the abandonment of the low-level pipe that currently passes water through the dam and the associated valve structure at the downstream end of the pipe. The upstream end of the pipe will be filled with grout and the end of the pipe capped with a steel plate. The valve house will be removed and the downstream end of the pipe covered by a slotted steel plate to facilitate ongoing drainage. Any exposed section of pipe will be covered by a 2 m thickness of soil.

Approximately 75,000 m^3 of material will be removed from the dam to create the breach. The material will be deposited into one of three proposed spoil areas which are generally located on Drawing 2. Some of the excavated material will be used to cover the exposed ends of the low-level pipe.



Notes:
Base Map supplied by the Orthoshop, January 1991
North American Datum 1927
Contour Interval 100 m
Universal Transverse Mercator Projection
Map is a composite of 9 basemaps.

NOTE: SCALE HAS BEEN REDUCED BY 50%

DRAWING INDEX:

- DRAWING 1.: COVER SHEET
- DRAWING 2.: FWSD EXISTING CONDITIONS
- DRAWING 3.: FWSD DETAILS: EXISTING CONDITIONS
- DRAWING 4.: RESERVOIR SITE PLAN
- DRAWING 5.: FWSD BREACH GENERAL ARRANGEMENT
- DRAWING 6.: FWSD BREACH SECTIONS
- DRAWING 7.: FWSD BREACH PLAN AND PROFILE
- DRAWING 8.: REHABILATED CHANNEL PLAN & PROFILE
- DRAWING 9.: FWSD INLET DETAILS
- DRAWING 10.: FWSD CHANNEL DETAILS
- DRAWING 11.: LOW LEVEL OUTLET ABANDONMENT
- DRAWING 12.: WATER MANAGEMENT
- DRAWING 13.: CONSTRUCTION AREA AND REVEGETATION PLAN

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ENVIRONMENTAL MANAGEMENT PLAN

DESIGNED BY: GWF DATE: JAN. 2003
DRAWN BY: DC/JM DATE: JAN. 2003
CHECKED BY: CCS DATE: JAN. 2003
DISCIP. ENGR. DATE:
PROJ. MGR: DATE
PROJ. ENGR. DATE
SRK PROJECT NUMBER: 1CD003.22

Deloitte & Touche Inc.

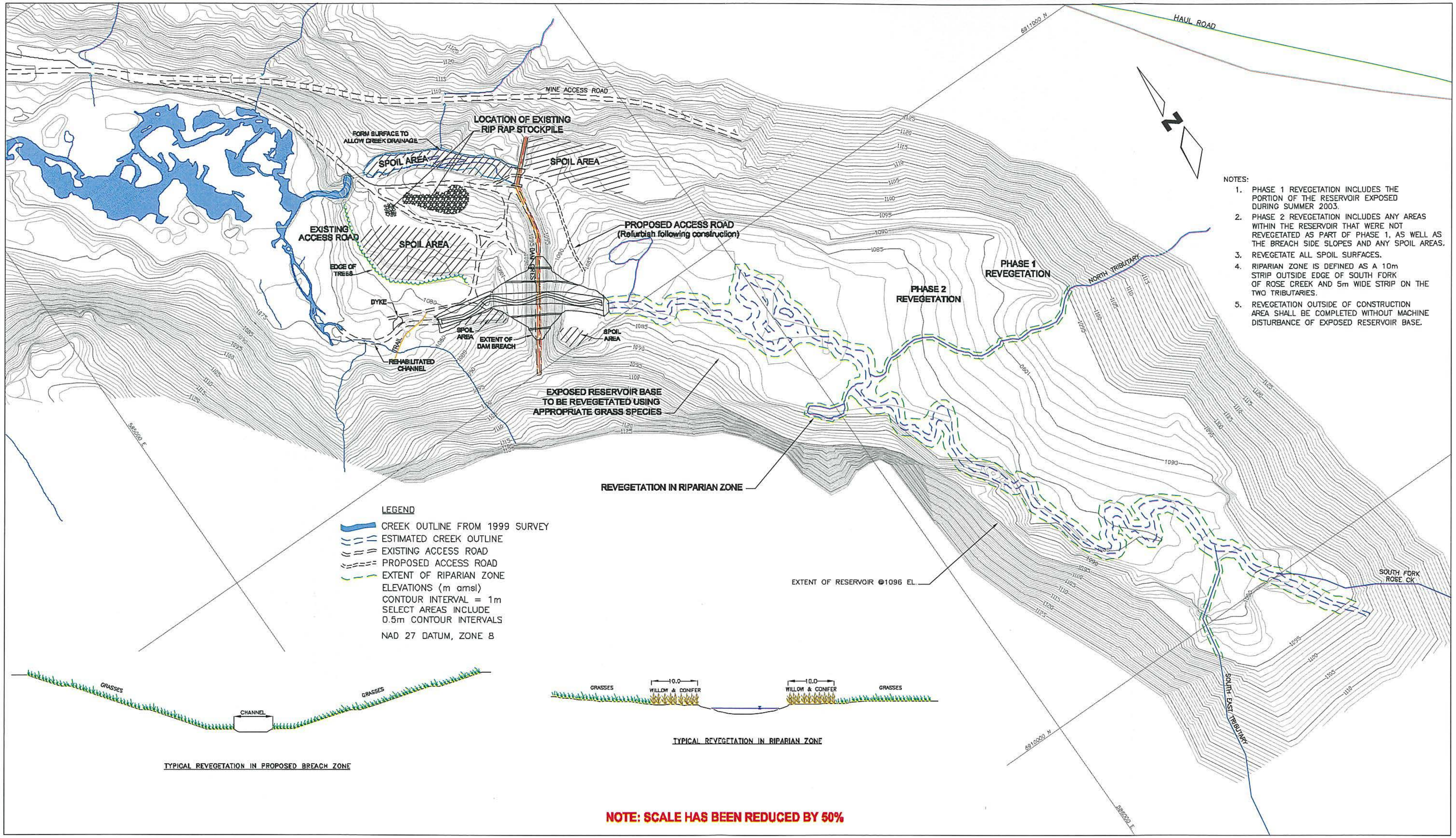
FRESH WATER SUPPLY DAM BREACH
ANVIL RANGE MINING COMPLEX, YT

SCALE: 1:15,000
0 200 400 600 800 1000

COVER SHEET

DRAWING NUMBER #1
REV.

FILE NAME: F:\Deloitte_Tailings\Acad drawings-Faro\Faro FWSD\Figure 1.dwg



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PROJ. DES. COORD. | PROJ. ENGR.
DATE | DATE
SRK PROJECT NUMBER: 1CD003.20

Deloitte & Touche Inc.

FRESH WATER SUPPLY DAM BREACH
ANVIL RANGE MINING COMPLEX, YT

SCALE: 1:3000
0 50 100 150 200 250 metres

CONSTRUCTION AREA AND REVEGETATION PLAN

DRAWING NUMBER: #2
REV.

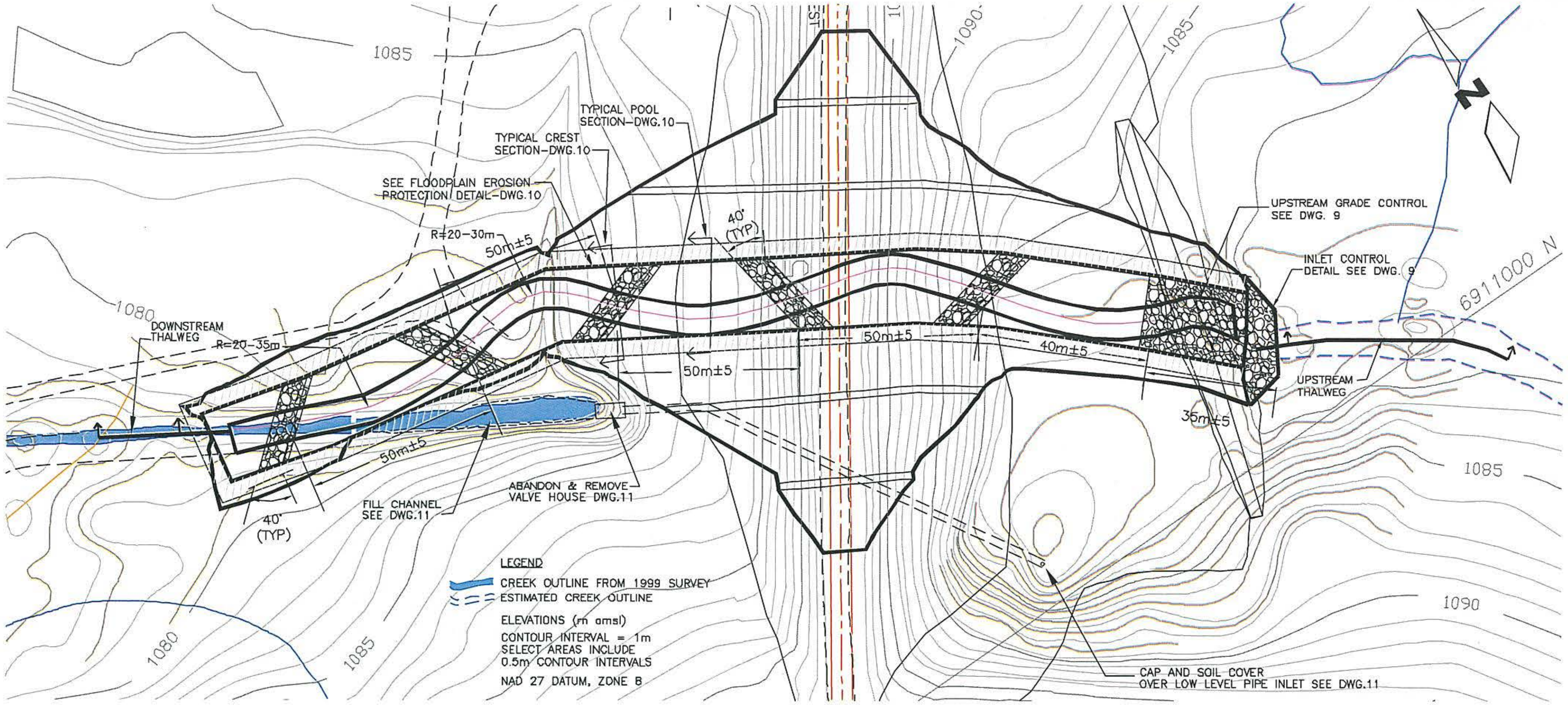
2.2 Stream Channel through the Breach

A sinuous 8 m wide channel of pool/riffle character will be constructed in the flood plain through the breach. The purpose of this channel is to recreate fish habitat characteristics that were likely present in the area prior to the formation of the dam. The overall design grade is 1% with riffle and pool as the general hydraulic condition providing habitat and passage for arctic grayling. The channel is designed to contain the normal flood (2 year return period of 5.6 m^3/s) as bank full flow in the channel. Larger floods will overtop the channel, however velocities of water passing through the breach will allow for fish passage during 10-year return period floods. During estimated winter base flows of 0.08 to 0.12 m^3/s it is expected that the pools will be able to provide over-winter refugia for fish. The design channel includes a depth of 0.3 m over the riffles and approximately one meter deep pools. The constructed riffles would be spaced approximately every 50 m and the pools would make up about 50 to 75% of the channel length. General details of the channel design is provided in Drawing 3. The channel through the breach will be constructed under the supervision of a qualified stream restoration engineer.

2.3 Channel Restoration - Downstream of the Dam

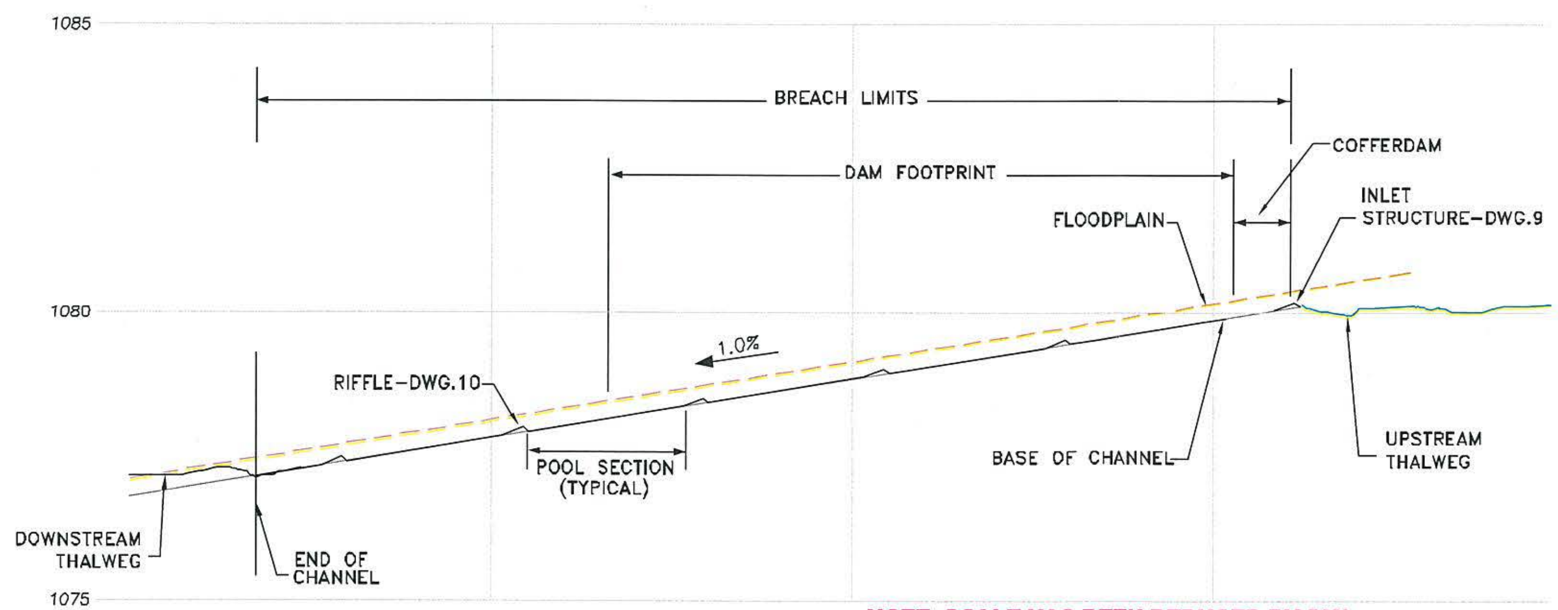
When the dam was built a low-level outlet was incorporated into the dam and used to convey water through the dam to allow extraction of water for use in the milling process and to maintain a minimum flow in Rose Creek. The channel that conveyed the water into the unaltered section of the South Fork of Rose Creek below the dam, was designed to carry flows of less than 1 m^3/s. Drawing 4 shows the general layout of the existing reservoir and low-level pipe. Once the dam is breached this channel will have to carry normal freshet flows that will reach 5.6 m^3/s and higher. The increased flows that the channel will have to handle once the dam has been breached could potentially cause erosion and downstream sedimentation.

Because this channel has been established for over 30 years, the preferred approach to restoration is to minimize instream work and the leave the channel in its existing state. With the upgrade to the valve on the low-level pipe the valve is currently discharging just over 2 m^3/s into the channel with no evidence of erosion or other flow problems downstream. Rather than engineer and construct a channel below the dam, an adaptive approach will be taken that would initially allow the stream to re-work the channel. The new channel through the breach will discharge directly into the existing channel downstream of the dam. The downstream channel will be monitored during the freshet flows in the spring of 2004. If significant erosion and flooding occurs a plan will be developed to provide the appropriate channel dimensions and stability elements. These alterations will be made during the low flow conditions in the summer or fall of 2004. If there are no significant problems during the 2004 freshet the channel will be left as it is.



RIFFLE STRUCTURE STARTING AT UPSTREAM END	ELEVATION OF RIFFLE CREST (EXCLUDING THE SLOPE TO THE RIFFLE CENTRE)
INLET STRUCTURE	1080.50
RIFFLE	1079.92
RIFFLE	1079.32
RIFFLE	1078.72
RIFFLE	1078.12
RIFFLE	1077.50

NOTE: DETAILED COORDINATES TO BE PROVIDED PRIOR TO CONSTRUCTION



HORIZONTAL SCALE – 1:1000
VERTICAL SCALE – x2

NOTE: SCALE HAS BEEN REDUCED BY 50%

REV.	ISSUE PURPOSE	AUTH. BY	DATE
C	ISSUED TO WATER BOARD	GNF	APR. 17/03
B	FINAL DESIGN	GNF	APR. 03/03
A	PRELIMINARY DESIGN	GNF	FEB 3/03

DRAWING NO. | DRAWING TITLE — REFERENCE DRAWINGS
NO. | DESCRIPTION | CHK'D | APP'D | DATE — REVISIONS
ISSUE AUTHORIZATION

Gartner Lee Limited
BGC Engineering Inc. AN APPLIED EARTH SCIENCES COMPANY
SRK Consulting Engineers and Scientists

ENVIRONMENTAL MANAGEMENT PLAN

DESIGNED BY: GNF | DRAWN BY: DC/JM
DATE: Jan. 2003 | DATE:
CHECKED BY: CCS | DISCIP. ENGR.
DATE: JAN. 2003 | DATE
PROJ. DES. COORD. | PROJ. ENGR.
DATE | DATE
SRK PROJECT NUMBER: 1CD003.22

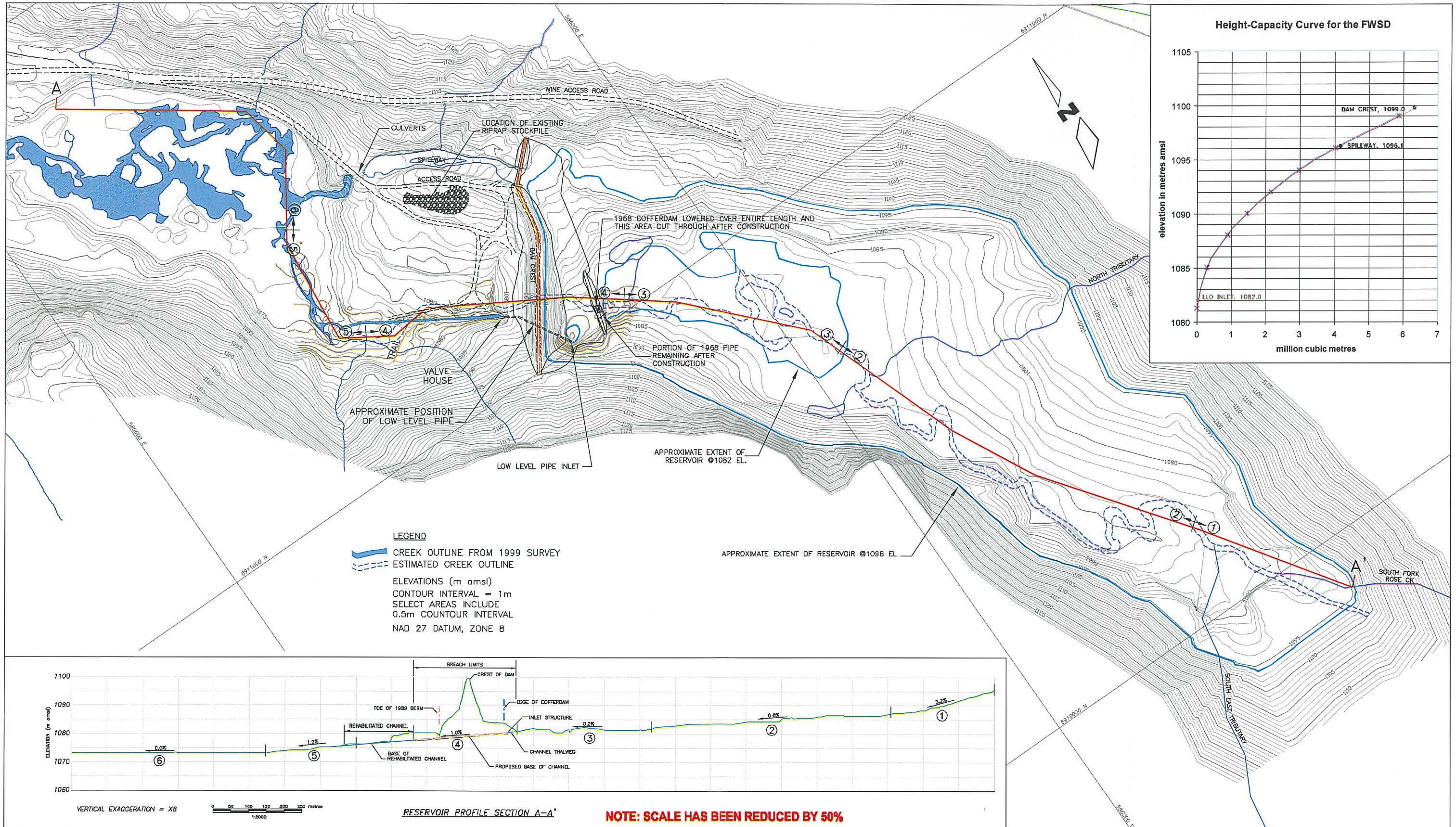
Deloitte & Touche Inc.

FRESH WATER SUPPLY DAM BREACH
ANVIL RANGE MINING COMPLEX, YT

SCALE: 1:750 — 0 10 20 30 40 50 Metres

FWSD BREACH PLAN AND PROFILE

DRAWING NUMBER: #3
REV.



NOTE: SCALE HAS BEEN REDUCED BY 50%

REV.	ISSUE PURPOSE	AUTH. BY	DATE
C	ISSUED TO WATER BOARD	GWF	APR. 17/03
B	FINAL DESIGN	GWF	APR. 03/03
A	PRELIMINARY DESIGN	GWF	FEB 3/03

REFERENCE DRAWINGS (DRAWING NO. / DRAWING TITLE) — REVISIONS (NO. / DESCRIPTION / CHK'D / APP'D / DATE) — ISSUE AUTHORIZATION

Gartner Lee Limited — BGC Engineering Inc. AN APPLIED EARTH SCIENCES COMPANY — SRK Consulting Engineers and Scientists

ENVIRONMENTAL MANAGEMENT PLAN

DESIGNED BY: GWF | DRAWN BY: DC/JM
DATE: Jan. 2003 | DATE:
CHECKED BY: CCS | DISCIP. ENGR.
DATE: JAN. 2003 | DATE
PROJ. DES. COORD. | PROJ. ENGR.
DATE | DATE
SRK PROJECT NUMBER: 1CD003.22

Deloitte & Touche Inc.

FRESH WATER SUPPLY DAM BREACH
ANVIL RANGE MINING COMPLEX, YT

SCALE: 1:3000 — 0 50 100 150 200 250 metres

RESERVOIR SITE PLAN

DRAWING NUMBER: #4

REV.

2.4 Water Management

2.4.1 Reservoir drawdown

During the spring and summer months of 2003, the reservoir will be held at 1090 m amsl or less (down to 1088 m amsl) when practical. Upgrades to the valve on the low-level outlet now allow the valve to safely pass flows up to 2.3 m^3/s. Due to the low snow pack this year, the freshet inflows to the reservoir were less than normal. This should, therefore, facilitate keeping the reservoir level at or near 1090 m amsl, providing there are no significant rain events.

There are three constraints on reservoir drawdown:

- Rate of inflows and the low-level pipe's capacity to match or exceed the inflows to the reservoir.
- Dam safety. If drawn down too rapidly, it could cause failure on the upstream face of the dam
- The fish salvage program. Removing fish from the reservoir is anticipated to take place when the reservoir levels are around 1086 m to provide enough depth to operate fish capture gear without getting fouled by woody debris on the bottom of the reservoir.

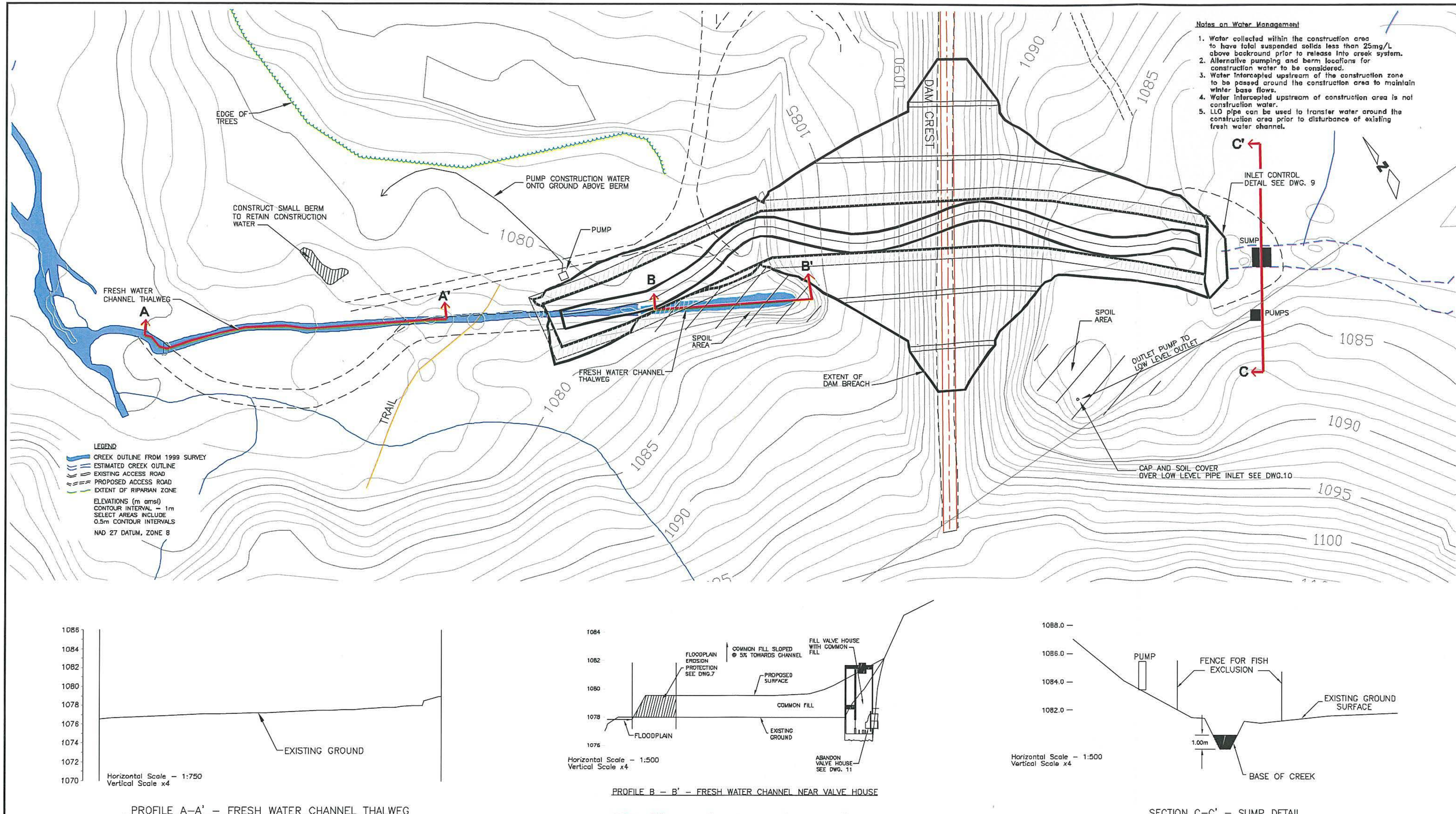
Under normal weather conditions, the reservoir will be down to the 1082 m level by mid to late October. Below 1082 m, pumps will have to be used to remove the final 50,000 m^3 of water from the reservoir and to discharge the anticipated inflows at that time of year.

2.4.2 Water Management During Construction

Surface water and groundwater will be managed throughout construction. Water management has two components; diverting winter base flows in Rose Creek past the construction area and collecting surface or groundwater that flows into the work site. Therefore, there will be two types of water during construction: creek water and construction water. Creek water will be diverted around the construction site in a manner that will provide continuous passage of flow from above the cofferdam to the freshwater channel below the work site. Construction water will be collected to ensure that waters with elevated sediment levels do not get released in to the South Fork of Rose Creek.

In order to capture and pump the winter base flow in the South Fork of Rose Creek, a sump will be excavated within the old channel just upstream of the cofferdam (Drawing 5) Digging the sump will temporarily cause high TSS within the disturbed area of the sump construction. The excavation of the sump will be done in a manner that will minimize the release of sediment downstream. The suggested procedure might include:

- Deploy a silt curtain across the reservoir or around the sump construction area to contain the turbid water
- Pumps fitted with appropriate fish screens would extract water from an area outside the sediment curtain and discharge creek flow into the low-level pipe.



NOTE: SCALE HAS BEEN REDUCED BY 50%

REV.	DESCRIPTION	AUTH. BY	DATE
C	ISSUED TO WATER BOARD	GWF	APR. 17/03
B	FINAL DESIGN	GWF	APR. 03/03
A	PRELIMINARY DESIGN	GWF	FEB 3/03

REFERENCE DRAWINGS (DRAWING NO. / DRAWING TITLE) — REVISIONS (NO. / DESCRIPTION / CHK'D / APP'D / DATE) — ISSUE AUTHORIZATION (REV. / ISSUE PURPOSE / AUTH. BY / DATE)

Gartner Lee Limited

BGC Engineering Inc. AN APPLIED EARTH SCIENCES COMPANY

SRK Consulting Engineers and Scientists

ENVIRONMENTAL MANAGEMENT PLAN

DESIGNED BY: GWF	DRAWN BY: DC/JM
DATE: Jan. 2003	DATE:
CHECKED BY: CCS	DISCIP. ENGR.
DATE: JAN. 2003	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
SRK PROJECT NUMBER: 1CD003.22	

Deloitte & Touche Inc.

FRESH WATER SUPPLY DAM BREACH
ANVIL RANGE MINING COMPLEX, YT

SCALE: 1:750

0 10 20 30 40 50 metres

WATER MANAGEMENT

DRAWING NUMBER #5

REV.

FILE NAME: F:\Deloitte_touche\Acad drawings-Faro\Rose FWSD\Figure12.dwg

- Leave the curtain in place until the sediment levels drop to background levels.
- Move pump intakes into the sump area once sediment levels have decreased.
- Avoid cutting off the flow of water downstream of the dam.

Throughout the construction period, it is anticipated that the reservoir will be frozen and snow covered, with little likelihood of generating sediment. However, the water collecting in the sump may be affected by sediment generated as the creek restores itself within its former channel and potentially by moving sediment collected in the former channel. The recent sediment investigation (SRK 2003b) indicated that approximately 3,700 to 5,000 m^3 of sediment have accumulated in the reservoir and that the creek location was discernable, which indicates that the effects are likely to be minimal. Despite steps to minimize the erosion potential, such as the seeding program (section 3.1), some sediment will inevitably be mobilized, primarily during the first post-construction freshet in 2004. As noted in the design report (SRK 2003a), data from other decommissioning projects indicates that 20 to 30% of the total sediment could be mobilized during the first freshet. If this were applied to the FWS Reservoir, there could be a sediment load of 80 to 330 mg/L in the south fork of Rose Creek immediately below the breach depending on factors such as snow pack, temperature and rainfall.

The volume of creek water that can be expected throughout the construction period is outlined in Table 1. Sufficient pumping capacity will be available to handle the expected inflows. In the event of a pump failure, standby pumps will be available on 24-hour notice. The original cofferdam will be used to contain flows above the work area with sufficient capacity to hold the anticipated volume of water that would accumulate over the 24hour period.

Table 1. Estimated Monthly Inflow to the FWS Dam Reservoir in m^3/s

Month	Estimated Monthly Flow (m^3/s), Year of Estimate			
	Average (1968)[1]	Minimum (2003)[1]	Average (2003)[1]	Maximum (2003)[1]
January	0.113	0.08	0.16	0.22
February	0.085	0.06	0.14	0.20
March	0.085	0.06	0.13	0.18
April	0.113	0.11	0.16	0.18
May	1.42	0.94	1.38	1.91
June	2.92	0.94	1.96	2.92
July	1.49	0.64	1.01	1.25
August	0.906	0.59	0.96	1.48
September	0.736	0.53	0.97	1.72
October	0.595	0.39	0.61	1.23
November	0.269	0.22	0.29	0.37
December	0.198	0.12	0.20	0.25

[1]Average (1968) refers to the values established by Parsons in 1968. The 2003 values are based on more recent data, as reported in the 2003 design report.

Pumping of the water from the sump to the downstream receiving environment will require pumping around the downstream construction area and discharging the water into the natural downstream channel.

While the low-level pipe is in place water will pumped directly into the pipe. If the low-level pipe is to be decommissioned before water can be allowed to flow down the new channel through the breach, the creek water will be transferred downstream of the construction area by pumping water into an open flume or through a series of pipes laid through the breach.

Water that collects within the disturbed construction area is construction water. This water will be pumped and discharged onto a vegetated area upslope of a temporary holding area which will be built using a temporary berm on the north side of the existing fresh water channel (Drawing 5). As the construction water runs across the vegetated ground surface, it is anticipated that the sediment content will decrease significantly before it reaches the holding area. Any water that collects behind the berm will be pumped into the creek provided that it meets the discharge criteria for TSS. Alternative methods of clearing the sediment from the construction water will be examined as part of final construction planning.

The water management will vary as the construction proceeds in various stages, likely in accordance with the sequence outlined below. However, efficiencies on the construction side will be sought from the contractor provided they are able to meet the environmental requirements.

- Perform bulk excavation of the notch. The excavation will not extend to the position of the inlet structure. Water will be pumped through the LLO and into the existing fresh water channel.
- Perform installation of the channel erosion protection and formation of the stream channel through the breach. Water will be pumped through the LLO and into the existing channel.
- Abandon the LLO and complete excavation of the upstream portion of channel and install inlet control. Water will be pumped into a flume/pipe which will outlet into the channel below the dam or the channel through the breach, if construction activities have been completed in that section of the channel. The timing of the abandonment of the LLO is uncertain but will likely occur in conjunction with completion of the installation of the erosion protection. Whenever the LLO is abandoned, water will be pumped directly into a flume/pipe system around the active construction area.

3. Environmental Issues and Mitigation

The components of this project that have environmental consequences include:

- Pre construction which includes dewatering of the reservoir, and the disposition of the fish population currently in the reservoir and the exposure of unvegetated soils
- Construction activities which includes reconstructing the stream channel through the breach, the exclusion of fish from the construction area and control of erosion and the release of sediment into the South Fork of Rose Creek

- Post Construction which includes the revegation of the reservoir, reestablishment of the riparian and other aspects of fish habitat along the re-established stream channel.

The direct effect of the project on the environment is associated with the drawdown and exposure of unvegetated areas within the reservoir and the potential alteration of fish habitat because of the work within the footprint of the dam and immediately downstream of the dam. We have assumed that the section of the South Fork of Rose Creek above the dam will naturally find the original channel as the water levels drop. During the bathymetric survey conducted in August 2002 and additional sampling in February 2003, the original creek channel was evident and it shows up on the hydroacoustic tracings of the reservoir bottom. Indications are that sediment accumulations have been minimal and there is a high likelihood that re-establishment of the old creeks channels will occur. The water levels in the reservoir have been maintained at about the 1090 m amsl through the spring and early summer of 2003 and the south fork of rose creek does appear to have re-formed in its former location between elevation 1096 and 1090 m amsl.

3.1 Reservoir Dewatering and Erosion Control

The reservoir water level will be kept as close to 1090 as possible through freshet, however, it will likely temporarily rise above this level due to freshet or rain events and may not return to 1090 until inflows drop, despite efforts by site staff. Ideally water levels will be lowered to approximately 1087 m to provide storage if summer rains exceed the capacity of the LLO to keep the reservoir at 1090 and to also expedite drawdown for construction, once approved. Exposure of unvegetated slopes because of the reduced reservoir levels provides the potential for erosion and sedimentation. A proactive approach to stabilizing the bare soils will be implemented to minimize erosion and potential sedimentation into the South Fork of Rose Creek. A two-phased re-vegetation program of the reservoir is proposed:

Phase 1. Broadcast seeding of the exposed soils between 1096 and 1090 m amsl. This will take place during the 2003 growing season. Arctic Alpine Seed Ltd. has developed a specific seeding plan for this component that is provided in Appendix A. It is anticipated that this seeding program will contribute to erosion control during the 2004 freshet. Even though the grasses die off over winter, this planting will provide root structure to reduce erosion during spring snowmelt and rains in the spring of 2004. Over the summer, the erosion potential for areas between 1090 and the water level just prior to permanent snow cover will be assessed and seed applied where necessary. This seed would then be in place under the snow and available to germinate early in the spring right after snow melt.

Phase 2. Spring 2004 seeding after snow melts. This seeding will focus the areas of the reservoir base that were not seeded during the first phase of revegetation. This may include the reapplication of seeds in areas seeded in Phase 1 where there is low germination or seed has been washed away be rain or snow melt or eaten by wildlife. Specific attention will be paid to the riparian zones of the mainstem and tributary streams. The revegetation will also extend to the construction zone and the spoil areas. The seed mixture and methods used for the Phase 2 revegetation will be similar to that used for the 2003 program (Appendix A)

The riparian zone will include revegetation with grass, willow and spruce (or white fir) plantings. The willow and spruce will be planted in a 10 m wide zone (extending 10 m from the edge of the bank) adjacent to the South Fork of Rose Creek and a 5 m wide zone adjacent to the smaller tributaries, as shown in Drawing 2.

Planting of white spruce or alpine fir as part of the Phase 2 revegetation will be performed within the riparian zones of the stream channels within the reservoir. The actual areas to be planted will be determined throughout the summer of 2004, after snow melt. The areas selected will be those where stumps indicate the presence of these trees prior to reservoir formation. Preliminary plans for planting trees include the use of larger planting stock to ensure the trees have a good chance of survival amongst the grass and sedge that will be established through seeding. Planted trees will be fertilized with an appropriate starter mix to accelerate root establishment as the nutrient condition of the soils within the reservoir are likely depleted through years of saturation. The anticipated planting density will be equivalent to 800 stems per hectare.

Based on the estimated alignment of the original channel the riparian area to be rehabilitated with willow stakes is approximately 2,400 m long and 20 m wide, for a total area of 48,000 m^2. Willow stakes should be generally placed on 1 m centres with up to 48,000 stakes being required. However willow and tree densities will be adjusted in areas where both are planted. Willow stakes should be collected while the plants are still dormant (i.e. late winter or early spring before leaves start to form). This plan will be refined and a final rehabilitation plan developed after a site survey that will be carried out once the reservoir is dewatered. This will likely take place in the spring of 2004 after snow melt but could be done in the fall of 2003 if water levels are low enough prior to snow accumulation.

3.2 Fish Salvage

3.2.1 Introduction

There are three components to fish salvage for this project:

- The removal of fish from the reservoir as the water levels in the reservoir drop
- Salvage of fish stranded in pools that become cutoff from the main body of water as the reservoir level drops, and
- Salvage of fish from the construction area.

One of the main concerns of the reservoir dewatering is for the fish population that currently exists in the reservoir. The stream habitat that will be left once the reservoir is dewatered will not have the capacity to support the number of fish that would be left behind. Fisheries and Oceans Canada (DFO) and the Yukon

Territorial Government (YTG) provided a guideline document for the salvage of fish from the reservoir and the following program is based on that document.

The objectives of the program are:

- Salvage a predefined number of fish (by species and size) and relocate them into appropriate habitats within Rose Creek to maintain genetic diversity of fish species within the watershed.
- Collect biological data on the fish population in the reservoir including:
  - An estimate of the fish population through a mark – recapture program
  - Data related to productivity of the reservoir.
- Ensure beneficial use of the fish if excessive mortalities occur during the salvage program

This section is based on the information available at the time of writing. The DFO/YTG guidelines require that a final salvage program be provided that includes detail of personnel function/responsibility, the equipment to be used, locations for sampling and fish release. This section will be updated as we obtain this information. Current efforts are underway to locate the necessary sampling gear, transport equipment and finalize the field team. This information will be provided as it becomes available. Also, in support of this fish removal program an application to transfer live fish will be submitted to the Yukon Introductions and Transfer Committee.

The reservoir could contain a significant number of grayling. An estimate of the population in the reservoir can be made using a basic productivity model by Downing *et al.* (1990) which was developed to estimate lake productivity based on the largest size class of fish and the total phosphate in a water body. Gartner Lee (2002) collected water samples from the reservoir which contained 0.0025 mg/L (average) of total phosphate in the reservoir and the largest size class of grayling at 320 mm. Therefore, the Downing *et al.* model provided an estimated number of grayling in the reservoir ranging from 3,000 to 4,500 fish.

3.2.2 Removal of fish from the reservoir

3.2.2.1 Initial Fish Tagging

The primary purpose of this component is to help track the progress of the fish transfer and removal. This component consists of a capture and marking phase of 100 to 200 arctic grayling that have a fork length of 250 mm or greater. The fish will be tagged with numbered floy tags (or other suitable tags). Each fish will be measured, weighed, tagged and released into a holding tank. The fish will be observed for one hour and then released back into the reservoir.

Once the 200 fish are tagged and released, fish capture will be suspended for two to three days. This will allow the marked fish to re-integrate with the main population. Once the actual transfer and removal program is initiated as described below, the marked fish that are recaptured will be recorded. As the fish removal proceeds the reduction or lack of tagged fish captured will be used as indication the removal of fish from the reservoir is nearing completion. Because the overall salvage program will result in the removal of a significant portion of the population, the overall ratio of marked to unmarked fish can also be used to generate an estimate of the total population of fish. A caution regarding the marked fish is that fish that are handled for marking can change their behaviour for several days to two weeks resulting in initially low capture rates of marked fish.

3.2.2.2 Capture and Out Planting

A survey of the south and north forks and the mainstem of Rose Creek will be conducted prior to release of fish. The purpose of the survey will be to determine the distribution and abundance of adult grayling in the study area. Previous fish sampling has indicated that larger grayling are located in the pools and other deeper water areas and are difficult to capture through electrofishing. Therefore, a snorkel survey will be used to collect information on the distribution of species and numbers of fish by size class. An initial analysis of this information will be used to determine if there are sections of suitable adult grayling habitat that appear to be under stocked. Any under stocked areas will be identified as the sites for out planting fish from the reservoir. Other criteria used to determine out planting sites include having a suitable distribution of sites along the creek and accessibility by truck and/or a short walk. The number of fish released at each location will depend on the observed density of fish at that location during the snorkel survey and the number of sites chosen. Out planting sites will be marked on the ground and on maps, photographed and habitat data recorded.

Initially the capture and out planting will focus on relocating adult grayling, burbot and slimy sculpins. A minimum of 100 adult grayling that are judged to be in good condition will be tagged and released into the out planting sites. Approximately 10 fish will be released per site but this will depend on the number of sites identified. All grayling to be out planted will be weighed and measured and marked with a floy tag similar to the ones used to mark the fish during the initial marking period.

The capture program will target the live capture of 100 slimy sculpins which will be released at the out planting sites. Length data of all fish caught and released will be recorded. All of the first 100 fish will be out planted.

Burbot are also present in the reservoir. The fish salvage guidelines did not specify a target number of fish to be captured live, however, any fish that are caught will be measured (total length) and released at the out planting sites. In all cases field notes will record the number of fish released at each out planting site.

Fish caught for tagging and release will be anaesthetized using alkaseltzer or clove oil (clove oil is preferred) and weighed, measured and tagged. After handling the fish will be released into a holding facility and their recovery monitored for one hour. Fish that appear healthy will be transported by pick-up truck in aerated tanks to the out planting sites. Buckets will be used to transfer the fish from the truck to the creek.

Details of transporting the fish include:

- Keeping fish in holding tank until ready for transport
- Filling transport containers with cool water form the reservoir just prior to transporting the fish.
- A dissolved oxygen (DO) meter and thermometer will be on hand to monitor temperature and DO
- During hot weather, the capture and transport of fish will be done in early morning or late afternoon to avoid high temperatures
- Provide tarps to keep direct sun light off holding tank and transport tank

Temperature conditions during the salvage and out planting operations will be monitored closely to limit heat related stress on the fish. Ideal temperatures during the salvage will be air temperatures that do not exceed 20° C and water temperatures in the reservoir that do not exceed 15° C. To minimize this risk the salvage will not start until after August 15th. Particular attention will be paid to the temperature in the transfer tank which would ideally should be cooler than the temperature of the receiving water. If weather conditions are such that the water temperatures can not be controlled the fish salvage and transport will be suspended until temperatures drop.

3.2.2.3 Biological Sampling

The guidelines provided by DFO/YTG have specified that once the above targets for out planting are met then fish are to be caught and preserved for biological analysis. Specifically:

- Arctic Grayling. A total of 500 fish with a minimum of 50 fish in each size class (5cm increments, 0 – 5 cm, 6 – 10, 11 – 15, 16 – 20, 21 – 25, 26 – 30, 31+)
- Slimy sculpins, up to 500
- Burbot, a up to 500.

Depending on the rate of capture, fishing techniques may be altered to catch the fish for the biological sampling program. A gang of gill nets of various mesh sizes could be used to facilitate the capture of fish in the various size classes. Since live capture is not required, the gill nets would be set for longer periods of time starting with 1 – 2 hour sets around dusk or dawn. Overnight sets would only be considered if several shorter sets result in only small captures of fish.

All fish collected for this biological sampling will be weighed, measured and tagged for future cross referencing with any other analysis that may be carried out on the fish. Additional information on the capture date, time location, gear type will be recorded and the fish will be packaged and frozen for delivery to the Yukon Territorial Government for further analysis.

There is the potential for there to be higher mortality of fish than required to meet the biological sampling program needs. A contingency plan will be developed with input from local stakeholders, YTG and DFO for dealing with these excess fish. The goal will be to find a beneficial use for all mortalities and to release as many live fish back into Rose Creek and possibly the Pelly River as practical.

In order to provide YTG with information required to assess the productivity of the reservoir, additional limnological data will be collected at the time of the biological fish sampling. This will include:

- Secchi reading
- Dissolved oxygen and temperature profiles
- Collection of water samples from the surface, mid-depth and just above the bottom for analysis of general water quality parameters including total and dissolved metals, nitrogens, phosphorus, total suspended solids, pH (field and lab), specific conductivity, and sulphate, total organic carbon, chlorophyll a.

3.2.2.4 Final Fish Out

Preliminary estimates of the maximum number of grayling that could be in the reservoir is 3,000 to 4,500. If this is the case then significantly more fish will be present than have been targeted for out planting and biological sampling (i.e. 600 grayling). If catch per unit effort and the preliminary mark recapture population estimates indicates that significant numbers of fish remain in the reservoir, DFO and YTG will be contacted and a decision for dealing with the remaining fish will be made. The preliminary plan is to revert to the live capture of fish and out plant these fish into the Pelly River near the town of Faro. As with the other out planting, relevant data will be recorded and a portion of the arctic grayling will be tagged.

3.2.2.5 Fish Capture Methods

The proposed methods of fish capture include trap nets, minnow traps, beach seining, electrofishing and gill nets. The fish in the reservoir generally fit three categories.

1. The arctic grayling are more pelagic and are likely found throughout the reservoir depending on size, water temperature, time of day, etc. Trap nets are likely the most effective method for the live capture of grayling.
2. Sculpins and burbot tend to be associated with the bottom and may not be so easily captured. Sinking gill nets, beach seines and minnow traps may be more effective methods for these species.
3. Juveniles of all species are likely to be associated with shoreline habitats where minnow traps, beach seines and electrofishing may be effective.

The preferred method for larger arctic grayling (over 150 mm) is trap netting. Two trap nets (if available) will be deployed and left to fish for 12 to 24 hours. The guidelines for trap net deployment include locating the trap box in water that is as at least as deep as the box and in water no deeper than 1.5 times the height of the trap box. However, conditions of use and catch efficiency are affected by a variety of factors and the field biologist will make on site decisions on where the traps will be located. Depending on capture rates, trap nets will be moved every two days to maximize the opportunity for catching fish. We anticipate that the salvage work will take place when the reservoir is at an elevation of 1085 to 1087 m and the main basin of the reservoir will be over 3 m deep. The use of the trap nets will be focused on the west end where water will be deepest.

Beach seines could be effective collecting shore based species/lifestages. Beach seining requires access to beach areas free of boulders or medium to large size woody debris and a uniform bottom. If these types of beach areas are not available then electroshocking, minnow traps and possibly small mesh gillnets will be used. Backpack electroshockers can be used to capture fish along the shore areas targeting areas of habitat complexity where juveniles are likely to be present.

Gill nets can target a wide range of fish sizes and may be effective for the different needs of this project. If gillnets are used for the live capture phases, the sets will be restricted to short periods starting with 20 minute sets. Mesh size will depend on the size of fish being targeted. Generally, a 1.5" stretch mesh will be used to start but as sampling progresses, mesh sizes may be altered to depending on the success of the initial mesh. The focus will be to minimize mortality during the capture phase except in the case where these nets are used to capture the fish for the biological sampling phase. Both sinking and floating gill nets of various mesh sizes ranging from 25 to 89 mm will be available.

3.2.3 Follow up monitoring of Out Planted Fish

The out planting sites on Rose Creek will be surveyed after the out planting has been completed and prior to the on set of winter conditions in 2003. A snorkel survey will be used to collect the same information as was collected prior to the out planting. The location of any tagged arctic grayling that are observed will be recorded.

During the early summer of 2004 another snorkel survey will be conducted of Rose Creek. Additional survey work will take place in the reservoir area and upstream to the culverts that create a barrier to fish movement. The upstream survey will focus on determining the extent of fish use in the constructed channels, the re-established stream channel in the reservoir and the presence of tagged fish above the reservoir. The accessible portions of the other tributary streams that currently flow into the reservoir will also be surveyed for tagged fish. This monitoring program will be carried out in conjunction with the monitoring of habitat that is provided later in this report.

3.2.4 Fish Salvage During Drawdown and Prior to Construction

It is likely that the majority of the fish will be removed from the reservoir before the reservoir reaches low levels (i.e. below 1082 m). However, the nature of fish collection suggests that not all the fish will be removed, therefore, there will have to be some monitoring during the final drawdown to check for potential stranding areas and stranded fish. DFO/YTG will be notified of any fish stranding and a decision taken as to what to do with those fish.

At this time, it is anticipated that drawn down could be complete before the accumulation of snow and ice. Therefore, monitoring of fish use in the vicinity of the construction area will be carried out. The initial plan is to establish some form of fish barrier on the south fork of Rose Creek upstream of the proposed location of the intakes for the pumps that will be used to remove the final volume of water from the reservoir. After the barrier is put in place, minnow trapping and electrofishing will be used to remove fish from the stream channel below the barrier. Fish caught during this salvage operation will be placed back into the stream upstream of the barrier.

3.3 Fish Habitat Restoration

An important component of this project is the re-establishment of the original fish habitat in the South Fork of Rose Creek. Details of the re-establishment of the stream channel through the breach is described in section 2.2 and the adaptive management approach to the channel immediately downstream of the breach is described in section 2.3. The other aspects of the habitat restoration is bringing the stream channels above the dam back into production after being at the bottom of the reservoir for over 30 years. The current plan for work in this area (approximately 2530 m of stream channel) is focused on re-establishing fish passage to Reach 4 of the South Fork of Rose Creek and re-establishing riparian vegetation as quickly as possible.

- Streams will be assessed for blockages that may have formed as a result of the reservoir and the creation of deltas over the past 30 years. A survey of the stream will be conducted in the spring of 2004 and if necessary a plan developed to remove the blockages if they were formed as a result of the reservoir.
- Revegetating this area is an important component of the fish habitat restoration and has been described in section 3.1. The seeding for erosion control will be augmented by riparian planting and will include willow staking and conifer planting in a 10 m wide strip on either side of the South Fork of Rose Creek and a 5 m wide strip either side of the tributary streams. A final rehabilitation plan will be developed after a field reconnaissance once the reservoir is drained. This will likely take place after snow melt in the spring of 2004 but could be done prior to snow in the fall of 2003 if the water levels are low enough. The purpose will be to identify areas where trees grew previously based on the presence of stumps and assess soil conditions. Initial plans anticipate that these riparian areas will be re-planted with spruce or alpine fir at a density of 800 stems per ha. Other areas will be planted with willow stakes at a density of 10,000 per ha.

The work on the entire length of stream habitat affected by the dam and reservoir is designed to re-establish the form and function of the habitat in this section of the South Fork of Rose Creek to a condition similar to the system prior to the construction of the dam.

However, there is some uncertainty with how well the upstream creek section will become reestablished in the original stream channel. It is expected, based on the 1948 air photos, that some sections the creek will have a very low gradient and high sinuosity, which provides the possibility for the stream flow to cut a new channel. This could result in the formation of sections of unstable channel. However, preliminary indications suggest that the water will likely find the old stream channel. This will be a focus of follow up monitoring in the spring/summer of 2004.

3.4 Fish Habitat Compensation Program

The compensation activities incorporated into the project currently include:

- planting of willows and conifers along the stream channels to establish riparian habitat
- evaluating and implementing a plan to restore the original creek channel immediately downstream of the channel that will be constructed through the breach.

An adaptive management approach will be taken to further evaluate the fish and fish habitat conditions in Rose Creek such as the assessment and removal of any barriers to fish movement that were created as a result of the presence of the reservoir. If surveys in the spring/summer of 2004 indicate that there are ongoing residual impacts within the aquatic or terrestrial habitats because of this project, compensation plans will be developed for approval from the agencies.

4. Construction Effects and Mitigation

4.1 General

The potential environmental issues of the construction phase include:

- Loss of control of water upstream of the construction site
- Water management and sediment control within the construction areas.
- Accidents and malfunctions associated with heavy equipment working near fish habitat.
- Disruption of riparian habitat.
- The development of spoil area(s).

The construction is scheduled to take place over the winter months when there is very little water flow. Therefore, the potential for erosion and sedimentation is very low during construction. This will be further minimized through diverting any stream flow that collects upstream of the existing cofferdam around the construction area. Hydrologic projections estimate that the flow in the South Fork of Rose Creek between December and March is approximately 0.11 m^3/s, which can be easily managed by pumping. The hydrologic assessment also indicates that the risk of a flood event during the construction period is near negligible.

The greatest source of erodible material in the construction area is the material used to construct impervious core of the dam which extends out to the downstream edge of the cofferdam. Drainage collection and sediment control measures will include pumping water out of the construction area, as necessary. The water will be pumped to a closed system to the north of the fresh water channel, as described in Section 2.4.

The contractor will be responsible for installing and maintaining the mitigation measures described in this report that are required for the construction phase and any additional measures that may be required during the course of the construction to minimize any unanticipated negative environmental consequences that may arise during the construction phase of this project.

4.2 Water Management

The water management program has been described in section 2.4. The plan will ensure that there is a continuous flow of water into the South Fork of Rose Creek below the work site. Execution of the water management plan will have to be done in a way that ensures that water stays under the ice. Once water begins to flow over the ice it is very difficult to get it back into the channel until the ice melts. This could impact fish habitat downstream of the project if it occurs.

It is anticipated that the small quantities of water that get into the construction area will be pumped to an upland area where it will be allowed to seep into the snow or vegetation. A berm will be built downslope of the discharge point to collect any pumped water that stays on the surface. Any water collecting behind the berm will be pumped back to the creek, provided it meets the Canadian Council of Ministers of the Environment (CCME 2002) guidelines for suspended sediment. The pumps will be appropriately sized to handle the expected water quantities. Fish screens will not be required on these pumps, as fish will not be able to get into the construction area, and fish will be salvaged from the construction area before construction begins. Sufficient storage capacity will be provided upstream of the cofferdam to contain flows in the South Fork of Rose Creek in the event that pumps break down and a replacement pump has to be brought in from Whitehorse (24 hours).

4.3 Fuel Handling and Accidents and Malfunctions

Accidents and malfunctions provide the greatest risk to water quality and sediment contamination. Any accident or malfunction with the potential with environmental consequences will be immediately reported to the site supervisor and the environmental monitor. If the Environmental Monitor determines that a work stoppage is required to minimize further environmental impact, such an order will be issued immediately. The appropriate authorities will also be informed as soon as practical. Section 6.2.6 summarizes the potential accidents and malfunctions. The most critical malfunction would be the breakdown of the pumps used to pass the water in the South Fork of Rose Creek around the work site. A suitably sized back-up pump will be on site to minimize the risk of this event happening. Delay in completing the project due to equipment failure should not result in a delay that would end up with a partially completed breach at the start of freshet. The proposed dewatering plans anticipate that it will be possible to start excavating the breach of the dam in November 2003, which will allow ample time to complete the breach even if additional equipment needs to be brought on site to cover for broken equipment.

Refueling will be confined to a designated site adjacent to the access road on the downstream side of the dam located a minimum of 100 m from any watercourse. The area will be set up so that any fuel spill remains contained in the area. Bulk fuel storage will be at the mine site and a truck designed for fuel transfer will be used to refuel equipment at the designated refueling spot. A fully equipped spill kit will be on site at the refueling site and each piece of heavy equipment will have an appropriately equipped spill kit on board. The drainage collection features would also serve to contain any significant fuel spill that might occur during the construction phase. Any soils contaminated by a fuel spill will be collected and properly disposed of in a manner acceptable to the Environmental Monitor and any applicable regulations. The operators will be educated and aware of the requirements of the workplan and how to react in the event of a spill. In order to reduce the risk and the impact of spills:

1) The contractor will provide an oil spill response plan.
2) Biodegradable/environmentally friendly hydraulic fluid will be used on all equipment (i.e. loaders, excavators and dozers) using hydraulics within the creek channel below the high water level. An exception to this condition may be necessary depending on the air temperatures during construction and the temperature operating range of the biodegradable hydraulic fluid.
3) All machinery employed for in-stream work will be steam cleaned prior to arrival at the site.
4) All machinery employed will be inspected for leaks or worn hoses, fittings and all repairs will be made prior to access onto the site.
5) Oil sorbent sheets and/or containers will be placed under leaking vehicles and equipment immediately upon discovery.
6) Place oil sorbent sheets and/or containers under vehicles and equipment parked in high risk areas (i.e., adjacent to watercourses) for longer than 2 hours or immediately under any vehicle or equipment that is leaking.
7) Refueling areas will be enclosed so that any spills can be contained and easily cleaned up and prevent oil and fuel from entering the water. Maintenance of refueling areas (such as removal of rainwater) must be carried out such that no oil and fuel enters the environment. After the project is completed, any contaminated soils within the refueling area must be removed and disposed of properly.
8) To minimize the release of grease to the environment, excavators will not sit in water that is deep enough to cause the rotational table to be below the water level.

9) All clean-up materials and equipment, including sorbent pads, and leak proof waste containers, will be readily available on site in the quantities required for the type of equipment being used. The contractor is required to develop an appropriate list of equipment and materials that will be available at the work site.

10) Waste containers will be labeled appropriately and stored in a secure location, protected from weather until removal and disposal can be arranged.

11) Any waste oil or materials will be removed from the site as soon as possible in accordance with applicable Waste Management Standards, Transportation of Dangerous Good requirements and Special Waste Regulations.

12) In the event of a spill, 200L containment drums will be used to temporarily store material for shipment off site for disposal.

13) Fuel storage areas will be supplied with:
    - 2 open-top type, leak-proof, empty 45 gal drums with sealable lids
    - 2 packages (400 sheets) of absorbent pads (polypropylene – oil only)
    - 2 polypropylene sorbent socks (3"x 4' – oil only)
    - 1 polypropylene sorbent sock (3"x 10' – oil only)
    - 1 bag treated oil only cellulose particulate
    - 1 roll poly plastic sheet 110'x 6'x 6 mil thickness
    - 1 neoprene drain cover
    - 6 poly disposal bags and ties (45 gal drum size, 6 mil)
    - 2 pair nitrite gloves (large)
    - 1 rake
    - 1 shovel
    - 1 utility knife
    - blank labels / indelible maker
    - oil sorbent sheets and/or containers will be placed under leaking vehicles and equipment immediately upon discovery

4.4 Riparian Areas

The majority of the work will take place in close proximity to the dam and there is no need to clear riparian vegetation. When the work areas are laid out the environmental monitor will be onsite to ensure that access roads, lay down areas and spoil sites are located to avoid the loss of any riparian vegetation. Section 3.3 addresses the rehabilitation of the riparian areas within the footprint of the reservoir.

4.5 Spoil Areas

Three spoil areas have been identified (Drawing 2). Prior to freshet, appropriate erosion and sediment control measures will be implemented to ensure that sediment laden water from the spoil area does not enter any watercourses. The spoil pile will revegetated as part of the Phase 2 revegetation in spring/summer 2004. Depending on the results of post-construction monitoring, a granular berm may be placed at the downstream toe of the spoil pile to contain sediment from erosion of the spoil pile surface.

5. Environmental Monitoring

5.1 General

It is assumed that the field team responsible for the execution of the environmental monitoring will comprise a Resident Engineer, Site Supervisor (Contractor), and Environmental Monitor (Monitor).

The Resident Engineer will be on-site daily during all construction work related to the breach. The Resident Engineer will be responsible for day to day environmental monitoring (during active construction) and ensuring the works are performed in accordance with the EMP.

The Monitor is not expected to be on-site daily throughout the construction period. However, the Monitor will be on-site daily during project startup, the construction of the sump, and construction of the inlet structure for the channel. The Monitor will also be on site on an as needed basis, depending on the nature of the work being undertaken and discussions between the Monitor and the Resident Engineer. As noted above, when the Monitor is not on site, the Resident Engineer will be responsible for the execution of the EMP and environmental monitoring. The Monitor will conduct a site visit prior to the commencement of the construction phase of the project, during any shut-down stages of the project, and as required during any of the key stages of the project. More details on the schedule of the Monitor will be provided as the final construction schedule is developed. The Monitor will have the authority to order the shutdown of the operation if environmental protection is compromised (i.e. water quality criteria are exceeded, a fuel spill occurs, etc).

5.2 Responsibilities

The Resident Engineer, Construction Manager, the Contractor's Site Supervisor, and Environmental Monitor for each component of the work are responsible for ensuring that the EMP has been reviewed and understood by all personnel, including sub-contractors, involved with the project. Environmental issues will be covered in pre-job and on-site meetings with the crews to ensure that environmental risks have been identified and adequately addressed. Any subcontractors will be issued a copy of the EMP and will be required to sign a "Contractor Orientation Record" form. The contractor will ensure that all staff is familiar with the relevant components of the EMP. Any changes to the work plan shall be brought to the attention of the Site Supervisor and Environmental Monitor so that the EMP can be amended and agencies contacted, if necessary.

Prior to the start of the construction project, the reporting structure for the environmental monitoring will be clearly identified. The Environmental Monitor will report issues of concern directly to the site supervisor who will coordinate any corrective action with equipment operators. The Environmental Monitor will work closely with the Resident Engineer and Contractor's senior site representative to review project schedules and issues of concern and to anticipate environmental issues ahead of time so that contingency plans are in place to ensure good environmental stewardship throughout the project.

5.3 Monitoring

Monitoring will be required before, during and after construction. Many of the aspects that must be monitored have been identified earlier and include:

- Monitoring fish left in the reservoir to check for stranding. This will be particularly important during the final stages of dewatering the reservoir.
- Set up of construction area including laydown areas, fueling site, establishment of drainage and sediment control measures for construction
- Initial monitoring of construction activities to ensure appropriate environmental protocols are followed such as refueling and emergency preparedness.
- Advise on layout of stream channel features, especially the section below the dam. Daily monitoring during the construction of the stream channel through the breach and any compensation habitat required.
- Monitor water discharge from construction area and stream restoration work areas for turbidity
- Monitor downstream pools in Reach 2 of the South Fork of Rose Creek for turbidity and dissolved oxygen during all construction phases
- Be on site during initial snow melt to evaluate turbidity levels and assess the need for additional practical sediment control to minimize sedimentation of streams (i.e. locate and stabilize or isolate sources of erosion)
- Monitor seeding success in early spring and determine the need for additional seeding.

5.4 Monitoring Total Suspended Sediment and Turbidity

Monitoring of water quality will focus on total suspended sediment (TSS). There is a lab at the mine that can be used to measure the TSS concentration in water on a daily basis. Samples for TSS will be collected on a routine basis and turbidity measurements (NTUs) taken at the time of sampling. The TSS and turbidity data will be used to generate a relationship between TSS and turbidity so that an immediate, approximate assessment of TSS levels based on the turbidity reading can be made if required. Therefore, a properly calibrated turbidity meter will be onsite prior to and during the construction phase. The criteria that will be used for TSS is the CCME (2002) aquatic life guidelines which stipulate that the maximum induced TSS level in the receiving wares is 25 mg/L above background. If background levels are greater than 250 mg/L then the maximum increase is 10% of the background level.

Prior to the start of construction, TSS levels will be measured upstream and downstream of the reservoir. The upstream site will be established in a pool at least 0.7 m deep located just downstream of the culvert on the mine access road on the south fork of Rose Creek. The downstream site will be located in the LLO discharge channel downstream of the construction area or at a downstream location where the water is deep enough so that it is not likely to freeze. The collection of TSS and turbidity measurements at these sites will be done on a daily basis for at least a week prior to the construction of the sump upstream of the dam to establish background conditions and to establish the TSS/NTU relationship.

TSS monitoring will continue through the construction period, however, it may not be possible to collect water samples from the upstream section of the creek in mid winter if the creek freezes to the bottom. It is anticipated that downstream sampling will be possible throughout the construction period to monitor effects of the project. If necessary the background sediment or turbidity level will be the average of the values collected prior to the start of construction.

During the construction phase, construction water discharged from the holding area (or from some other form of treat and pump) must not exceed the CCME criteria for TSS when it is discharged back into the South Fork of Rose Creek. The monitor will take regular (at least daily) measurements of turbidity levels in the South Fork of Rose Creek downstream of the construction area. If this turbidity indicates that TSS levels are equivalent to or exceed the CCME guideline for TSS then the monitor will take a water sample for laboratory analysis and also investigate the source of the sediment. If the source of TSS is from the work area or discharge from the water treatment system, immediate action will be taken to stop the flow of sediment into the creek. This may involve stopping all work responsible for creating sediment until the source is properly contained or controlled. If the sediment is coming from the reservoir (upstream of the construction area), further investigation may be required to determine the source and if necessary corrective action taken. However, regardless of the source, either within or above the reservoir, it is necessary to continue the pumping of Rose Creek base flows around the work site to maintain flow in the channel below the dam. This is particularly important over the winter when cessation of flow could result in the creation of ice blockages in the channel and subsequent difficulties in re-establishing flow in the channel when pumping resumes.

5.5 Post-Construction Monitoring and Follow-up Monitoring

The following aspects will be the focus of the post construction monitoring and is an important component of the adaptive management approach that will be used to mitigate the effects of the initial freshet in the reservoir, through the breach and in the channel immediately downstream of the breach.

Subsequent monitoring is required to assess the success of the mitigation and compensation programs associated with the breach of the Fresh Water Supply Dam and restoring the South Fork of Rose Creek to pre-dam, natural conditions.

- Summer/Fall of 2003, evaluate the seed germination success rate of the grass seed put down for erosion control within the reservoir. Assess the need for additional seeding required in areas of poor germination or cover and of areas exposed during summer draw down of the reservoir.
- Evaluate channel stability after the 2004 freshet in the following areas:
  - Within the footprint of the reservoir;
  - Through the breach; and
  - In the fresh water channel immediately downstream of the channel through the breach.

  This evaluation will be done in conjunction with the Resident Engineer. Prepare a report on channel conditions with, recommendations for stream work that could be carried out, depending on access and logistics, prior to the 2005 freshet.
- Prepare a rehabilitation plan for the reservoir area that further refines the details provided in section 3.3, specifically to identify soil conditions with in the riparian areas, locations for planting willow and conifers. This will likely be done when the snow is off the reservoir area in the spring of 2004 but could be done in the fall of 2003 before snow accumulation if water levels are low enough.
- Monitor vegetation survival at the end of the 2004 growing season. In areas of poor survival (i.e. less that 80%) new plants will be added. Replanting can be done in late fall when the plants have become dormant or can be carried out in the spring while they are still dormant.
- 2004 survey of the out planting sites to assess densities of fish and look for tagged fish. Additional survey of the creek within the footprint of the reservoir to assess fish usage and to look for tagged fish.
- 2005 assessment of revegetation success and stream habitat conditions. Stream assessment should include channel stability, riparian condition, and availability of spawning and rearing habitat, fish sampling to determine densities and determine if there is any evidence of spawning and spawning success. Control sites should be established in another area of Rose Creek for comparison.
- Annual evaluation of areas planted with willows and conifers, on going mitigation or compensation measures for the re-establishment of instream habitat through 2008. The results will be reported annually with recommended maintenance or corrective actions.
- After 2008 the mine reclamation and closure plan will be complete and approved and will take over the requirements for maintaining and rehabilitating fish habitat affected by mining in the Rose Creek drainage. The mine closure plan will include a comprehensive plan for restoring fish habitat through out Rose Creek, including the area of the FWSD.

6. Reporting

- Environmental Monitor (supported by the Resident Engineer) will be required to maintain suitable records and photographs throughout the construction phase. Weekly reports that summarize work activities and incidents or issues will be submitted to the Interim Receiver, DIAND and DFO (and, possibly, Yukon Department of Environment).
- Any significant environmental issues will be reported immediately (the protocols for reporting will be defined as part of final design and the development of an Environmental Management Plan QA/QC program).
- Any significant changes in construction methods (detailed in the final design report), to habitat rehabilitation, stream channel design, monitoring procedures, etc. will be presented to the Interim Receiver, DFO, DIAND and the Yukon Department of Environment, along with justification for the changes.
- A report on the environmental aspects of the construction phase is required within 3 months of the completion of the construction work and should include photo documentation of the construction activities, summary of significant incidents.
- A report on the assessment of the success of revegetation program after the first full growing season and the condition of the stream channel after the first freshet along with recommendations for additional work or any remedial action taken will be submitted by December 2004.
- A report on the fish salvage and mark-recapture program and follow up survey in the fall of 2004 will be prepared and will include all the fish data collected, limnological data, habitat assessment and fish densities of out planting sites.
- A report on the 2004 survey of out planting sites and fish use of reach 3 of the south fork of Rose Creek. Plus annual reports on the condition of the stream habitat until 2008 that include the degree of utilization of the fish habitat, success of the revegetation, etc.

7. References

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SRK Consulting. 2003a. Final Breach Design, Fresh Water Supply Dam, Faro Mine. Prepared for Deloitte & Touche as Interim Receivers.

SRK Consulting. 2003b. Supplement to the Preliminary Brach Design, Fresh Water Supply Dam, Faro Mine. Prepared for Deloitte & Touche as Interim Receivers

Appendices

Gartner Lee

Appendix A

Arctic Alpine Seed Ltd. Reclamation Plan

Arctic Alpine Seed Ltd
RECLAMATION PLAN

ANVIL RANGE MINING COMPLEX
FARO, YUKON

FRESHWATER SUPPLY DAM

Prepared for:

Deloitte & Touche

May 7, 2003

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INTRODUCTION

- The site is the Fresh Water Supply Dam (FWSD) at the Anvil Range Mining Complex, Faro, Yukon.
- The FWSD at the Anvil Range Mining Complex, Faro is to be drawn down over a period of time in preparation for mine closure.
- There is currently a six-meter (approximately), area of shoreline, between elevation 1096 and 1090 m (area is 17.2 hectares), which is exposed and will require revegetation to minimize erosion and to stabilize the shoreline as more water is drawn down.
- By August 2003, the water level is to be drawn down from elevation 1090 to 1082 m amsl (area is 27.5 ha). This will further expose the shoreline and will require revegetation to minimize erosion and to stabilize the shoreline.

Randy Lewis, Partner, Arctic Alpine Seed Ltd. conducted the site analysis and evaluation of the property on May 2, with Mr. Dana Hagger of Deloitte & Touche:

Arctic Alpine Seed Ltd:

- Conducted a literature and information review:
    - Government of Yukon - "Guidelines for Reclamation / Revegetation in Yukon".
        - Seed Mixtures / Specifications for sub alpine regions / sandy soils.
    - Government of Canada – "Reclamation Guidelines for Northern Canada"
        - Chapter 4 – "Drainage and Erosion Control"
        - Chapter 5 – "Revegetation"
        - Chapter 6 – "Seed Mixture Recommendations"
        - Chapter 7 – "Monitoring"
    - Review of previous Arctic Alpine Seed Ltd. Projects:
- Prepared seed specifications based on the most prominent indigenous grass and legume species identified on site analysis
    - Recommended rate of seeding – 30 kg /hectare
    - Seeding rate is based on site / soils analysis information and the proposed methodology for installation.
    - The following grass and legume species were identified on site
        - Agropyron violaceum – Violet Wheatgrass
        - Deschampsia caespitosa – Tufted Hairgrass
        - Festuca saximontana – Northern Fescue
        - Festuca ovina – Sheep Fescue
        - Poa alpina – Alpine Bluegrass

- Poa palustris – Fowl Bluegrass
- Agrostis scabra – Ticklegrass
- Puccinellia nutalliana – Alkaligrass
- Oxytropis campestris – Northern Oxytrope
- Others to be indentified

SITE LOCATION

Fresh Water Supply Dam at the Anvil Range Mining Complex, Faro, Yukon

PHYSICAL DESCRIPTION

The site is located primarily in a sub alpine boreal forest, narrow valley of deciduous and coniferous plant community.

The grade of the area to be reclaimed is primarily a gentle slope to the existing waterline. The freshwater lake has deposited a sand / silt sediment over a period of approximately 30 to 40 years. The shoreline is irregular due to wave action.

The site is sensitive to disturbance.

PRINCIPLES OF PROJECT DESIGN

Arctic Alpine Seed Ltd. acting as project manager will ensure that the area will be revegetated using 100% indigenous (native) species:

The site analysis determined site-specific requirements:

1) Due to the sensitivity of the site:
   a) Access for revegetation will be restricted to currently existing access
      i) Access road on the dam.
      ii) Access road to lake half way along the east side.
      iii) Addition access to the site will be via a boat.
2) No mechanical activity is to occur on the newly exposed shoreline.
3) All revegetation activity will be limited to only manual labor.

4) 100% of grass and legume seed types will be indigenous to the site and surrounding areas.
5) No fertilizer will be used on this site, due to the proximity of the lake and creek.
6) Hydro seeding is not required or recommended for this site.
7) The reclamation project is time sensitive and should be completed before June 30, 2003, to maximize germination and to establish sufficient growth this season to limit erosion.

PROJECT MANAGEMENT

As Project Manager, Randy Lewis, Partner, Arctic Alpine Seed Ltd., would be primarily responsible for ensuring that the Reclamation Plan is fully and completely implemented to the Owner's satisfaction including management and training of all labour forces and expediting of materials to complete the:

- Layout and design of key and all other planting areas at the Fresh Water Supply Dam
- Seeding of disturbed areas
- Biweekly (or as required) reporting, production of final report.

It is proposed that a Ross River Dene Council Crew (4 persons) is hired to work with Arctic Alpine Seed Ltd. until project completion; and it is anticipated that the local crewmembers would be fully trained to be able to provide ongoing support for future reclamation projects.

Reclamation Activities:

- Layout and design of areas to be seeded
- Crew Training / Site Supervision
- Site specific seed mixes for the lakeshore
- Raking (Preparation of Seed Bed for Planting)
- The area to be seeded will need to be scarified (raked) to a depth of 2 to 3 inches in order to loosen the site soils
- Hand seeding of disturbed areas
    - The seed will be applied by broadcast spreading
    - Final raking - incorporated into the soil surface by hand raking.

This method will significantly increase the results of the reclamation plan as well as ensuring that the work is completed on schedule and on budget.

SCHEDULE

The scheduled completion date is June 30, 2003.

Site Inspection Dates: To be determined

Changes to the Contract:

- All changes or additions to the work described here in will be approved in advance of any expenditures being made.

Schedule: (To be confirmed)

- May 8 Submission of Plan
- May 12 Authorization to proceed
- May 14-16 Labor request with RRDC
- May 19 –23 Mobilize
- May 26 On site at fresh water supply dam
- June 30 Completion

RECLAMATION AREAS

LOCATION	TREATMENT
1. Shoreline Areas (see site sketch)	Hand raking / Seeding / Hand raking

Appendix B

Contractor Environmental Orientation Record

CONTRACTOR ENVIRONMENTAL ORIENTATION RECORD

The Contractor Environmental Orientation Record shall be completed for all contract work involving an environmental component. The Owner's Representative is responsible for ensuring that the environmental requirements of the work are reviewed with the Contractor before work is started, and that a record of the discussion is documented on this form. The form must be signed by both the Owner's Representative and the Contractor. Signing this form indicates that the Contractor has been advised of the environmental requirements of the project. In field situations, compete two (2) copies of the form (one for the Contractor and one for the Owner) or photocopy the form.

	Date:		File No.
1	**Project Information**		
	Project Title		
	Project Description		
	Project Location		
2	**Contractor Information (if applicable)**		
	Company Name		
	Company Address		
	Site Contact/Representative Name		
	Tel. #	Fax #	E-mail
3	**Environmental Management Plan / Environmental Practices** Review the environmental issues and requirements of the work as specified in the Environmental Management Plan (EMP) or Environmental Practices (EP).		

Is there an EMP or are there Eps for the work?		❑ Yes.	❑ NA.
Have the environmental requirements been reviewed with the contractor and the contractor's staff? (Use the checklist below to guide discussion)		❑ Yes.	❑ NA.
Environmental Issues	***Environmental Protection Requirements***	**Discussed**	**NA**
Soil erosion / compaction		❑	❑
Vegetation disturbance or removal			
Generation and disposal of hazardous substances			
Generation and disposal of waste			
Spill of hazardous substances			
Fuel and flammable storage			
Dust generation / other air emissions			
Water quality – erosion and siltation			
Fish and Aquatic - Habitat alteration, disturbance or loss			

	Wildlife and Bird – Habitat Alteration, Disturbance or Loss			
	Disturbance to Heritage Resources / Archaeological Sites			
	Visual Impacts / Noise Concerns			
	Property Considerations			
	Disruption of Recreation Use			
	Public Safety Concerns			
	Do the tools and equipment meet the requirements?			
4	**Permits and Approvals Information:** Ensure the necessary environmental permits and approvals relating to the work have been obtained prior to starting work.			
	Are environmental notification, permits, licenses or approvals required?		❑ Yes	❑ NA
	List applicable regulatory requirements and permit reference numbers. .			
	Have the permits, licenses and approvals obtained and / or checked?		❑ Yes.	❑ NA
5	**Emergency Response Plan / Oil and Chemical Spill Response Plan**			
	Has the Emergency Response Plan discussed?		❑ Yes	❑ NA
	Has the Oil and Chemical Spill Response Plan discussed?		❑ Yes	❑ NA
	Are there spill kits available on location?		❑ Yes	❑ NA
	Where are the spill kits located?			
6	***Environmental Incident Reporting***	Ensure Contractor is aware of BCH EIR system.		
	Environmental Incident Reporting Procedures discussed?		❑ Yes	❑ NA

The undersigned has been briefed on the environmental requirements of the work as detailed above.

Signed: ______________________ Contractor Date: __________

Counter-signed: ______________________ Owner's Representative Date: __________

Additional Comments:

____

____

____

____

____

____

____

APPENDIX B3
Specifications

Final Breach Design
Fresh Water Supply Dam, Faro Mine
Technical Specifications

1.0 General

The Interim Receiver for Anvil Range Mining Corporation is planning to breach the Fresh Water Supply Dam (FWSD) prior to the 2004 spring freshet. The FWSD is no longer needed and, in the absence of further mining, constitutes a risk to the tailings infrastructure and receiving environment situated downstream.

The design of the proposed breach is described in detail in the design report prepared jointly by SRK Consulting, BGC Engineering Inc. and Gartner Lee Limited in April 2003. The design report contains background details and the design basis on which these technical specifications have been based and should be reviewed by the Contractor during preparation of construction plans.

Technical specifications (presented here), the environmental monitoring plan (EMP), design drawings (Drawings 1 to 13) and a schedule of quantities are being issued at this time as part of contract finalization. It is important to note, however, that this project is in the midst of the permitting process and changes to these documents may be necessary before they are issued for construction. Note also that the side slopes within the breach will be reviewed prior to construction, and the selected slope angle will be included on the drawings that are issued for construction.

The contractor will become familiar with the Water Licence, once it is issued by the Water Board, and will include the requirements of the Water Licence in the execution of the project.

2.0 Scope of Work

Prior to the commencement of the work, there are a number of preparatory activities that will be executed under the direction of the Interim Receiver prior to the commencement of the Contractor's work. These include the following:

1) Lowering of the reservoir to approximately 1082 m amsl using the low level outlet pipe (LLO);

2) Fish transfer; and,
3) Phase 1 revegetation.

The scope of work that the Contractor is required to complete includes the following main activities:

- Prepare the contractor's work area and the spoil areas;
- Manage the water;
- Excavate the breach;
- Excavate the channel;
- Place riprap for floodplain erosion protection;
- Construct the riffles;
- Abandon the LLO and demolish the valve house; and,
- Clean up.

The specifications associated with each of these activities are provided below.

3.0 Environmental Requirements

The contractor will perform the proposed works in accordance with the requirements outlined in the EMP, a copy of which accompanies these specifications, and the Water Licence (once it is issued by the Water Board).

4.0 Site Preparation

The contractor will be responsible for the preparation of the work area, spoil areas and a refueling area.

Three separate spoil areas are envisioned, shown on Drawing 13, for the various spoil materials to be generated as part of the project. Portions of the spoil area on the downstream side of the dam will be used for placement of any concrete, PAG material or woody debris. The remainder of the spoil will be deposited in separate spoil areas. The spoil area located within the former spillway location is to be used prior to the other spoil areas. Preparation of the spoil areas is to consist of clearing, i.e. removal of trees and brush.

The siting of the refueling area must conform to the requirements of the EMP. The EMP also outlines the requirements for spill contingencies.

5.0 Managing the Water

The Contractor will be responsible for management of both creek water and construction water throughout the construction period.

During the reservoir lowering phase (defined as, lowering the reservoir below elevation 1082 m amsl), the Contractor will provide, install, operate and maintain pumps so that creek water can be pumped into the LLO for discharge to the downstream environment. As required by the EMP, the Contractor will use a silt screen to isolate the pumping area and pumps fitted with fish screens. These pumps will be available for maintenance of the reservoir during this phase of the water management.

The Contractor will construct a sump within the base of the creek channel (Drawing 12) to capture and pump the winter base flow in the South Fork of Rose Creek. Following construction of the sump, any disturbed sediment will be allowed to settle prior to the commencement of pumping activities (alternatively, this water would be treated as construction water).

Sufficient pumping capacity will be available to handle the expected inflows, as outlined in the following table, with appropriate spare capacity.

Estimated Monthly Inflow to the FWS Reservoir in m^3/s

Month	Estimated Monthly Flow (m^3/s), Year of Estimate			
	Average (1968)	Minimum (2003)	Average (2003)	Maximum (2003)
October	0.595	0.39	0.61	1.23
November	0.269	0.22	0.29	0.37
December	0.198	0.12	0.20	0.25
January	0.113	0.08	0.16	0.22
February	0.085	0.06	0.14	0.20
March	0.085	0.06	0.13	0.18
April	0.113	0.11	0.16	0.18

The contractor will pump the water from the sump to the downstream receiving environment by pumping around the downstream construction area and discharging the water into the natural downstream channel. The discharge of the water to the downstream environment is envisioned to consist of two phases. The first phase will precede the disturbance of the fresh water channel, during which time it will be possible to pump to the LLO inlet and discharge water through the established channel. The second phase will commence with the disturbance of the fresh water channel, i.e. within the breach, and continue until the breach construction is completed. During this disturbance and reconstruction phase, the creek water will be transferred downstream of the construction area by pumping water into an open flume or through a series of pipes.

Water that collects within the disturbed construction area is construction water. This water will be pumped and discharged onto a vegetated area upslope of a temporary holding area (which will be built using a temporary berm on the north side of the existing fresh water channel, Drawing 12). As the construction water runs across the vegetated ground surface, it is anticipated that the sediment content will decrease significantly before it reaches the holding area. Water which collects in the holding area, behind the berm, will be pumped into the creek (subject to meeting discharge criteria). Alternative methods of clearing the sediment from the construction water will be examined as part of final construction planning.

The water management will vary as the construction proceeds in various stages, likely in accordance with following the sequence outlined below. The final construction sequence will meet the requirements of the EMP and Water Licence, but the Contractor is encouraged to offer efficiencies on the construction side.

- Perform bulk excavation of the notch. The excavation will not extend to the position of the inlet structure. Water will be pumped through the LLO and into the existing fresh water channel.
- Perform installation of the channel erosion protection and formation of the stream channel through the breach. Water will be pumped through the LLO and allowed to flow through the fresh water channel.
- Abandon the LLO and complete excavation of the upstream portion of channel and install inlet control. Water will be pumped into a flume/pipe which will outlet into the fresh water channel (or the channel through the breach, if construction activities have been completed in that section of the channel). The timing of the abandonment of the LLO is uncertain but will likely occur in conjunction with completion of the installation of the erosion protection. Once the LLO is abandoned, water will be pumped directly into a flume/pipe system around the active construction area.

6.0 Excavate the Breach

The bulk excavation for the breach will be completed to the lines and grades on the drawings. The excavation will extend through the dam section, the two downstream berms, the downstream seepage collection trench and the upstream seepage blanket. Drawings 5, 6 and 7 show the location and general arrangement of the breach excavation. Approximately 75,000 m^3 (bank volume) of soil will be excavated and hauled to three main spoil areas (Drawing 13). Due to bulking, the volume of the spoil after disposal will be about 90,000 m^3. A portion of the excavated material will be used to cover both ends of the LLO (Drawing 11).

Drawings 2 and 3 show the soil types used in the construction of the dam and downstream berms. To the maximum practical extent, the different soil types will be separated as they area excavated and deposited in separate spoil areas. The materials to be excavated are expected to include:

- Phyllite riprap from the surface of dam;
- Acid generating material in the stabilizing buttress downstream of the dam;
- Shell material;
- Core material;
- Random material; and,
- In situ foundation soils (original creek alluvium).

The phyllite riprap on the upstream face of the dam was determined to be potentially acid generating (PAG). The riprap excavated as part of the breach construction and all the riprap located to the south of the breach section will be hauled to a separate part of the spoil areas. The phyllite riprap spoil will be located such that run-off from this material can be tested and, if necessary, the riprap material removed as part of activities subsequent to the current contract.

The material that comprises the 1969 stabilizing berm downstream of the dam, on the north side of the creek, will be hauled to the spoil areas and dumped in an area separate from other PAG waste. The spoil area will be located such that run-off from this material can be tested and, if necessary, removed as part of activities subsequent to the current contract.

7.0 Excavate the Channel

The base of the channel through the breach will link the thalweg of the natural channel upstream of the 1968 cofferdam (Drawing 4) with the thalweg of the fresh water channel (Drawing 7). The channel excavation is expected to encounter mostly alluvial material (assumed to be a random mixture of sand and gravel with some cobbles and silt). The channel location will vary (Drawing 7) throughout the floodplain and will be based 1 m below the top of the floodplain elevation. A smooth transition should be constructed which links the proposed channel through the breach to the existing fresh water channel.

Excavated material, which is expected to consist of foundation soils (original creek alluvium), should be kept nearby for use in the final grading of the floodplain following riffle construction. Excavated material that does not get used in the floodplain construction should be deposited in a separate spoil area.

8.0 Place Riprap for Erosion Protection and Construct Riffles

8.1 Materials

8.1.1 Non-woven Geotextile

A non-woven geotextile shall be placed as a filter layer between the sides of the excavation and the riprap, as shown on Drawing 10. The geotextile shall be Polyfelt F80 or approved equivalent.

8.1.2 Riprap

The required riprap shall be obtained from the existing riprap stockpile near the FWSD (Drawing 2). Two types of riprap have been prescribed. Type I riprap has a median rock size of (D_{50}) 400 mm and the range of rock sizes should be based on $D_{85}/D_{15} = 5.3$. Type II riprap has a median rock size of (D_{50}) 450 mm and the range of rock sizes should be based on $D_{85}/D_{15} = 5.3$.

The Contractor shall be responsible for obtaining riprap of the appropriate size and gradation from the existing stockpile. It is anticipated that selected borrowing may be required to produce Type I riprap and that selected borrowing and/or processing may be required to produce Type II riprap. Gradation testing of the existing rip rap stockpile is available upon request.

8.2 Place Riprap for Erosion Protection

Type I riprap will be placed at the edges of the floodplain (Drawings 7 and 10). The geotextile separation layer will be installed between the Type I riprap and the foundation (base) soils. Excavation for installation of the floodplain erosion protection will extend below the expected water table, through the alluvial material at the base of the valley. The drawings indicate that the erosion protection will extend 1 m below the base of the floodplain throughout the majority of the breach and 1.75 m in locations where riffles are to be installed. The minimum thickness of the erosion protection rip rap is 0.8 m and 4.5 m^3 per running metre of length (below the top of floodplain) is required in all locations along the edge of the floodplain.

The channel is sinuous and extends completely to the edge of floodplain. When the channel is co-incident with the edge of the floodplain, the erosion protection shall be widened (Drawing 10) to ensure that the minimum 4.5 m^3 per running metre of length (below the top of floodplain) is maintained.

8.3 Construct Riffles

Riffles, which extend to the floodplain erosion protection, are to be installed on a 40° angle to the centreline of the floodplain (Drawing 7). The riffles are to be spaced at approximately 50 m on center. The riffles are to be constructed from Type I rip rap in accordance with the lines and grades shown on Drawing 10.

At the upstream end of the channel, an inlet structure will be installed (Drawing 9). The inlet will be formed to match the angle of the existing cofferdam, to direct the water from the upstream creek into the channel through the breach and to prevent down-cutting at the point were the channel slope steepens. The inlet structure will be constructed from Type II rip rap. The crest of the inlet is to be 0.5 m above the base of the natural channel.

8.4 Material Placement

The geotextile will be placed in accordance with the manufacturer's recommendations for use under riprap. These recommendations will stipulate the minimum overlap.

The riprap shall be placed according to the lines and grades shown on the Drawings. Care will be required to place the riprap in such a way that the geotextile is not torn, punctured or moved significantly from the lines shown on the Drawings.

9.0 Abandon the LLO and Demolish the Valve House

Abandonment of the inlet of the LLO will consist of removal of the existing trash rack and covering (plugging) the inlet with a steel plate. The remaining structure will be buried and the ground surface shaped to match pre-construction slopes (Drawing 11).

Abandonment of the valve house will consist of removal of the roof and walls of the valve house, removal of a portion of the piping that was previously located within the valve house, plugging the inlet end of the LLO and burial of the exposed footprint. The resulting ground surface will be shaped to ensure drainage towards the newly constructed channel.

The following details have been developed in relation to the abandonment of the LLO:

1) The inlet section of the LLO will remain in place.
2) The trash rack of the LLO will be removed and a barrier installed at least 10 m downstream from the center line of the vertical inlet.
3) Grout (cement or cement/bentonite) will be pumped into the inlet, completely filling the pipe between the barrier and the LLO inlet. The Contractor is responsible for providing the necessary materials to produce and filling the end of the LLO with grout.
4) The area surrounding the inlet location will be a spoil area for material taken from the breach of the dam. The spoil will be used to fill in the low area around the inlet, providing a minimum cover of 2 m over the capped inlet of the LLO. The surface will be shaped to match the existing topography and drain towards the center of the valley.
5) The roof and walls of the valve house will be demolished and removed. Waste generated from the removal will be taken to an appropriate spoil area.
6) A plate shall be bolted or welded to cover the outlet of the LLO. The plate will be slotted so it will drain (Drawing 11).
7) The former location of the valve house will be used as a spoil area. The capped end of the LLO will be covered by a thickness of soil greater than 2 m. The surface will be sloped to drain towards the breach.

10.0 Cleanup

At the end of the construction activities, the construction site will be cleared of any construction-related debris, the sump will be backfilled and water will be allowed to pass through the breach.

SRK Consulting
Engineers and Scientists

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PROJECT MEMORANDUM

To:	Pelly Construction Ltd.	**Pages:**	1 of 1
Attention:	Jess Jewell	**Date:**	November 12, 2003
CC:			
From:	Cam Scott / Gerry Ferris	**Project Number:**	1CD003.22
Subject:	**Layout and Measurement**		

The following is a proposed amendment to the technical specifications regarding layout and measurement for the Fresh Water Supply Dam Breach Project at the Faro Mine.

Section 11 – Layout and measurement

The owner shall establish primary survey points in the vicinity of the project and shall furnish to the contractor the location and elevation of the survey points. The contractor will be responsible for preserving the primary survey points.

The owner shall layout the initial grade stakes for the project; this will include the location of the extent of the breach (including offset stakes) and the extent of the spoil areas.

The owner shall perform measurement of the payment items during construction. The contractor will ensure that suitable notification is given to the owner to allow for the arrangement of surveyors to undertake measurements.

The frequency of the survey to establish the base and buried lines of the riprap and inlet control structure shall be determined jointly by the Contractor and the Engineer at the outset of the work.

The Contractor shall be responsible for the proper alignment, height and the depths, and shall lay out on the ground all the works associated with the contract, following the initial layout undertaken by the owner.

Payment

Payment for survey required to complete the above noted alignment, grade control required for the layout shall be paid based on the work completed. The Contractor shall provide back up documentation for the surveying costs for which he is responsible as part of any request for payment.

APPENDIX C
Construction Activities

APPENDIX C1
Daily Reports

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY
1605, 840 – 7 Avenue S.W. , Calgary, Alberta, Canada. T2P 3G2
Phone (403) 250-5185 Fax (403) 250-5330

PROJECT MEMORANDUM

To:	SRK Consulting Inc.	Fax No.:	Via e-mail
Attention:	Cam Scott	CC:	Bruce Ford Dana Haggar
From:	Gerry Ferris/Brad Finnson	Date:	November 9, 2003
Subject:	Daily report – FWSD Breach project		
No. of Pages (including this page): 1		Project No:	0257-012-09

Weather:

Temperature ranged from -2°C to -8°C, overcast with slight breeze. Light snow throughout the morning until about 3:00 pm.

Construction Activities:

Completed stripping of the spoil area within the former spillway.
Started construction of the refuelling area.
Started mobilization of equipment from staging area to work area.

Water Monitoring:

Prior to commencement of construction activities at the dam, conducted sampling at four monitoring locations as specified in the water licence. No water was generated within the construction area, so no sampling of sample point FWSD-3 was undertaken. The results are in the attached table.

Date	FWSD – 1	FWSD – 2	FWSD – 4	FWSD - 5
November 8	>1	1	2	2
November 9	1	2	2	2

Other:

Orientation meeting was held with the contractors construction personnel. This orientation meeting included a review of the EMP and the spill contingency plan.

Completed the Contractor Orientation form with Roy Smith, Superintendent for the contractor.

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PROJECT MEMORANDUM

To:	SRK Consulting Inc.	Fax No.:	Via e-mail
Attention:	Cam Scott	CC:	Bruce Ford
			Dana Haggar
From:	Gerry Ferris/Brad Finnson	Date:	November 10, 2003
Subject:	Daily report – FWSD Breach project		
No. of Pages (including this page): 2		Project No:	0257-012-09

Weather:

Temperature ranged from -11°C to -20°C, occasional cloud with calm conditions.

Construction Activities:

Completed stripping of the spoil area upstream of the dam.
Completed construction of the refuelling area.
Completed mobilization of equipment from staging area to work area.
Completed the removal of the PAG rip rap from the face of the dam and disposal in the designated spoil area (upstream of the dam).
Placed fish screen on the pump barge and installed upstream of the cofferdam. Fish screen constructed to requirements provided by DFO.
Relocated the generator and installed impermeable liner underneath it.

Construction/Engineering:

Detailed pre-construction survey revealed the need for a minor design change at the outlet from the breach construction to the existing fresh water channel (FWC). The minor design change required consists of re-aligning the breach construction to match more closely the FWC alignment (centerline of channel is moved about 2 m to the north). Additionally, the base of the downstream section of the channel will need to lowered slightly to match the existing FWC thalweg.

Photos:

Attached to this report are photos showing: fish exclusion screen, refuelling area and removal of the PAG rip rap from the dam.

Water Monitoring:

Monitoring of the four active monitoring points as indicated in the water licence was undertaken. The results are in the attached table. It should be noted that no construction water was encountered at the site. When the removal of water from the construction site becomes necessary monitoring will commence at FWSD-3.

Date	FWSD – 1	FWSD – 2	FWSD – 4	FWSD - 5
November 10	>1	2	2	2
November 11				
November 12				
November 13				
November 14				
November 15				
November 16				

Environmental Summary:
Posted copies of the EMP, CEAA Screening, Water Licence and Fisheries authorization in the construction trailer at site.

Toured, with the construction superintendent, waste oil storage and contaminated waste dump locations that are available onsite.

Other:

None.

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PROJECT MEMORANDUM

To:	**SRK Consulting Inc.**	**Fax No.:**	**Via e-mail**
Attention:	**Cam Scott**	**CC:**	**Bruce Ford**
			Dana Haggar
From:	**Gerry Ferris/Brad Finnson**	**Date:**	**November 11, 2003**
Subject:	**Daily report – FWSD Breach project**		
No. of Pages (including this page): 2		**Project No:**	**0257-012-09**

Weather:

Temperature ranged from -12°C to -25°C, occasional cloud with calm conditions.

Construction Activities:

Started bulk excavation of the breach. Spoil generated from this process was taken to the spoil area within the former spillway.
Continuing pumping creek water around the construction site.

Engineering/construction issues:

Revised channel (based on alignment and elevation variations noted yesterday) was laid out.

Photos:

Attached to this report is a photo showing: start of the bulk excavation.

Water Monitoring:

Monitoring of the four monitoring points indicated in the water licence was undertaken. The results are in the attached table. It should be noted that no construction water was encountered at the site at this time. When the removal of water from the construction site becomes necessary monitoring will commence at FWSD-3.

Date	FWSD – 1	FWSD – 2	FWSD – 4	FWSD – 5
November 10	>1	2	2	2
November 11	>1	3	3	3
November 12				
November 13				
November 14				
November 15				
November 16				

Env. Monitoring

Directions were issued to Pelly Construction to remedy a number of deficiencies re. conditions of EMP:
- waste oil improperly stored in construction area
- improper disposal of contaminated absorbent pads
- insufficient berm around refuelling area

Directions were also issued to clean up small quantities of oil contaminated snow and to replace a leaking hydraulic hose on the excavator.

Other:

Remaining contractor personnel for the night shift were orientated on the contents of the spill contingency plan and the EMP.

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PROJECT MEMORANDUM

To:	**SRK Consulting Inc.**	**Fax No.:**	**Via e-mail**
Attention:	**Cam Scott**	**CC:**	**Bruce Ford**
			Dana Haggar
From:	**Gerry Ferris/Brad Finnson**	**Date:**	**November 12, 2003**
Subject:	**Daily report – FWSD Breach project**		
No. of Pages (including this page): 2		**Project No:**	**0257-012-09**

Weather:

Temperature ranged from 1°C to -5°C, ranged from mostly cloudy to overcast. Approximately 5 cm of snow fell through the night.

Construction Activities:

Continued bulk excavation of the breach. Spoil generated from this process was taken to the spoil area within the former spillway.
Continuing pumping creek water around the construction site.

Engineering/construction issues:

Initial original ground survey and layout of the construction area is nearly complete. One portion on the upstream side of the dam remains to be laid out due to the current ice cover.

Photos:

Attached to this report is a photo showing the progress to date of the bulk excavation.

Water Monitoring:

Monitoring of the four monitoring points indicated in the water licence was undertaken. The results are in the attached table. It should be noted that no construction water was encountered at the site at this time. When the removal of water from the construction site becomes necessary monitoring will commence at FWSD-3.

Date	FWSD – 1	FWSD – 2	FWSD – 4	FWSD – 5
November 10	>1	2	2	2
November 11	>1	3	3	3
November 12	>1	1	2	2
November 13				
November 14				
November 15				
November 16				

Env. Monitoring

Directions were issued to Pelly Construction to remedy a deficiency re. conditions of EMP:

- waste oil improperly stored in construction area (different than on the 11th)

The directions was promptly followed and the condition remedied. Note that the deficiencies noted on November 11 were all promptly remedied by Pelly Construction.

Set a 30 m length of 2 ½ inch gill net between the pump barge and coffer dam for a one hour set between 3:40 and 4:40 pm. Captured one Artic Grayling which was 22 cm in length. The set was made in order to ascertain potential concentrations of fish in the vicinity of the construction area.

During a survey for potential fish stranding between the coffer dam and the inlet four slimy sculpin were observed between the crest of the coffer dam and the trash rack at the reservoir.

Other:

None.

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PROJECT MEMORANDUM

To:	**SRK Consulting Inc.**	**Fax No.:**	**Via e-mail**
Attention:	**Cam Scott**	**CC:**	**Bruce Ford**
			Dana Haggar
From:	**Gerry Ferris/Brad Finnson**	**Date:**	**November 13, 2003**
Subject:	**Daily report – FWSD Breach project**		
No. of Pages (including this page): 2		**Project No:**	**0257-012-09**

Weather:

Temperature ranged from -1°C to -8°C, with clouds in the morning and snow starting at about 11:00 am, snow continued throughout the day. Approximately 3 cm of snow fell through the day.

Construction Activities:

Continued bulk excavation of the breach. Spoil generated from this process was taken to the spoil area within the former spillway.
Continuing pumping creek water around the construction site.

Engineering/construction issues:

Initial round of survey has been completed, surveyors are no longer on site. Current plan has the surveyors returning in approximately 6 days to do further measurements for payment.

Water levels within the remaining pond are still essentially the same as prior to the initiation of pumping. Contractor is bringing more pumps to the site to reduce the water levels.

Estimated volume of soil removed from the breach, start of day Nov. 13, is about 8,000 m^3 (based on the contractors load count, no surveyed measurements).

Photos:

Attached to this report is a photo showing the progress to date of the bulk excavation.

Water Monitoring:

Monitoring of the four monitoring points indicated in the water licence was undertaken. The results are in the attached table. It should be noted that no construction water was encountered at the site at this time. When the removal of water from the construction site becomes necessary monitoring will commence at FWSD-3.

Date	FWSD – 1	FWSD – 2	FWSD – 4	FWSD – 5
November 10	>1	2	2	2
November 11	>1	3	3	3
November 12	>1	1	2	2
November 13	>1	1	3	3
November 14				
November 15				
November 16				

Env. Monitoring

Set 1.5 and 2.5 inch mono gill nets in potential entrapment pools adjacent to the trash rack at the intake pipe. No Grayling captured in four hour sets.

Made a one hour set from the coffer dam to the pump barge in the main reservoir with a 30m 3 inch mesh mono gill net. No fish captured. Made a second set in the same location for one hour and forty five minutes with a 1.5 inch mono gill net and captured eight Arctic Grayling in the 16 to 20 cm range. The catch rate may have been affected by pump installation activities in the vicinity of the set. Further sets with 1.5 inch mesh nets are planned to further determine possible concentrations of juvenile age class AG's in the reservoir.

Other:

None.

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PROJECT MEMORANDUM

To:	**SRK Consulting Inc.**	**Fax No.:**	**Via e-mail**
Attention:	**Cam Scott**	**CC:**	**Bruce Ford**
			Dana Haggar
From:	**Gerry Ferris/Brad Finnson**	**Date:**	**November 14, 2003**
Subject:	**Daily report – FWSD Breach project**		
No. of Pages (including this page): 2		**Project No:**	**0257-012-09**

Weather:

Temperature ranged from -6°C to -16°C, with partial cloud in the morning and light snow starting at about 4:00 pm.

Construction Activities:

Continued bulk excavation of the breach. Spoil generated from this process was taken to the spoil area within the former spillway and also to the spoil area on the downstream side of the dam. Spoiling on the downstream side of the dam began based on slippery conditions caused by snow.
Continuing pumping creek water around the construction site.

Engineering/construction issues:

Water levels within the remaining pond are still essentially the same as prior to the initiation of pumping. A 88 HP pump with a 10 inch discharge was brought to site, construction of the fish screen for this pump is underway.

Measurement of the flow in the creeks was performed; this indicated a total inflow to the former reservoir of 0.284 m^3/s (4,520 USgpm). Current flow over the coffer dam is 0.179 m^3/s (2,830 USgpm), this flow is in excess of the currently installed pumping capacity.

Estimated volume of soil removed from the breach, start of day Nov. 14, is about 11,000 m^3 (based on the contractors load count, no surveyed measurements).

Photos:

Attached to this report is a photo showing the progress to date of the bulk excavation.

Water Monitoring:

Monitoring of the four monitoring points indicated in the water licence was undertaken. The results are in the attached table. It should be noted that no construction water was encountered at the site at this time. When the removal of water from the construction site becomes necessary monitoring will commence at FWSD-3.

Date	FWSD – 1	FWSD – 2	FWSD – 4	FWSD – 5
November 10	>1	2	2	2
November 11	>1	3	3	3
November 12	>1	1	2	2
November 13	>1	1	3	3
November 14	1	2	4	2
November 15				
November 16				

Env. Monitoring

During the night shift of November 13/14 a leak developed on one of the hydraulic hoses on the EX1100 excavator. The leak was stopped and the excavator was moved to the refuelling area for repairs. The hydraulic hose was repaired in the morning.

A series of gill net sets were made from the coffer dam to the pump barge. The first set utilized a 30m, 1.5 inch mono net set for one hour which yielded two Arctic Grayling 17 and 22cm in length. The second set, using the same gear and set duration as the first, produced seven Grayling that ranged from 17 to 19cm in length.

Other:

None.

BGC

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PROJECT MEMORANDUM

To:	**SRK Consulting Inc.**	**Fax No.:**	**Via e-mail**
Attention:	**Cam Scott**	**CC:**	**Bruce Ford**
			Dana Haggar
From:	**Gerry Ferris**	**Date:**	**November 15, 2003**
Subject:	**Daily report – FWSD Breach project**		
No. of Pages (including this page): 2		**Project No:**	**0257-012-09**

Weather:

Temperature ranged from -3°C to -5°C, with overcast conditions, winds between 20 and 25 km/h in the morning to 10 – 15 km/h in the afternoon.

Construction Activities:

Continued bulk excavation of the breach. Spoil generated from this process was taken to the spoil area within the former spillway and also to the spoil area on the downstream side of the dam. Spoiling on the downstream side of the dam began based on slippery conditions caused by snow.
Continuing pumping creek water around the construction site.

Engineering/construction issues:

Water levels within the remaining pond are still essentially the same as prior to the initiation of pumping. The 88 HP pump with a 10 inch discharge was installed today adjacent to the barge with the other pumps. The two 88 HP pumps discharge into a 24 inch diameter PVC pipe which in turn discharge into the inlet structure of the LLO.

Estimated volume of soil removed from the breach, start of day Nov. 14, is about 16,000 m^3 (based on the contractors load count, no surveyed measurements).

Photos:

Attached to this report are photos showing the: progress to date of the bulk excavation, a close-up of the excavation surface and the newly pump and associated fish screen.

Water Monitoring:

Monitoring of the four monitoring points indicated in the water licence was undertaken. The results are in the attached table. It should be noted that no construction water was encountered at the site at this time. When the removal of water from the construction site becomes necessary monitoring will commence at FWSD-3.

Date	FWSD – 1	FWSD – 2	FWSD – 4	FWSD – 5
November 10	>1	2	2	2
November 11	>1	3	3	3
November 12	>1	1	2	2
November 13	>1	1	3	3
November 14	1	2	4	2
November 15	>1	3	6	4
November 16				

Env. Monitoring

Brad Finnison is no longer on site. He will return to site once the water level around the LLO inlet is lowered to perform a check for fish entrapped within this area.

Other:

None.

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PROJECT MEMORANDUM

To:	**SRK Consulting Inc.**	**Fax No.:**	**Via e-mail**
Attention:	**Cam Scott**	**CC:**	**Bruce Ford**
			Dana Haggar
From:	**Gerry Ferris**	**Date:**	**November 16, 2003**
Subject:	**Daily report – FWSD Breach project**		
No. of Pages (including this page): 2		**Project No:**	**0257-012-09**

Weather:

Temperature ranged from -12°C to -20°C, with overcast conditions, slight breeze throughout the day with light snow starting in the late afternoon.

Construction Activities:

Continued bulk excavation of the breach. Spoil generated from this process was taken to the spoil area within the former spillway and also to the spoil area on the downstream side of the dam. Sorting of the spoil continues, the core material is being placed in the downstream section of the spillway spoil area.
Continuing pumping creek water around the construction site.

Engineering/construction issues:

Water levels dropped through the night and continued through the day until only a small volume of water was flowing over the coffer dam. It is expected that flow over the coffer dam will cease during the night.

A 2.5 to 3 m deep pool of water continues to be retained behind the coffer dam.

Estimated volume of soil removed from the breach, start of day Nov. 15, is about 22,000 m^3 (based on the contractors load count, no surveyed measurements).

Photos:

Attached to this report is a photo showing the progress to date of the bulk excavation.

Water Monitoring:

Monitoring of the four monitoring points indicated in the water licence was undertaken. The results are in the attached table. It should be noted that no construction water was encountered at the site at this time. When the removal of water from the construction site becomes necessary monitoring will commence at FWSD-3.

Date	FWSD – 1	FWSD – 2	FWSD – 4	FWSD – 5
November 10	>1	2	2	2
November 11	>1	3	3	3
November 12	>1	1	2	2
November 13	>1	1	3	3
November 14	1	2	4	2
November 15	>1	3	6	4
November 16	1	2	3	3

Env. Monitoring

The water level of the remaining reservoir is such that the flow over the coffer dam will be stopped by tomorrow. A small pool will be maintained on the upstream side of the dam until a fish out is performed in this area by Brad Finnison.

Other:

None.

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PROJECT MEMORANDUM

To:	**SRK Consulting Inc.**	**Fax No.:**	**Via e-mail**
Attention:	**Cam Scott**	**CC:**	**Bruce Ford**
			Dana Haggar
From:	**Gerry Ferris**	**Date:**	**November 17, 2003**
Subject:	**Daily report – FWSD Breach project**		
No. of Pages (including this page): 2		**Project No:**	**0257-012-09**

Weather:

Temperature ranged from -22°C to -27°C, with overcast conditions, slight breeze throughout the day with light snow starting in the late afternoon.

Construction Activities:

Continued bulk excavation of the breach. Spoil generated from this process was taken to the spoil area within the former spillway, the spoil area upstream of the dam and the spoil area on the downstream side of the dam. Sorting of the spoil continues, the core material is being placed in the downstream section of the spillway spoil area.
Continuing pumping creek water around the construction site.

Engineering/construction issues:

Water levels dropped through the night and continued through the day. Water is no longer flowing over the coffer dam. A small, isolated pool remains adjacent to the LLO inlet. Pumping continues using the three available pumps, water outletted from the pumps goes into the LLO inlet structure.

Estimated volume of soil removed from the breach, start of day Nov. 17, is about 29,000 m^3 (based on the contractors load count, no surveyed measurements).

Surveyors are scheduled to return to the site on Wednesday, likely for two days to complete measurement of some areas for payment and complete the layout.

Photos:

Attached to this report are a photo showing the progress to date of the bulk excavation and a photo showing the release of the sculpin.

Water Monitoring:

Monitoring of the four monitoring points indicated in the water licence was undertaken. The results are in the attached table. It should be noted that no construction water was encountered at the site at this time. When the removal of water from the construction site becomes necessary monitoring will commence at FWSD-3.

Date	FWSD – 1	FWSD – 2	FWSD – 4	FWSD – 5
November 17	>1	7	4	3
November 18				
November 19				
November 20				
November 21				
November 22				
November 23				

Env. Monitoring

Performed fish salvage in the pool surrounding the LLO inlet pipe. Fourteen slimy sculpin, ranging from 22 to 40 mm in length, were removed from the pool and transferred downstream of the valve house.

Given the lowering of the water level in the remaining pond behind the coffer dam, a brief inspection of the exposed channel upstream of the pond was undertaken. In the newly exposed portion of the channel the creek is back within its former channel with no water flowing over the ice.

Other:

Conference Call was held today at 2:00pm. A project update was provided to those on the conference call.

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PROJECT MEMORANDUM

To:	SRK Consulting Inc.	Fax No.:	Via e-mail
Attention:	Cam Scott	CC:	Bruce Ford Dana Haggar
From:	Gerry Ferris	Date:	November 18, 2003
Subject:	Daily report – FWSD Breach project		
No. of Pages (including this page): 2		Project No:	0257-012-09

Weather:

Temperature ranged from -22°C to -30°C, with overcast conditions, slight breeze throughout the day with light snow starting in the late afternoon.

Construction Activities:

Continued bulk excavation of the breach. Spoil generated from this process was taken to the spoil area within the former spillway, the spoil area upstream of the dam and the spoil area on the downstream side of the dam. Sorting of the spoil continues, the core material is being placed in the downstream section of the spillway spoil area.
Continuing pumping creek water around the construction site.
The 1969 berm was encountered and the spoil from this berm was taken to the PAG stockpile.
Clearing of the brush from the lowest portion of the channel commenced.

Engineering/construction issues:

Water levels behind the coffer dam were surveyed this morning. The water level had dropped by about 0.5 m since pumping was initiated with the 4", 8" and 10" pumps (note that there had been no water level drop until the 10" pump was installed). The 8" pump was removed and a second 10" pump was installed in an attempt to lower the water behind the coffer dam faster.

Estimated volume of soil removed from the breach, start of day Nov. 18 (ie end of day 17^{th}), is about 35,400 m^3 (based on the contractors load count, no surveyed measurements).

Photos:

Attached to this report are photos showing the progress to date of the bulk excavation, the exposed portion of the 1969 berm and the final fish out of the pond near the LLO.

Water Monitoring:

TSS monitoring of the four monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. It should be noted that no construction water was encountered at the site at this time. When the removal of water from the construction site becomes necessary monitoring will commence at FWSD-3.

Date	FWSD – 1	FWSD – 2	FWSD – 4	FWSD – 5
November 17	>1	7	4	3
November 18	>1	4	4	4
November 19				
November 20				
November 21				
November 22				
November 23				

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

Env. Monitoring

Oil drip on Rock Truck (unit 7305) was discussed with the superintendent and protocols were developed to deal with it.

Final fish salvage was performed on the pond around the LLO. 15 passes were made with a seinn net and 6 slimy sculpins were captured (20 to 40 mm range).

Stream channel upstream of the remaining pond from the reservoir was surveyed on foot. This section of the creeks appears to be well channelized.

Received a list of the hazardous products that are stored by Pelly at the Fresh Water Dam Breach job site.

Other:

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PROJECT MEMORANDUM

To:	**SRK Consulting Inc.**	**Fax No.:**	**Via e-mail**
Attention:	**Cam Scott**	**CC:**	**Bruce Ford**
			Dana Haggar
From:	**Gerry Ferris**	**Date:**	**November 19, 2003**
Subject:	**Daily report – FWSD Breach project**		
No. of Pages (including this page): 2		**Project No:**	**0257-012-09**

Weather:

Temperature ranged from -28°C to -36°C, with clear sky and very slight breeze.

Construction Activities:

Continued bulk excavation of the breach. Spoil generated from this process was taken to the spoil area within the former spillway, the spoil area upstream of the dam and the spoil area on the downstream side of the dam. Sorting of the spoil continues, the core material is being placed in the downstream section of the spillway spoil area.
Continuing pumping creek water around the construction site, through the LLO pipe.
Started final slope dressing of the portion of the excavation above the upper 2 m wide bench.
Cleared an expanded spoil area near the spillway.

Engineering/construction issues:

Following the installation of the second 10" pump (pumping using two 10" pumps and one 4" pump) yesterday the water level in the remaining pond was lowered completely, so that only channel flow was occurring. A water level drop of about 1.5 m occurred throughout the night. The water coming to the pumps consisted of creek flow and ground water discharge. Preparation for changing the pumping arrangement are under way, planning to pump from the creek up the face of the dam to a flume pipe that would outlet water downstream of the construction area.

Contractor now has a dedicated pump operator for both the day and night shift to ensure that pumping matches inflows. Contingency plans for generator and pump failure are being brought into force, ie. back up generators and pumps.

Estimated volume of soil removed from the breach, start of day Nov. 19 (ie end of day 18th), is about 40,200 m^3 (based on the contractors load count, no surveyed measurements).

The excavation has, in places, reached to the final floodplain elevation. Excavation on this final level of the breach has extended approximately 40 m from the location of the former seepage collection trench.

Photos:

Attached to this report are photos showing the progress to date of the bulk excavation along with the rechannalized creek and the final slope dressing of the north side and work continuing on the south side.

Water Monitoring:

TSS monitoring of the four monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. It should be noted that no construction water was encountered at the site at this time. When the removal of water from the construction site becomes necessary monitoring will commence at FWSD-3.

Date	FWSD – 1	FWSD – 2	FWSD – 4	FWSD – 5
November 17	>1	7	4	3
November 18	>1	4	4	4
November 19	>1	5*	9*	8*
November 20				
November 21				
November 22				
November 23				

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

*a 500ml sample was used for this test, rather than the normal 1,000ml. Note rapid drawdown of the reservoir occurred between November 18 and 19.

Env. Monitoring

Stream channel upstream of the remaining pond from the reservoir was surveyed on foot. This section of the creek appears to be well channelized with a distinct channel visible. Some minor ponds of water developed on the surface of the ice, but no groundfast ice was encountered and the flow continues beneath the ice.

During a generator shut down, a review of the flow in the downstream section of the Fresh Water Channel revealed that groundwater discharge maintains a flow in the channel.

Other:

Performed an orientation session with three new personnel.

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PROJECT MEMORANDUM

To:	**SRK Consulting Inc.**	**Fax No.:**	**Via e-mail**
Attention:	**Cam Scott**	**CC:**	**Bruce Ford**
			Dana Haggar
From:	**Gerry Ferris**	**Date:**	**November 20, 2003**
Subject:	**Daily report – FWSD Breach project**		
No. of Pages (including this page): 3		**Project No:**	**0257-012-09**

Weather:

Temperature ranged from -25°C to -33°C, with clear sky and very slight breeze.

Construction Activities:

Continued bulk excavation of the breach. Spoil generated from this process was taken to the spoil area within the former spillway, the spoil area upstream of the dam and the spoil area on the downstream side of the dam. Sorting of the spoil continues, the core material is being placed in the downstream section of the spillway spoil area.
Started moving spoil via an access road on the upstream side of the dam.
Continuing pumping creek water around the construction site, through the LLO pipe.
Completed final slope dressing of the portion of the excavation above the upper 2 m wide bench and forming of the upper bench.

Engineering/construction issues:

Some problems were experienced with the generator during the cold weather conditions, so some cycling of the water flow was experienced (note the increased TSS for today). Water levels now are typically within the base of the creek and pumping is performed using one 10" and one 4" pump.

The 12" diameter PVC pipe was re-aligned so that water being pumped around the site no longer forms a pond. This pond around the LLO inlet will be removed tomorrow.

Preliminary layout of the inlet structure was performed to allow the contractor to plan the location of the sump.

Estimated volume of soil removed from the breach, start of day Nov. 20 (ie end of day 19th), is about 46,000 m^3 (based on the contractors load count, no surveyed measurements).

Both the north and the south sides of the excavation have been trimmed, also the upper bench has been formed. Excavation near the final floodplain level continued until approximately 40 m from the upstream toe of the dam.

A minor seep was encountered within the excavation, this was quickly frozen and did not result in the need to pump out as construction water.

Photos:

Attached to this report are photos showing the progress to date of the bulk excavation along with the upper slope section and upper bench.

Water Monitoring:

TSS monitoring of the four monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. It should be noted that no construction water was encountered at the site at this time. When the removal of water from the construction site becomes necessary monitoring will commence at FWSD-3.

Date	FWSD – 1	FWSD – 2	FWSD – 4	FWSD – 5
November 17	>1	7	4	3
November 18	>1	4	4	4
November 19	>1	5*	9*	8*
November 20	1	58*	33*	15*
November 21				
November 22				
November 23				

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

*a 500ml sample was used for this test, rather than the normal 1,000ml. Note rapid drawdown of the reservoir occurred between November 18 and 19. Note pumps started and stopped between November 19 and 20.

Env. Monitoring

Stream channel downstream of the construction side was surveyed on foot. The effects of water level cycling was apparent, with some water being backed up above the ice and about 50% of the total flow being above the ice.

Despite the water level fluctuations caused by the stoppage of pumping the upstream section of the channel remained within its channel and flow remained beneath the ice.

During the night shift, two separate hoses ruptured on the 1100 excavator. The total spilled hydraulic fluid was less than 3 litres and was recovered by shovel (into the 45 gallon barrel)

Some oil was spilled at the generator during the night (engine blow by). This oil did not extend outside of the bermed and lined area beneath the generator. This oil was clean up using absorbent pads.

Other:

Bud McAlpine and Milos Stepanek visited the site today.

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PROJECT MEMORANDUM

To:	**SRK Consulting Inc.**	**Fax No.:**	**Via e-mail**
Attention:	**Cam Scott**	**CC:**	**Bruce Ford**
			Dana Haggar
From:	**Gerry Ferris**	**Date:**	**November 21, 2003**
Subject:	**Daily report – FWSD Breach project**		
No. of Pages (including this page): 3		**Project No:**	**0257-012-09**

Weather:

Temperature ranged from -12°C to -25°C, with clear sky in the morning changing to overcast in the afternoon. Winds ranged from 10 to 30 km/h.

Construction Activities:

Continued bulk excavation of the breach. Spoil generated from this process was taken to the spoil area within the former spillway, the spoil area upstream of the dam and the spoil area on the downstream side of the dam. Sorting of the spoil continues, the core material is being placed in the downstream section of the spillway spoil area.
Continued pumping creek water around the construction site, through the LLO pipe.
Preparations are underway to pump water around the construction site using the existing pumps and a series of pipes to bring the water into the downstream portion of the Fresh Water Channel.
Started final slope dressing of the portion of the excavation between the upper and lower bench (north side).
A back-up generator was brought to site yesterday. Today a berm was constructed around the trailer and it was hooked up and a trial run of the pumps was undertaken using the back-up generators.

Engineering/construction issues:

The small pond that previously was located adjacent to the LLO inlet location was removed.

Preliminary planning for the location of the sump was undertaken.

Estimated volume of soil removed from the breach, start of day Nov. 21 (ie end of day 20th), is about 51,000 m^3 (based on the contractors load count, no surveyed measurements).

The north side of the excavation was undergoing final trimming between the upper and lower benches. Surveyors were working placing grade stakes.

Layout of the clearing limits for the fill to be placed in the Fresh Water Channel was undertaken, this is to be reviewed tomorrow.

Change for pumping through the LLO to pumping around the site in a flume is planned for Monday. Also the upstream sump construction is planned for Monday.

Photos:

Attached to this report are photos showing the progress to date of the bulk excavation and the berms surrounding the two generators.

Water Monitoring:

TSS monitoring of the four monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. It should be noted that no construction water was encountered at the site at this time. When the removal of water from the construction site becomes necessary monitoring will commence at FWSD-3.

Date	FWSD – 1	FWSD – 2	FWSD – 4	FWSD – 5
November 17	>1	7	4	3
November 18	>1	4	4	4
November 19	>1	5*	9*	8*
November 20	1	58*	33*	15*
November 21	>1	21*	20*	7*
November 22				
November 23				

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

*a 500ml sample was used for this test, rather than the normal 1,000ml. Note rapid drawdown of the reservoir occurred between November 18 and 19. Note pumps started and stopped between November 19 and 20.

Env. Monitoring

During the final draining of the small pond located near the LLO, 14 slimy slupin were encountered. These fish were released to the downstream environment.

Planning is underway as part of the construction of the sump. Brad Finnson will be back, on site for this construction.

Other:

Bud McAlpine and Milos Stepanek visited the site today.

An EMP orientation session was undertaken today with six new construction staff.

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PROJECT MEMORANDUM

To:	**SRK Consulting Inc.**	**Fax No.:**	**Via e-mail**
Attention:	**Cam Scott**	**CC:**	**Bruce Ford**
			Dana Haggar
From:	**Gerry Ferris**	**Date:**	**November 22, 2003**
Subject:	**Daily report – FWSD Breach project**		
No. of Pages (including this page): 2		**Project No:**	**0257-012-09**

Weather:

Temperature ranged from -9°C to -16°C, with clear sky in the morning changing to overcast in the afternoon with light snow starting at about 2:00 pm. Winds in the morning were about 10 km/h reducing to a slight breeze in the afternoon.

Construction Activities:

Continued bulk excavation of the breach. Spoil generated from this process was taken to the spoil area within the former spillway, the spoil area upstream of the dam and the spoil area on the downstream side of the dam. Sorting of the spoil continues, the core material is being placed in the downstream section of the spillway spoil area.
Continued pumping creek water around the construction site, through the LLO pipe.
Continued preparations for pipe/flume construction for pumping water completely around the construction site.
Completed final slope dressing for the portion of the excavation between the upper and lower bench (north side). Started final slope dressing of this portion of the excavation on the south side.

Engineering/construction issues:

Sump location was finalized and is likely to be constructed on Monday. The location is near the current pump location, within a small backwater channel.

Estimated volume of soil removed from the breach, start of day Nov. 22 (ie end of day 21th), is about 56,000 m^3 (based on the contractors load count, no surveyed measurements).

Surveyors completed a portion of remaining original ground survey on the upstream side of the dam (following removal of ice by the contractor). The cutslopes for this portion of the excavation was laid out.

Clearing limits for the fill to be placed in the fresh water channel were slightly modified based on a review by the Engineer.

Surveyors (working for the contractor) laid out the preliminary position of the channel and daylight stakes near the outlet of the construction works.

Photos:

Attached to this report are photos showing the progress to date of the bulk excavation, the clearing completed for the downstream portion of the floodplain and the position of the pipe to be used to transfer water around the site.

Water Monitoring:

TSS monitoring of the four monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. It should be noted that no construction water was encountered at the site at this time. When the removal of water from the construction site becomes necessary monitoring will commence at FWSD-3.

Date	FWSD – 1	FWSD – 2	FWSD – 4	FWSD – 5
November 17	<1	7	4	3
November 18	<1	4	4	4
November 19	<1	5*	9*	8*
November 20	1	58*	33*	15*
November 21	<1	21*	20*	7*
November 22	<1	15	13	3
November 23				

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

*a 500ml sample was used for this test, rather than the normal 1,000ml. Note rapid drawdown of the reservoir occurred between November 18 and 19. Note pumps started and stopped between November 19 and 20.

Env. Monitoring

The pipe around the site is being placed in preliminary position; this is to be reviewed prior to finalization to ensure discharge to ensure discharge does not result in excessive erosion. This was discussed with the contractor.

Other:

None.

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PROJECT MEMORANDUM

To:	**SRK Consulting Inc.**	**Fax No.:**	**Via e-mail**
Attention:	**Cam Scott**	**CC:**	**Bruce Ford**
			Dana Haggar
From:	**Gerry Ferris**	**Date:**	**November 23, 2003**
Subject:	**Daily report – FWSD Breach project**		
No. of Pages (including this page): 2		**Project No:**	**0257-012-09**

Weather:

Temperature ranged from -12°C to -18°C, with clear to partial cloudy conditions. Winds ranged from a light breeze to about 10 km/h.

Construction Activities:

Continued bulk excavation of the breach. Spoil generated from this process was taken to the spoil area within the former spillway, the spoil area upstream of the dam and the spoil area on the downstream side of the dam. Sorting of the spoil continues, the core material is being placed in the downstream section of the spillway spoil area.
Continued pumping creek water around the construction site, through the LLO pipe.
Continued preparations for pipe/flume construction for pumping water completely around the construction site.
Completed final slope dressing on both the north an south sides. Started final slope dressing between the lower bench and floodplain.

Note: Work with the 1100 excavator (and the haul trucks) was halted at about 1:00 pm today to complete some repairs. The machine should be back in service for the night shift. Slope trimming continued with the Linkbelt and the crawler tractor.

Engineering/construction issues:

Estimated volume of soil removed from the breach, start of day Nov. 23 (ie end of day 22^{th}), is about 60,500 m^3 (based on the contractors load count, no surveyed measurements).

Valves were installed on the upstream end of the 24 inch PVC pipe. These valves will be used to help control the pumping rate (ie. matching output from the pumps to the inflow from the creek).

Surveyors (working for the contractor) continued placing slope staked for final trimming.

Photos:

Attached to this report are photos showing the progress to date on the upstream side and the clearing and excavation that has occurred on the upstream side.

Water Monitoring:

TSS monitoring of the four monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. It should be noted that no construction water was encountered at the site at this time. When the removal of water from the construction site becomes necessary monitoring will commence at FWSD-3.

Date	FWSD – 1	FWSD – 2	FWSD – 4	FWSD – 5
November 17	<1	7	4	3
November 18	<1	4	4	4
November 19	<1	5*	9*	8*
November 20	1	58*	33*	15*
November 21	<1	21*	20*	7*
November 22	<1	15	13	3
November 23	<1	16	19	9

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

*a 500ml sample was used for this test, rather than the normal 1,000ml. Note rapid drawdown of the reservoir occurred between November 18 and 19. Note pumps started and stopped between November 19 and 20.

Env. Monitoring

None.

Other:

None.

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PROJECT MEMORANDUM

To:	**SRK Consulting Inc.**	**Fax No.:**	**Via e-mail**
Attention:	**Cam Scott**	**CC:**	**Bruce Ford**
			Dana Haggar
From:	**Gerry Ferris**	**Date:**	**November 24, 2003**
Subject:	**Daily report – FWSD Breach project**		
No. of Pages (including this page): 3		**Project No:**	**0257-012-09**

Weather:

Temperature ranged from -14°C to -18°C, with overcast conditions. Winds ranged from about 10 km/h to 15 km/h with light snow throughout the day.

Construction Activities:

Continued bulk excavation of the breach. Spoil generated from this process was taken to the spoil area within the former spillway, the spoil area upstream of the dam and the spoil area on the downstream side of the dam. Sorting of the spoil continues, the core material is being placed in the downstream section of the spillway spoil area.
Continued pumping creek water around the construction site, through the LLO pipe.
Continued preparations for pipe/flume construction for pumping water completely around the construction site.
Continued slope dressing between the lower bench and floodplain, mostly on the south side of the breach.
Constructed the sump within a side channel adjacent to the main stem of South Fork Rose Creek. This included the construction of a small berm on the downstream side of the sump.

Repairs continue on the 1100 excavator.

Engineering/construction issues:

Estimated volume of soil removed from the breach, start of day Nov. 24 (ie end of day 23^{th}), is about 62,000 m^3 (based on the contractors load count, no surveyed measurements).

Sump construction was performed in a small side channel. The sump construction was performed by first placing sand bags to prevent migration of the construction water generated in the sump from entering the creek (pumping of creek water continued throughout). A small berm was constructed on the downstream end of the sump location. The water was left to settle overnight, and will be evaluated in the morning for further need for clarification.

Surveyors (working for the contractor) continued placing slope staked for final trimming.

Surveyors picked up additional information for clearing limits and performed additional topographical pickup and layout in the fill area around the LLO inlet structure.

Photos:

Attached to this report are photos showing the progress of slope trimming and continuing bulk excavation above the floodplain level and the excavation of the sump (note the turbid water and the small dike constructed on the downstream side of the sump).

Water Monitoring:

TSS monitoring of the four monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. It should be noted that no construction water was encountered at the site at this time. When the removal of water from the construction site becomes necessary monitoring will commence at FWSD-3.

Date	FWSD – 1	FWSD – 2	FWSD – 4	FWSD – 5
November 24	<1	15	15	1
November 25				
November 26				
November 27				
November 28				
November 29				
November 30				

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

Env. Monitoring

During the sump construction some highly turbid water escaped from the sump construction area and was discharged downstream via the pumps and LLO. The estimated time of impact was less than 45 minutes and the fine material consisted of silt and organic matter. Approximately 45 minutes after the release the water running through the LLO was again clear. This happened despite precautions taken against such an occurrence and was the result of unanticipated ground conditions that were buried under ice prior to initiation of construction. Monitoring of the released sediment will be performed and following the construction of the berm on the downstream side of the sump a release of turbid water is not expected to re-occur.

A follow-up inspection of the downstream creek was performed; over ice flow is continuing to occur in the area near the confluence of the fresh water channel and the natural channel and about 300 m downstream. Beyond this the channel is flowing underneath the ice.

The 1100 excavator is currently out of service for repairs and is currently parked adjacent to the concrete wing wall of the former spillway. The equipment needs to be refuelled occasionally during this service (it is left running so as not to freeze) and was parked outside of the designated fuelling area. The contractor was directed to have on hand appropriate spill contingency equipment and also have additional manpower available to deal with any spills during fuelling, if a spill occurred. The location of the 1100 excavator is more then 100 m away from the nearest water course.

The soil removed as part of the oil leak of a couple of days ago was removed from the refuelling area and taken to the on site disposal area.

Other:

Participated in a conference call for the project at 2:00 pm.

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PROJECT MEMORANDUM

To:	**SRK Consulting Inc.**	**Fax No.:**	**Via e-mail**
Attention:	**Cam Scott**	**CC:**	**Bruce Ford**
			Dana Haggar
From:	**Gerry Ferris**	**Date:**	**November 25, 2003**
Subject:	**Daily report – FWSD Breach project**		
No. of Pages (including this page): 3		**Project No:**	**0257-012-09**

Weather:

Temperature ranged from -21°C to -29°C, with overcast conditions. Winds ranged from a light breeze to about a 10 km/h wind.

Construction Activities:

Continued bulk excavation of the breach. Spoil generated from this process was taken to the spoil area within the former spillway, the spoil area upstream of the dam and the spoil area on the downstream side of the dam. Sorting of the spoil continues, the core material is being placed in the downstream section of the spillway spoil area.
Continued pumping creek water around the construction site, through the LLO pipe.
Continued preparations for pipe/flume construction for pumping water completely around the construction site.
Continued slope dressing between the lower bench and floodplain on both sides. Excavation is now lowered to the elevation of the top of the rip rap excavation.

Engineering/construction issues:

Estimated volume of soil removed from the breach, start of day Nov. 25 (ie end of day 24th), is about 65,000 m^3 (based on the contractors load count, no surveyed measurements).

Surveyors (working for the contractor) continued placing slope staked for final trimming and top of the excavation for rip rap.

The geotextile that the contractor brought to site was inspected and approved.

Photos:

Attached to this report are photos showing the progress of slope trimming and continuing bulk excavation above the floodplain level and the pumping of turbid water from the sump into the reservoir to clear.

Water Monitoring:

TSS monitoring of the four monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. It should be noted that no construction water was encountered at the site at this time. When the removal of water from the construction site becomes necessary monitoring will commence at FWSD-3.

Date	FWSD – 1	FWSD – 2	FWSD – 4	FWSD – 5
November 24	<1	15	15	1
November 25	<1	13	27	5
November 26				
November 27				
November 28				
November 29				
November 30				

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

Env. Monitoring

The water within the sump was measured in the morning and contained very high turbidity. A small gasoline powered pump was used to pump the water from the sump into a low area of the former reservoir base in order to clear the water prior to its use for pumping. The pump was contained within a metal boat and portions of the spill contingency barrel was brought to this location (absorbent pads and a floating berm).

An oil leak (less than 1 L) occurred from the gasoline powered pump, this was all contained within the boat and was promptly cleaned up using absorbent pads.

The water within the creek and the sump was tested for turbidity throughout the day. The turbidity in the creek was maintained throughout the day at very low levels. The measured turbidity in the pond was very high in the morning and by the end of day reduced (by the pumping efforts) to slightly above creek levels. It is anticipated that tomorrow the sump will be sufficiently clean to be used as the primary pumping location. This will be confirmed.

Most of the ice within the fresh water channel was cleared in preparation for fish salvage.

Other:

Yukon Water resources inspector visited the site today and expressed no concerns.

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PROJECT MEMORANDUM

To:	SRK Consulting Inc.	Fax No.:	Via e-mail
Attention:	Cam Scott	CC:	Bruce Ford
			Dana Haggar
From:	Gerry Ferris	Date:	November 26, 2003
Subject:	Daily report – FWSD Breach project		
No. of Pages (including this page): 3		Project No:	0257-012-09

Weather:

Temperature ranged from -19°C to -29°C, with clear conditions in the morning changing to overcast in the afternoon with light snow starting at 4:00 pm. Winds ranged from a light breeze to about a 10 km/h wind.

Construction Activities:

Continued bulk excavation of the breach. Spoil generated from this process was taken to the spoil area within the former spillway, the spoil area upstream of the dam and the spoil area on the downstream side of the dam.
Continued pumping creek water around the construction site, through the LLO pipe.
Final preparations were made for the piping of the creek water around the site, however upon completing the final connection one of the flanges broke. This will require repairs tomorrow prior to starting pumping using the pipe.
Continued slope dressing between the lower bench and floodplain on both sides. Excavation has now progressed to the elevation of the floodplain for the majority of the construction site.
Hauling of spoil to the upstream side of the dam commenced, this spoil will be used to cover the LLO inlet structure.

Engineering/construction issues:

Estimated volume of soil removed from the breach, start of day Nov. 26 (ie end of day 25th), is about 69,000 m^3 (based on the contractors load count, no surveyed measurements).

Surveyors (working for the contractor) continued placing slope staked for final trimming and top of the excavation for rip rap.

Water is now present on the base of the excavation. The water is contained within a number of low spots and has not yet required pumping from the construction site. It is anticipated that pumping will commence once further excavation is undertaken (for the channel or rip rap).

The final preparations for piping water around the construction site were made. The 10 inch pumps were shut down in order to make the tie in (running the 4 inch pump to maintain flow in the downstream channel). The tie in of the PVC pipe was started but the flange broke on the portion of the PVC pipe which was to take the water over the dam. Repairs will be attempted tomorrow so as to start pumping water around the site. If repairs are not possible, other alternatives will be sought.

Photos:

Attached to this report are photos showing the progress of continuing bulk excavation, a view of water in the base of the excavation and performance of fish salvage downstream of the valve house.

Water Monitoring:

TSS monitoring of the four monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. It should be noted that no construction water was encountered at the site at this time. When the removal of water from the construction site becomes necessary monitoring will commence at FWSD-3.

Date	FWSD – 1	FWSD – 2	FWSD – 4	FWSD – 5
November 24	<1	15	15	1
November 25	<1	13	27	5
November 26	<1	9	10	1
November 27				
November 28				
November 29				
November 30				

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

Env. Monitoring

Fish salvage was undertaken on the stream channel extending from the valve house to the down stream tie in point. The stream was electro shocked for a total of 2468 seconds. 43 Slimy sculpin, 3 Burbot and 2 Arctic Grayling were captured and released down stream of the tie in point.

A leak in the hydraulic system was detected on the 1100 excavator. A leak was also identified on one of the dump trucks. Roy Smith was notified and appropriate clean up and leak suppression measures were undertaken.

Seapage water began to daylight in small quantity at a single site in the construction area. The location will be monitored for further development.

The ice dam that had formed 250 meters down stream of the construction area was assessed. Most of the stream flow remains channelised with a portion overflowing and glaciating in low lying areas adjacent to the stream channel. Stream flows below the ice dam remain strong. The ice dam does not appear to pose as a barrier to fish movement.

Other:

None.

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PROJECT MEMORANDUM

To:	**SRK Consulting Inc.**	**Fax No.:**	**Via e-mail**
Attention:	**Cam Scott**	**CC:**	**Bruce Ford**
			Dana Haggar
From:	**Gerry Ferris**	**Date:**	**November 27, 2003**
Subject:	**Daily report – FWSD Breach project**		
No. of Pages (including this page): 3		**Project No:**	**0257-012-09**

Weather:

Temperature ranged from -21°C to -31°C, with overcast conditions and light snow starting at 3:30 pm. Winds ranged from a light breeze to about 5 km/h.

Construction Activities:

The bulk excavation is nearing completion, with approximately 500 m^3 to be completed. Spoil generated from this process was taken to the spoil area within the former spillway, the spoil area upstream of the dam and the spoil area on the downstream side of the dam.
Continued pumping creek water around the construction site, through the LLO pipe.
Repairs to the pipe system were undertaken.
Started excavation for placement of rip rap erosion protection.
Completed the excavation for the base of riffle 4.
Hauling of spoil to the upstream side of the dam will be completed once the bulk excavation is completed.

Engineering/construction issues:

Estimated volume of soil removed from the breach, start of day Nov. 27 (ie end of day 26th), is about 71,000 m^3 (based on the contractors load count, no surveyed measurements).

Surveyors (working for the contractor) continued placing slope stakes for excavation of the riprap structures and for riffle 4.

The excavation for riffle 4 is located near the downstream limit of construction that can be completed without disturbance of the fresh water channel. It is the contractor's intention to use this excavation as a sump location for construction water, if necessary.

Photos:

Attached to this report are photos showing the progress of continuing bulk excavation and a view of the start of the excavation for the erosion protection rip rap.

Water Monitoring:

TSS monitoring of the five monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. During the attempt yesterday (Nov. 26) to attach the piping system some water was spilled into the area surrounding the LLO inlet. This water is within the disturbed construction area and was tested today as construction water. As indicated the tested water did not met discharge criteria and was not moved.

Date	FWSD – 1	FWSD – 2	FWSD - 3	FWSD – 4	FWSD – 5
November 24	<1	15		15	1
November 25	<1	13		27	5
November 26	<1	9		10	1
November 27	<1	7	121	9	2
November 28					
November 29					
November 30					

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

Env. Monitoring

A leak in the hydraulic system was detected on the 1100 excavator during the night shift. A fule leak was also identified the 1100 excavator during the start of the day shift (about 10 litres). Both leaks were cleaned up and repairs were undertaken to stop the leaks. The excavator was shut down following discovery of the leak and was not restarted until the leaking hose was repaired.

The water within the base of the excavation has not yet begun to flow or require pumping.

Other:

Bud McAlpine and Sandra Orban visited the site today.

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PROJECT MEMORANDUM

To:	**SRK Consulting Inc.**	**Fax No.:**	**Via e-mail**
Attention:	**Cam Scott**	**CC:**	**Bruce Ford**
			Dana Haggar
From:	**Gerry Ferris**	**Date:**	**November 28, 2003**
Subject:	**Daily report – FWSD Breach project**		
No. of Pages (including this page): 2		**Project No:**	**0257-012-09**

Weather:

Temperature ranged from -18°C to -29°C, with overcast conditions. Winds ranged from 20 to 30 km/h, making conditions extremely cold.

Construction Activities:

The bulk excavation was completed during the night shift.
Continued pumping creek water around the construction site, through the LLO pipe until 4:00 pm and then through the pipe system.
The newly constructed flange to complete the 24 inch diameter pipe system was installed.
A small berm was created adjacent to the spoil pile for trapping of construction water.
Continued excavation for placement of rip rap erosion protection, spoil is being taken to the spoil area within the former spillway. For a portion of the construction this excavation extends fully to the base of the rip rap structure, with no construction water in evidence.

Engineering/construction issues:

Estimated volume of soil removed from the breach, start of day Nov. 28 (ie end of day 27th), is about 73,000 m^3 (based on the contractors load count, no surveyed measurements). This represents the bulk excavation to date. As noted the bulk excavation is largely complete, with only a small portion of bulk excavation remaining on the south bank of the fresh water channel and at the coffer dam.

Surveyors (working for the contractor) continued placing slope stakes for excavation of the riprap structures.

Water is now flowing through the pipe system around the construction site. This will continue for a couple of days prior to the abandonment of the fresh water channel.

A small flow is currently being maintained in the fresh water channel through the use of the 4 inch diameter pump. The fresh water channel will be maintained as a contingency if something were to go wrong with the pipe system, water could be diverted back into the LLO inlet and through the channel.

Photos:

Attached to this report are photos showing the progress of the excavation for placement of erosion protection rip rap and the excavation for Riffle 4.

Water Monitoring:

TSS monitoring of the five monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. During the attempt on Nov. 26 to attach the piping system some water was spilled into the area surrounding the LLO inlet. This water is within the disturbed construction area and was tested today as construction water. As indicated the tested water did not met discharge criteria and was not moved.

Date	FWSD – 1	FWSD – 2	FWSD - 3	FWSD – 4	FWSD – 5
November 24	<1	15		15	1
November 25	<1	13		27	5
November 26	<1	9		10	1
November 27	<1	7	121	9	2
November 28	<1	7	95	11	1
November 29					
November 30					

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

Env. Monitoring

The contractor was directed to place a pan or absorbent pads underneath a rock truck (unit 7305) to contain a leak. This truck has experienced an ongoing leak problem since the start of the construction project. Contingencies have been in place throughout the project to minimize the leak, but based on the construction now being advanced to the final grades this truck is not to the used.

Other:

Bud McAlpine and Sandra Orban visited the site today.

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PROJECT MEMORANDUM

To:	**SRK Consulting Inc.**	**Fax No.:**	**Via e-mail**
Attention:	**Cam Scott**	**CC:**	**Bruce Ford**
			Dana Haggar
From:	**Gerry Ferris**	**Date:**	**November 29, 2003**
Subject:	**Daily report – FWSD Breach project**		
No. of Pages (including this page): 3		**Project No:**	**0257-012-09**

Weather:

Temperature ranged from -15°C to -24°C, with partly cloudy conditions becoming overcast in the afternoon. Winds were about 15 to 20 km/h in the morning, the winds reduced to about 5 km/h. Light snow between about 10:30 to 2:00pm. Overnight about 2 cm of snow fell.

Construction Activities:

Continued pumping creek water around the construction site via the pipe system.
Pipe was laid to transfer the construction water from the sump located at riffle 4 to the bermed area constructed yesterday.
Continued excavation for placement of rip rap erosion protection, spoil is being taken to the spoil area within the former spillway. The erosion protection excavation now extends (on both the right and left banks completely through the main body of the dam.

Engineering/construction issues:

The excavation volume below the floodplain base on the morning of Nov. 29 (ie. end of night on Nov 28) is 2,000 m3 (based on contractors load counts, not surveyed quantities). This quantity includes excavation for erosion protection, channel excavation and riffle excavation.

Surveyors (working for the contractor) continued placing slope stakes for excavation of the riprap structures and riffles.

A small flow is currently being maintained in the fresh water channel through the use of the 4 inch diameter pump. The fresh water channel will be maintained as a contingency if something were to go wrong with the pipe system, water could be diverted back into the LLO inlet and through the channel.

The erosion protection excavation now extends nearly through the body of the dam. This excavation is also being used to transfer the small amount of construction water to the sump created by the excavation of riffle 4.

The erosion protection excavation includes the following two features; extension of the base of the excavation for the riffle and extension into the sideslope to increase the thickness when the channel is close to the edge of the floodplain.

Photos:

Attached to this report are photos showing the progress of the excavation for placement of erosion protection rip rap and the flow of construction water along the open excavation for the erosion protection (outletting at Riffle 4).

Water Monitoring:

TSS monitoring of the five monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. During the attempt on Nov. 26 to attach the piping system some water was spilled into the area surrounding the LLO inlet, also some water leaks at the flange. This water is within the disturbed construction area and was tested today as construction water. The construction water near the LLO inlet now meets criteria for discharge, the contractor was informed.

Date	FWSD – 1	FWSD – 2	FWSD - 3	FWSD – 4	FWSD – 5
November 24	<1	15		15	1
November 25	<1	13		27	5
November 26	<1	9		10	1
November 27	<1	7	121	9	2
November 28	<1	7	95	11	1
November 29	1	2	4	4	3
November 30					

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

Env. Monitoring

Discussion was held with the contractor on the final dressing of the surface and edges of the spoil areas. The contractor was directed to maintain the spoil area within the spillway with a route for two small ephemeral creeks. This drainage will be directed towards the existing CMP culverts. The downslope edge of the other two spoil areas will be dressed with a smooth slope and will have a small berm at the toe.

A review of the pool located downstream from the valve house revealed that no fish were present.

Construction water is now flowing, in a small volume along the base of the excavation for the erosion protection and into the sump created by the excavation for riffle 4.

Other:

Discussion was held with the contractor about the potential removal of about 2,300 m^3 PAG rock adjacent to the dam and its disposal within the current PAG disposal area.

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PROJECT MEMORANDUM

To:	**SRK Consulting Inc.**	**Fax No.:**	**Via e-mail**
Attention:	**Cam Scott**	**CC:**	**Bruce Ford**
			Dana Haggar
From:	**Gerry Ferris**	**Date:**	**November 30, 2003**
Subject:	**Daily report – FWSD Breach project**		
No. of Pages (including this page): 3		**Project No:**	**0257-012-09**

Weather:

Temperature ranged from -16°C to -34°C. The morning was clear with a slight breeze with temperatures about -30°C. The temperature warmed throughout the day until about 2:00 pm, when the temperature was -16°C, but the wind picked upto 40 to 50 km/h and overcast.

Construction Activities:

Continued pumping creek water around the construction site via the pipe system.
Working on getting a pump set up for the construction water.
Continued excavation for placement of rip rap erosion protection, spoil is being taken to the spoil area within the former spillway. The erosion protection excavation now extends (on both the right and left banks completely through the main body of the dam. Final grading is being performed in preparation for rip rap placement.

Engineering/construction issues:

The excavation volume below the floodplain base on the morning of Nov. 30 (ie. end of night on Nov 29) is 3,700 m3 (based on contractors load counts, not surveyed quantities). This quantity includes excavation for erosion protection, channel excavation and riffle excavation.

Approved a portion of the erosion protection for placement, this was the right side of the excavation between station 0+50 and 0+130.

Surveyors (working for the contractor) continued placing slope stakes for excavation of the riprap structures and riffles.

A small flow is currently being maintained in the fresh water channel through the use of the 4 inch diameter pump. The fresh water channel will be maintained as a contingency if something were to go wrong with the pipe system, water could be diverted back into the LLO inlet and through the channel.

The erosion protection excavation now extends nearly through the body of the dam, final grading is being performed for this portion. This excavation is also being used to transfer the small amount of construction water to the sump created by the excavation of riffle 4.

The erosion protection excavation includes the following two features; extension of the base of the excavation for the riffle and extension into the sideslope to increase the thickness when the channel is close to the edge of the floodplain.

Photos:

Attached to this report are photos showing the progress of the excavation for placement of erosion protection rip rap and excavation downstream of Riffle 4.

Water Monitoring:

TSS monitoring of the five monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. During the attempt on Nov. 26 to attach the piping system some water was spilled into the area surrounding the LLO inlet, also some water leaks at the flange. This water is within the disturbed construction area and was tested today as construction water. The construction water near the LLO inlet now meets criteria for discharge, the contractor was informed.

Date	FWSD – 1	FWSD – 2	FWSD - 3	FWSD – 4	FWSD – 5
November 24	<1	15		15	1
November 25	<1	13		27	5
November 26	<1	9		10	1
November 27	<1	7	121	9	2
November 28	<1	7	95	11	1
November 29	1	2	4	4	3
November 30	<1	2	3	2	1

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

Env. Monitoring

Construction water is now flowing, in a small volume along the base of the excavation for the erosion protection and into the sump created by the excavation for riffle 4. The pumping system is not yet working, but the water is ponding in the riffle 4 location and all remains within the construction site.

Other:

YES changed survey crew.

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PROJECT MEMORANDUM

To:	SRK Consulting Inc.	Fax No.:	Via e-mail
Attention:	Cam Scott	CC:	Bruce Ford
			Dana Haggar
From:	Gerry Ferris	Date:	December 1, 2003
Subject:	Daily report – FWSD Breach project		
No. of Pages (including this page): 2		Project No:	0257-012-09

Weather:

Temperature ranged from -6°C to -12°C. The morning was clear with a slight breeze with temperatures about -12°C, wind picked up to 10 km/h about 10:00 am. Snow started about 3:00 pm and the wind picked up to about 50 km/h at 4:00 pm.

Construction Activities:

Continued pumping creek water around the construction site via the pipe system.
Pumped construction water to the bermed settling area twice during the day. No water was pumped from the settling area.
Continued excavation for placement of rip rap erosion protection, spoil is being taken to the spoil area within the former spillway. The erosion protection excavation now extends (on both the right and left banks completely through the main body of the dam. Final grading is being performed in preparation for rip rap placement.
Placed geotextile from station 0+40 to 0+190 on the right hand side and started placing rip-rap as part of this erosion protection structure.

Engineering/construction issues:

The excavation volume below the floodplain base on the morning of Nov. 30 (ie. end of night on Nov 29) is 4,500 m3 (based on contractors load counts, not surveyed quantities). This quantity includes excavation for erosion protection, channel excavation and riffle excavation.

Approved a portion of the erosion protection for placement, this was the right side of the excavation between station 0+40 to 0+50 and 0+130 to 0+190.

Surveyors (working for the contractor) continued placing slope stakes for excavation of the riprap structures and riffles.

A small flow is currently being maintained in the fresh water channel through the use of the 4 inch diameter pump. The fresh water channel will be maintained as a contingency if something were to go wrong with the pipe system, water could be diverted back into the LLO inlet and through the channel.

The erosion protection excavation now extends nearly through the body of the dam, final grading is being performed on the left side of the floodplain, for inspection tomorrow. This excavation is also being used to transfer the small amount of construction water to the sump created by the excavation of riffle 4.

Photos:

Attached to this report are photos showing the geotextile on the right side of the floodplain and a view of the surface of the rip rap placed in this erosion protection structure.

Water Monitoring:

TSS monitoring of four of the monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. Additionally water that is ponding next to the LLO inlet structure is being tested and treated as construction water (ie. subject to the same discharge criteria).

Date	FWSD – 1	FWSD – 2	LLO	FWSD – 4	FWSD – 5
December 1	<1	6	4	6	3
December 2					
December 3					
December 4					
December 5					
December 6					
December 7					

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

Env. Monitoring

Construction water is now flowing, in a small volume along the base of the excavation for the erosion protection and into the sump created by the excavation for riffle 4. The construction water ponds in the excavation for riffle 4 and is then pumped to the settling area as needed. There has been no need to start pumping water from the settling area to the creek. The small amount of water pumped to the settling area has frozen. This will continue to be monitored.

Other:

Participated in a conference call today to give an update on the construction progress.

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PROJECT MEMORANDUM

To:	**SRK Consulting Inc.**	**Fax No.:**	**Via e-mail**
Attention:	**Cam Scott**	**CC:**	**Bruce Ford**
			Dana Haggar
From:	**Gerry Ferris**	**Date:**	**December 2, 2003**
Subject:	**Daily report – FWSD Breach project**		
No. of Pages (including this page): 2		**Project No:**	**0257-012-09**

Weather:

Temperature ranged from 2°C to -20°C. The morning was overcast and warm. With wind varying throughout the day, some snow at 2:00 pm. The temperature dropped from 4:00 pm onwards to the low temperature at the end of the night.

Construction Activities:

Continued pumping creek water around the construction site via the pipe system.
Pumped construction water to the bermed settling area once during the day and separately to a portion of the brush area adjacent to the construction area. No water was pumped out from the settling area.
Continued placing rip rapon the right hand side of the excavation.
Placed geotextile from station 0+30 to 0+120 on the left hand side and started placing rip-rap as part of this erosion protection structure.

Engineering/construction issues:

The excavation volume below the floodplain base on the morning of Dec. 1 (ie. end of night on Nov 30) is 5,300 m3 (based on contractors load counts, not surveyed quantities). This quantity includes excavation for erosion protection, channel excavation and riffle excavation. Note that this volume includes overexcavation.

Approved a portion of the erosion protection for placement, this was the left side of the excavation between station 0+30 to 0+120.

Surveyors (working for the contractor) continued placing slope stakes for excavation of the riprap structures and riffles.

A small flow is currently being maintained in the fresh water channel through the use of the 4 inch diameter pump. The fresh water channel will be maintained as a contingency if something were to go wrong with the pipe system then water could be diverted back into the LLO inlet and through the channel.

The erosion protection excavation now extends nearly through the body of the dam, final grading is being performed on the left side of the floodplain. This excavation is also being used to transfer the small amount of construction water to the sump created by the excavation of riffle 4.

Photos:

Attached to this report are photos showing the progress of the excavation and a second is a close view of the rip rap placement.

Water Monitoring:

TSS monitoring of four of the monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. Additionally water that is ponding next to the LLO inlet structure is being tested and treated as construction water (ie. subject to the same discharge criteria).

Date	FWSD – 1	FWSD – 2	LLO	FWSD – 4	FWSD – 5
December 1	<1	6	4	6	3
December 2	<1	7	5	10	21
December 3					
December 4					
December 5					
December 6					
December 7					

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

Env. Monitoring

Construction water is now flowing, in a small volume along the base of the excavation for the erosion protection and into the sump created by the excavation for riffle 4. The construction water ponds in the excavation for riffle 4 and is then pumped to the settling area as needed. There has been no need to start pumping water from the settling area to the creek. The small amount of water pumped to the settling area has frozen. This will continue to be monitored.

Small drip leaks on the 1100 excavator, the 345 excavator and Unit 7305 were repaired today.

Other:

Barry Chilibeck visited the site today.

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PROJECT MEMORANDUM

To:	SRK Consulting Inc.	Fax No.:	Via e-mail
Attention:	Cam Scott	CC:	Bruce Ford Dana Haggar
From:	Gerry Ferris	Date:	December 3, 2003
Subject:	Daily report – FWSD Breach project		
No. of Pages (including this page): 3		Project No:	0257-012-09

Weather:

Temperature ranged from -18°C to -31°C. The morning was clear and changed to overcast throughout the day with a slight breeze.

Construction Activities:

Continued pumping creek water around the construction site via the pipe system.
Started preparations for a second pipe system.
Pumped construction water to a settling area within the brush to the north of the downstream end of the construction site. No water was pumped from the settling area.
Placed geotextile from station 0+120 to 0+200 on the left hand side and started placing rip-rap as part of this erosion protection structure.

Engineering/construction issues:

The excavation volume below the floodplain base on the morning of Dec. 2 (ie. end of night on Dec 2) is 5,500 m3 (based on contractors load counts, not surveyed quantities). This quantity includes excavation for erosion protection, channel excavation and riffle excavation. Note that this volume includes over-excavation.

Approved a portion of the erosion protection for placement, this was the left side of the excavation between station 0+120 to 0+220.

Surveyors (working for the contractor) continued placing slope stakes for excavation of the riprap structures, riffles and the remaining portion of the excavation.

Surveyors (working for the engineer) did a final topographic survey of the current PAG stockpile, the construction water berm and buried lines of the erosion protection structure, following acceptance of the works.

A small flow is currently being maintained in the fresh water channel through the use of the 4 inch diameter pump. The fresh water channel will be maintained as a contingency if something were to go wrong with the pipe system then water could be diverted back into the LLO inlet and through the channel.

The contractor plans to install a second pipe system on the right bank of the cut. This system will also pipe the water completely around the site, similar to the current pipe. However, the current system has a small but significant leak near the LLO inlet. This leak will make it impossible to abandon the LLO inlet until after the completion of all other work, therefore the contractor is installing this second pipe system to expedite the abandonment of the LLO.

The erosion protection excavation now extends through the body of the dam. The excavation for the erosion protection is being used to transfer the small amount of construction water to the sump created by the excavation of riffle 4. Pumping from the riffle 4 sump continues to a couple different settling areas.

Photos:

Attached to this report is a photo showing the progress of the placement of rip rap on the right side of the floodplain.

Water Monitoring:

TSS monitoring of four of the monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. Additionally water that is ponding next to the LLO inlet structure is being tested and treated as construction water (ie. subject to the same discharge criteria). The ponded water within the brush area was tested, currently no water is planned to be pumped from the settling area.

Date	FWSD – 1	FWSD – 2	LLO	FWSD – 3	FWSD – 4	FWSD – 5
December 1	<1	6	4		6	3
December 2	<1	7	5		10	21
December 3	<1	6	18	64	7	15
December 4						
December 5						
December 6						
December 7						

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-3 is located within the brush area to the north of the construction site. FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

Env. Monitoring

Construction water is now flowing, in a small volume along the base of the excavation for the erosion protection and into the sump created by the excavation for riffle 4. The construction water ponds in the excavation for riffle 4 and is then pumped to the settling area as needed.

There has been no need to start pumping water from the settling area to the creek. The small amount of water pumped to the settling area has frozen. This will continue to be monitored.

The contractor started pumping construction water to a different settling area within the brushes located to the north of the lower portion of the construction area.

Other:

Barry Chilibeck visited the site today in the morning.
Two YES survey crews were on site today.

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PROJECT MEMORANDUM

To:	**SRK Consulting Inc.**	**Fax No.:**	**Via e-mail**
Attention:	**Cam Scott**	**CC:**	**Bruce Ford**
			Dana Haggar
From:	**Gerry Ferris**	**Date:**	**December 4, 2003**
Subject:	**Daily report – FWSD Breach project**		
No. of Pages (including this page): 3		**Project No:**	**0257-012-09**

Weather:

Temperature ranged from -16°C to -28°C. Clear to partly cloudy with a slight breeze, increasing to 2 - 5 km/h in the afternoon.

Construction Activities:

Continued pumping creek water around the construction site via the pipe system.
Continued preparation of the second pipe system, it is being located on the right side of the floodplain. It consists of a 16 inch diameter PVC pipe. This pipe will take water from the sump and discharge it downstream from the construction area.
Pumped construction water to a settling area within the brush to the north of the downstream end of the construction site. No water was pumped from the settling area.
Placed geotextile from station 0+200 to 0+220 on the left hand side.
Placed rip rap up to station 0+220 on the left hand side.
Completed the excavation from 0+250 to 0+310 on the right hand side.
Started channel construction from station 0+30 to 0+70 (upstream from riffle 1).

Engineering/construction issues:

The excavation volume below the floodplain base on the morning of Dec. 4 (ie. end of night on Dec 3) is 5,600 m3 (based on contractors load counts, not surveyed quantities). This quantity includes excavation for erosion protection, channel excavation and riffle excavation. Note that this volume includes over-excavation.

Approved a portion of the erosion protection for placement, this was the right side of the excavation between station 0+310 to 0+250.

Surveyors (working for the contractor) continued placing slope stakes for excavation of the riprap structures, riffles and the remaining portion of the excavation.

Surveyors (working for the engineer) did a final topographic survey of the breach sideslopes, survey of the road surfaces downstream of the dam, the buried lines of the erosion protection structure and surface of the rip rap, following acceptance of the works.

A small flow is currently being maintained in the fresh water channel through the use of the 4 inch diameter pump. The fresh water channel will be maintained as a contingency if something were to go wrong with the pipe system then water could be diverted back into the LLO inlet and through the channel.

The contractor plans is installing a second pipe system on the right bank of the cut.

The erosion protection structure is now largely complete through the body of the dam. The excavation for the erosion protection is being used to transfer the small amount of construction water to the sump created by the excavation of riffle 4. Pumping from the riffle 4 sump continues to a couple different settling areas.

Photos:

Attached to this report are photos showing the view of the upstream end of the floodplain and the channel layout and the progress on the downstream end of the floodplain.

Water Monitoring:

TSS monitoring of four of the monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. Additionally water that is ponding next to the LLO inlet structure is being tested and treated as construction water (ie. subject to the same discharge criteria). The ponded water within the brush area was tested, currently no water is planned to be pumped from the settling area.

Date	FWSD – 1	FWSD – 2	LLO	FWSD – 3	FWSD – 4	FWSD – 5
December 1	<1	6	4		6	3
December 2	<1	7	5		10	21
December 3	<1	6	18	64	7	15
December 4	3	5	6		7	17
December 5						
December 6						
December 7						

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-3 is located within the brush area to the north of the construction site. FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

Env. Monitoring

Construction water continues flowing, although in smaller volumes following the placement of the rip rap within erosion protection structures. This water does flows downstream towards the sump created in the excavation for riffle 4. The construction water ponds in the excavation for riffle 4 and is then pumped to the settling area as needed. There has been no need to start pumping water from the settling area to the creek. The small amount of water pumped to the settling area has frozen. This will continue to be monitored.

Other:

Two YES survey crews were on site until about 10:00 am.
Bud McAlpine visited the site today in the afternoon.

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PROJECT MEMORANDUM

To:	**SRK Consulting Inc.**	**Fax No.:**	**Via e-mail**
Attention:	**Cam Scott**	**CC:**	**Bruce Ford**
			Dana Haggar
From:	**Gerry Ferris**	**Date:**	**December 5, 2003**
Subject:	**Daily report – FWSD Breach project**		
No. of Pages (including this page): 3		**Project No:**	**0257-012-09**

Weather:

Temperature ranged from -9°C to -17°C. Overcast conditions with light snow throughout the day.

Construction Activities:

Continued pumping creek water around the construction site via the pipe system.
Continued preparation of the second pipe system, it is located on the right side of the floodplain.
Pumped construction water to a settling area within the brush to the north of the downstream end of the construction site. No water was pumped from the settling area.
Excavated the final base of channel from station 0+40 to 0+90 (or riffle 1).
Started excavation of riffle 1.
Completed the excavation for erosion protection structure from 0+180 to 0+200 on the right hand side.

Engineering/construction issues:

The excavation volume below the floodplain base on the morning of Dec. 5 (ie. end of night on Dec 4) is 5,900 m3 (based on contractors load counts, not surveyed quantities). This quantity includes excavation for erosion protection, channel excavation and riffle excavation. Note that this volume includes over-excavation.

Approved a portion of the erosion protection excavation for placement on the right side of the floodplain from station 0+180 to 0+210.

Surveyors (working for the contractor) continued placing slope stakes for excavation of the riprap structures, riffles and the remaining portion of the excavation.

Surveyors (working for the engineer) did a final topographic survey of the rip rap surfaces and the buried lines of the erosion protection structure and surface of the rip rap, following acceptance of the works.

A small flow is currently being maintained in the fresh water channel through the use of the 4 inch diameter pump. The fresh water channel will be maintained as a contingency if something were to go wrong with the pipe system then water could be diverted back into the LLO inlet and through the channel.

The contractor continues work on the installation of a second pipe system on the right bank of the floodplain.

The erosion protection structure is now largely complete through the body of the dam. The excavation for the erosion protection is being used to transfer the small amount of construction water to the sump created by the excavation of riffle 4. Pumping from the riffle 4 sump continues to a couple different settling areas.

The channel is formed into final shape between the plug of soil at the coffer dam and riffle 1

Riffle 1 is being excavated in preparation for rip rap placement.

Photos:

Attached to this report are photos showing the progress of the construction of the floodplain downstream of the main dam structure and the initial portion of the channel excavation.

Water Monitoring:

TSS monitoring of four of the monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. Additionally water that is ponding next to the LLO inlet structure is being tested and treated as construction water (ie. subject to the same discharge criteria). The ponded water within the brush area sump was tested on Dec. 3, currently no water is planned to be pumped from the settling area. There has been no water available for testing at the FWSD-3 site since Dec. 3.

Date	FWSD – 1	FWSD – 2	LLO	FWSD – 3	FWSD – 4	FWSD – 5
December 1	<1	6	4		6	3
December 2	<1	7	5		10	21
December 3	<1	6	18	64	7	15
December 4	3	5	6		7	17
December 5	1	2	8		5	22
December 6						
December 7						

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-3 is located within the brush area to the north of the construction site. FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

Env. Monitoring

Construction water continues flowing, although in smaller volumes following the placement of the rip rap within erosion protection structures. This water does flows downstream towards the sump created in the excavation for riffle 4. The construction water ponds in the excavation for riffle 4 and is then pumped to the settling area as needed. There has been no need to start pumping water from the settling area to the creek. The small amount of water pumped to the settling area has frozen. This will continue to be monitored.

Pumping construction water continues within the construction site, from different riffle sumps to the next downstream one so as to have clear areas to complete the construction.

Other:

Bud McAlpine visited the site today in the morning.

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PROJECT MEMORANDUM

To:	SRK Consulting Inc.	Fax No.:	Via e-mail
Attention:	Cam Scott	CC:	Bruce Ford Dana Haggar
From:	Gerry Ferris	Date:	December 6, 2003
Subject:	Daily report – FWSD Breach project		
No. of Pages (including this page): 3		Project No:	0257-012-09

Weather:

Temperature ranged from -14°C to -25°C. Overcast conditions with light snow throughout the day.

Construction Activities:

Switched over from pumping around the construction site using the 24 inch diameter pipe located to the south of the construction site to a 16 inch diameter pipe which is located on the right side of the floodplain.
Pumping of the creek water is now occurring from the sump location using one 10 inch diameter pump.
Pumped construction water to a settling area within the brush to the north of the downstream end of the construction site. No water was pumped from the settling area.
Completed the excavation of riffle 1 and started placement of rip rap within riffle 1.
Roughed out the channel excavation between riffle 1 and riffle 3.

Engineering/construction issues:

Approved the base of riffle 1 for placement of rip rap.

Surveyors (working for the contractor) continued placing slope stakes for excavation of the riprap structures, riffles and the remaining portion of the excavation.

Surveyors (working for the engineer) performed final topographic survey of the base of riffle 1.

The flow through the 24 inch diameter pipe and the flow through the LLO was stopped today. The water is now being diverted around the construction site through the use of the 16 inch diameter pipe system. This change was necessary in order to complete the abandonment of the LLO system and begin filling of the fresh water channel.

The excavation for the erosion protection and riffles is being used to transfer the small amount of construction water to the sump created by the excavation of riffle 4. Pumping from the riffle 4 sump continues to a couple different settling areas.

A rough excavation of the channel was formed between riffle 1 and riffle 3.

Placement of rip rap for riffle 1 has been performed, it needs to be formed into its final shape.

Photos:

Attached to this report are photos showing the progress of the excavation of riffle 1 and the roughed out portion of the channel downstream of Riffle 1.

Water Monitoring:

TSS monitoring of four of the monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. Additionally water that is ponding next to the LLO inlet structure is being tested and treated as construction water (ie. subject to the same discharge criteria). The ponded water within the brush area sump was tested on Dec. 3, currently no water is planned to be pumped from the settling area. There has been no water available for testing at the FWSD-3 site since Dec. 3.

Date	FWSD – 1	FWSD – 2	LLO	FWSD – 3	FWSD – 4	FWSD – 5
December 1	<1	6	4		6	3
December 2	<1	7	5		10	21
December 3	<1	6	18	64*	7	15
December 4	3	5	6		7	17
December 5	1	2	8		5	22
December 6	<1	3	11		3	5
December 7						

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-3 is located within the brush area to the north of the construction site. FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

* This test was performed on the water collected in the settling area, no water was released from the settling area.

Env. Monitoring

A review of the fresh water channel downstream of the valve house was undertaken by Brad Finnson. Seine nets were used to determine if any fish had migrated upstream following the fish out performed last week, no fish were recovered.

Construction water continues flowing, although in smaller volumes following the placement of the rip rap within erosion protection structures. This water flows downstream towards the sump created in the excavation for riffle 4. The construction water ponds in the excavation for riffle 4 and is then pumped to the settling area as needed. There has been no need to start pumping water from the settling area to the creek. The small amount of water pumped to the settling area has frozen or seeped into the ground. This will continue to be monitored.

Pumping construction water continues within the construction site. This has consisted of pumping water from the upstream riffle locations to the downstream locations, until reaching riffle 4 where it is pumping into the brush and the settling area.

Using the above methodology throughout the day on Dec. 5, the water was moved in a downstream direction from riffle 1. The water appeared slowly into riffle 4 throughout the day shift. Sometime between the end of the day shift and the start of the night shift the rate of inflow into riffle 4 increased. This combined with pump failure at riffle 4 resulted in the release of water downstream of the riffle. The water ran along the completed section of erosion protection downstream of riffle 4, reaching station 0+311 (the end of the work). The construction water reached the end of the erosion protection excavation, but did not leave the construction site. The water levels in riffle 4 was reduced through pumping at the start of the night shift and the water within the erosion protection excavation was pumped out to the settling area within the brush.

Other:

A work suspension was issued for the night shift of Dec 5/6. This suspension of work remained in force until the day shift of December 6, until a detailed plan was presented by Pelly to ensure proper work coordination was undertaken and no re-occurrence of the near release of construction water happens.

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PROJECT MEMORANDUM

To:	SRK Consulting Inc.	Fax No.:	Via e-mail
Attention:	Cam Scott	CC:	Bruce Ford
			Dana Haggar
From:	Gerry Ferris	Date:	December 7, 2003
Subject:	Daily report – FWSD Breach project		
No. of Pages (including this page): 3		Project No:	0257-012-09

Weather:

Temperature ranged from -5°C to -17°C. Overcast conditions with light snow throughout the day.

Construction Activities:

Continued pumping through the 16 inch diameter pipe system. A recirculation hose was added to help in matching inflow to the sump location.
Pumped construction water to a settling area within the brush to the north of the downstream end of the construction site. No water was pumped from the settling area.
Completed the placement of rip rap and common material in riffle 1. Excavated the base of riffle 2 and started placement of rip rap in riffle 2.
Nearly completed the channel excavation between riffle 1 and riffle 2.

Engineering/construction issues:

Approved the placed rip rap and common material within riffle 1. Approved the base of riffle 2 for placement of rip rap. Reviewed the base of the channel excavation between riffle 1 and 2, and requested some additional excavation to ensure the channel base is at the appropriate elevation.

Surveyors (working for the contractor) continued placing slope stakes for excavation of the riprap structures, riffles and the remaining portion of the excavation.

Surveyors (working for the engineer) performed final topographic survey of the base of the buried lines and grades of riffle 1 and 2 and also performed a survey of the current rip rap stockpiles.

The excavation for the erosion protection and riffles is being used to transfer the small amount of construction water to the sump created by the excavation of riffle 4. Pumping from the riffle 4 sump continues to a couple different settling areas.

A heater is being used to heat the area surrounding the LLO inlet, in preparation of abandonment. Also a 1.5 inch submersible pump is being used to remove water from the LLO pipe.

A berm was placed on the downstream end of the construction limit in preparation for construction water. A pump was set up to collect water that ponds behind the berm, this water is pumped in the settling area within the brush.

Photos:

Attached to this report are photos showing the progress of the excavation of the channel between riffle 1 and riffle 2. The second photo shows the rip rap surface in riffle 1 during placement of common material, note the pond forming on the upstream side of this riffle.

Water Monitoring:

TSS monitoring of four of the monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. Additionally water that is ponding next to the LLO inlet structure is being tested and treated as construction water (ie. subject to the same discharge criteria). The ponded water within the brush area sump was tested on Dec. 3, currently no water is planned to be pumped from the settling area. There has been no water available for testing at the FWSD-3 site since Dec. 3.

Date	FWSD – 1	FWSD – 2	LLO	FWSD – 3	FWSD – 4	FWSD – 5
December 1	<1	6	4		6	3
December 2	<1	7	5		10	21
December 3	<1	6	18	64*	7	15
December 4	3	5	6		7	17
December 5	1	2	8		5	22
December 6	<1	3	11		3	5
December 7	3	6	14	72*	21	13

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-3 is located within the brush area to the north of the construction site. FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

* This test was performed on the water collected in the settling area, no water was released from the settling area.

Env. Monitoring

Construction water continues flowing, although in smaller volumes following the placement of the rip rap within erosion protection structures. This water flows downstream towards the sump created in the excavation for riffle 4. The construction water ponds in the excavation for riffle 4 and is then pumped to the settling area as needed. There has been no need to start pumping water from the settling area to the creek. The small amount of water pumped to the settling area has frozen or seeped into the ground. This will continue to be monitored.

Yesterday during the switch over from pumping from the channel to drawing water from the sump the following sequence was undertaken.

- The ice and snow from the top of the sump area was removed. The sand bag wall was removed (formerly used to block water from entering the sump). These action created some turbidity within the sump.
- The 10 inch pump within the tremel cage was removed from the creek and transferred to the sump.
- The pump within the sump was run in order to clear out the turbidity. This water was discharged to a low area within the former reservoir.
- The pumps were switched so that rather than diverting water around the construction site by pumping through the 24 inch pipe they were pumping through the 16 inch pipe.
- The pumps located in the barge were removed. The barge was set into the sump and the tremel cage was removed.
- A sand bag berm was created to divert the water from the main channel into the sump location.

Some turbid water was discharged from the sump area due to the inflow of water to this new location. The turbid water release was for less than one hour, after which the water returned to its current clear state.

Pumping construction water continues within the construction site. This has consisted of pumping water from the upstream riffle locations to the downstream locations, until reaching riffle 4 where it is pumping into the brush and the settling area.

A second construction water collection point was created within the former fresh water channel. The water collected at this point is pumped to the same settling area within the brush.

Other:

Prior to each shift the contractor is providing a detailed plan of construction; this plan is reviewed by the engineer.

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PROJECT MEMORANDUM

To:	**SRK Consulting Inc.**	**Fax No.:**	**Via e-mail**
Attention:	**Cam Scott**	**CC:**	**Bruce Ford**
			Dana Haggar
From:	**Gerry Ferris**	**Date:**	**December 8, 2003**
Subject:	**Daily report – FWSD Breach project**		
No. of Pages (including this page): 3		**Project No:**	**0257-012-09**

Weather:

Temperature ranged from -15°C to -23°C. Overcast conditions in the morning changing to clear around noon. A slight breeze to 3 km/h winds.

Construction Activities:

Continued pumping through the 16 inch diameter pipe system.
Pumped construction water to a settling area within the brush to the north of the downstream end of the construction site. No water was pumped from the settling area.
Completed the placement of rip rap and common material in riffle 2. Excavated the base of riffle 3 and started placement of rip rap in riffle 3. Excavation for final size of riffle 4 commenced.
Completed the channel excavation from riffle 1 through to part way to riffle 3.
Removed the valves from the valve house. Started destruction of the valve house.
Continued placement of fill within the fresh water channel.
Removed the 24 inch diameter pipe that was used to transfer water around the site.

Engineering/construction issues:

Approved the placed rip rap and common material within riffle 2. Approved the base of riffle 3 for placement of rip rap. Approved the base of channel between riffle 1 and 2.

Surveyors (working for the contractor) continued placing slope stakes for excavation of the riprap structures, riffles and the remaining portion of the excavation.

Surveyors (working for the engineer) performed final topographic survey of the base of the buried lines and grades of riffle 2 and 3. They also did final topographic survey of the channel and final floodplain upstream of riffle 1.

The excavation for the erosion protection and riffles is being used to transfer the small amount of construction water to the sump created by the excavation of riffle 4. Pumping from the riffle 4 sump continues to a couple different settling areas.

All the water was removed form the valve house during the night shift.

Photos:

Attached to this report are photos showing the completed riffle 1 with initial pool forming upstream of the riffle and the progress downstream from riffle 3 (including initial fill placement within the fresh water channel).

Water Monitoring:

TSS monitoring of four of the monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. Additionally water that is ponding next to the LLO inlet structure is being tested and treated as construction water (ie. subject to the same discharge criteria). The ponded water within the settling area within the brush is tested but currently no water is being pumped from the settling area.

Date	FWSD – 1	FWSD – 2	LLO	FWSD – 3	FWSD – 4	FWSD – 5
December 8	2	5	16	306*	9	11
December 9						
December 10						
December 11						
December 12						
December 13						
December 14						

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-3 is located within the brush area to the north of the construction site. FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

* This test was performed on the water collected in the settling area, no water was released from the settling area.

Env. Monitoring

Construction water continues flowing, although in smaller volumes following the placement of the rip rap within erosion protection structures. This water flows downstream towards the sump created in the excavation for riffle 4. The construction water ponds in the excavation for riffle 4 and is then pumped to the settling area as needed. There has been no need to start pumping water from the settling area to the creek. The small amount of water pumped to the settling area has frozen or seeped into the ground. This will continue to be monitored.

Pumping construction water continues within the construction site. This has consisted of pumping water from the upstream riffle locations to the downstream locations, until reaching riffle 4 where it is pumping into the brush and the settling area. A second sump is located upstream of the dam created in the fresh water channel. Water from this sump is pumped to the same location in the brush.

A total of 313 slimy sculpin were saved from the pond within the valve house prior to pumping this completely dry.

Other:

Prior to each shift the contractor is providing a detailed plan of construction; this plan is reviewed by the engineer.

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PROJECT MEMORANDUM

To:	**SRK Consulting Inc.**	**Fax No.:**	**Via e-mail**
Attention:	**Cam Scott**	**CC:**	**Bruce Ford**
			Dana Haggar
From:	**Gerry Ferris**	**Date:**	**December 9, 2003**
Subject:	**Daily report – FWSD Breach project**		
No. of Pages (including this page): 3		**Project No:**	**0257-012-09**

Weather:

Temperature ranged from -15°C to -23°C. Overcast conditions in the morning changing to clear around noon. A slight breeze to 3 km/h winds.

Construction Activities:

Continued pumping through the 16 inch diameter pipe system.
Pumped construction water to a settling area within the brush to the north of the downstream end of the construction site. No water was pumped from the settling area.
Completed the placement of rip rap and common material in riffle 3. Completed the excavation for riffle 4 and riffle 5.
Placed geotextile on the side slope of the erosion protection (right side) from riffle 4 to downstream end of the construction site.
Completed the channel excavation through to riffle 3.
Placed a steel plug within the LLO pipe approximately 10 m downstream from the riser pipe.
Placed concrete within LLO pipe.

Engineering/construction issues:

Approved the placed rip rap and common material within riffle 3. Approved the base of riffle 4 and 5 for placement of rip rap. Approved the base of channel between riffle 2 and 3.

Excavation of the channel downstream of riffle 3 has not yet commenced. This is the location of the access ramp into the construction site.

Surveyors (working for the contractor) continued placing slope stakes for excavation of the riprap structures, riffles and the remaining portion of the excavation.

Surveyors (working for the engineer) performed final topographic survey of the base of the buried lines and grades of riffle 4 and 5. They also did final topographic survey of the channel and final floodplain upstream of riffle 3. The final portion of original ground pick-up was performed near the coffer dam.

The excavation for the erosion protection and riffles is being used to transfer the small amount of construction water to the sump created by the excavation of riffle 4. Pumping from the riffle 4 sump continues to a couple different settling areas. The location of the sump is moving to riffle 5 during the night shift as riffle 4 will be backfilled with rip rap.

Photos:

Attached to this report are photos showing the excavation of riffle 5, a view of the channel and riffle 1 and 2 and the plug within the LLO pipe.

Water Monitoring:

TSS monitoring of four of the monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. Additionally water ponding next to the LLO inlet structure is being tested and treated as construction water (ie. subject to the same discharge criteria). The water that was located adjacent to the LLO was pumped dry during the night shift of Dec 8/9 and is no longer present. The ponded water within the settling area within the brush is tested but currently no water is being pumped from the settling area.

Date	FWSD – 1	FWSD – 2	LLO	FWSD – 3	FWSD – 4	FWSD – 5
December 8	2	5	16	306*	9	11
December 9	<1	9	-	52*	7	8
December 10						
December 11						
December 12						
December 13						
December 14						

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-3 is located within the brush area to the north of the construction site. FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

* This test was performed on the water collected in the settling area, no water was released from the settling area.

Comparison of the results obtained by the on site laboratory was made with a commercial laboratory (Cavendish Analytical Laboratory Ltd., Vancouver) based on samples collected on December 2. A comparison of the results of the onsite testing and the commercial laboratory is presented in the following table.

	FWSD – 1	FWSD – 2	LLO	FWSD – 4	FWSD – 5
On site Lab.	<1	7	5	10	21
Cavendish	1	11	6	13	17

Env. Monitoring

Construction water continues flowing, although in smaller volumes following the placement of the rip rap within erosion protection structures. This water flows downstream towards the sump created in the excavation for riffle 4, however with the approval of the base of the riffle 4, the sump will be located in riffle 5 during the night shift. The construction water ponds in the excavation for riffle 4 and is then pumped to the settling area as needed. There has been no need to start pumping water from the settling area to the creek. The small amount of water pumped to the settling area has frozen or seeped into the ground. This will continue to be monitored.

Pumping construction water continues within the construction site. This has consisted of pumping water from the upstream riffle locations to the downstream locations, until reaching riffle 4 where it is pumping into the brush and the settling area. A second sump is located upstream of the dam created in the fresh water channel. Water from this sump is pumped to the same location in the brush.

The contractor was directed to clean up a small oil leak from one of the light towers, this was promptly completed.

Other:

Prior to each shift the contractor is providing a detailed plan of construction; this plan is reviewed by the engineer.

Doug Sedgwick, Wes Treleaven and Dave Sherstone visited the site today.

Participated in the weekly conference call today.

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PROJECT MEMORANDUM

To:	SRK Consulting Inc.	Fax No.:	Via e-mail
Attention:	Cam Scott	CC:	Bruce Ford
			Dana Haggar
From:	Gerry Ferris	Date:	December 10, 2003
Subject:	Daily report – FWSD Breach project		
No. of Pages (including this page): 3		Project No:	0257-012-09

Weather:

Temperature ranged from -18°C to -28°C. Clear conditions overnight changing to overcast in the afternoon and then back to clear in the evening. A slight breeze to 5 km/h winds.

Construction Activities:

Continued pumping through the 16 inch diameter pipe system.
Pumped construction water to a settling area within the brush to the north of the downstream end of the construction site. No water was pumped from the settling area.
Completed the placement of rip rap and common material in riffle 5. Rip rap is placed in riffle 4 but not yet given its final shape. Rip rap was placed on the erosion protection (right side) but not completed to final grades.
Completed channel excavation downstream of riffle 5 and nearly completed channel excavation between riffle 4 and 5.
Completed excavation of the final downstream portion of erosion protection on the left side.
Slotted the existing 42 inch diameter pipe and completed installation of a plate on the end of the pipe.
Started spreading the fill to be placed above the LLO inlet pipe.

Engineering/construction issues:

Approved the placed rip rap and common material within riffle 5. Approved the base of erosion protection (left side) downstream of riffle 4.

Excavation of the channel downstream of riffle 3 and upstream of riffle 4 has not yet commenced. This is the location of the access ramp into the construction site.

Surveyors (working for the contractor) continued placing slope stakes for excavation of the riprap structures, inlet structure, riffles and the remaining portion of the excavation.

Surveyors (working for the engineer) performed final topographic survey of the base of the buried lines and grades of riffle 5 and the erosion protection downstream of riffle 4 (left side).

The excavation for the erosion protection and riffles is being used to transfer the small amount of construction water to the sump in the former fresh water channel, at the downstream limit of the construction. Given that there is not a complete connection between the channel upstream of riffle 3 and the downstream end there is very small quantities of construction water at the sump. The construction water was not pumped today.

Photos:

Attached to this report are photos showing the excavation of riffle 5 and downstream channel and spreading of fill above the LLO inlet structure.

Water Monitoring:

TSS monitoring of four of the monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. Additionally water ponding next to the LLO inlet structure is being tested and treated as construction water (ie. subject to the same discharge criteria). The water that was located adjacent to the LLO was pumped dry during the night shift of Dec 8/9 and is no longer present. The ponded water within the settling area within the brush is tested but currently no water is being pumped from the settling area.

Date	FWSD – 1	FWSD – 2	LLO	FWSD – 3	FWSD – 4	FWSD – 5
December 8	2	5	16	306*	9	11
December 9	<1	9	-	52*	7	8
December 10	<1	3			2	3
December 11						
December 12						
December 13						
December 14						

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-3 is located within the brush area to the north of the construction site. FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

* This test was performed on the water collected in the settling area, no water was released from the settling area.

Env. Monitoring

Pumping construction water did not occur today, either within the construction site or out from the sump location (downstream end of the fresh water channel).

The contractor was directed to clean up a number of small oil leaks that occurred form the Loader, the D9 and within the parking area.

Other:

Prior to each shift the contractor is providing a detailed plan of construction; this plan is reviewed by the engineer.

Due to a power outage on the line suppling the mine, the power to the pumps for refuelling were down. Pelly had enough fuel in their fuel truck to get through the night shift, the power was re-established in the afternoon.

Doug Sedgwick and Wes Treleaven visited the site today.

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PROJECT MEMORANDUM

To:	SRK Consulting Inc.	Fax No.:	Via e-mail
Attention:	Cam Scott	CC:	Bruce Ford
			Dana Haggar
From:	Gerry Ferris	Date:	December 11, 2003
Subject:	Daily report – FWSD Breach project		
No. of Pages (including this page): 3		Project No:	0257-012-09

Weather:

Temperature ranged from -14°C to -23°C. Clear conditions overnight changing to overcast in the afternoon and then back to clear in the evening. A slight breeze to 5 km/h winds.

Construction Activities:

Continued pumping through the 16 inch diameter pipe system.
Pumped construction water to a settling area within the brush to the north of the downstream end of the construction site, very small volume was pumped today. No water was pumped from the settling area.
Completed the placement of rip rap and common material in riffle 4. Rip rap was placed within the left bank of the channel for erosion protection of the fill material.
Completed channel excavation between riffle 4 and 5, started final channel excavation between riffle 3 and 4.
Completed excavation of the final downstream portion of erosion protection on the left side.
Completed fill placement above the LLO inlet pipe.
Started the fill placement in the fresh water channel (nearly complete), removed the valve house prior to fill placement.
Started excavation of the coffer dam in preparation for construction of the inlet structure.

Engineering/construction issues:

Approved the placed rip rap and common material within riffle 4. Approved the channel excavation downstream of riffle 4.

Surveyors (working for the contractor) continued placing slope stakes for excavation of the riprap structures, inlet structure, riffles and the remaining portion of the excavation.

Surveyors (working for the engineer) performed final topographic survey of the base of the buried lines and grades of riffle 4 and the channel excavation downstream of riffle 4.

The excavation for the erosion protection and riffles is being used to transfer the small amount of construction water to the sump in the former fresh water channel, at the downstream limit of the construction. Given that there is not a complete connection between the channel upstream of riffle 3 and the downstream end there is very small quantities of construction water at the sump. The construction water was not pumped today.

Photos:

Attached to this report are photos showing the fill placed above the former valve house and excavation of the coffer dam.

Water Monitoring:

TSS monitoring of four of the monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. Additionally water ponding next to the LLO inlet structure is being tested and treated as construction water (ie. subject to the same discharge criteria). The water that was located adjacent to the LLO was pumped dry during the night shift of Dec 8/9 and is no longer present. The ponded water within the settling area within the brush is tested but currently no water is being pumped from the settling area.

Date	FWSD – 1	FWSD – 2	LLO	FWSD – 3	FWSD – 4	FWSD – 5
December 8	2	5	16	306*	9	11
December 9	<1	9	-	52*	7	8
December 10	<1	3			2	3
December 11	<1	5			2	2
December 12						
December 13						
December 14						

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-3 is located within the brush area to the north of the construction site. FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

* This test was performed on the water collected in the settling area, no water was released from the settling area.

Env. Monitoring

Pumping construction water did not occur today (during dayshift), either within the construction site or out from the sump location (downstream end of the fresh water channel).

Last night the ice was removed from a portion of the original channel that is between the sump and the coffer dam. The following numbers of fish were salvaged from this location and moved upstream: 10 burbot, 146 slimy sculpin and 592 grayling.

The contractor was directed to clean up a number of small oil leaks that occurred from the equipment in the parking area.

The generator was shut down for service for approximately 25 min today, this backed up the water in the sump during this timeframe.

When the pump was restarted after this delay a leak of water occurred where the 16 inch diameter pipe transitions to a 30 inch diameter pipe. The leakage of water from this location was into the construction site. This water was retained behind the small berm located in the fresh water channel, none of this water was released into the creek.

Other:

Prior to each shift the contractor is providing a detailed plan of construction; this plan is reviewed by the engineer.

Bud McAlpine visited the site today in the afternoon.

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PROJECT MEMORANDUM

To:	SRK Consulting Inc.	Fax No.:	Via e-mail
Attention:	Cam Scott	CC:	Bruce Ford Dana Haggar
From:	Gerry Ferris	Date:	December 12, 2003
Subject:	Daily report – FWSD Breach project		
No. of Pages (including this page): 3		Project No:	0257-012-09

Weather:

Temperature ranged from -12°C to -22°C. Mostly clear conditions to high cloud cover. A slight breeze to 5 km/h winds.

Construction Activities:

Continued pumping through the 16 inch diameter pipe system.
Pumped construction water to a settling area within the brush to the north of the downstream end of the construction site, very small volume was pumped today. No water was pumped from the settling area.
Completed the channel excavation between riffle 3 and 4, except for a small plug left inplace to act as retention for construction water flowing in the channel.
The bulk excavation for the inlet structure has been completed, finishing work has commenced. Currently all the excavation is above the water line.
Continued placing fill in the fresh water channel.

Engineering/construction issues:

Approved the channel excavation downstream of riffle 4.

Surveyors (working for the contractor) continued placing slope stakes for excavation of the riprap structures, inlet structure, and the remaining portion of the channel excavation.

The channel is being used to transfer the small amount of construction water to the sump in the channel surface just downstream of riffle 3. A small plug of soil has been left within the channel to act as the sump, this reduces the amount of water that reaches the small berm located at the downstream limit of construction. Construction water was pumped today both from the excavation for the inlet structure and also out of the construction site to the settling area.

The excavation for the inlet structure is within soft ground with a significant volume of seepage coming into the excavation.

During excavation of the inlet structure the 42 inch diameter pipe that was used to transfer water around the site was revealed. The end of the pipe would have extended through the rip rap of the inlet structure, so a plan was developed to cut-off a portion of the pipe and abandon it.

Photos:

Attached to this report are photos showing an overview of the excavation for the inlet structure and a close up showing the left side of the excavation that includes the 42 inch diameter pipe from the 1968 construction.

Water Monitoring:

TSS monitoring of four of the monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. Additionally water ponding next to the LLO inlet structure is being tested and treated as construction water (ie. subject to the same discharge criteria). The water that was located adjacent to the LLO was pumped dry during the night shift of Dec 8/9 and is no longer present. The ponded water within the settling area within the brush is tested but currently no water is being pumped from the settling area.

Date	FWSD – 1	FWSD – 2	LLO	FWSD – 3	FWSD – 4	FWSD – 5
December 8	2	5	16	306*	9	11
December 9	<1	9	-	52*	7	8
December 10	<1	3	-		2	3
December 11	<1	5	-		2	2
December 12	<1	3	-		2	3
December 13						
December 14						

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-3 is located within the brush area to the north of the construction site. FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

* This test was performed on the water collected in the settling area, no water was released from the settling area.

Env. Monitoring

Pumping construction water did not occur today (during dayshift), either within the construction site or out from the sump location (downstream end of the fresh water channel).

During excavation within the channel between riffle 3 and 4 the D9 developed a hydraulic leak, about 1 L of fluid was leaked. The machine was removed immediately on detection and taken to the refuelling area for repairs. The leak was cleaned up immediately thereafter.

Other:

Prior to each shift the contractor is providing a detailed plan of construction; this plan is reviewed by the engineer.

Bud McAlpine visited the site today in the morning.

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PROJECT MEMORANDUM

To:	SRK Consulting Inc.	Fax No.:	Via e-mail
Attention:	Cam Scott	CC:	Bruce Ford
			Dana Haggar
From:	Gerry Ferris	Date:	December 13, 2003
Subject:	Daily report – FWSD Breach project		
No. of Pages (including this page): 3		Project No:	0257-012-09

Weather:

Temperature ranged from -8°C to -21°C. Cloudy conditions in the morning and evening with partial cloudiness throughout the remainder of the day. A slight breeze to 3 km/h winds.

Construction Activities:

Continued pumping through the 16 inch diameter pipe system.
Pumped construction water to a settling area within the brush to the north of the downstream end of the construction site, very small volume was pumped today. No water was pumped from the settling area.
Abandoned the pipe through the coffer dam.
Completed the erosion protection excavation, installed geotextile for the last segment downstream of the inlet structure.
Continued finishing excavation of the inlet structure. Approximately ½ of the upstream "wings" and the upstream apron were completed.

Engineering/construction issues:

Approved the erosion protection buried lines and grades, also approved the base of the inlet structure excavation and rip rap surface.

Surveyors (working for the contractor) continued placing slope stakes for the inlet structure.

Surveyors (working for the engineer) measured the buried lines and grades of the approved structures today.

The channel is being used to transfer the small amount of construction water to the sump in the channel surface just downstream of riffle 3. A small plug of soil has been left within the channel to act as the sump, this reduces the amount of water that reaches the small berm located at the downstream limit of construction. Construction water was pumped today both from the excavation for the inlet structure and also out of the construction site to the settling area.

The excavation for the inlet structure is within soft ground with a significant volume of seepage coming into the excavation and also sloughing of the sides is expanding the excavation.

Photos:

Attached to this report are photos showing an overview of the completed channel and the excavation for the the inlet structure.

Water Monitoring:

TSS monitoring of four of the monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. Additionally water ponding next to the LLO inlet structure is being tested and treated as construction water (ie. subject to the same discharge criteria). The water that was located adjacent to the LLO was pumped dry during the night shift of Dec 8/9 and is no longer present. The ponded water within the settling area within the brush is tested but currently no water is being pumped from the settling area.

Date	FWSD – 1	FWSD – 2	LLO	FWSD – 3	FWSD – 4	FWSD – 5
December 8	2	5	16	306*	9	11
December 9	<1	9	-	52*	7	8
December 10	<1	3	-		2	3
December 11	<1	5	-		2	2
December 12	<1	3	-		2	3
December 13	1	105			18	84
December 14						

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-3 is located within the brush area to the north of the construction site. FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

* This test was performed on the water collected in the settling area, no water was released from the settling area.

Env. Monitoring

Pumping construction water did not occur today (during dayshift), either within the construction site or out from the sump location (downstream end of the fresh water channel).

Other:

Prior to each shift the contractor is providing a detailed plan of construction; this plan is reviewed by the engineer.

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PROJECT MEMORANDUM

To:	SRK Consulting Inc.	Fax No.:	Via e-mail
Attention:	Cam Scott	CC:	Bruce Ford Dana Haggar
From:	Gerry Ferris	Date:	December 14, 2003
Subject:	Daily report – FWSD Breach project		
No. of Pages (including this page): 3		Project No:	0257-012-09

Weather:

Temperature ranged from -14°C to -21°C. Cloudy conditions in the morning and evening with partial cloudiness throughout the remainder of the day. A slight breeze to 5 km/h winds.

Construction Activities:

Continued pumping through the 16 inch diameter pipe system.
Pumped construction water to a settling area within the brush to the north of the downstream end of the construction site, a large volume was pumped today. No water was pumped from the settling area.
Continued the excavation of the inlet structure and placement of rip rap within the structure.
The entire upstream apron and the upstream "wings" were completed (both excavation and placement of rip rap).
Started performing the excavation for the downstream apron.
Finalized the excavation for the final portion of the erosion protection excavation (left side). This will have geotextile placed through the night shift.

Engineering/construction issues:

Approved the erosion protection buried lines and grades, also approved the base of the inlet structure excavation and rip rap surface for the upstream apron.

Surveyors (working for the contractor) continued placing slope stakes for the inlet structure.

Surveyors (working for the engineer) measured the buried lines and grades of the approved structures today.

The channel is being used to transfer the small amount of construction water to the sump in the channel surface just downstream of riffle 3. A small plug of soil has been left within the channel to act as the sump, this reduces the amount of water that reaches the small berm located at the downstream limit of construction. Construction water was pumped today both from the excavation for the inlet structure and also out of the construction site to the settling area.

The excavation for the inlet structure is within soft ground with a significant volume of seepage coming into the excavation and also sloughing of the sides is expanding the excavation.

Photos:

Attached to this report is a photo showing the excavation of the upstream apron and the placed rip rap on the completed portion of the upstream apron.

Water Monitoring:

TSS monitoring of four of the monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. Additionally water ponding next to the LLO inlet structure is being tested and treated as construction water (ie. subject to the same discharge criteria). The water that was located adjacent to the LLO was pumped dry during the night shift of Dec 8/9 and is no longer present. The ponded water within the settling area within the brush is tested but currently no water is being pumped from the settling area.

Date	FWSD – 1	FWSD – 2	LLO	FWSD – 3	FWSD – 4	FWSD – 5
December 8	2	5	16	306*	9	11
December 9	<1	9	-	52*	7	8
December 10	<1	3	-		2	3
December 11	<1	5	-		2	2
December 12	<1	3	-		2	3
December 13	1	105			18	84
December 14	<1	2		58*	2	2

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-3 is located within the brush area to the north of the construction site. FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

* This test was performed on the water collected in the settling area, no water was released from the settling area.

Env. Monitoring

Pumping of construction water occurred throughout the day and last night. The main source of water is the excavation for the inlet structure. This water is collected from the excavation and pumped through the channel, and then collected within the channel and pumped form there to the settling area within the bush.

A fish exclusion net was installed (yesterday) and finished today upstream of the small sand bag berm in the main channel of the creek, this will be left in place until the water flow through the channel is established.

Other:

Prior to each shift the contractor is providing a detailed plan of construction; this plan is reviewed by the engineer.

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY
1605, 840 – 7 Avenue S.W., Calgary, Alberta, Canada. T2P 3G2
Phone (403) 250-5185 Fax (403) 250-5330

PROJECT MEMORANDUM

To:	**SRK Consulting Inc.**	**Fax No.:**	**Via e-mail**
Attention:	**Cam Scott**	**CC:**	**Bruce Ford**
			Dana Haggar
From:	**Gerry Ferris**	**Date:**	**December 15, 2003**
Subject:	**Daily report – FWSD Breach project**		
No. of Pages (including this page): 3		**Project No:**	**0257-012-09**

Weather:

Temperature ranged from -9°C to -25°C. Partial cloudy to clear throughout the day. Wind ranged from calm to 25 km/h, but was about 5 km/h throughout the day.

Construction Activities:

Continued pumping through the 16 inch diameter pipe system.
Pumped construction water to a settling area within the brush to the north of the downstream end of the construction site, a large volume was pumped today. No water was pumped from the settling area.
Finished the excavation and placement of rip rap within the inlet structure.
The final portion of the erosion protection on the left side near the inlet was completed.
The rip rap was placed (upto the floodplain level) in the remaining portions of the erosion protection structure on the right side. Note that some excavation and placement of rip rap above the floodplain level need to the completed.
Excavated a portion of the natural channel and through the disturbed area (due to the inlet construction) to make a connection between the natural channel and the constructed channel.
Changed from pumping into the 16 inch diameter pipe system with a 10 inch (88 HP) diameter pump to a 4 inch diameter pump (30 HP).

Engineering/construction issues:

Approved the excavation and placement of rip rap in the inlet structure and the rip rap placed within the erosion protection on the left and right sides of the floodplain.

Surveyors (working for the contractor) continued placing slope stakes for the inlet structure.

Surveyors (working for the engineer) measured the buried lines and grades of the approved structures today.

The channel is being used to transfer the small amount of construction water to the sump in the channel surface just downstream of riffle 3. A small plug of soil has been left within the channel to act as the sump, this reduces the amount of water that reaches the small berm located at the downstream limit of construction. Construction water was pumped today both from the excavation for the inlet structure and also out of the construction site to the settling area.

The following sequence was followed for the final breach of the channel:

- Construction water upstream of the plug in the channel was pumped.
- The inlet structure was completed.
- The erosion protection (near the inlet structure) on the left side was completed.
- The erosion protection (near the inlet structure) on the right side was completed upto the floodplain level.
- The erosion protection on the right side (between riffle 3 and 4) was completed.
- The small dyke at the downstream limit of the construction was removed.
- The plug that remained in the channel (between riffle 3 and 4) was removed.
- The 10 inch diameter flight pump was removed and replace with a 4 inch diameter flight pump. This allowed a constant flow of water to be maintained downstream of the construction site during breaching.
- The sand bag berm within the main stem of channel was removed.
- The final breach between the natural channel and the constructed channel was made.

As water flowed through the construction site the riffles worked well with the water nearly backing upto the crest before flowing through/over the riffle.

Photos:

Attached to this report are photos showing the construction of the downstream apron and a view looking downstream at the constructed channel (prior to breaching).

Water Monitoring:

TSS monitoring of four of the monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. The ponded water within the settling area within the brush is tested but currently no water is being pumped from the settling area.

Date	FWSD – 1	FWSD – 2	FWSD – 3	FWSD – 4	FWSD – 5
December 15	<1	4	639*	3	4
December 16					
December 17					
December 18					
December 19					

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-3 is located within the brush area to the north of the construction site. FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

* This test was performed on the water collected in the settling area, no water was released from the settling area.

Env. Monitoring

Pumping of construction water occurred throughout the day and last night. The main source of water is the excavation for the inlet structure. This water is collected from the excavation and pumped through the channel, and then collected within the channel and pumped form there to the settling area within the bush.

The last of the construction water was pumped at about 2:00 pm.

Note the breaching sequence outlined above.

Other:

Prior to each shift the contractor is providing a detailed plan of construction; this plan is reviewed by the engineer.

The dam was breached today at 8:40 pm. The water flowed through the channel and reached the downstream limit of the construction at 9:38 pm.

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PROJECT MEMORANDUM

To:	SRK Consulting Inc.	Fax No.:	Via e-mail
Attention:	Cam Scott	CC:	Bruce Ford
			Dana Haggar
From:	Gerry Ferris, Brad Finnson	Date:	December 16, 2003
Subject:	Daily report – FWSD Breach project		
No. of Pages (including this page): 2		Project No:	0257-012-09

Weather:

Temperature ranged from -9°C to -15°C. Clear conditions and calm.

Construction Activities:

Continued construction activities as identified on the deficiencies list.
Started clean up and demobilization activities.

Engineering/construction issues:

A deficiencies list was created on December 15, 2003. This list identifies a number of items that need to be completed prior to the contractor leaving the site.

Surveyors are completing the final topographic survey of the site.

Photos:

None currently available.

Water Monitoring:

TSS monitoring of four of the monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. The ponded water within the settling area within the brush is tested but currently no water is being pumped from the settling area.

Date	FWSD – 1	FWSD – 2	FWSD – 3	FWSD – 4	FWSD – 5
December 15	<1	4	639*	3	4
December 16	<1	2		9	11
December 17					
December 18					
December 19					

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-3 is located within the brush area to the north of the construction site. FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

* This test was performed on the water collected in the settling area, no water was released from the settling area.

Env. Monitoring

The majority of the stream in the newly constructed channel is flowing under the ice, the few remaining sections of the channel that are running on the ice are expected to break through and run on the channel bottom soon. This will be monitored.

The fish screen in the main channel upstream of inlet structure was removed at about 3:00 pm.

Upwards of 20 graying were observed holding upstream of the inlet structure.

An otter was observed at the downstream limit of the construction.

Other:

Prior to each shift the contractor is providing a detailed plan of construction; this plan is reviewed by the engineer.

Tony Polyck and Kevin Rumsey of Water Resources, Kirby Meister the Faro Conservation Officer and Bud McAlpine of Diand visited the site today.

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AN APPLIED EARTH SCIENCES COMPANY

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Phone (403) 250-5185 Fax (403) 250-5330

PROJECT MEMORANDUM

To:	**SRK Consulting Inc.**	**Fax No.:**	**Via e-mail**
Attention:	**Cam Scott**	**CC:**	**Bruce Ford**
			Dana Haggar
From:	**Gerry Ferris, Brad Finnson**	**Date:**	**December 17, 2003**
Subject:	**Daily report – FWSD Breach project**		
No. of Pages (including this page): 2		**Project No:**	**0257-012-09**

Weather:

Temperature ranged from -3°C to -18°C. Clear conditions and calm.

Construction Activities:

Completed construction activities as identified on the deficiencies list.
Completed clean up and demobilization activities.

Engineering/construction issues:

The items identified on the deficiencies list were completed.

Surveyors completed the final topographic survey of the site.

Photos:

None currently available.

Water Monitoring:

TSS monitoring of four of the monitoring points indicated in the water licence was undertaken. The results, in mg/L are in the attached table. The ponded water within the settling area within the brush is tested but currently no water is being pumped from the settling area.

Date	FWSD – 1	FWSD – 2	FWSD – 3	FWSD – 4	FWSD – 5
December 15	<1	4	639*	3	4
December 16	<1	2		9	11
December 17	<1	3		6	9
December 18					

FWSD-1 is located at the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-4 is located immediately downstream of the construction site, FWSD-3 is located within the brush area to the north of the construction site. FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel.

* This test was performed on the water collected in the settling area, no water was released from the settling area.

Env. Monitoring

Some constriction of flow in the channel is occurring downstream of the construction area, likely due to frazil ice. This area will be monitored by site staff.

Other:

Prior to each shift the contractor is providing a detailed plan of construction; this plan is reviewed by the engineer.

APPENDIX C2
Weekly Reports

Fresh Water Supply Dam Breach Construction - Faro
Weekly Environmental Monitoring Report

Week of: November 10 to 16, 2003

DISTRIBUTION: A. Von Finster (DFO), S. Orban (DFO), J. Jewell (Pelly Construction), T. Polyck (YTG), L. Gomm (YTG), D. Sherstone (DIAND), B. McAlpine (DIAND), D. Sedgwick (D&T), W. Treleaven (D&T), D. Haggar (D&T), C. Scott (SRK)

Monitors: Gerry Ferris, Brad Finnson and Mine site techs

Work Activity Summary

- Nov 3 to 9 – Site mobilization, prepared refueling area.
- Nov 9 – Completed Contractor Orientation and cleared spoil areas.
- Nov 10 – Removed potentially acid generating (PAG) rip-rap from face of dam and began pumping water into the low-level pipe
- Nov 11-17 – Breach excavation at FWSD and placing spoil in three spoil areas.

Environmental Mitigation and Monitoring

- Copies of the EMP, CEAA screening, Water Licence and Fisheries Authorization are posted on site.
- Pumping of water into the low level pipe was initiated and a fish screen was constructed and installed on the pump intake
- Installed an impermeable liner under the generator and located it as far as possible from the edge of the creek.
- Fish salvage upstream of the coffer dam with gill nets of various mesh sizes over several sets. 9 artic grayling were captured. Indications are that the initial salvage in September effectively removed a high proportion of the grayling in the reservoir.
- PAG rip rap placed in designated spoil area upstream of the dam.
- Spill containment kits located at the refueling area and also at the site trailer. The contents of the spill kits meet the guidelines given in the EMP, however the manhole covers were deemed unnecessary at this site.

Water Quality Monitoring

The water licence requires daily water sampling at 5 sites and samples are to be analyzed for total suspended solids. The attached map indicates the approximate location of stations FWSD-1, -2, -4 and -5. FWSD-3 is the sample site for construction water, however no samples have been collected as no construction water has been produced during the current phase of the excavation.

Total Suspended Solids (reporting average values recorded for the day at each site in mg/L)

Date	FWSD – 1	FWSD – 2	FWSD – 4	FWSD – 5
November 10	>1	2	2	2
November 11	>1	3	3	3
November 12	>1	1	2	2
November 13	>1	1	3	3
November 14	1	2	4	2
November 15	>1	3	6	4
November 16	1	2	3	3

Issues and Comments

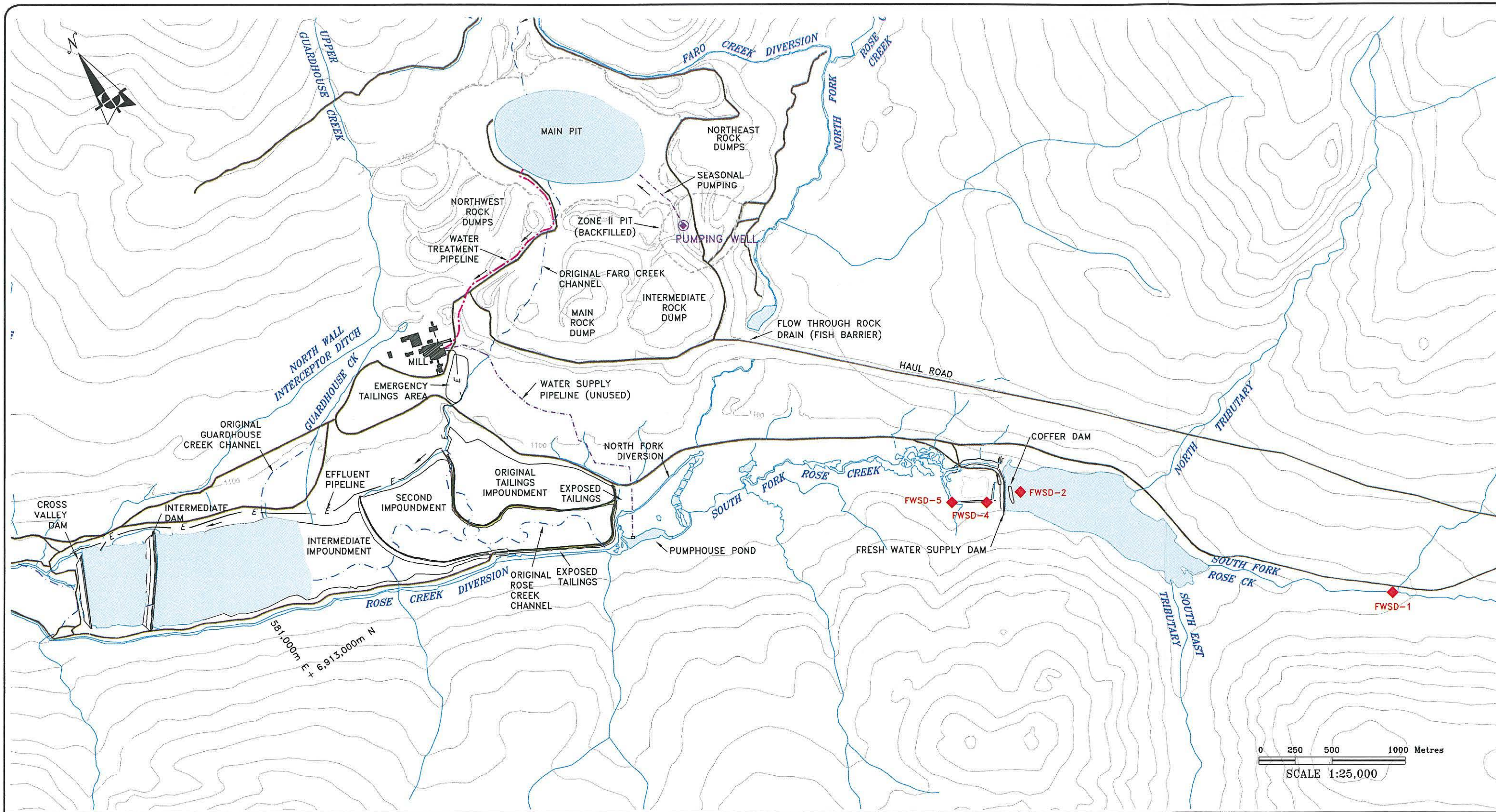
- Pelly Construction was directed to:
    - develop proper storage for waste oil,
    - properly dispose of used absorbent pads and
    - improve the berm around the refueling area
- Requested contractor to perform on-going clean up of spot contamination of soil and snow from oil and other contaminates
- In-flow to reservoir exceeded pumping capacity and additional pumping capacity was brought on to lower the reservoir behind the coffer dam.

Recommendations and Follow-up

- The isolated pool of water that will exist in the area of the low-level intake (between the coffer dam and the main dam) will have to be checked for fish before the area is pumped dry.

Report prepared by:

Gerry Ferris P. Eng.
Brad Finnson
Bruce Ford R.P. Bio.



LEGEND:

- ROADS
- EXISTING SURFACE DRAINAGE
- PRE-MINE DRAINAGE
- E EFFLUENT PIPELINE
- PIPELINE
- WATER TREATMENT PIPELINE
- SURFACE WATER
- FWSD-1 WATER SAMPLING STATION

SOURCES OF INFORMATION:

1. DIGITAL COPY OF 1:50,000 TOPOGRAPHIC MAP SUPPLIED BY SRK CONSULTING.
2. MAP COORDINATES ARE UTM NAD83 ZONE 8; CONTOUR INTERVAL 100 FT.
3. FARO MINE DETAILS ADAPTED FROM DRAWINGS BY ROBERTSON GEOCONSULTANTS INC.

DRAWING INFORMATION:	
REVIEWED BY:	BF
DRAWN BY:	CPW
DATE ISSUED:	NOVEMBER, 2003
PROJECT NUMBER:	23-025
FILE NAME:	23025-3M-01.DWG
REVISION:	0

Project: BREACH OF THE FARO FRESH WATER SUPPLY DAM
Location: FARO MINE, YUKON
Client: ANVIL RANGE MINING CORPORATION (INTERIM RECEIVER)

WATER SAMPLING STATIONS

Gartner Lee | Deloitte & Touche | FIGURE NO. 1

Fresh Water Supply Dam Breach Construction - Faro
Weekly Environmental Monitoring Report

Week of: November 17 to 23, 2003

DISTRIBUTION: A. Von Finster (DFO), S. Orban (DFO), J. Jewell (Pelly Construction), T. Polyck (YTG), L. Gomm (YTG), D. Sherstone (DIAND), B. McAlpine (DIAND), D. Sedgwick (D&T), W. Treleaven (D&T), D. Haggar (D&T), C. Scott (SRK)

Monitors: Gerry Ferris, Brad Finnson and Mine site techs

Work Activity Summary

- Nov 17 to 23 – excavation of the FWSD and placing of spoil in all three of the spoil areas. This included the removal of some additional PAG material (located within the 1969 berm).
- Nov. 17 to 23 – creek water was pumped through the LLO pipe. The water level behind the coffer dam was lowered until it was within the creek on Nov. 20 and maintained at this level since that time.
- Nov. 21 to 23 – started preparations for fluming around the construction site.

Environmental Mitigation and Monitoring

- Pumping of water into the low level pipe continued with minor interruptions on Nov. 19 and 20.
- A second 10" diameter submersible pump was brought to site and a second fish screen was constructed for this pump.
- Daily TSS water testing was performed.
- A backup generator was brought to site and was placed within a separate bermed area.
- PAG material from the 1969 berm was placed in designated spoil area upstream of the dam.
- During the night shift of Nov. 20, two separate hoses ruptured on the excavator. The total spill was less than 3 litres and was quickly recovered by shovel and placed into 45 gallon barrel for disposal.
- A review of the pond surrounding the LLO inlet was performed and 34 slimy sculpin were recovered from the pond and transferred downstream. Following this final fish recovery in the area it was pumped dry.

Water Quality Monitoring

Daily water sampling as required by the water licence is reported in the following table. Note that there has still been no creation of construction water, therefore, no water samples results have been reported for FWSD-3.

Total Suspended Solids (reporting average values recorded for the day at each site in mg/L)

Date	FWSD – 1	FWSD – 2	FWSD – 4	FWSD – 5
November 17	<1	7	4	3
November 18	<1	4	4	4
November 19	<1	5*	9*	8*
November 20	1	58*	33*	15*
November 21	<1	21*	20*	7*
November 22	<1	15	13	3
November 23	<1	16	19	9

* Note rapid drawdown of the reservoir occurred between November 18 and 19 and pumps started and stopped at various times between November 19 and 20.

Issues and Comments

- Requested contractor to perform on-going clean up of spot contamination of soil and snow from oil and other contamination.
- The list of hazardous materials was received from Pelly Construction and included the following: fuel oil, gas, motor oil, hydraulic oil, gear oil, grease, antifreeze, solvent, battery acid, batteries, starting fluid, penetrating fluid, brake fluid, compressed gas, propane, welding gases, methyl hydrate, air brake antifreeze, gas line antifreeze, compressed nitrogen, metalarc lights.

Recommendations and Follow-up

- The sump construction is planned to take place between November 24 and 26. The plans for the sump construction will be reviewed so as to ensure minimization of sediment resulting from this construction.
- Once the sump is constructed and elevated sediment levels that may develop during sump construction have settled out, the contractor will begin pumping the water around the site using the existing pumps and a 24 inch diameter PVC pipe. Once the water is bypassing the construction area in the 24 in pipe, a final fish out of the area between the LLO valve house and the discharge end of the PVC will be made.

Report prepared by:

Gerry Ferris, P. Eng.
Bruce Ford, R.P. Bio.

Fresh Water Supply Dam Breach Construction - Faro
Weekly Environmental Monitoring Report

Week of: November 24 to 30, 2003

DISTRIBUTION: A. Von Finster (DFO), S. Orban (DFO), J. Jewell (Pelly Construction), T. Polyck (YTG), L. Gomm (YTG), D. Sherstone (DIAND), B. McAlpine (DIAND), D. Sedgwick (D&T), W. Treleaven (D&T), D. Haggar (D&T), C. Scott (SRK)

Monitors: Gerry Ferris, Brad Finnson and Mine site techs

Work Activity Summary

- Nov 24 to 28 – excavation of the FWSD bulk breach, spoil from this excavation was taken to all three of the spoil areas. This included the removal of some additional PAG material (located within the 1969 berm). The majority of the bulk excavation is complete and approximately 73,000 m^3 of material has been removed to date.
- Nov. 27 to 30 – excavation of the habitat elements within the base of the bulk excavation. This included excavation of the erosion protection elements, the riffles and portions of the channel.
- Nov. 24 to 28 – creek water was pumped through the LLO pipe. The water level behind the coffer dam was maintained within the former creek banks. Following November 28 only a small volume of water was passed through the LLO using a 4 inch diameter pump.
- Nov. 28 to 30 – pumped creek water through a 24 inch diameter pipe around the construction site, collecting water from the creek upstream of the construction site and outletting water in the fresh water channel downstream of the site.
- A sump was constructed in a side channel just upstream of the coffer dam on November 23, 2003. On November 24 the area was pumped out in order to clear the water in the sump. As of Nov. 30, the pumps have not been moved to the sump area.

Environmental Mitigation and Monitoring

- Water samples for daily TSS analysis were collected.
- PAG material from the 1969 berm was placed in designated spoil area upstream of the dam.
- With excavation for the new channel and anticipating the start of pumping water around the entire work site, a fish salvage was carried out in the freshwater channel between the valve house and the tie in point for the new channel. An electroshocker was used for a total of 2468 seconds and 43 slimy sculpins, 3 burbot and 2 arctic grayling were captured and released downstream of the tie in point.

Water Quality Monitoring

Daily water sampling as required by the water licence is reported in the following table. Note that there has still been no creation of construction water, therefore, no water samples results have been reported for FWSD-3.

Total Suspended Solids (reporting average values recorded for the day at each site in mg/L)

Date	FWSD – 1	FWSD – 2	FWSD – 4	FWSD – 5
November 24	<1	15	15	1
November 25	<1	13	27	5
November 26	<1	9	10	1
November 27	<1	7	9	2
November 28	<1	7	11	1
November 29	1	2	4	3
November 30	<1	2	2	1

Samples were collected from a small pond located adjacent to the LLO inlet structure. High TSS results (121 and 95 mg/l) were measured in the first two days of sampling, however since that time the results were about the same as the creek water and have been allowed to discharge through the LLO inlet to the creek.

Issues and Comments

- Requested contractor to perform on-going clean up of spot contamination of soil and snow from oil and other contamination.
- A fuel spill constituting about 10 L occurred on November 23, 2003, the contaminated soil was removed in barrels and taken to the on site disposal facility.
- Construction water is flowing within the base of the excavations, the water is directed towards a sump created in the construction area. Construction water is pumped from the sump to a bermed settling area. The volume of water pumped to the settling area has been minor and no water has been released from the settling area.

Recommendations and Follow-up

- None.

Report prepared by:

Gerry Ferris, P. Eng.
Bruce Ford, R.P. Bio.

Fresh Water Supply Dam Breach Construction - Faro
Weekly Environmental Monitoring Report

Week of: December 1 to 7, 2003

DISTRIBUTION: A. Von Finster (DFO), S. Orban (DFO), J. Jewell (Pelly Construction), T. Polyck (YTG), L. Gomm (YTG), D. Sherstone (DIAND), B. McAlpine (DIAND), D. Sedgwick (D&T), W. Treleaven (D&T), D. Haggar (D&T), C. Scott (SRK)

Monitors: Gerry Ferris, Brad Finnson and Mine site techs

Work Activity Summary

- Dec. 1 to 7 – excavation of the habitat elements within the base of the bulk excavation. This included excavation of the erosion protection elements, the riffles and portions of the channel. Riffles 1 and 2 are and the associated stream channel are extensively complete.
- Dec. 1 to 6 – pumped creek water through a 24 inch diameter pipe around the construction site, collecting water from the creek upstream of the construction site and outletting water in the fresh water channel downstream of the site.
- Dec. 6 to 7 – pumped creek water through a 16 inch diameter pipe around the construction site, collecting water on the upstream side of the construction water in the sump and outletting water on the downstream side of the site in the fresh water channel.

Environmental Mitigation and Monitoring

- Daily TSS water testing was performed.
- Once the excavation reached the base of the erosion protection, riffles and channel some construction water was encountered. This water was pumped within the site as needed for completion of the various works and also pumped out of the site into a settling area to the North of the site. No water pumping out of the settling area was required.
- Final check for fish was made in the fresh water channel immediately downstream of the valve house.

Water Quality Monitoring

Daily water sampling as required by the water licence is reported in the following table. Note that the results presented for FWSD-3 are from samples collected within the settling area and there has been no release of construction water from the settling pond.

Total Suspended Solids (reporting average values recorded for the day at each site in mg/L)

Date	FWSD – 1	FWSD – 2	FWSD - 3	FWSD – 4	FWSD – 5
December 1	<1	6		6	3
December 2	<1	7		10	21
December 3	<1	6	64	7	15
December 4	3	5		7	17
December 5	1	2		5	22
December 6	<1	3		3	5
December 7	3	6	72	21	13

Issues and Comments

- Requested contractor to perform on-going clean up of spot contamination of soil and snow from oil and other contamination.
- Construction water is flowing within the base of the excavations, the water is directed towards a sump, from which it is pumped to a settling area. On December 5th a failure of the pump used to remove water from the construction area sump resulted in the sump overflowing and construction water flowing down to the end of the construction area. There was no discharge into the fresh water channel. Work was suspended for the Dec 5/6 night shift and resumed for the day shift on Dec. 6 after Pelly Construction presented a plan to further minimize the risk of construction water entering the South Fork of Rose Creek. To date, there has been no release of construction water into the South Fork of Rose Creek from the construction area or from the settling area.

Recommendations and Follow-up

- None.

Report prepared by:

Gerry Ferris, P. Eng.
Bruce Ford, R.P. Bio.

Fresh Water Supply Dam Breach Construction - Faro
Weekly Environmental Monitoring Report

Week of: **December 8 to 14, 2003**

DISTRIBUTION: A. Von Finster (DFO), S. Orban (DFO), J. Jewell (Pelly Construction), T. Polyck (YTG), L. Gomm (YTG), D. Sherstone (DIAND), B. McAlpine (DIAND), D. Sedgwick (D&T), W. Treleaven (D&T), D. Haggar (D&T), C. Scott (SRK)

Monitors: **Gerry Ferris, Brad Finnson and Mine site techs**

Work Activity Summary

- Dec. 8 to 14 – excavation of the habitat elements within the base of the bulk excavation. This included excavation of the erosion protection elements, the riffles, the inlet structure and portions of the channel. All five riffle elements in the channel were completed.
- Dec. 8 to 14 – pumped creek water through a 16 inch diameter pipe around the construction site, collecting water on the upstream side of the construction water in the sump and outletting water on the downstream side of the site in the fresh water channel.
- Dec. 8 to 14 – pumped construction water from the sump locations to a settling area within the bush.
- Dec. 8 to 14 – Valve house and low level pipe decommissioning was completed.

Environmental Mitigation and Monitoring

- Daily TSS water testing was performed.
- Once the excavation reached the base of the erosion protection, riffles and channel some construction water was encountered. This water was pumped within the site as needed for completion of the various works and also pumped out of the site into a settling area to the North of the site. No water pumping out of the settling area was required.
- A total of 313 slimy sculpin were salvaged from the pond within the valve house prior to pumping it completely dry.
- A total of 10 burbot, 146 slimy sculpin and 592 artic graying were removed from a low area of the natural channel upstream of the construction site. This location was the original location of the barge that supported the pumps used to complete the final draw down of the reservoir.
- A fish exclusion screen was installed within the main channel of the creek, located slightly upstream of a sand bag berm. This screen is intended to keep fish out of the constructed channel until after the channel is filled with water flowing properly.

Water Quality Monitoring

Daily water sampling as required by the water licence is reported in the following table. Note that the resulted presented for FWSD-3 are from samples collected within the settling area. There has been no release of construction water from the settling pond.

Total Suspended Solids (reporting average values recorded for the day at each site in mg/L)

Date	FWSD – 1	FWSD – 2	FWSD - 3	FWSD – 4	FWSD – 5
December 8	2	5	306	9	11
December 9	<1	9	52	7	8
December 10	<1	3		2	3
December 11	<1	5		2	2
December 12	<1	3		2	3
December 13	1	105		18	84
December 14	<1	2	58	2	2

Issues and Comments

- Requested contractor to perform on-going clean up of spot contamination of soil and snow from oil and other contamination.
- Construction water is flowing within the base of the excavations, the water is directed towards a sump, from which it is pumped to a settling area. No water has been pumped from the settling area.

Recommendations and Follow-up

- None.

Report prepared by:

Gerry Ferris, P. Eng.
Bruce Ford, R.P. Bio.

Fresh Water Supply Dam Breach Construction - Faro
Weekly Environmental Monitoring Report

Week of: December 15 to 17, 2003

DISTRIBUTION: A. Von Finster (DFO), S. Orban (DFO), J. Jewell (Pelly Construction), T. Polyck (YTG), L. Gomm (YTG), D. Sherstone (DIAND), B. McAlpine (DIAND), D. Sedgwick (D&T), W. Treleaven (D&T), D. Haggar (D&T), C. Scott (SRK)

Monitors: Gerry Ferris, Brad Finnson and Mine site techs

Work Activity Summary

- Dec. 15 – completed excavation and placement of the habitat elements within the base of the bulk excavation. This included the inlet structure and portions of the erosion protection. A connection was made between the constructed works and the natural channel in the evening of Dec 15, 2003 and water was allowed to flow through the completed construction.
- Dec. 15 – pumped construction water from the sump locations to a settling area within the bush in the morning.
- Dec. 15 to 16 – pumped creek water through a 16 inch diameter pipe around the construction site, with the pump intake in the sump created in the creek channel upstream of the construction site and discharging water on the downstream side of the site in the fresh water channel. This activity continued until the morning of Dec. 16. In the late afternoon of Dec. 15 the 10 inch flight pump was exchanged for a 4 inch flight pump to maintained a flow in the downstream channel while allowing the majority of creek water into the new channel once the connection between the upstream creek and the new channel was completed.
- Dec. 16 to 17 – performed clean-up activities and demobilization.

Environmental Mitigation and Monitoring

- Daily TSS water testing was performed.
- The following sequence was followed for the final breach of the channel:
    - Construction water upstream of the plug in the channel (between riffle 3 and 4) was pumped out.
    - The inlet structure was completed.
    - The erosion protection (near the inlet structure) on the left side was completed.
    - The erosion protection (near the inlet structure) on the right side was completed upto the floodplain level.
    - The erosion protection on the right side (between riffle 3 and 4) was completed.
    - The small dyke at the downstream limit of the construction was removed.
    - The plug that remained in the channel (between riffle 3 and 4) was removed.
    - The 10 inch diameter flight pump was removed and replace with a 4 inch diameter flight pump. This allowed a constant flow of water to be maintained downstream of the construction site during breaching.
    - The sand bag berm within the main stem of channel was removed.

  - The final breach (of a small "plug" of insitu soil was left in place between the natural channel and the constructed channel until this time) between the natural channel and the constructed channel was made.
- The dam was breached on Dec. 15 at 8:40 pm. The water flowed through the channel and reached the downstream limit of the construction at 9:38 pm.
- A fish exclusion net had been placed in the creek channel immediately upstream of the inlet to the new channel to keep fish out of the new channel until proper flow was established through the channel. The exclusion net was removed on Dec. 16.

Water Quality Monitoring

Daily water sampling as required by the water licence is reported in the following table. Note that the resulted presented for FWSD-3 are from samples collected within the settling area. There has been no release of construction water from the settling pond.

Total Suspended Solids (reporting average values recorded for the day at each site in mg/L)

Date	FWSD – 1	FWSD – 2	FWSD - 3	FWSD – 4	FWSD – 5
December 15	<1	4	639	3	4
December 16	<1	2		9	11
December 17	<1	3		6	9
December 18	<1	11		8	10

Issues and Comments

- Prior to releasing the creek water into the channel some ice had formed in it (due to construction water). Initially the creek water flowed over this ice cover, but by Dec. 17 the creek water had melted through this ice and was flowing on the base of the constructed channel.
- Requested contractor to perform on-going clean up of spot contamination of soil and snow from oil and other contamination.
- The breach was completed in the evening of Dec. 15.
- The contractor completed minor deficiencies and the site clean up by Dec. 17.
- Demobilization by the contractor began on Dec. 16 and continued to Dec. 17.

Recommendations and Follow-up

- Monitoring of the completed works is to be performed as per the water licence and the EMP.

Report prepared by:

Gerry Ferris, P. Eng.
Bruce Ford, R.P. Bio.

APPENDIX C3
Monthly Reports

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY
1605, 840 – 7 Avenue S.W., Calgary, Alberta, Canada. T2P 3G2
Phone (403) 250-5185 Fax (403) 250-5330

MONTHLY REPORT FOR NOVEMBER

To:	**Yukon Water Board** **Suite 106, 419 Range Road** **Whitehorse, Yukon Y1A 3V1**	**Fax No.:** **CC:**	**Hard Copy, Electronic** **C. Scott, SRK** **D. Sedgwick, D&T** **Dana Haggar, D&T**
From:	**Gerry Ferris**	**Date:**	**December 11, 2003**
Subject:	**Monthly report – FWSD Breach project**		
No. of Pages (including this page): 7		**Project No:**	**0257-012-09**

As required by Water Licence QZ03-058, the monthly report for November on the construction and monitoring activities at the Fresh Water Supply Dam Breach Project is hereby submitted.

1. Construction Activities & Progress:

Construction activities at the site commenced on November 10. The dam breach to floodplain level was completed by November 27 with a total of 68,000 m^3 of material removed from the dam. Construction of the channel (and pools and riffles) within the floodplain breach is underway. The latest project schedule is attached as Figure 1.

Water has been diverted around the construction site during the activities, either through the LLO pipe and existing fresh water channel or, since November 28, through a pipe system which collects water upstream of the construction site and discharges into the freshwater channel downstream of the western limits of the construction area.

The water was managed in the following stages prior to and during November:

- Prior to receipt of the water licence, the water in the reservoir was maintained at an approximate elevation of 1086.
- Following receipt of the water licence, the water was lowered using the low level outlet (LLO) to elevation 1082 m, which is the elevation of the breach through the original cofferdam. The measured creek flow on November 10 was 4,000 US gpm (0.252 m^3/s, compared with the statistical averages in Table 2.5 of Report 1CD003.22, April 2003: 0.269 m^3/s in 1968 and 0.29 m^3/s in 2003).

- Pumps were installed upstream of the cofferdam and creek water was pumped into the LLO inlet. Various arrangements of pumps were used during this period (inflow was managed using one 10-inch flight pump with a capability of 4,000 US gpm).
- As construction advanced, a O.D. 24-inch (0.6-m) pipe system was installed to divert creek water around the construction site This system commenced operation on Nov. 26, although a small volume of water was still pumped through the LLO to maintain it in an ice-free condition until it could be abandoned later in the project.

2. Water Monitoring:

As required by the licence, water samples were collected daily and tested to determine the total suspended solids (TSS). The sampling was done by the mine site environmental technicians and the TSS testing was performed on site using existing facilities. One set of samples was sent out for independent evaluation.

2.1 Prior to Construction:

As indicated in the Environment Management Plan, TSS water sampling and testing was undertaken prior to commencement of construction. The sample points were located upstream and downstream of the construction site. As this sampling was begun prior to receipt of the water licence, the sampling points do not correspond to the sample locations indicated in the water licence. Figure 2, attached, shows the locations of the two sample points used prior to receipt of the water licence. Table 1 contains the results of the sampling and testing program, the results in the table are TSS in mg/L.

Table 1 – Water Sampling Results Prior to Construction

Date	T-1, 15m downstream of the confluence of the South Fork of Rose Creek and South East Tributary	X-3, at the downstream end of the Pumphouse Pond
September 19	8	Not measured
September 22	6	2
September 23	5	2
September 24	4	1
September 29	4	1
October 7	3	1
October 10	1	Not measured
October 15	9	Not measured
October 17	9	1
October 20	5	1
October 22	6	1
October 24	3	1
October 27	3	1
October 29	0	1
October 31	4	2
November 3	3	3
November 5	6	3
November 7	5	2

2.2 During Construction

TSS monitoring as specified in the water licence was completed daily in November. The results, in mg/L are provided in Table 2. The locations of four of these points are shown on Figure 1. The location of FWSD-3 is not shown on the figure because no construction water was discharged into the creek.

Table 2 – TSS Water Quality Results During Construction

Date	FWSD – 1	FWSD – 2	FWSD – 3	FWSD – 4	FWSD – 5	LLO
Discharge Criterion	NA	NA	**FWSD-2 value + 25**	NA	NA	**FWSD-2 value + 25**
November 10	<1	2		2	2	
November 11	<1	3		3	3	
November 12	<1	1		2	2	
November 13	<1	1		3	3	
November 14	1	2		4	2	
November 15	<1	3		6	4	
November 16	1	2		3	3	
November 17	<1	7		4	3	
November 18	<1	4		4	4	
November 19	<1	5*		9*	8*	
November 20	1	58*		33*	15*	
November 21	<1	21*		20*	7*	
November 22	<1	15		13	3	
November 23	<1	16		19	9	
November 24	<1	15		15	1	
November 25	<1	13		27	5	
November 26	<1	9		10	1	
November 27	<1	7		9	2	**121**
November 28	<1	7		11	1	**95**
November 29	1	2		4	3	4
November 30	<1	3			1	2

FWSD-1 is located upstream of the FWS reservoir near the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-3 is the point from which construction water is discharged from site, FWSD-4 is located immediately downstream of the construction site, FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel, LLO is located directly adjacent to the LLO inlet structure.

* Note that the elevated TSS values from Nov.19 to 21 are related to rapid drawdown of the reservoir that occurred between November 18 and 19 as a result of increasing the pumping capacity, and the starting and stopping of the pumps between November 19 and 20 due to generator problems.

A small pond of water formed around the LLO as a result of a leak in one of the connections on the 24-inch diameter pipe system. This water, which was tested daily (the LLO column in Table 2), was treated as construction water and its management was therefore considered to be governed by the TSS criterion for FWSD-3 (25 mg/L above the water collected upstream of the dam). No discharge of this water occurred on Nov. 27 and 28. However, as a result of compliant TSS levels on November 29 and 30, this water was discharged to the creek.

Comparison of the results obtained by the on site laboratory was made with a commercial laboratory (Cavendish Analytical Laboratory Ltd., Vancouver) based on samples collected on

November 15. A comparison of the results (in mg/L) of the onsite testing and the commercial laboratory is presented in Table 3.

Table 3 – Comparison of TSS results, November 15, 2003

	FWSD – 1	FWSD – 2	FWSD – 4	FWSD – 5
On site Lab.	<1	3	6	4
Cavendish	<1	2	7	6

3. PAG Material Storage Areas

Potential acid generating (PAG) material was collected from the face of the dam and from the location of the buried 1968 berm and taken to a portion of the spoil area upstream of the dam. No run off from this area has occurred. A perimeter berm is planned, as indicated in the EMP for the project. There has been no run off from this area to date.

4. Other:

YTG environmental technician, Wayne Kettley, visited the site on November 18 and collected samples as part his annual visit to the Faro site.

YTG inspector, Tony Polyck, visited the site on November 25 and inspected the construction work and progress to date.

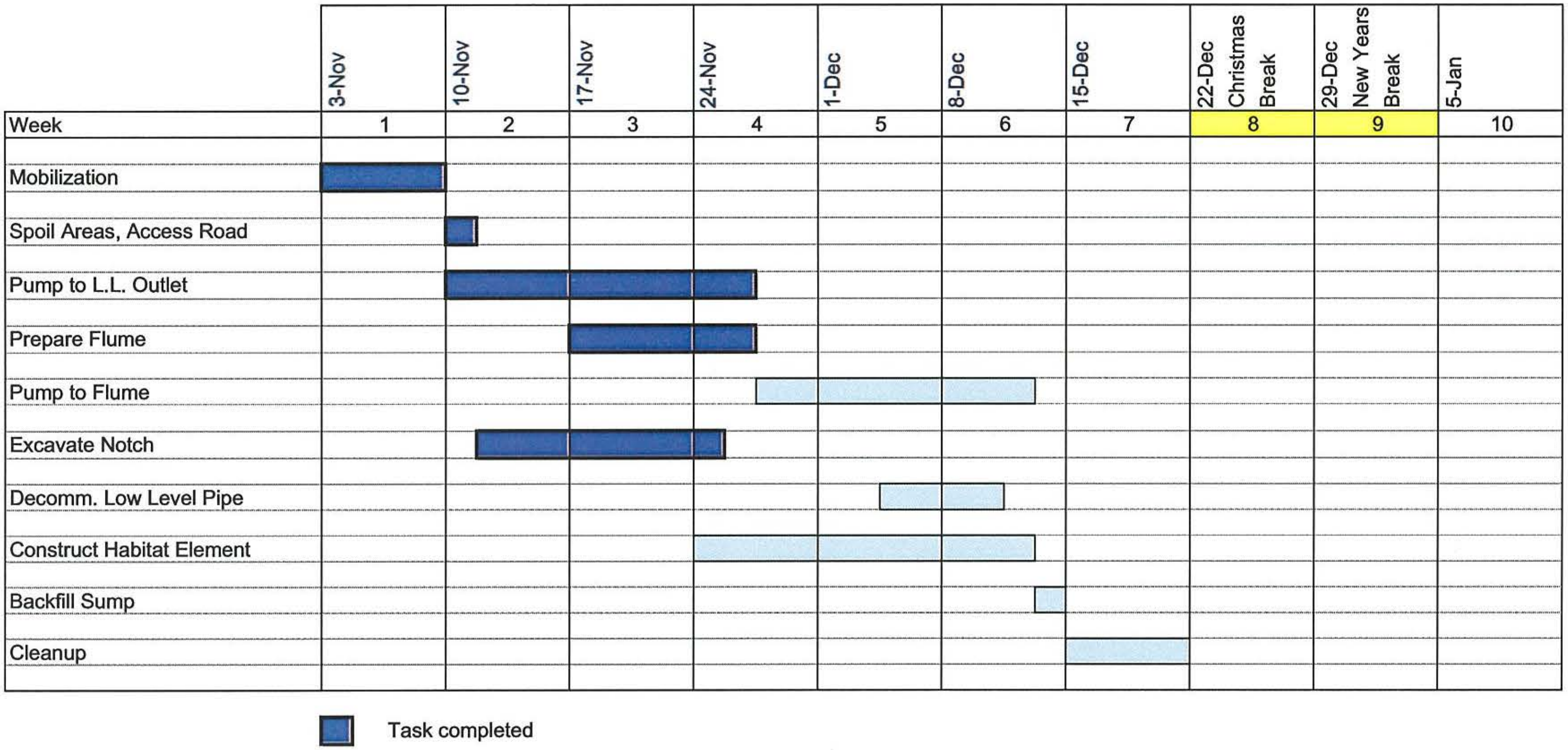
Sandra Orban (DFO) visited the site on November 27/28, and inspected the construction work and progress to date.

Bud McAlpine (DIAND Type II Mines) visited the site on November 13/14, 20/21 and 27/28, and inspected the construction works. Milos Stepanek, technical consultant to DIAND Type II Mines, was present during the inspections of November 20/21.

Prior to the commencement of the project, a criterion was set for the size of spill (20 litres) that would trigger reporting to the Yukon Spill Hotline. There were no spills larger than 20 L, and therefore no reports to the Yukon Spill Hotline. There were some minor oil leaks (less than 1 L) and one fuel spill of a lesser size; these spills were promptly dealt with as outlined in the spill contingency plan.

Figure 1

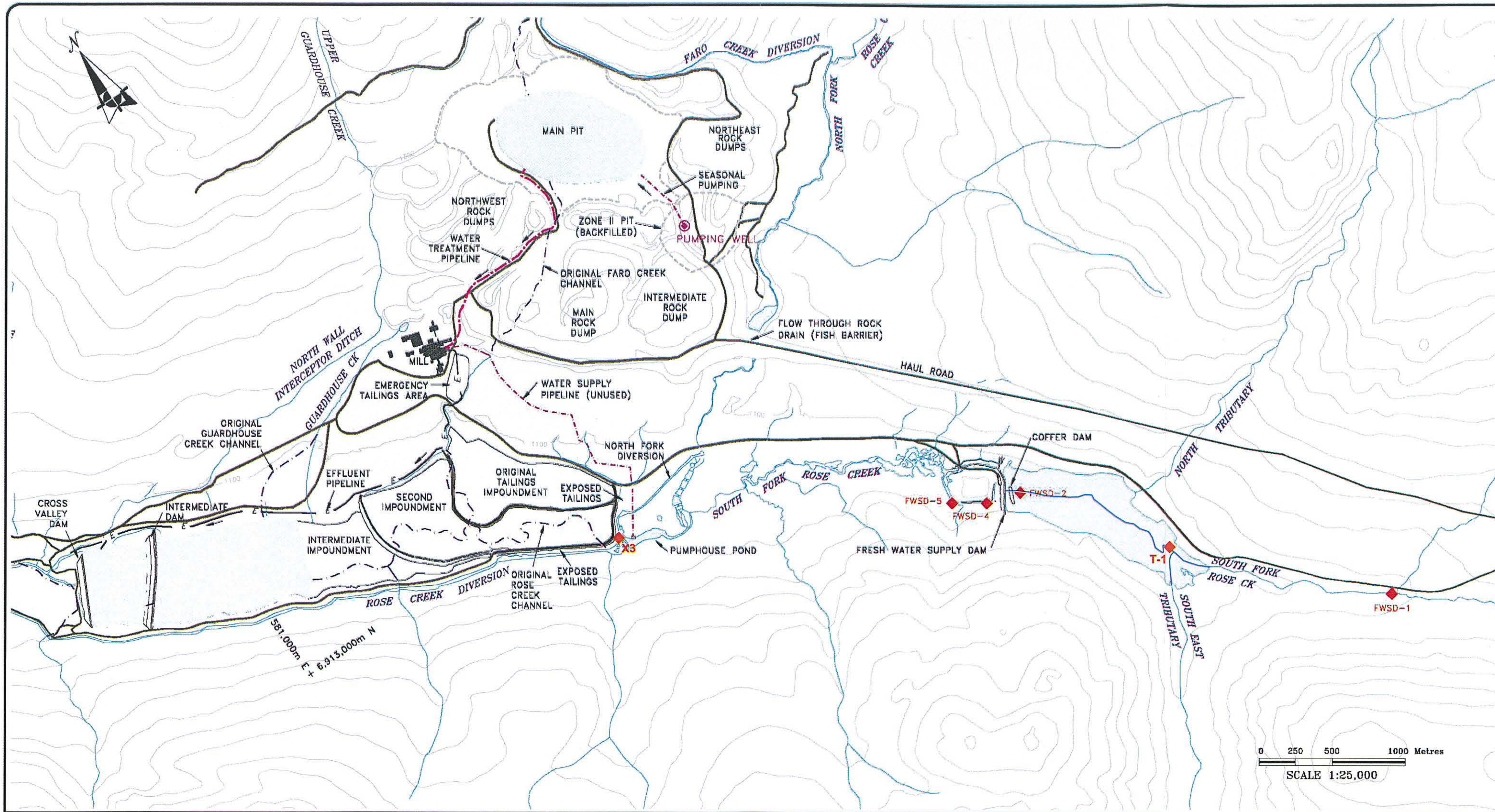
FWSD BREACH PROJECT CONSTRUCTION SCHEDULE



NOTE 1: Week 1 starts with notice to proceed.
NOTE 2: Pumping to the flume is extended into the next week.
NOTE 3: Downstream mitigation not needed as part of this contract.

Pelly Cons't Oct 31/03
Revised by SRK Nov 10/03
Revised by BGC/Pelly Nov. 29/03

Nov Figure 1_schedule.ck.xls/SRK 10 Nov/12/11/2003



LEGEND:

- ROADS
- EXISTING SURFACE DRAINAGE
- PRE-MINE DRAINAGE
- EFFLUENT PIPELINE
- PIPELINE
- WATER TREATMENT PIPELINE
- SURFACE WATER
- FWSD-1 WATER SAMPLING STATION

SOURCES OF INFORMATION:

1. DIGITAL COPY OF 1:50,000 TOPOGRAPHIC MAP SUPPLIED BY SRK CONSULTING.
2. MAP COORDINATES ARE UTM NAD83 ZONE 8; CONTOUR INTERVAL 100 FT.
3. FARO MINE DETAILS ADAPTED FROM DRAWINGS BY ROBERTSON GEOCONSULTANTS INC.

DRAWING INFORMATION:	
REVIEWED BY:	BF
DRAWN BY:	CPW
DATE ISSUED:	NOVEMBER, 2003
PROJECT NUMBER:	23-025
FILE NAME:	23025-3M-01.DWG
REVISION:	0

Project: BREACH OF THE FARO FRESH WATER SUPPLY DAM
Location: FARO MINE, YUKON
Client: ANVIL RANGE MINING CORPORATION (INTERIM RECEIVER)

WATER SAMPLING STATIONS

Gartner Lee | Deloitte & Touche | FIGURE NO. 2

BGC ENGINEERING INC.

AN APPLIED EARTH SCIENCES COMPANY

1605, 840 – 7 Avenue S.W., Calgary, Alberta, Canada. T2P 3G2
Phone (403) 250-5185 Fax (403) 250-5330

MONTHLY REPORT FOR DECEMBER

To:	Yukon Water Board	Fax No.:	Hard Copy, Electronic
	Suite 106, 419 Range Road	CC:	C. Scott, SRK
	Whitehorse, Yukon Y1A 3V1		D. Sedgwick, D&T
			Dana Haggar, D&T
From:	Gerry Ferris	Date:	January 9, 2004
Subject:	Monthly report – FWSD Breach project		
No. of Pages (including this page): 5		Project No:	0257-012-09

As required by Water Licence QZ03-058, the monthly report for December on the construction and monitoring activities at the Fresh Water Supply Dam Breach Project is hereby submitted.

1. Construction Activities & Progress:

The construction of the breach in the FWSD was completed December 15, 2003. The South Fork of Rose Creek was allowed to flow through the completed channel on December 15. The contractor completed clean up activities and demobilized from the site on December 17.

During the first 15 days of December, water was diverted around the construction site through either a 24-inch (0.6-m) diameter pipe or a 16-inch (0.34-m) diameter pipe. The pipe systems collected water upstream of the construction site via pumps (either from a low spot in the natural channel or from a sump) and discharged this water into the freshwater channel downstream of the western limits of the construction area.

The water was managed in the following stages during December:

- Pumps were maintained upstream of the cofferdam (within a low area of the natural creek channel) and creek water was pumped into an O.D. 24-inch pipe system. This system was located to the south of the breach construction and utilized one 10-inch (0.25-m) flight pump (with a capability of 4,000 US gpm). A small volume of water flow was maintained in the LLO pipe through the use of a 4-inch (0.1-m) flight pump.
- On December 6, the water intake location was changed to the sump. A 10-inch diameter flight pump was used to pump water through an O.D. 16-inch pipe system. This pipe was located partly within the completed constructed works, at the northern

limit of the floodplain. The flow through the LLO pipe was maintained using the 4-inch flight pump until December 7, when the LLO was abandoned.

- On December 15, the 10-inch flight pump was removed and a 4-inch pump installed in its place. This was done as part of allowing water to flow through the completed breach. This smaller pump was used to maintain some flow downstream (through the 16-inch pipe) while the main volume of water was directed into the channel through the breach. It took close to one hour for the channel to fill and for water to begin discharging into the creek below the newly constructed channel. Water began flowing through the completed breach on December 15.
- The 4-inch flight pump was removed on December 16.

A fish exclusion net was installed in the creek channel above the intake to the new channel on December 13th. This net was intended to keep fish from entering the channel until flow through the channel was properly established. The net was removed on December 16.

2. Water Monitoring:

As required by the licence, water samples were collected daily and tested to determine the total suspended solids (TSS). The sampling was done by the mine site environmental technicians and the TSS testing was performed on site using existing facilities. One set of samples was sent out for independent evaluation.

2.1 Monitoring During Construction

TSS monitoring as specified in the water licence was completed daily in December. The results, in mg/L are provided in Table 1. The locations of five of these points are shown on Figure 1.

Table 1 – TSS Water Quality Results During Construction

Date	FWSD – 1	FWSD – 2	FWSD – 3	FWSD – 4	FWSD – 5	LLO
Discharge Criterion	NA	NA	**FWSD-2 value + 25**	NA	NA	**FWSD-2 value + 25**
December 1	<1	6		6	3	4
December 2	<1	7		10	21	5
December 3	<1	6	**64***	7	15	18
December 4	3	5		7	17	6
December 5	1	2		5	22	8
December 6	<1	3		3	5	11
December 7	3	6	**72***	21	13	14
December 8	2	5	**306***	9	11	
December 9	<1	9	**52***	7	8	
December 10	<1	3		2	3	
December 11	<1	5		2	2	
December 12	<1	3		2	3	
December 13	1	105[1]		18[1]	84[1]	
December 14	<1	2	**58***	2	2	
December 15	<1	4	**639***	3	4	
December 16	<1	2		9	11	
December 17	<1	3		6	9	

FWSD-1 is located upstream of the FWS reservoir near the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-3 is the point from which construction water is discharged from site, FWSD-4 is located immediately downstream of the construction site, FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel, LLO is located directly adjacent to the LLO inlet structure.

* Note that all sampling at FWSD-3 was done within the settling area, no water was released from the settling area to the creek.
[1] Note that no construction activities occurred upstream of FWSD-2, it is expected that the high TSS valve reported is the result of creek erosion (under the ice) upstream of FWSD-2.

A small pond of water formed around the LLO as a result of a leak in one of the connections on the 24-inch diameter pipe system. This water, which was tested daily (the LLO column in Table 1), was treated as construction water and its management was therefore considered to be governed by the TSS criterion for FWSD-3 (25 mg/L above the water collected upstream of the dam). The water in this LLO area was discharged to the creek as needed. After December 7 there was no water in the LLO area.

Comparison of the results obtained by the on site laboratory was made with a commercial laboratory (Cavendish Analytical Laboratory Ltd., Vancouver) based on samples collected on December 2. A comparison of the results (in mg/L) of the onsite testing and the commercial laboratory is presented in Table 2.

Table 2 – Comparison of TSS results, December 2, 2003

	FWSD – 1	FWSD – 2	LLO	FWSD – 4	FWSD – 5
On site Lab.	<1	7	5	10	21
Cavendish	1	11	6	13	17

3. PAG Material Storage Areas

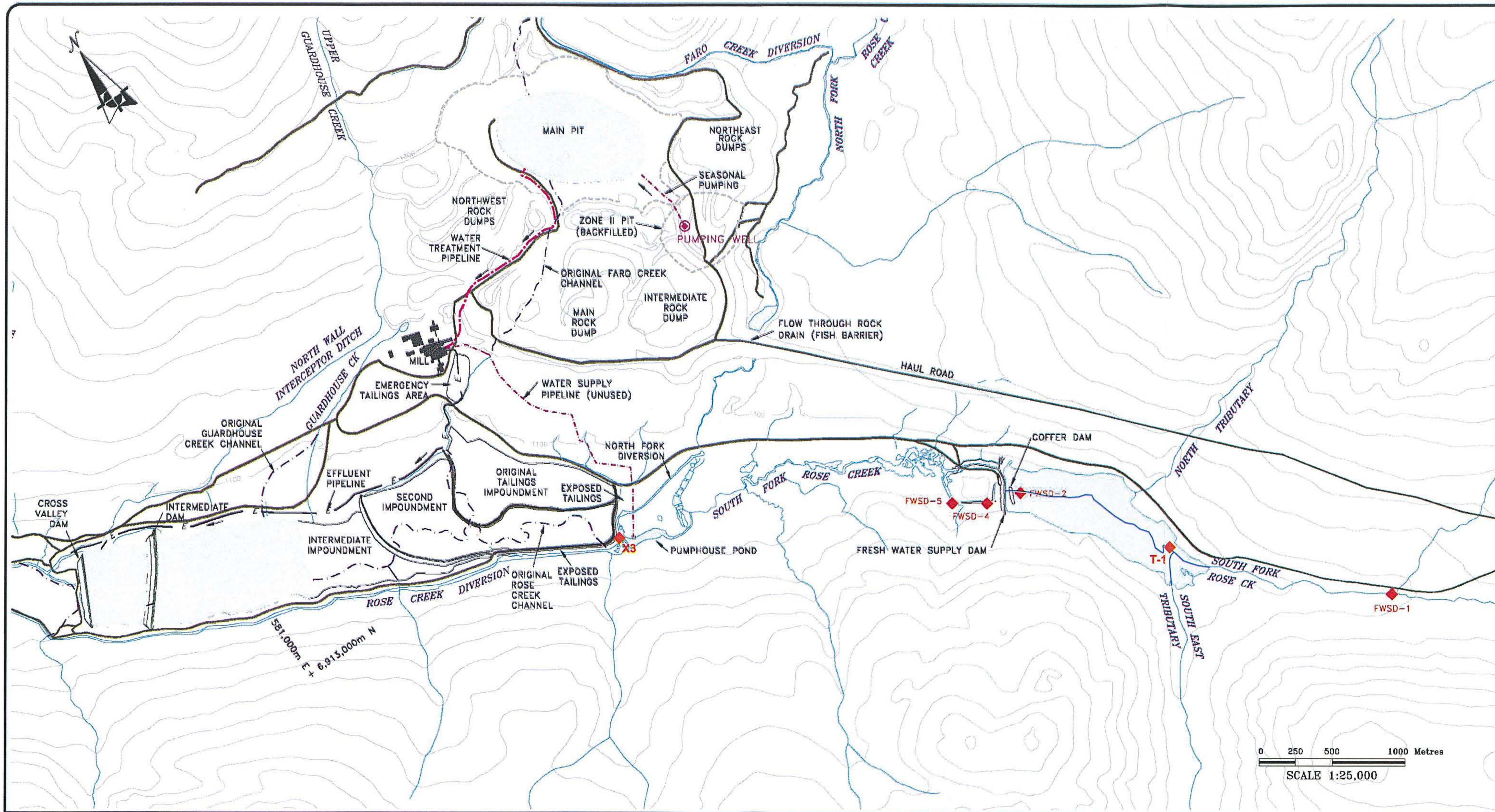
Potential acid generating (PAG) material was collected from the face of the dam and from the location of the buried 1968 berm and taken to a portion of the spoil area upstream of the dam. No run off from this area has occurred. A perimeter berm has been constructed. Water from this area will be analyzed in accordance with the water licence in the spring/summer period.

4. Other:

Bud McAlpine (DIAND Type II Mines) visited the site on December 4/5, 12/13 and 16th and inspected the construction works.

YTG inspector (Tony Polyck & Kevin Rumsey) visited the site on December 16 and inspected the completed construction work.

Kirby Meister (Faro Conservation Officer) visited the site on December 16 and inspected the completed construction work.



LEGEND:

ROADS	SURFACE WATER
EXISTING SURFACE DRAINAGE	
PRE-MINE DRAINAGE	FWSD-1 WATER SAMPLING STATION
EFFLUENT PIPELINE	
PIPELINE	
WATER TREATMENT PIPELINE	

SOURCES OF INFORMATION:

1. DIGITAL COPY OF 1:50,000 TOPOGRAPHIC MAP SUPPLIED BY SRK CONSULTING.
2. MAP COORDINATES ARE UTM NAD83 ZONE 8; CONTOUR INTERVAL 100 FT.
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DRAWING INFORMATION:	
REVIEWED BY:	BF
DRAWN BY:	CPW
DATE ISSUED:	NOVEMBER, 2003
PROJECT NUMBER:	23-025
FILE NAME:	23025-3M-01.DWG
REVISION:	0

Project: BREACH OF THE FARO FRESH WATER SUPPLY DAM
Location: FARO MINE, YUKON
Client: ANVIL RANGE MINING CORPORATION (INTERIM RECEIVER)

WATER SAMPLING STATIONS

Gartner Lee | Deloitte & Touche | FIGURE NO. 1

APPENDIX C4
Related Construction Summaries

Schedule of Quantities for the FWSD Breach

Task	Item	Units	Quantity
1	Prepare spoil areas	m^2	15140
	Prepare access roads for site and spoil areas	m^3	1189
2	Screen to make Type II riprap	m^3	463
	Purchase geotextile and deliver	m^2	3850
	Geotextile adjustment	m2	3850
3	Mob and Demob	l.s.	1
	Install flume/pipe for pumping	l.s.	1
	Pumping of creek water	l.s.	1
	Preparation of access road to upstream side of dam	m^3	100
	Install fish exclusion - repair from item 1	l.s.	1
	Excavated sump	m^3	24
	Construct - construction water berm	m^3	41
	Pumps for removing construction water*	days	16
4	Excavation of riprap and local storage	m^3	99.2
	Excavation of potential PAG, local storage	m^3	1797
	Excavation, separation and local storage	m^3	65,549
5	Excavation of channel	m^3	1695
	Excavation for placement of riffles	m^3	867
	Place Type I rip rap in riffles.	m^3	1084
6	Excavation for residual structure erosion protection	m^3	4,236
	Place geotextile	m^2	2,430
	Place type I riprap at edge of residual structure	m^3	3,320
7	Fill sump	m^3	19
	Final channel excavation - near inlet	m^3	14
	Placement inlet structure - Type II rip rap	m^3	463
	Excavation of inlet structure	m3	2210
	Place grout for abandonment of inlet of LLO	m^3	6
	Place fill above inlet of LLO	m^3	1700
	Abandon valve house	lump	1
	Survey	lump	1
	Fill placement in fresh water channel	m^3	2000
	Backfill at inlet & riffles	m3	1950
	Separate PAG - downstream side	m3	2387

Task 1 - Other pre-construction activites, including preliminary revegetation
Task 2 - Prepare fill materials and source supplies
Task 3 - Install cofferdam and maintain reservoir
*Pumping days within this task are preliminary estimates, pumping will be paid on the basi: pumping required.
Task 4 - Bulk excavation of breach
Task 5 - Excavation of channel
Task 6 - Fill placement, geotextile, riprap and gravel
Task 7 - Removal of cofferdam and site clean up

Weather Data during FWS Dam Breach Project
(Weather Data from Environment Canada's Faro A station)

Date	Temperature (°C)		Wind Speed (km/h)		
	Daily Maximum	Daily Minimum	Maximum	Average	Weather Comments
10-Nov-03	-9	-16	11	6	
11-Nov-03	-15	-24	13	8	5 cm of snow overnight
12-Nov-03	-1	-8	22	13	overcast
13-Nov-03	-6	-8	15	9	snow started near midday, 3 cm
14-Nov-03	-12	-17	9	3	light snow starting at 4:00 pm
15-Nov-03	-1	-4	28	22	overcast
16-Nov-03	-18	-20	13	12	light snow in afternoon
17-Nov-03	-21	-23	20	17	light snow in afternoon
18-Nov-03	-23	-25	19	12	
19-Nov-03	-33	-37	6	0	
20-Nov-03	-33	-36	7	3	
21-Nov-03	-23	-29	19	17	
22-Nov-03	-14	-19	15	10	
23-Nov-03	-10	-11	22	15	
24-Nov-03	-17	-21	15	6	
25-Nov-03	-24	-29	7	0	
26-Nov-03	-24	-26	11	4	
27-Nov-03	-26	-31	0	0	light snow in afternoon
28-Nov-03	-22	-24	17	11	2 cm snow through night
29-Nov-03	-20	-22	24	13	
30-Nov-03	-25	-30	22	16	
1-Dec-03	-15	-23	15	5	
2-Dec-03	1	-3	39	28	
3-Dec-03	-25	-31	9	3	
4-Dec-03	-26	-27	9	2	
5-Dec-03	-20	-21	4	0	light snow through day
6-Dec-03	-21	-25	4	0	light snow through day
7-Dec-03	-14	-20	4	0	light snow through day
8-Dec-03	-18	-23	6	2	
9-Dec-03	-22	-24	11	6	
10-Dec-03	-27	-29	7	3	
11-Dec-03	-15	-20	15	8	
12-Dec-03	-14	-16	7	4	
13-Dec-03	-21	-24	4	0	
14-Dec-03	-23	-25	0	0	
15-Dec-03	-17	-24	17	13	
16-Dec-03	-15	-20	9	2	
17-Dec-03	-14	-20	7	2	

QA/QC Inspection Summary

		Rip Rap Sizing		Rip Rap Placement		Floodplain & Channel Excavation		Fill Placement
Date	Visual Inspection of Slopes and Rough grades	Visual	Gradation	Visual	Measurement	Visual	Measurement	Visual
Preconstruction		*	*					
10-Nov-03	*	*						
11-Nov-03	*							
12-Nov-03	*							
13-Nov-03	*							
14-Nov-03	*	*						
15-Nov-03	*							
16-Nov-03	*		*					
17-Nov-03	*							
18-Nov-03	*							
19-Nov-03	*							
20-Nov-03	*					*		
21-Nov-03	*					*		
22-Nov-03	*					*		
23-Nov-03	*					*		
24-Nov-03	*	*				*		
25-Nov-03	*					*		
26-Nov-03	*					*		
27-Nov-03	*					*		
28-Nov-03	*					*		
29-Nov-03	*					*		
30-Nov-03	*					*		
1-Dec-03	*	*		*		*		*
2-Dec-03		*		*		*	*	*
3-Dec-03		*		*		*	*	*
4-Dec-03		*		*	*	*	*	*
5-Dec-03		*		*	*	*	*	*
6-Dec-03		*		*	*	*	*	*
7-Dec-03		*		*	*	*	*	*
8-Dec-03		*		*	*	*	*	*
9-Dec-03		*		*	*	*	*	*
10-Dec-03		*		*	*	*	*	*
11-Dec-03		*		*	*	*	*	*
12-Dec-03		*		*	*	*	*	*
13-Dec-03	*	*		*	*	*	*	*
14-Dec-03	*	*		*	*	*	*	*
15-Dec-03		*		*	*	*	*	*
16-Dec-03								
17-Dec-03								

Results of Total Suspended Solids (TSS) Monitoring for the FWS Dam Breach Project.

Date	FWSD – 1	FWSD – 2	FWSD – 3	FWSD – 4	FWSD – 5	LLO
Discharge Criterion	NA	NA	**FWSD-2 value + 25**	NA	NA	**FWSD-2 value + 25**
Nov-10	<1	2		2	2	
Nov-11	<1	3		3	3	
Nov-12	<1	1		2	2	
Nov-13	<1	1		3	3	
Nov-14	1	2		4	2	
Nov-15	<1	3		6	4	
Nov-16	1	2		3	3	
Nov-17	<1	7		4	3	
Nov-18	<1	4		4	4	
Nov-19	<1	5*		9*	8*	
Nov-20	1	58*		33*	15*	
Nov-21	<1	21*		20*	7*	
Nov-22	<1	15		13	3	
Nov-23	<1	16		19	9	
Nov-24	<1	15		15	1	
Nov-25	<1	13		27	5	
Nov-26	<1	9		10	1	
Nov-27	<1	7		9	2	**121**
Nov-28	<1	7		11	1	**95**
Nov-29	1	2		4	3	4
Nov-30	<1	3			1	2
Dec-01	<1	6		6	3	4
Dec-02	<1	7		10	21	5
Dec-03	<1	6	**64****	7	15	18
Dec-04	3	5		7	17	6
Dec-05	1	2		5	22	8
Dec-06	<1	3		3	5	11
Dec-07	3	6	**72****	21	13	14
Dec-08	2	5	**306****	9	11	
Dec-09	<1	9	**52****	7	8	
Dec-10	<1	3		2	3	
Dec-11	<1	5		2	2	
Dec-12	<1	3		2	3	
Dec-13	1	105		18	84	
Dec-14	<1	2	**58****	2	2	
Dec-15	<1	4	**639****	3	4	
Dec-16	<1	2		9	11	
Dec-17	<1	3		6	9	

FWSD-1 is located upstream of the FWS reservoir near the gun club, FWSD-2 is located immediately upstream of the construction site, FWSD-3 is the point from which construction water is discharged from site, FWSD-4 is located immediately downstream of the construction site, FWSD-5 is located slightly downstream of the confluence of the fresh water channel and the natural channel, LLO is located directly adjacent to the LLO inlet structure.

Bold items exceed the discharge criterion

* The elevated TSS values from Nov.19 to 21 are related to rapid drawdown of the reservoir that occurred between November 18 and 19 as a result of increasing the pumping capacity, and the starting and stopping of the pumps between November 19 and 20 due to generator problems.

** All sampling at FWSD-3 was done within the settling area, no water was released from the settling area to the creek.

APPENDIX C5
Change Orders

SRK Consulting
Engineers and Scientists

Steffen Robertson and Kirsten (Canada) Inc.
Suite 800, 1066 West Hastings St.
Vancouver, BC.
Canada
V6E 3X2

email: vancouver@srk.com
URL: http://www.srk.com
Tel: 604.681.4196
Fax: 604.687.5532

PROJECT MEMORANDUM

To:	Pelly Construction Ltd.	**Pages:**	1 of 1
Attention:	Jess Jewell/Roy Smith	**Date:**	November 12, 2003
CC:			
From:	Gerry Ferris	**Project Number:**	1CD003.22
Subject:	**Change Directive No. 1**		

The following minor design changes are required for the 2 m wide benches on the sideslopes of the breach elevation.

1. The surface of the bench to be sloped at a grade of 5% into the sideslope rather than on its current flat alignment (Drawings 5 and 6).
2. The surface of the bench to be sloped at a maximum of 0.5% grade along the alignment of the breach. The upper bench to be sloped towards the upstream side of the dam and the lower bench is drain the both towards the upstream and downstream side the dam, with the high point near the center of the dam.

The changes noted above will be reflected in the initial layout of the works undertaken by the owner.

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PROJECT MEMORANDUM

To:	Pelly Construction Ltd.	**Pages:**	1 of 1
Attention:	Jess Jewell/Roy Smith	**Date:**	November 13, 2003
CC:			
From:	Gerry Ferris	**Project Number:**	1CD003.22
Subject:	**Change Directive No. 2**		

The following minor design changes are required for the portion of the breach downstream of the current dam footprint, i.e. the 40± m section at the downstream end of the breach floodplain/channel.

1. The centerline of the channel within this section is to be re-aligned to be approximately 2.2 m to the north of the position indicated on Drawing No. 7.
2. The centerline of the floodplain within this section is to be re-aligned to be approximately 4.3 m to the north of the position indicated on Drawing No. 7.
3. The grade of the floodplain and channel, downstream of the footprint of the dam (Drawing No. 7), shall be increased to 1.5% for a portion of its length. This grade increase is to start at station 190 (position of Riffle 3) and end at station 301 (position of Riffle 5).
4. The elevation of the channel and the crests of Riffles 4 and 5 are to be lowered to match this overall grade change.

The changes noted above will be reflected in the initial layout of the works undertaken by the owner.

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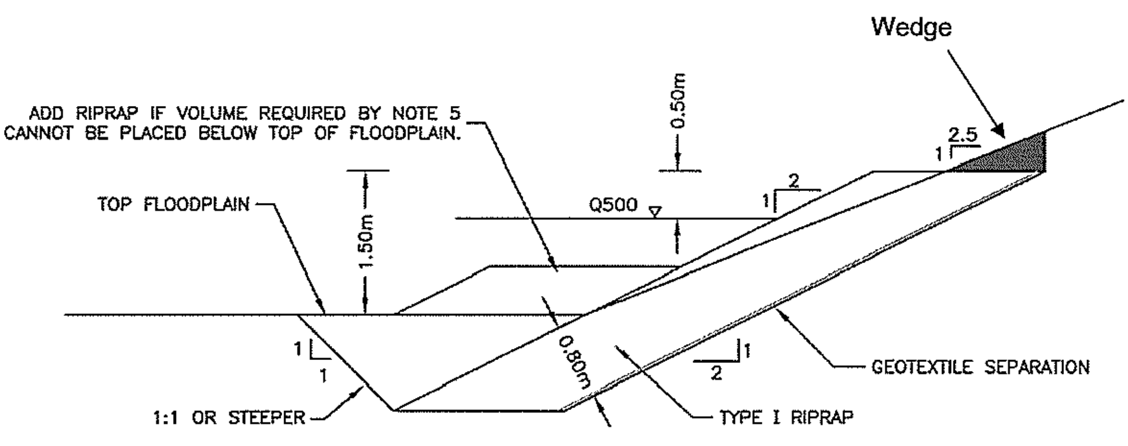
PROJECT MEMORANDUM

To:	Pelly Construction Ltd.	**Pages:**	1 of 1
Attention:	Jess Jewell/Roy Smith	**Date:**	December 4, 2003
CC:			
From:	Gerry Ferris	**Project Number:**	1CD003.22
Subject:	**Change Directive No. 3**		

The following change is required for the placement of rip rap erosion protection on the lower side slope of the breach . Drawing 10 indicates that rip rap is to be placed on the side slopes of the breach, outside of the final surface (subcut into final surface of the residual dam structure). This subcut has been performed using a near vertical backslope and has formed a small "wedge" above the rip rap erosion protection structure (see figure below). The design drawings indicated that the material used to backfill this wedge be common material. The following change should be undertaken:

1. The "wedge" shall be backfilled using rip rap.
2. The downstream length of the erosion protection on the edge of the floodplain will be reduced. The length of the reduction will match, in volume terms, the amount of rip rap to be used to backfill the wedge.

The volume of rip rap placement is expected to remain the same, and the rip rap to be placed in the wedge will be measured and paid according to rip rap placement.



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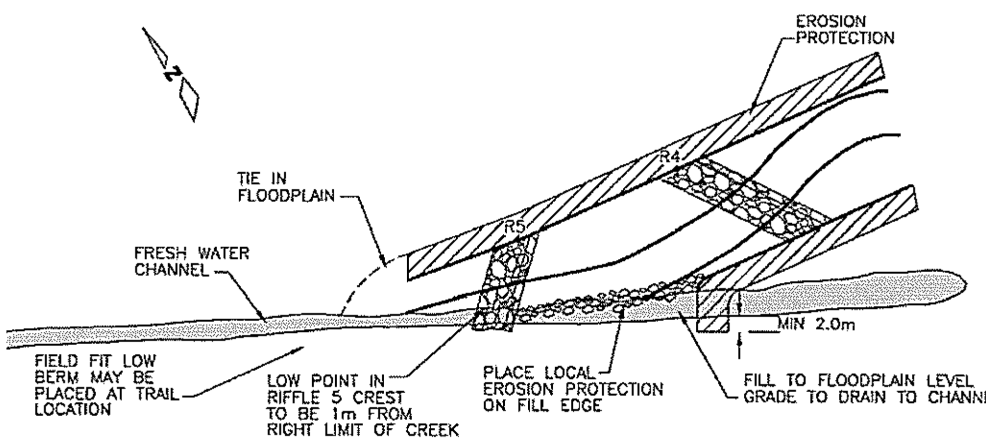
PROJECT MEMORANDUM

To:	Pelly Construction Ltd.	**Pages:**	1 of 1
Attention:	Jess Jewell/Roy Smith	**Date:**	December 8, 2003
CC:			
From:	Gerry Ferris	**Project Number:**	1CD003.22
Subject:	**Change Directive No. 4**		

The following design change is required at the downstream section of the breach. The change essentially consists of tying in the breach channel alignment with the existing fresh water channel alignment. This will allow the use of the existing left bank of the fresh water channel as part of the breach channel. The sketch, below, provides a plan view of the required change. Further details are provided below:

1. Realign the channel as indicated in the sketch.
2. The position of the erosion protection on the left edge of channel shall be constructed in the location shown. This erosion protection will be subcut into the existing fresh water channel edge by 2 m.
3. Riffle 5 is to be modified as indicated, with the central portion of the riffle to be subcut into the existing bank by 2 m. The low point on the riffle crest shall be sloped as indicated, so that the low point is about 1 m from the right bank.
4. Rip rap is to be placed along the edge of the newly formed channel, adjacent to the fill within the fresh water channel.
5. A small berm is to be constructed on the left bank of the existing floodplain near the lower limit of the construction site.



APPENDIX D
As-built Drawings