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December 16, 2008

Reference: TBGE00090132

Mr. Paul Brugger  
Barrick Gold Corporation  
171 Copper Cliff Road East  
Neebing, ON P7L 0B6

***2008 Tailings Dam Examination  
Cullaton Lake Gold Mine, Nunavut  
Licence NWB1CUL0207***

Dear Sirs:

Further to your authorization we have carried out a visual examination of the tailings impoundment facility at the above noted site. The field examination was performed on September 6, 2008. The attached Dwg. No. 1 in Appendix A, (January 30, 1995) illustrates the general layout of the facility.

As requested by the Nunavut Water Board in a letter to Barrick dated June 9, 2004, commenting on the 2003 Tailings Dam Examination report, we have restructured the report to include a brief history and summary of previous inspection concerns. The 2004 and 2005 reports were similarly structured.

Additionally, and in accordance with Licence Amendment No. 1 (Part C, Item 1(e)), dated June 6, 2005), this report comments on the following; *"Monitoring of the encapsulated Shear Lake Waste Rock "cap" for erosion shall be carried out until such point that vegetation is sufficiently established so as to stabilize the cap and preclude significant erosion thereof."*

**Historical Summary**

The site of the Cullaton Lake Gold Mine is located in Nunavut at approximately 61°16' north latitude and 98°30' west longitude. The site is geographically located relative to the following communities:

- 670 km north of Thompson, Manitoba
- 250 km west of Arviat, N.W.T.
- 416 km south of Baker Lake, N.W.T.
- 416 km northwest of Churchill, Manitoba

The site is at the tree line and in the zone of discontinuous permafrost.

Access to the property is normally gained by charter air flights from Thompson or Churchill, Manitoba to the 1460 m gravel airstrip located north of the mill site.

The mine site area features undulating terrain with shallow surficial soils overlying bedrock. The surficial deposits consist mainly of a bouldery glacial till with localized surface organic deposits. The soil matrix of the glacial till is a well-graded, silty sand with no clay to traces of clay (i.e., exhibit little or no plasticity).

The Cullaton Lake Gold Mine's construction and mill startup of a 300 tonnes per day complex was completed in early fall of 1981 with its first gold pour in December 1981. Total gold produced from the B-Zone and the Shear Lake zones to August, 1985 was over 100,000 ounces; when, for economic reasons, it was decided to put the property on temporary closure on a care-and-maintenance basis. The property has remained closed since September 1985.

Based on the mill records, a total of 373,000 tonnes of ore was processed, of which approximately 150,000 tonnes came from the B-Zone with the balance of 223,000 tonnes coming from the Shear Zone. Laboratory analyses previously showed that the tailings from the B-Zone have a relatively high acid generation potential; however, there was no evidence, either physical or chemical, that acid drainage had been taking place within the tailings impoundment area. This lack of effect was attributed to three main factors:

- the majority of the tailings are either submerged below water and/or saturated, such that there is a lack of oxygen required for oxidation
- the tailings are frozen for about eight months of the year, and when thawed, only near the top. This and the fact they remain saturated, limits water movement through the tailings, with resulting limited oxidation
- the acid kinetic reaction from the tailings impoundment becomes substantially diluted and is not detectable in the surrounding environment.

The principal concern of the Water Board, with respect to abandonment of the tailings impoundment facility, was the potential generation of acidic drainage. As part of the closure plan<sup>1</sup>, the objectives were to minimize acid generation by:

- maintaining water cover over the tailings within the pond to prevent access by oxygen
- placement of cover material over the exposed tailings to reduce access by oxygen
- maintaining of the remaining tailings in a frozen state (permafrost), by thickening the cover material.

The homogeneous tailings dams were constructed in the late 1970s or early 1980s (presumably) with local silty sand and gravel till (there are no construction records). Maximum dam height was about 5.5 m above original ground. The dams included filter fabric and synthetic impermeable liners on the upstream faces.

The following inspections of the tailings dams and ponds have been performed and reported on by Trow since the preparation of the Closure Report. Note that ownership of the property has changed over the years. These reports should be on file with the Water Board and with Barrick.

<sup>1</sup> Abandonment and Restoration Plan, Cullaton Lake Gold Mines Ltd. Reference No. F-90132-A/E. May 7, 1991. Prepared for Corona Corporation by Trow Consulting Engineers Ltd.

### **August 1992 Inspection – Reported to Homestake Canada Ltd. (March 15, 1993)**

The attached Drawings, No. 1 to 4 (Appendix B), are reproduced from the 1992 inspection report and serve to illustrate the conditions at the time. Observations with respect to the tailings impoundment included:

- the Pond No. 1 spillway exceeds the design requirements (wider channel and flatter slopes) given in the Closure Plan and was constructed with non-woven filter fabric on the cohesionless subgrade soil and covered with a rubber liner and about a 300 mm thick layer of graded waste rock
- a few minor seeps were observed on the downstream side of Dam No. 1
- no recommendations were made other than to conduct a detailed site survey.

### **June 1994 Inspection – Reported to Homestake Canada Ltd. (February 1, 1995)**

A detailed survey of the tailings impoundment area and structures was completed. Observations with respect to the tailings impoundment included:

- the pond elevations of Pond No. 1 and No. 2 were 94.0 m and 89.4 m, respectively
- no seepage evidenced on the downstream side of either dam
- spillways in good condition
- dams appear stable
- no evidence of exposed tailings in Tailings Area No. 1
- no recommendations were made

### **September 1996 Inspection – Reported to Homestake Canada Ltd. (November 27, 1996)**

Observations with respect to the tailings impoundment included:

- the tailings dams are presently stable, and in good condition with no signs of distress or erosion
- although there were a few wet areas near the downstream toe of Dam No. 1, no seeps were visible; wetness may have been due to recent rainfall accumulations
- the water level in Pond No. 1 was the same as it was in 1994
- there were no exposed tailings in the area
- it was recommended that some minor repair work be undertaken to address the exposed liner at the Dam No. 1 spillway, and that damaged and exposed sections of liner be removed from Dam No. 2.

### **July 1999 Inspection – Reported to Homestake Canada Ltd. (October 13, 1999)**

Observations with respect to the tailings impoundment included:

- some small erosion scars were observed on both upstream and downstream sides of Tailings Dam No. 1, likely due to erosion of the previously flattened slopes
- upstream and downstream slopes of about 3H:1V and 6H:1V, respectively, and crest width varies up to 15 m
- Pond No. 1 level about 93.7 m, slightly lower than the 94.0 m of previous inspections
- no unsubmerged tailings observed
- no seepages observed at either dam
- both dams considered stable
- no recommendations were made

**July 2001 Inspection – Reported to Homestake Canada Ltd. (February 6, 2002)**

Observations with respect to the tailings impoundment included:

- similar observations as in 1999, except Pond No. 1 water level was about 0.3 m higher at elevation 94.0, similar to previous years.
- no recommendations were made

**July 2003 Inspection – Reported to Barrick Gold Inc. (October 15, 2003)**

- similar observations as in 2001
- the erosion scars previously identified appear to be naturally revegetating and self-armouring with larger rock particles from the dam fill
- the weir in the Dam No. 1 spillway had been removed subsequent to the 2001 inspection
- no recommendations were made

**July 2004 Inspection – Reported to Barrick Gold Inc. (February 9, 2005)**

- similar observations as in 2003
- the erosion scars previously identified appeared to be continuing to revegetate naturally and to self-armour with larger rock particles from the dam fill
- a recommendation to repair the rubber liner and restore the design configuration of the base of the Dam No. 1 spillway channel was made.

**August 2005 Inspection – Reported to Barrick Gold Inc. (October 3, 2005)**

- similar observations as in prior recent years
- the erosion scars previously identified appeared to be continuing to revegetate naturally and to self-armour with larger rock particles from the dam fill

- local fine rockfill (25 mm to 75 mm size) was sourced and placed in the Dam No. 1 spillway channel to cover much of the exposed rubber liner that was previously evident in a few locations. Up to about 100 mm thickness was placed and it was recommended that this be monitored during future inspections.

#### **August 2006 Inspection – Reported to Barrick Gold Inc. (October 11, 2006)**

- similar observations as in prior recent years
- the previously identified erosion scars on Dam No. 1 appeared to be continuing to revegetate naturally and to self-armour with larger rock particles from the dam fill. No new erosion was apparent.
- The pond level in Pond No. 1 was about 100 mm to 150 mm lower than in 2005, due to a relatively dry period. There was no flow over the Dam No. 1 spillway.
- No erosion of the fine rockfill placed on the spillway in 2005 was observed.
- No seepages through the dam were observed.
- No exposed tailings were observed within the pond.
- Vegetation on the till cap on the Shear Lake Waste Rock continues to improve.

#### **July 2007 Inspection – Reported to Barrick Gold Inc. (February 11, 2008)**

- similar observations as in prior recent years
- the previously identified erosion scars on Dam No. 1 appeared to be continuing to revegetate naturally and to self-armour with larger rock particles from the dam fill. No new erosion was apparent.
- The pond level in Pond No. 1 was about 100 mm higher than in 2006 and only a minor trickle was observed at the Dam No. 1 spillway.
- No erosion of the fine rockfill placed on the spillway in 2005 was observed.
- No seepages through the dam were observed.
- No exposed tailings were observed within the pond.
- Vegetation on the till cap on the Shear Lake Waste Rock continues to improve.

#### **Current Inspection – September 6, 2008**

The field examination was carried out by Mr. Demetri Georgiou, P.Eng. on September 6, 2008. All of the attached photographs were taken on this date, unless otherwise noted.

Photos 1 and 2, attached, show oblique views of the site taken from the air. The tailings area had been previously covered with local till as reported in Trow's previous inspection reports. Vegetation on the till covered tailings is small and sparse. However, it is noted that the density of the vegetation is increasing gradually, based on the comparative visual observations of previous years.

## **Tailings Dam No. 1**

Photos 3 and 4 show views of Dam No. 1. Typically, the embankment, which is constructed principally with local cohesionless till, is irregular in section and surface grade. Average side slopes of the upstream and downstream sides were typically about 3H:1V and 6H:1V, respectively. The downstream side was estimated to be as steep as about 3H:1V in a few areas. The dam height ranges up to about 4 m. Some small erosion scars were observed on both the upstream and downstream sides; however, as described below, they appear to be stabilizing with vegetation and self-armouring with larger rock particles from the till and previously placed mine waste rock. These scars do not appear to be increasing in size, based on visual comparisons of previous years. No new erosion scars were apparent based on visual comparison from previous years. The crest width varies but is in the order of 15 m. No seepages were observed on the day of inspection. Within the tailings pond itself, no unsubmerged or exposed tailings were observed.

Photos 5 and 6 show views of the Dam No. 1 spillway channel. Only a very minor flow (trickle) was occurring at the spillway as had been observed in most previous years. A minor trickle was observed to flow through the rockfill comprising the channel bottom, somewhat less than that in 2007.

Our visual inspection of the spillway channel, where additional fine rockfill was placed in 2005 to cover small areas of previously exposed rubber liner indicated that no erosion had occurred. We expect that monitoring of this during future inspections will indicate that this has been sufficient treatment.

Based on the current as well as previous inspections and involvement with the project, the dam is not in any distress and is considered to be stable.

## **Tailings Dam No. 2**

Photo 7 shows a view of Dam No. 2. As with Dam No. 1, the principal construction material is local cohesionless till. The dam section and surface grade is irregular, although less so than Dam No. 1. The crest width varies but is in the order of 15 m. No seepages were observed on the day of examination.

Photo 8 is an upstream view of the Dam No. 2 spillway channel. Flow was occurring over the spillway, noticeably more than most previous years.

Based on the current as well as previous inspections and involvement with the project, the dam is not in any distress and is considered to be stable.

## **Review of Shear Lake Waste Rock Cap**

Photos 9 to 12, inclusive, show views of the Shear Lake Waste Rock Pile. The Shear Lake Waste Rock Pile, located on the east side of Shear Lake, some 4.5 km north of the former mill site, was reportedly capped with local, compacted glacial till to promote runoff and reduce infiltration. In 2005, Barrick personnel oversaw the re-seeding of the cap. The re-seeding (with grasses) was implemented to promote some vegetation growth which would reduce the erosion of the cover due to runoff, particularly along the side slopes.

Our observations in August 2006 and suggested that, while there are some sparse areas, the vegetation is helping to reduce erosion, in that very few small erosion gulleys/channels (20 to 30 mm deep/wide) were

noticed on the side slopes. These generally were short and did not extend the full length of the slope. Most of these had been filled to some extent with small granular material in 2005, to minimize further erosion. Our observations in July 2007 and September 2008 were similar. Photo 11 shows that the gravel filled erosion gullies have been stabilized.

Subsequent inspections should be made to verify the efficacy of the vegetation/till cover system. Any erosion gullies that form should be repaired with fine rock/gravel. It is expected that it will take several years for the vegetation to establish itself.

## Summary

Based on the numerous visual inspections that Trow has performed between 1992 and 2008, it is considered that no erosional or other detrimental forces have diminished the integrity of the tailings dams at the Cullaon Lake Mine. The dams should continue to serve their intended functions of providing storage and water cover for the tailings in Pond No. 1 long into the future.

It is recommended that the condition of the Dam No. 1 spillway channel continue to be monitored for erosion and if any is apparent, remedial measures, such as the addition of additional rockfill, be implemented.

We trust that this letter is sufficient for your current requirements. Should you require clarification of some point, please contact the undersigned.

Yours truly,

**Trow Associates Inc.**

Prepared by:



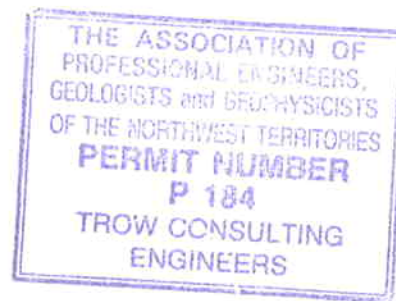
Demetri N. Georgiou, M.A.Sc., P.Eng.  
Branch Manager/Principal Engineer

Attach:      Photographs  
                 Appendix A  
                 Appendix B

Reviewed by:

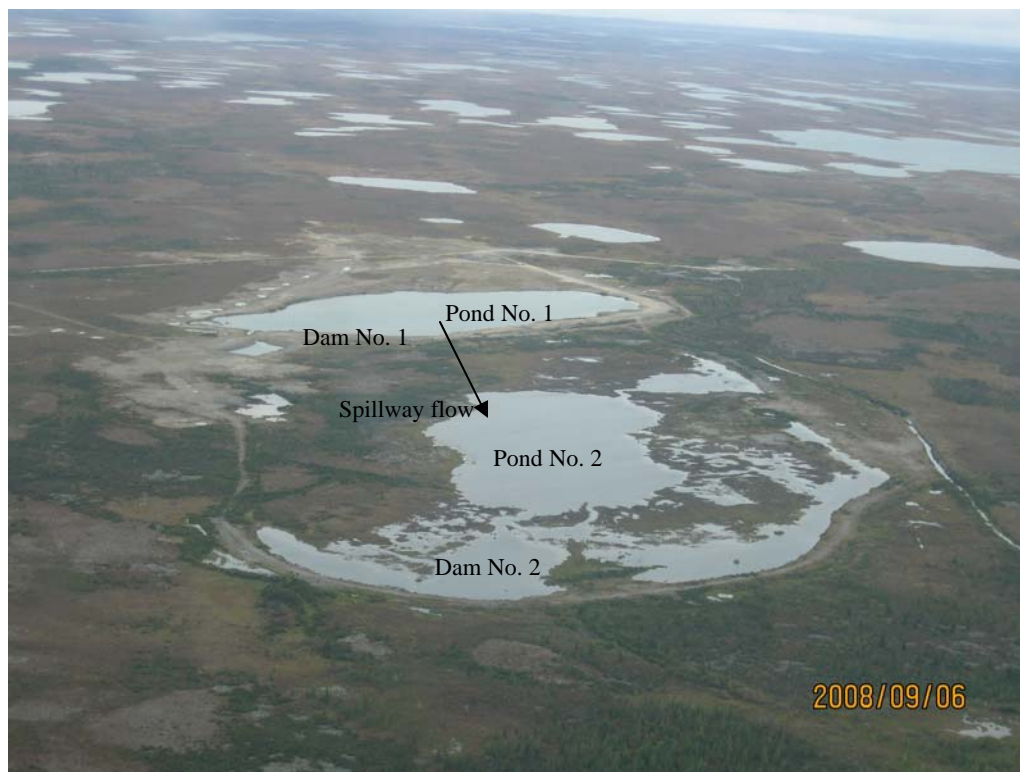


Robert B. Dodds, Ph.D, P.Eng.  
Senior Consultant



## **PHOTOGRAPHS**





*Photo 1: Tailings facility – looking roughly west*



*Photo 2: Tailings facility looking roughly northwest*



*Photo 3: Dam No. 1 - looking south - southeast*



*Photo 4: Downstream section of Dam No. 1*





*Photo 5: Dam No. 1 spillway looking downstream)*



*Photo 6: Dam No. 1 Spillway Inlet*



*Photo 7: View of Dam No. 2 (on the right) and Pond No. 2*



*Photo 8: Dam No. 2 Spillway Channel looking upstream to Pond 2*





*Photo 9: Aerial view of Shear Lake Waste Rock Pile looking west*



*Photo 10: East side of Shear Lake Waste Rock Pile showing grasses*



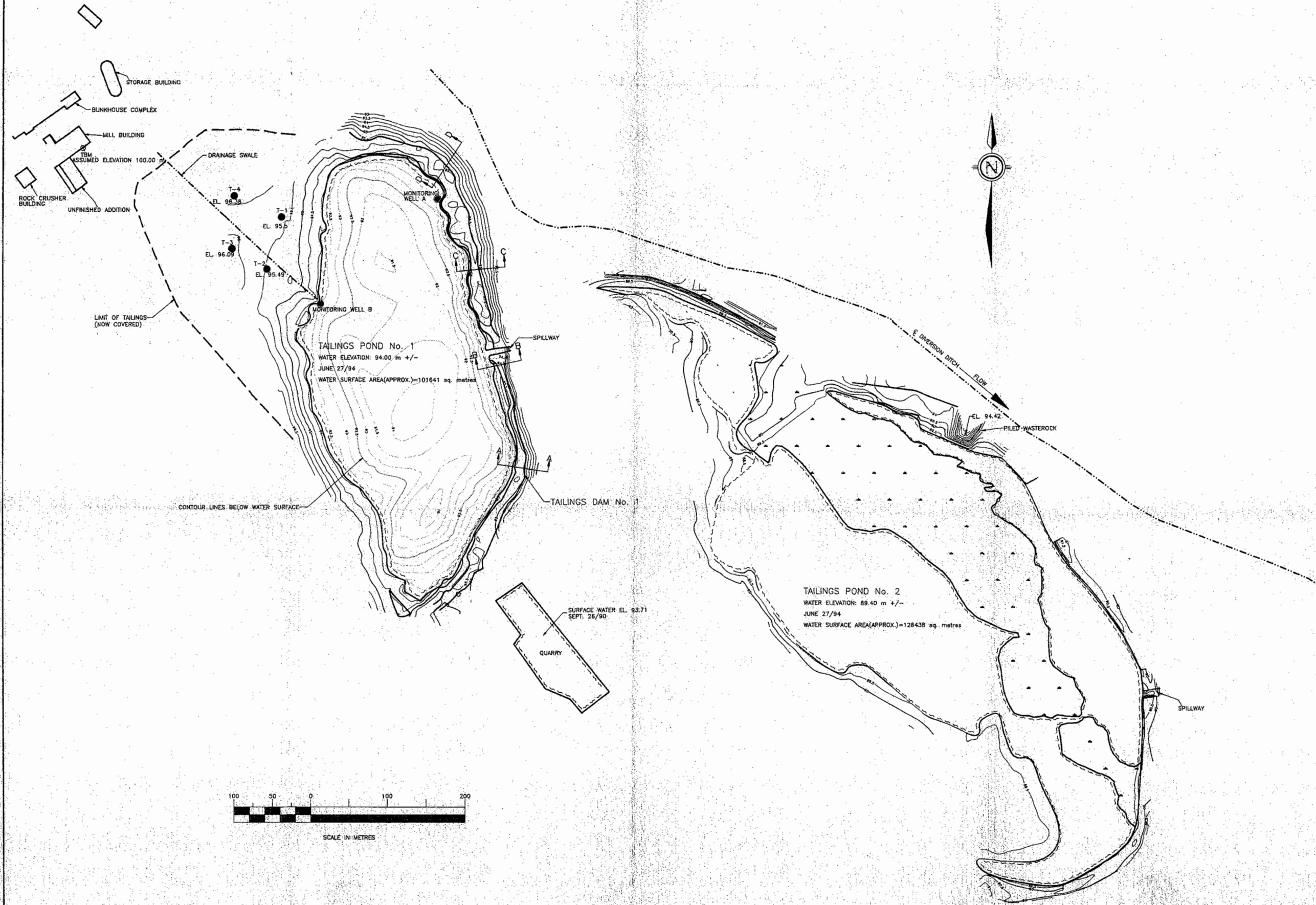
*Photo 11: Previously gravel filled erosion channels on Shear Lake Waste Rock Pile*






*Photo 12: Toe ditch outlet on east side of Shear Lake Waste Rock Pile*



## **APPENDIX A**



LEGEND

-  MONITORING WELL
-  BENCHMARK
-  THERMOSTERS

NOTES:

1. DATA INTERPRETED FROM TROW ENGINEERING SURVEY(JUNE 27/94) AND SURVEY BY H.I.W. SURVEYS LTD.(NOV. 10/90)
2. BENCH MARK IS LOCATED ON CONCRETE SLAB AT NORTH EAST CORNER OF MILL BUILDING. ASSUMED ELEVATION: 100.00m
3. ALL ELEVATIONS ARE SHOWN IN METRES.

REVISIONS

No.	Date:	Revision

Client: HOMESTAKE CANADA

Project: CULLATON LAKE MINE CLOSURE

Title: TAILINGS POND SURVEY  
CULLATON LAKE, N.W.T.

Project No. Dwg. No.:  
F-90132-A/G 1

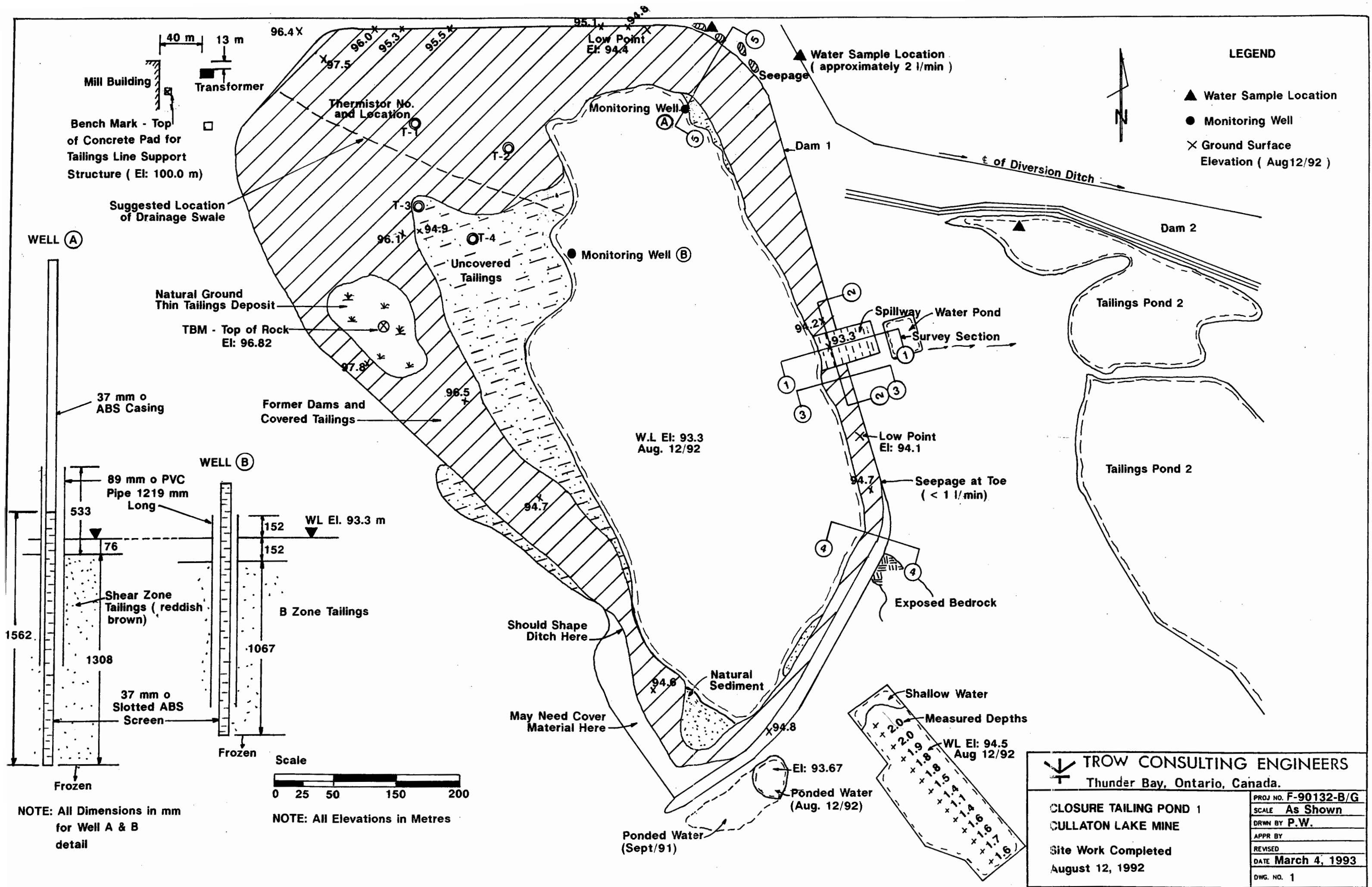
Drawn By: PW/DT Reviewed By: DK

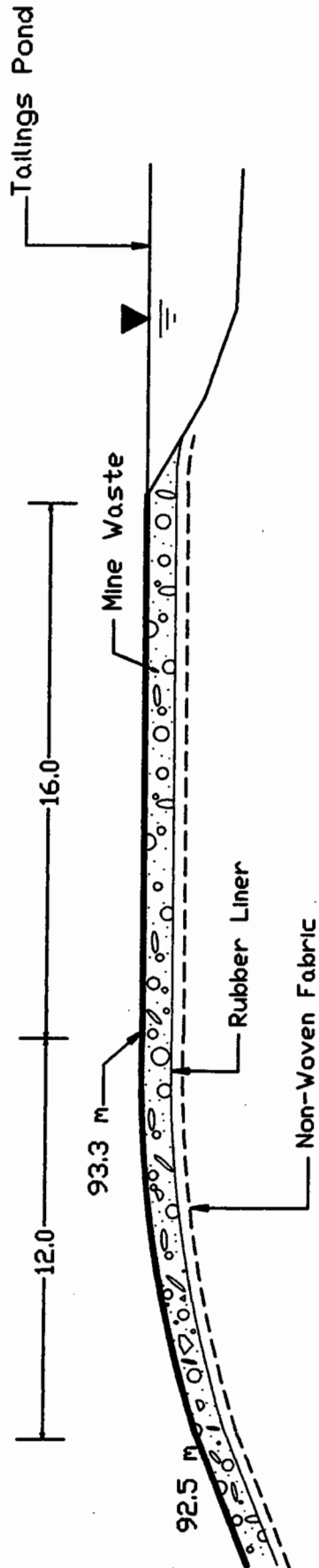
Date: JANUARY 30, 1995

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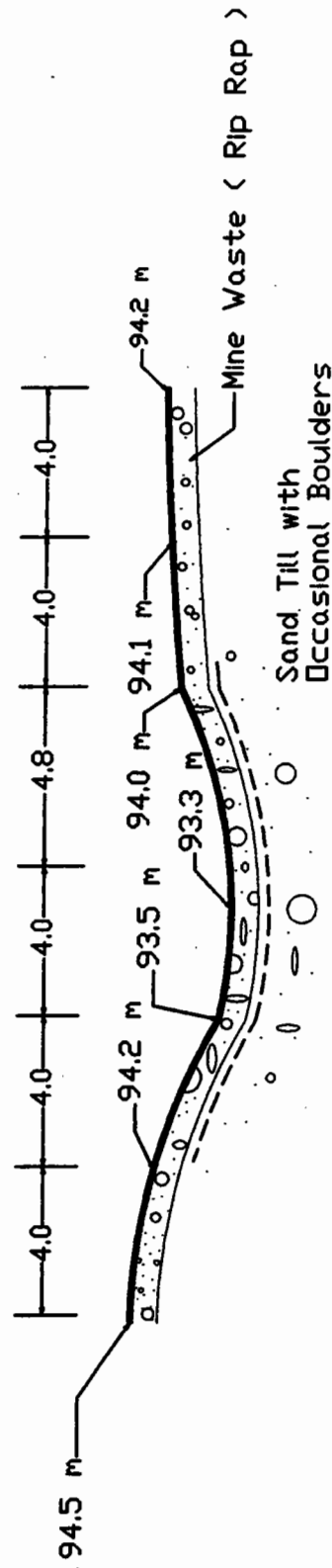


## **APPENDIX B**

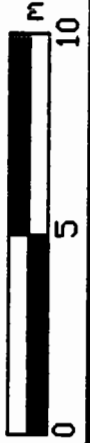




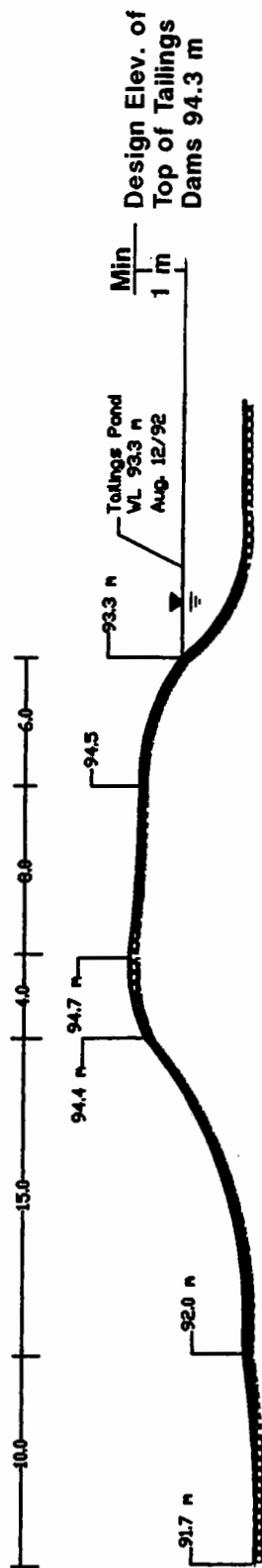
SECTION 1 - Longitudinal ( Looking South )



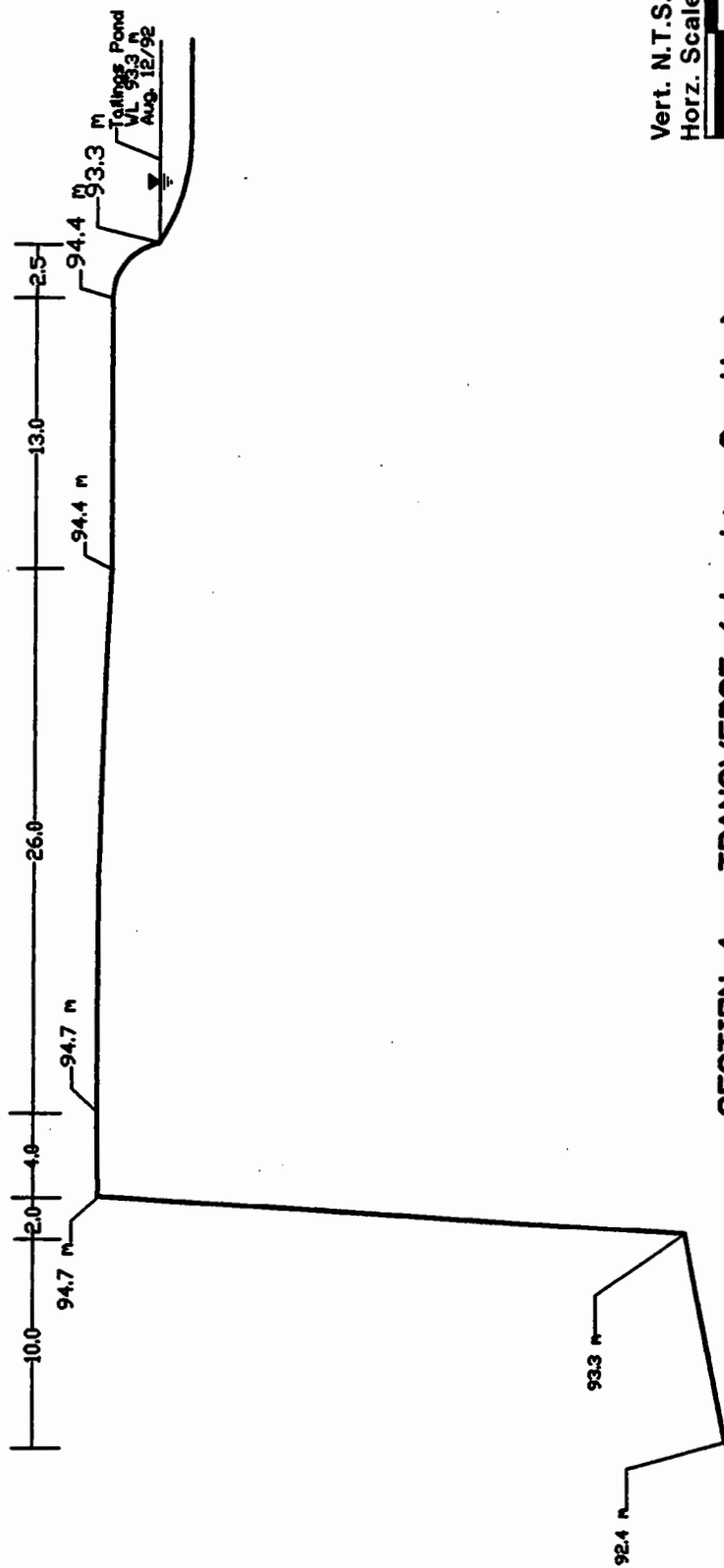
Vertical N.T.S.  
Horizontal Scale



SECTION 2 - Transverse ( Looking East )

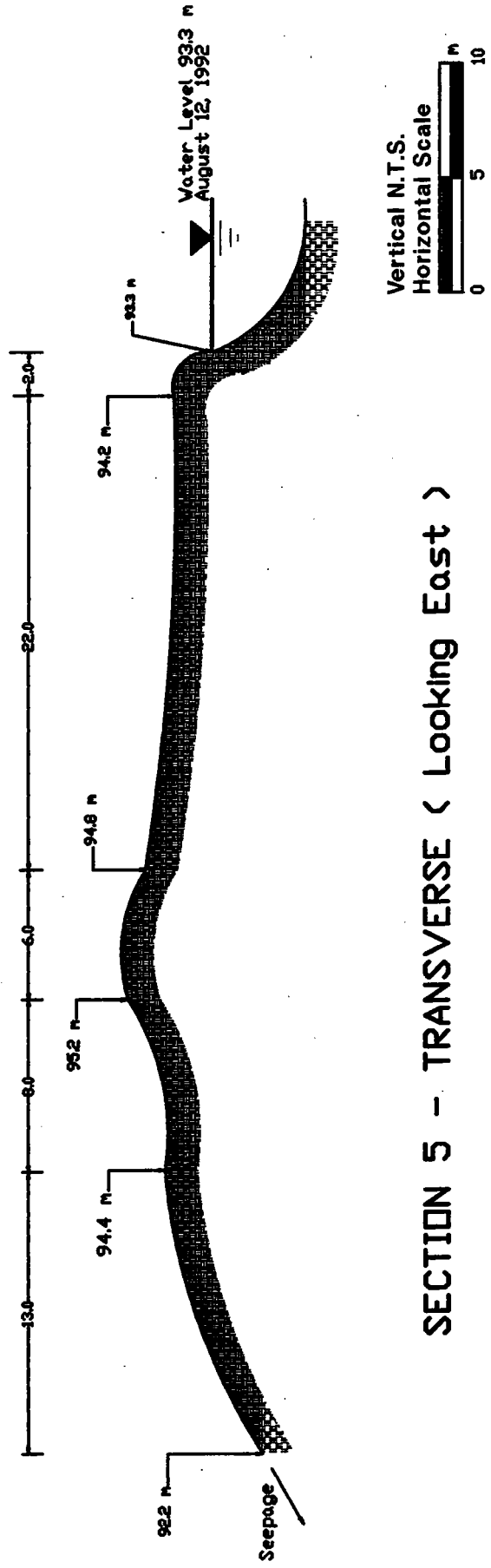


SECTION 3 - TRANSVERSE ( Looking South )



SECTION 4 - TRANSVERSE ( Looking South )

Vert. N.T.S.  
 Horz. Scale  
 0 5 10 m



SECTION 5 - TRANSVERSE ( Looking East )