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MOUNT POLLEY MINING CORPORATION
MOUNT POLLEY MINE
TAILINGS STORAGE FACILITY

ADDENDUM TO REPORT ON CYCLONED SAND CONSTRUCTION OF STAGE 3 AND ON-GOING STAGES OF THE TAILINGS STORAGE FACILITY

(REF. NO. 11162/13-4)

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TRANSMITTAL

TO: Ministry of Energy and Mines

DATE: May 11, 2000

REF NO: 0/1127

FILE NO: 11162/13.01

ATTENTION: Mr. George Headley

RE: Stage 3 Addendum Report

WE ARE SENDING YOU the following items: ☐ Attached ☐ Under separate cover via ______________________

☐ Print(s) ☐ Reproducibles ☐ Letter(s) ☐ Specifications ☐ Disk(s)
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Copy No. 1	"Addendum to Report on Cycloned Sand Construction of Stage 3 and On-going Stages of the Tailings Storage Facility (Ref. No. 11162/13-4, Rev 0)", dated May 11, 2000 GRIT 3342

REMARKS:

Copy To: Eric Leneve, MPMC (Copy Nos. 2+3)
Brian Kynoch, Imperial Metals (Copy No. 4)
Ed Beswick, MEM (Copy No. 5)

Signed: ______________________

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Rev. No.	Revision	Date	Approved
A	Issued in DRAFT for review	April 20, 2000	KJB
0	Issued in Final	May 11, 2000	KJB

MP00021

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ADDENDUM TO REPORT ON CYCLONED SAND CONSTRUCTION OF STAGE 3 AND ON-GOING STAGES OF THE TAILINGS STORAGE FACILITY (REF. NO. 11162/13-4)

SECTION 1.0 - INTRODUCTION

The Mount Polley gold and copper mine is owned and operated by Mount Polley Mining Corporation (MPMC). The Mount Polley Mine has been in production since June 13, 1997. Ore is crushed and processed by selective flotation to produce a copper-gold concentrate. The current mill throughput rate is approximately 20,000 tonnes per day (7.3 million tonnes per year). An overall site plan of the Mount Polley Mine is shown on Drawing 11162-12-100.

Mill tailings are discharged as a slurry into the Tailings Storage Facility, which has been designed to provide environmentally secure storage of the solid waste. As the solids settle out of the slurry, process fluids are collected and recycled back to the mill for re-use in the milling process. There is no surface discharge of any process solution from the Tailings Storage Facility.

The Tailings Storage Facility has been designed to incorporate staged construction during operations in order to minimize initial capital expenditures and to maintain an inherent flexibility to allow for variations in operation and production throughout the life of the mine. The construction stages incorporate a combination of centreline and modified centreline construction methods, with on-going raises providing incremental storage capacity for one or two years of production. This observational design approach requires that the proposed raises must be continually re-evaluated during operations to confirm satisfactory performance of the facility and to ensure that adequate storage capacity and embankment freeboard are maintained throughout the mine life. It also allows design modifications to be incorporated in order to respond to specific opportunities or constraints and to defer or reduce on-going costs for tailings disposal and for water management.

MPMC has considered a revised design concept for the tailings embankments, whereby the coarse sand fraction would be extracted from the bulk tailings stream by cycloning for incorporation into the shell zones of the embankment. The central core zone of low permeability glacial till would be retained as a seepage control measure. MPMC and Knight Piésold conducted a preliminary study in 1998 to assess the opportunities for incorporating cycloned sand in the tailings embankments. The results of the study are contained in the Knight Piésold report "Evaluation of Cycloned Tailings for Embankment Construction", (Ref. No. 11162/11-1, June 16, 1999). The report concluded that Mount Polley tailings were amenable to cycloned sand production, but additional studies were required in order to optimize sand production, refine construction methods, and demonstrate embankment stability.

Initial design concepts to incorporate cycloned sand in the embankments were described in the "Report on Cycloned Sand Construction of Stage 3 and On-Going Stages of the Tailings Storage Facility" (Ref. No. 11162/12-2, December 13, 1999).

This addendum report includes a description of modifications that have been made to the design of the Stage 3 expansion of the Tailings Storage Facility since the 1999 report. The modifications include the incorporation of more mechanically placed cycloned sand in the Main and Perimeter Embankments, with less reliance on hydraulically placed cycloned sand for embankment construction. The modifications have been incorporated primarily as a result of a detailed evaluation of the anticipated construction schedule, and introduce a greater degree of operational flexibility during Stage 3 construction.

This addendum also includes a response to comments provided by the Ministry of Energy and Mines (MEM) following their review of "Report on Cycloned Sand Construction of Stage 3 and On-Going Stages of the Tailings Storage Facility" (Ref. No. 11162/12-2, December 13, 1999). Two letters from MEM are presented in Appendix A. The modifications that have been made to the Stage 3 embankments incorporate many of the suggestions and comments provided by MEM.

SECTION 2.0 – DESIGN MODIFICATIONS

2.1 GENERAL

Initial design concepts to incorporate cycloned sand in the embankments were described in the "Report on Cycloned Sand Construction of Stage 3 and On-Going Stages of the Tailings Storage Facility" (Ref. No. 11162/12-2, December 13, 1999). Changes to these initial design concepts are highlighted in this section.

The Stage 3 expansion of the Tailings Storage Facility will include raises to the Main and Perimeter Embankments, as well as initial construction of the South Embankment. The Main Embankment includes a downstream expansion using both hydraulically and mechanically placed cycloned sand, other mechanically placed materials (glacial till and cycloned sand) for the shell zones and a crest raise using glacial till for the low permeability core zone. The Perimeter Embankment includes a downstream expansion using mechanically placed cycloned sand and a crest raise using glacial till for the low permeability core zone. The South Embankment (a maximum height of 1 to 2 metres for Stage 3) will incorporate a homogeneous glacial till section. The Overall Site Plan and Stage 3 General Arrangement are shown on Drawings 11162-12-100 and 102, respectively. Materials specifications are shown on Drawing 11162-12-104. Each of the embankments is discussed below.

2.2 MAIN EMBANKMENT

Revisions to the Stage 3 Main Embankment from the initial design concept include the following:

- Most of the downstream shell zone (approximately 70 per cent) will be constructed from mechanically placed cycloned sand. The revised embankment relies less on hydraulic placement of cycloned sand than the previous configuration, but has provisions for additional material to be placed hydraulically if conditions allow. MPMC plan to stockpile cycloned sand in the Tailings Storage Facility (Borrow Area 4) for up to 3 months before hydraulic placement is scheduled to begin at the Main Embankment. This provides the opportunity to optimize the cycloning system that will be used to place cycloned sand hydraulically in the Main Embankment.

It should be noted that drained cycloned sand was mechanically placed in the Main Embankment during Stage 2C construction. Sand was moved into the embankment from upstream areas by pushing it with a bulldozer, or was hauled into place using trucks. The sand was spread in maximum 1000 mm thick lifts by a bulldozer or grader and was compacted with a 10-ton smooth drum vibratory roller. The sand proved to be an excellent construction material, providing a trafficable surface and typically achieving densities greater than 100 percent of the Standard Proctor maximum dry density. The average moisture content of the sand was 12 percent.

- A filter material, Zone F, will be placed over the Zone T (transition zone rock) material that makes up the drainage and containment berms, and the existing Zone T haul road. Zone F will ensure that the cycloned sand will have a proper filter relationship with the underlying Zone T material.

The Main Embankment is shown in plan and section on Drawings 11162-12-110 and 11162-12-115, respectively.

2.3 PERIMETER EMBANKMENT

Revisions to the Stage 3 Perimeter Embankment from the initial design concept include the following:

- The Stage 3 Perimeter Embankment includes two sub-stages. Stage 3A will incorporate a two metre raise from the existing Stage 2C crest at El. 941 m to El. 943 m. This stage is to be constructed in 2000. Stage 3B is a one metre raise to El. 944 m that is scheduled to be completed in Spring 2001.

- Hydraulically placed cycloned sand will not be included in the Stage 3 Perimeter Embankment. A downstream expansion using mechanically placed cycloned sand will be constructed to the Stage 3A crest at El. 943 m. The material will be borrowed from two stockpiles, one near the intersection of the

Main and Perimeter Embankments (Stockpile A) and the other within the upper area of the Tailings Storage Facility (Stockpile BA4). The cycloned sand will be required to drain before it is placed in the embankment fill. As described above, the mechanically placed drained cycloned sand was proven to be an excellent construction material during Stage 2C construction.

- Zone F will be placed over the existing Zone T haul road to ensure a proper filter relationship with the underlying Zone T material.

The deferral of the Stage 3B raise will allow time for the development of a sandy tailings beach along the length of the Perimeter Embankment. This will facilitate installation of the upstream toe drain during Stage 3B construction and will provide a base for construction of the upstream shell zone. The Perimeter Embankment is shown in plan and section on Drawings 11162-12-120 and 11162-12-125, respectively.

2.4 SOUTH EMBANKMENT

The South Embankment is not changed from the "Report on Cycloned Sand Construction of Stage 3 and On-Going Stages of the Tailings Storage Facility" (Ref. No. 11162/12-2). The South Embankment is shown in plan and section on Drawing 11162-12-130.

2.5 INSTRUMENTATION AND MONITORING

The number and locations of vibrating wire piezometers to be installed during Stage 3 construction are unchanged from the "Report on Cycloned Sand Construction of Stage 3 and On-Going Stages of the Tailings Storage Facility" (Ref. No. 11162/12-2, December 13, 1999). All instrumentation, including vibrating wire piezometers, survey monuments and three new groundwater monitoring wells downstream of the South Embankment, is shown on Drawings 11162-12-150, 152, 154, 156, 158 and 159.

2.6 CONSTRUCTION MONITORING

Knight Piésold Ltd. provides supervision, inspection and testing services during embankment construction. Results of the Quality Assurance/Quality Control (QA/QC) program are presented in a Construction Report after each construction program. Interim reports are submitted to MEM twice per month during construction.

The QA/QC program will be expanded during cycloning operations. The following elements will be included in addition to routine inspection and testing activities:

- Underflow sampling for particle size analysis and density
- Measurement of drain flows
- Daily density testing by nuclear methods
- Daily recording of cyclone operating time
- Daily recording of observations such as trafficability, drainage, etc.

These monitoring procedures were used during construction of the downstream trial berm in 1999. MPMC tailings operators will assist in sampling and complete daily operator reports on cycloning operations.

2.7 STAGE 3 CONSTRUCTION SCHEDULE

As previously stated, the modifications to the initial Stage 3 design concepts have been incorporated primarily as a result of a detailed evaluation of the anticipated construction schedule.

The current construction schedule is shown on Figure 2.1. It incorporates conservative assumptions regarding cyclone underflow production and draining time for sand placed hydraulically in the embankment and in stockpiles.

The schedule will be updated continually throughout the construction program. It will be used to monitor progress of the construction program very closely. Key milestone dates will be set and alternative plans will be developed in the event that the key milestones are not met. The project is scheduled for completion in December 2000.

2.8 ON-GOING STAGES

The overall design of the Main Embankment includes a downstream shell of cycloned sand with an ultimate downstream slope of 3H:1V. The Main Embankment will be raised by centreline construction and will continue to incorporate the low permeability glacial till core zone. It is anticipated that future staged expansions of the downstream shell zone will incorporate hydraulic placement of cycloned sand. Mechanically placed cycloned sand will also be incorporated as required to meet the design objectives and the construction schedule. The details of this division will be finalized during the detailed design of each embankment stage.

The preliminary embankment development sequence allows for a minimal amount of construction work for the Stage 4 raise. By placing more material in a wider upstream shell zone during Stage 3, no upstream work will be required at the Main Embankment during Stage 4. This will result in a smaller construction program for the Stage 4 raise and will enable MPMC to concentrate on downstream placement of cycloned sand.

The design of the Perimeter Embankment is similar to that of the Main Embankment in that it also includes a downstream shell of cycloned sand with an ultimate downstream slope of 3H:1V. The low permeability glacial till core zone is also retained, but the design incorporates the modified centreline construction method. Although the Stage 3 downstream shell zone is to be constructed using mechanically placed cycloned sand, hydraulically placed cycloned sand will be incorporated to the greatest degree possible for later embankment stages. As for the Main Embankment, the details of this division will be finalized in the detailed design of each embankment stage.

No modifications have been made to the design of the South Embankment and the design is based on centreline construction using conventional earthfill materials. The ultimate downstream slope will be constructed to a maximum slope of 2H:1V.

2.9 ROCKFILL ALTERNATIVE

MPMC is currently preparing for Stage 3 construction. Work currently underway includes on-going detailed design studies, construction scheduling and preparation of Tender Documents for the construction program. MPMC intend to expand the Tailings Storage Facility in the safest and most economical method possible. They are therefore evaluating additional options for Stage 3 embankment construction and have included alternative construction options in the Tender Documents for the Stage 3 Main and Perimeter Embankments. These alternatives are based on a reduced reliance on the use of mechanically placed cycloned sand by incorporating rockfill in the downstream shell zones. These concepts were originally presented in the "Report on On-going Construction Requirements" (Ref. No. 10162/9-3, December 1997).

The development of rockfill and cycloned sand options for each of the Main and Perimeter Embankment has resulted in four alternatives for Stage 3 construction, as follows:

- Cycloned sand at both the Main and Perimeter Embankments.

- Cycloned sand at the Main Embankment and rockfill at the Perimeter Embankment.

- Rockfill at the Main Embankment and cycloned sand at the Perimeter Embankment.

- Rockfill at both the Main and Perimeter Embankments.

Prospective tenderers will be required to bid on each alternative and MPMC will select the alternative that best meets their ability to produce cycloned sand and construct the Stage 3 raise in a cost-effective and environmentally responsible manner. The alternatives that include rockfill in the downstream shell zone are shown on the Tender Drawings for Stage 3 Construction in Appendix B.

SECTION 3.0 - RESPONSE TO AGENCY COMMENTS

3.1 GENERAL

The Ministry of Energy and Mines (MEM) reviewed and commented on the "Report on Cycloned Sand Construction of Stage 3 and On-Going Stages of the Tailings Storage Facility" (Ref. No. 11162/12-2) shortly after the report was issued. Several modifications have been made to the Stage 3 embankments since the MEM review comments were received. The modifications were made primarily as a result of a detailed evaluation of the anticipated construction schedule that was revised on the basis of the trial programs and operating experience gained in 1999. The modifications incorporate many of the suggestions and comments that were provided by MEM. Many of the review comments have therefore already been addressed. This section provides a response to specific comments made by MEM.

3.2 RESPONSE TO FEBRUARY 16 LETTER

Comments were provided to Knight Piésold Ltd. in a February 16, 2000 letter from the MEM representative, Mr. C.O. Brawner. The letter is presented in Appendix A. The comments and responses to this letter are addressed in this section. Comments by the MEM representative are shown in *italics* and the responses by Knight Piésold Ltd. are presented in normal font.

INTRODUCTION

I note that Mt. Polley is anxious to move to cyclone sand construction for their TSF dam. EMPR is concerned that they may not have completed realistic cost estimates and recognized all the construction difficulties.

MPMC has completed three cycloning trial programs to date, including approximately 200,000 m^3 of cycloned sand that was deposited along the Main Embankment upstream berm. MPMC has evaluated the cost of incorporating cycloned sand in the embankments and has recognized the associated construction difficulties based on this information. The details of the cycloning trial programs are presented in the "Report on Cycloned Sand Construction of Stage 3 and On-Going Stages of the Tailings Storage

Facility" (Ref. No. 11162/12-2). The Main and Perimeter Embankments have been revised, as described in the previous section, so that there is less reliance on hydraulically placed cycloned because of the difficulties that may be associated with operating the cyclone systems.

In addition:

i) The fill has shifted upstream a bit and might be narrow above the existing dam crest.

The drawings and specifications show that there is a slight difference in the material specifications and placement and compaction requirements for the core zone (Zone S) and the earthfill shell zones (Zone B). The Zone B specification allows for slightly coarser and wetter material than Zone S. In addition, the specifications require that Zone B must be compacted to at least 92 percent of the Standard Proctor maximum dry density, compared to 95 percent for Zone S. This distinction was made to allow more effective use of available borrow materials and reduce spoil volumes. For practical purposes, however, Zone S and Zone B are typically placed as one lift, 300 mm thick after compaction and each zone receives the same compactive effort and achieves similar densities. Therefore, when evaluating the core zone thickness, the Zone S and B materials can be considered to be identical.

Test results included with this report illustrate the similarity of Zone S and B materials. Record samples taken during Stage 2A and 2B construction show that the material placed in Zone B meets the particle size specifications for Zone S, as shown on Figure 3.1. Each Zone B sample was compacted to greater than 95 percent of the Standard Proctor maximum dry density. A summary of Zone B record samples from Stage 2A and 2B construction is shown on Table 3.1.

Zone B record tests confirm that Zones S and B incorporate similar low permeability glacial till materials compacted to 95 percent of the Standard Proctor maximum dry density. Therefore, the minimum effective core zone width to date is 8 m for the Main Embankment, and 7.5 m for the Perimeter Embankment. A minimum core zone width of at least 6 m will be maintained in the design of all future raises. The Main and

Perimeter Embankment cross-sections are shown on Drawings 11162-12-115 and 125, respectively.

ii) *The need and effectiveness of the upstream drainage pipe has not been clearly demonstrated.*

The Main and Perimeter Embankments incorporate interconnected upstream toe drains, complete with redundant outlet drain pipes into the embankment sections. The first toe drain at the Main Embankment has been installed using perforated CPT pipe, placed within a zone of high permeability filter sand, which is in direct contact with coarse cycloned sand underflow. An adequate filter relationship exists between the cycloned sand, the filter sand and the CPT perforations to prevent any migration of fines into the drain system. At the abutments, the Main Embankment toe drain has been connected to carefully installed, concrete-encased outlet drains, complete with bentonite modified soil and HDPE seepage collars. The outlet drains were installed according to the design drawings and with full time engineering supervision by Knight Piésold Ltd. The outlet drains and seepage collars were installed in competent native till, and have been designed to provide long-term downstream access to the drain to allow for pressurized backfilling with grout if required. The likelihood of collapse or poor performance of the outlet drains, including fines migration and piping adjacent to the outside surface of the pipe, is considered to be extremely low.

In order to provide redundancy in the performance of the outlet drains, the current design allows for a connecting segment of solid CPT pipe between the Main and Perimeter embankment toe drains. The Perimeter Embankment toe drain is scheduled for installation at a slightly higher invert elevation than the Main Embankment drain in order to allow the perimeter drain to be installed within an established beach of higher permeability coarse cycloned sand or beach tailings. Despite this slight elevation offset, the connecting pipe will serve as a redundant safety measure by limiting pore pressures in the vicinity of the drains to a maximum of a couple of metres of water head.

These toe drains serve as a low-level outlet that significantly improve the performance of the structure in terms of safety and controlled seepage, similar to a water-retaining dam. Specifically, the drains act to depress the phreatic surface within the tailings storage facility, thereby reducing overall seepage gradients through the embankment core zones, and convey seepage waters directly to the seepage collection and recycle facilities and minimize the opportunity for losses to the environment via any previously-undetected permeable foundation layers. The effects of inclusion or exclusion of the toe drain on the phreatic surface of the embankment are shown schematically in the generalized sections of Figure 3.2.

Reduced seepage gradients and depressed phreatic surfaces translate directly into improved static and seismic embankment stability, reduced seepage losses to the environment, increased consolidation and densities of the tailings mass upstream of the embankment core zone. Furthermore, the toe drain installations and the resulting depressed phreatic surface provide the ability to monitor the long-term performance of the embankment structure with the flexibility and intent of eventually eliminating the requirements for the core zone in future raises of the embankment, with resulting cost savings. It is the opinion of Knight Piésold Ltd., based upon observation of existing structures and analyses of their performance, that the significant geotechnical, environmental and economic benefits associated with the upstream toe drains outweigh the minimal risks associated with properly designed and constructed outlet drains.

iii) The cycloned sand has a high silt content and therefore lower permeability.

It is agreed that the cycloned sand produced during the cyclone trial programs has higher silt content than materials from some other mines and that this impacts the permeability. However, the Mount Polley cycloned sand is coarser than the sand used at many other mines that operate successfully. (This is discussed further below.) It is because of the silt content and lower permeability that the initial design concept required a 3-week draining period prior to hydraulic deposition on previously hydraulically placed cycloned sand. The current design concept and construction schedule have adjusted this restriction to still provide a minimum 3-week drainage period for the one lift of sand placed hydraulically at the Main Embankment prior to on-going construction by mechanical placement of suitably drained cycloned sand. The cycloned sand stockpiles for mechanical fill placement have been conservatively scheduled to drain for 6 weeks before the materials are moved into the embankment fill zones.

MPMC has recently completed a comprehensive cyclone trial program during January to March 2000. The objectives of this program were to achieve a greater sand recovery while maintaining a lower percentage of fine particles in the underflow. The cleaner underflow product is expected to increase the permeability and decrease the draining time for hydraulically placed sand in the Main Embankment and in stockpiles.

I also received concerns from Mr. G. Headley, Senior Geotechnical Engineer on February 11, 2000. The project involves three embankments – The main, perimeter and south dams. The main embankment is the highest 57 meters – which represents a medium-high structure, certainly not unusual.

This is correct and Knight Piésold Ltd. agrees with the comments.

DESIGN

The design proposed is sensitive to many features which will require close control. These include:

- *An adequate materials balance*
- *Successful control of piezometric pressures in the dam and foundations*
- *Reasonable vertical drainability of the hydrauliced tailings*
- *Adequate density of the hydrauliced tailings*
- *Adequate under-drainage*
- *Optimization of cyclone operation over 7 months*
- *Adequate QA/QC field inspection program*
- *Adequate cyclone and hydraulicing operating personnel and facilities*

Knight Piésold Ltd. agree with these comments and have provided a discussion in the previous section of this report.

FIELD AND DESIGN PROGRAMS

Knight Piésold have performed considerable geotechnical and materials characteristics tests. They include:

- *Review of very large scale field cyclone and hydraulicing test program (200,000 m^3)*
- *Field gradation and density testing*
- *Field permeability and drainage evaluation*
- *Tailings gradation and density testing*
- *Seepage analysis*
- *Stability analysis – static and dynamic for the dam and foundations*
- *Final design stability allows for plugged drains*
- *Shear strength and permeability assessment of the tailings*
- *Emphasis that the ongoing design may be modified on experience – the observational approach*

I would note that the testing, evaluation and analysis generally meet the standard of industry requirements. Conservat(ism) *has been incorporated in tailings properties and the stability analysis.*

Knight Piésold Ltd. agree with these comments.

PAST EXPERIENCE

The use of the centreline method was successfully used at Gibraltar and Brenda Mines. It is recognized that the gradation of Mt. Polley is finer, therefore it is recommended that Knight Piésold – Mt. Polley Mines provide some further information such as:

- *Other projects internationally where a reasonably similar tailings gradation has been used successfully*

Knight Piésold have been involved in numerous tailings impoundments where cycloned sand has been utilized as a construction material. Typical underflow gradations from these operating mines are summarized on Figure 3.3, which also includes additional information from the Similco and Gibraltar mines in British Columbia. The gradation of the Mount Polley cycloned sand underflow is also included on this figure for comparison. This information demonstrates that the Mount Polley cycloned sand underflow product represents an average gradation when compared to these mines (the gradation plots in the middle of the distributions from the other mines). It should be noted that the data for the MPMC underflow product was obtained during the trial programs and it is felt that a full-scale, optimized cycloning system will produce a cleaner (more free draining) underflow product as previously discussed.

- *Foundation finger drains have been used under hydraulically placed tailings for downstream construction*

Drainage of the downstream shell zone of the hydraulically placed cycloned sand at the Main Embankment will be provided by the existing Zone T (transition zone) material and the incorporation of transverse (finger) drains along the base of the Stage 3 downstream expansion. The drains will include a capping layer of Zone F filter material to ensure that a proper filter relationship is maintained between the drain and the cycloned sand. This will prevent the migration of any fines into the drains. It is noted that these transverse drains are only expected to transfer significant seepage flows during the initial hydraulic placement of cycloned sand at the Stage 3 Main Embankment, as the remainder of the downstream shell zone will be constructed by conventional methods using dewatered sand fill. It will, however, be necessary to carefully manage the initial filling with hydraulically placed cycloned sand so as to ensure that the drains are not damaged by erosion. The transverse drains will provide hydraulic continuity between the longitudinal drains and any confining toe berms used for on-going staged expansions of the embankment.

MPMC has also constructed an underdrainage system with a similar configuration for the Borrow Area No. 4 stockpile. To date, the system of longitudinal and transverse drains has proven to be effective in draining the pile quickly enough to allow equipment access within 24 hours of deposition.

- *Adequate density has been obtained using hydraulic placement of tailings*

In-situ dry density was measured during the 1999 trial program. Hydraulically placed sand was found to achieve approximately 95 percent of the Standard Proctor maximum dry density. This is described in the 1999 report.

As described in Section 2.3, drained cycloned sand was also mechanically placed in the Main Embankment during Stage 2C construction. Sand was moved into the embankment from upstream areas by pushing with a bulldozer, or was hauled by 30-ton trucks. The sand was spread in maximum 1000 mm thick lifts by a bulldozer or grader and was compacted with a 10-ton smooth drum vibratory roller. The sand proved to be an excellent construction material, providing a trafficable surface and typically achieving densities greater than 100 percent of the Standard Proctor maximum dry density. The average moisture content of the sand was 12 percent.

Stage 3 construction will consist of initial hydraulic placement along the base of the Main Embankment. Subsequent lifts will be constructed using dewatered sand fill, which will be mechanically placed and compacted to at least 95 percent of the Standard Proctor maximum dry density. The initial hydraulically placed lift will also be reshaped and mechanically compacted prior to placement of subsequent lifts.

- *The cell deposition system they propose has been successful elsewhere*

Cell deposition is a common procedure used for constructing embankments from cycloned sand, and is described in various literature references, including "Planning, Analysis and Design of Tailings Dams" (Vick, S., 1983). The cell deposition method will only be used for one lift at the Main embankment during Stage 3 construction. In the event that this method proves to be impractical, it is intended that the cells will be infilled with mechanically placed and compacted cycloned sand obtained from stockpiles.

- *The foundation glacial fluvial sand is not subject to liquefaction under the site load conditions*

The foundation soils underlying the tailings embankment comprise glaciofluvial/ lacustrine sands and silts, laminated silt and clay layers and dense glacial till. The locations of the sandy sediments at the Main Embankment are shown on Figure 3.4.

In general, granular soils comprising saturated sands and silts are considered to be potentially liquefiable, whereas clayey soils with high fines contents are not liquefiable. However, clayey soils can accumulate large strains during an earthquake if the average earthquake induced shear stresses approach the static strength. Consequently, if the earthquake induced stresses approach or are greater than the undrained strength of the clay, the clay will deform.

The resistance of soils to cyclic loading and potential liquefaction is represented by the cyclic resistance ratio (CRR). For clayey soils the CRR represents an "equivalent liquefaction resistance". Earthquake loading is defined as the average induced cyclic shear stress ratio (CSR). The factor of safety against liquefaction (or large strains for clays) is defined as:

$$FS_{liq} = CRR/CSR.$$

The "liquefaction" potential of the foundation soils was carried out using the results of dynamic response analyses to determine the cyclic stress ratios induced by the design earthquakes and comparing them to the cyclic resistance ratios of the soils. As discussed in Section 4.0 of the Knight Piésold Report Ref. No. 11162/12-2, the program SHAKE was used to compute profiles of CRR. It has been estimated from the SHAKE analyses that the cyclic stress ratios within the foundation soils are approximately 0.045 for the Operating Basis Earthquake and 0.07 for the Maximum Design Earthquake.

A site investigation was completed to determine the strength characteristics of the foundation soils prior to commencement of embankment construction in 1996. This was achieved using the Cone Penetration Test (CPT). A total of five locations were tested as shown on Figure 3.4. The CPT independently measures tip stress (cone resistance) and sleeve friction resistance, which in combination can be used to estimate the normalized cyclic resistance ratio (CRR_1). This technique requires stress normalization of the cone resistance to a standard vertical effective stress of 1 atmosphere (approximately 100 kPa), and calculation of the friction ratio (sleeve friction divided by cone resistance). The CRR_1 is the cyclic resistance ratio of the soil for a magnitude 7.5 earthquake and a vertical effective stress of 100 kPa. Both the vertical effective stress and design earthquake magnitude influence the cyclic resistance of a soil. Therefore, estimated values of CRR_1 were corrected using the following equation:

$$CRR = CRR_1 \times MSF \times K_{\sigma} \text{ where}$$

MSF = Earthquake magnitude scaling factor
K_{σ} = Effective confining stress scaling factor

A conservative magnitude scaling factor of 0.71 was used for the design earthquakes, based on the relationship presented by Idriss (1998). This is representative of a large earthquake of magnitude 9 occurring along the Cascadia subduction zone, as discussed in previously issued Knight Piésold design reports. The relationship between effective confining pressure and K_{σ} is dependent on the soil type. For the foundation soils a relationship for silty and clayey sands (Arango, 1996) was used. The effective confining pressure imposed on the foundation soils by the ultimate embankment height was included. Each of the CRR profiles, corrected for earthquake magnitude and effective confining pressure, are presented on Figure 3.5. This figure also shows the estimated CSR of 0.07 for the Maximum Design Earthquake.

The corrected cyclic resistance ratios ($CRR_{9.0}$) of the foundation soils are typically in the range of 0.2 to 0.3 based on the CPT results, except for some softer layers where values range from 0.1 to 0.2, including those soils near surface (top 1.5 metres). These lower values may represent some softer layers of glaciofluvial sands and silts. However, all of the estimated values of $CRR_{9.0}$ are greater than the computed values of CSR indicating there is no potential for liquefaction in the embankment foundation soils. Also, the CPT soundings used to estimate the cyclic resistance of these soils was collected prior to embankment construction. The increased confining stresses imposed on these soils by the embankment will likely have increased the liquefaction resistance of these foundation soils.

RECOMMENDATIONS

The first year of hydraulic tailings disposal is critical.

It is recommended that Knight Piésold and Mt. Polley Mines meet the following requirements:

- *Develop redundancy in the hydraulic tailings disposal system – pipelines and cyclones.*

Knight Piésold Ltd. agree with this comment. The system is being designed by MPMC to provide appropriate redundancies to meet their proposed construction schedule. It is also noted that the revised construction schedule and reliance on mechanical placement methods provides significantly improved flexibility for embankment construction.

- *Establish a comprehensive QA/QC monitoring system and report data to EMPR monthly. This frequency may be relaxed pending successful procedures and results after year one.*

Knight Piésold Ltd. agree with this comment. The planned monitoring and reporting are discussed in Section 2.7 of this addendum.

- *Review the hydraulicing program annually and redesign the following year's program if necessary.*

Knight Piésold Ltd. agree with this comment. It is consistent with the observational approach that has been adopted for on-going design and construction. The on-going design of the embankments will be reviewed and finalized in the detailed design of each embankment stage. The performance of the Tailings Storage Facility will continue to be evaluated and reported on annually.

- *Install adequate instrumentation to allow the observational approach to be successful.*

Knight Piésold Ltd. agree with this comment. The requirements for geotechnical instrumentation are discussed in Section 2.6 of this addendum.

- *Incorporate a top filter in the finger drain design.*

Knight Piésold Ltd. agree with this comment. Zone F filter material has been incorporated in all drains on the Drawings in this addendum.

- *Ensure the width of the center clayey core is wide enough to be constructed effectively.*

Knight Piésold Ltd. agree with this comment. A discussion of the clay core width is presented above. A minimum core zone width of 6 m will be maintained.

- *Monitor the mass tailings balance to ensure the yearly volumes are available.*

Knight Piésold Ltd. agree with this comment. The mass balance will be developed and maintained by MPMC as part of their operations monitoring.

- *Develop the year one design of pipelines and cyclones and submit it to EMPR for information.*

Knight Piésold Ltd. agree with this comment. The system is being designed by MPMC, who will provide it to MEM.

- *Review the estimated cost estimate.*

The projected costs are continually monitored and updated by MPMC.

- *Re-assess the need of the upstream drainage pipe.*

This has been addressed above.

- *Communicate with EMPR immediately if the hydraulic tailings program develops problems and advise operational changes proposed.*

Knight Piésold Ltd. agree with this comment. The communications requirements will be identified in the updated Operation, Maintenance and Surveillance Manual that is being revised to include cyclone sand operations at the Tailings Storage Facility.

- *Develop a hydraulic tailings deposition operating manual as soon as reasonably possible.*

Knight Piésold Ltd. agree with this comment. The existing Operation, Maintenance and Surveillance Manual is being revised to include cyclone sand operations at the Tailings Storage Facility. It will be issued in the near future.

- *Ensure the surface drainage collection system and pressure relief wells are operational at the commencement of the hydraulicing program.*

Knight Piésold Ltd. agree with this comment. The surface water collection systems will be installed and operating prior to starting cycloned sand production at the Main Embankment stockpile and prior to hydraulic deposition in the Main Embankment cells. The details of the surface water collection systems at the Main Embankment are shown on Drawing 11162-12-117.

Providing the list of recommendations listed herein are met or agreed to, I consider you can recommend the use of the hydrauliced downstream design be approved subject to annual review.

Knight Piésold Ltd. agree with this statement.

3.3 RESPONSE TO OTHER MEM COMMENTS

MEM requested additional stability analysis in a letter dated January 24, 2000. The letter is presented in Appendix A. The purpose of the analysis was to evaluate the stability of the downstream cycloned sand fill during hydraulic placement. The percolation of water through the cycloned sand fill during hydraulic placement could cause saturation at the base of the fill for short periods of time.

The temporary saturated condition will not occur during Stage 3 embankment construction, as only one hydraulically placed lift is planned. It is, however, a consideration for hydraulic placement in future stages of the embankment, and during deposition of underflow sand in Stockpile A. Therefore, an analysis of the embankment slope was completed with the limit equilibrium computer program SLOPE/W, using the following conservative assumptions:

- Cycloned sand friction angle equals 32 degrees with no cohesion;
- Rockfill toe berm friction angle equals 45 degrees with no cohesion.

The static stability analysis determined a Factor Of Safety (FOS) of 1.5 against a shallow surface slip at the toe of the embankment using the above listed parameters. Two more analyses were performed to test the sensitivity of the FOS to the height of the phreatic surface. The first case modelled the phreatic surface at 1.4 metres (half of the maximum head predicted from the previously conducted seepage analyses). This generated a FOS approaching 1.9 which is the FOS against an infinite slope failure of the drained cycloned sand lying at 3H:1V. The second case modelled the phreatic surface at 5.5 metres (twice the maximum head predicted from the previously conducted seepage analyses) and produced a FOS of 1.0.

Factors of Safety against deep-seated circular failure in the cycloned sand were also determined for each of the above cases. The minimum FOS, with the phreatic surface at 5.5 metres, was 1.8.

The stability of the cycloned sand shell zone during hydraulic placement is not a concern during Stage 3 construction because only one lift will be placed hydraulically. The maximum height of hydraulically placed cycloned sand in the Stage 3 Main Embankment is anticipated to be approximately 8 m. The remaining downstream fill will consist of dewatered sand placed by mechanical methods. The angle of repose of hydraulically placed cycloned sand is approximately 5.5H:1V, flatter than the 3H:1V slope of on-going stages.

The stability analysis indicates an acceptable FOS against sloughing of the cycloned sand during hydraulic placement, and against deep-seated circular failure for on-going stages. The embankment and drain systems will be monitored and reviewed on an on-going basis to verify that the embankment is performing within the design tolerances.

The results of the analyses are summarized on Figure 3.6.

SECTION 4.0 - SUMMARY AND CONCLUSIONS

MPMC is evaluating a revised design concept for the tailings embankments, whereby the coarse sand fraction would be extracted from the bulk tailings stream by cycloning for incorporation into the shell zones of the embankments. MPMC conducted cycloning trial programs in 1999 in order to support this concept. The results of the trial programs were presented in the "Report on Cycloned Sand Construction of Stage 3 and On-Going Stages of the Tailings Storage Facility" (Ref. No. 11162/12-2).

This addendum has been prepared to present the modifications that have been made to the Stage 3 expansion of the Tailings Storage Facility as part of the on-going detailed design process. The modifications include the incorporation of more mechanically placed cycloned sand in the Main and Perimeter Embankments, with less reliance of hydraulically placed cycloned sand for embankment construction. The modifications introduce a greater degree of flexibility and reduce the impact of potential operational difficulties associated with the first year of cyclone operations.

This addendum also addresses comments received from the Ministry of Energy and Mines (MEM) and its representative following a review of the aforementioned report.

Key modifications to the Stage 3 Main and Perimeter Embankments are summarized below, along with some of the responses to key questions presented by MEM.

- The volume of hydraulically placed cycloned sand at the Main Embankment has been reduced. The revised design includes more mechanically placed cycloned sand that will be stockpiled in advance.

- The downstream shell zone of the Perimeter Embankment will be constructed from mechanically placed cycloned sand that will be hauled from stockpiles. The Stage 3A crest will be raised to El. 943 m during the 2000 construction season. The Stage 3B raise, to El. 944 m, will be constructed in the Spring of 2001. The overall configuration of the Perimeter Embankment will be a modified centreline arrangement.

- No changes were made to the South Embankment.

- MPMC is currently preparing for Stage 3 construction and plans to include in the Tender Documents alternative designs for the Stage 3 Main and Perimeter Embankments that utilize rockfill in the downstream shell zones. These designs were originally presented in the "Report on On-going Construction Requirements" (Ref. No. 10162/9-3, December 1997). The inclusion of both rockfill and cycloned sand options for each of the Main and Perimeter Embankment has resulted in four possible alternatives for Stage 3 construction. Prospective tenderers will be required to bid on each alternative and MPMC will select the alternative that best meets their ability to produce cycloned sand and construct the Stage 3 raise in a cost-effective and environmentally responsible manner. MEM will then be contacted and appropriate permit amendments will be requested after submission of the appropriate design documents.

- A liquefaction assessment was carried out on the foundation soils at the Main Embankment using cone penetration data collected during Stage 1 construction. The corrected cyclic resistance ratios exceeded the cyclic shear stress ratio estimated from SHAKE analyses, indicating that there is no potential for liquefaction in the foundation soils.

- The upstream toe drain significantly improves the performance of water and solids-retaining dams in terms of safety and controlled seepage. The benefits of properly designed and installed drains exceed the minimal risks.

- Record samples indicate that the Zone B material used in to construct the Stage 2A/2B raises meets the grain-size and compaction criteria for Zone S, ensuring a continuous low permeability zone.

- Limit equilibrium stability analyses were conducted to assess the potential for sloughing if the toe of the embankment becomes saturated during hydraulic placement of cycloned sand. The results indicate that the embankment toe will be stable for the saturated conditions that could occur temporarily during hydraulic placement of cycloned sand. These conditions will not occur during Stage 3 embankment construction, as the majority of the fill will comprise drained sand placed by mechanical methods. However, the analyses also indicate that sloughing of the toe is unlikely, except for very extreme saturation during hydraulic placement. The underdrainage systems have been designed to preclude this degree of saturation in any future stages which are constructed by hydraulic placement of cycloned sand.

MPMC will optimize the cyclone pipeworks systems and operating procedures during the 2000 construction season, when the primary objective will be to stockpile cycloned sand. Future construction programs will benefit from the experience gained during the Stage 3 construction program and will allow procedures for future construction using direct hydraulic placement in the embankment shell zones to be optimized.

SECTION 5.0 - REFERENCES

The following Knight Piésold Ltd. documents are relevant to this report:

- "Report on On-going Construction Requirements" (Ref. No. 10162/9-3, December 1997)

- "Evaluation of Cycloned Tailings for Embankment Construction", (Ref. No. 11162/11-1, June 16, 1999).

- "Report on Cycloned Sand Construction of Stage 3 and On-Going Stages of the Tailings Storage Facility" (Ref. No. 11162/12-2, December 13, 1999).

Other references that are relevant to this report include the following:

- Arango, I., (1996), "Derivation of Site-Specific $K_{\square}$ for an Old Clayey Sand Deposit," Draft Proceedings, NCEER Workshop on Evaluation of Liquefaction Resistance, Salt Lake City, Utah.

- Idriss, I.M., (1998), "Evaluation of Liquefaction Potential, Consequences and Mitigation - An Update," Presentation Notes for the Vancouver Geotechnical Society, Vancouver, B.C.

- Vick, S. G., (1983), "Planning, Analysis and Design of Tailings Dams", Wiley Series in Geotechnical Engineering, John Wiley & Sons, Inc.

SECTION 6.0 - CERTIFICATION

This report was prepared and approved by the undersigned.

Prepared by:

Ken D. Embree, P.Eng.
Senior Engineer

Approved by:

Ken J. Brouwer, P.Eng.
Principal

Knight Piésold
CONSULTING

TABLE 3.1

MOUNT POLLEY MINING CORPORATION
MOUNT POLLEY MINE
TAILINGS STORAGE FACILITY

STAGE 2A/2B RECORD SAMPLES
ZONE B SUMMARY SHEET

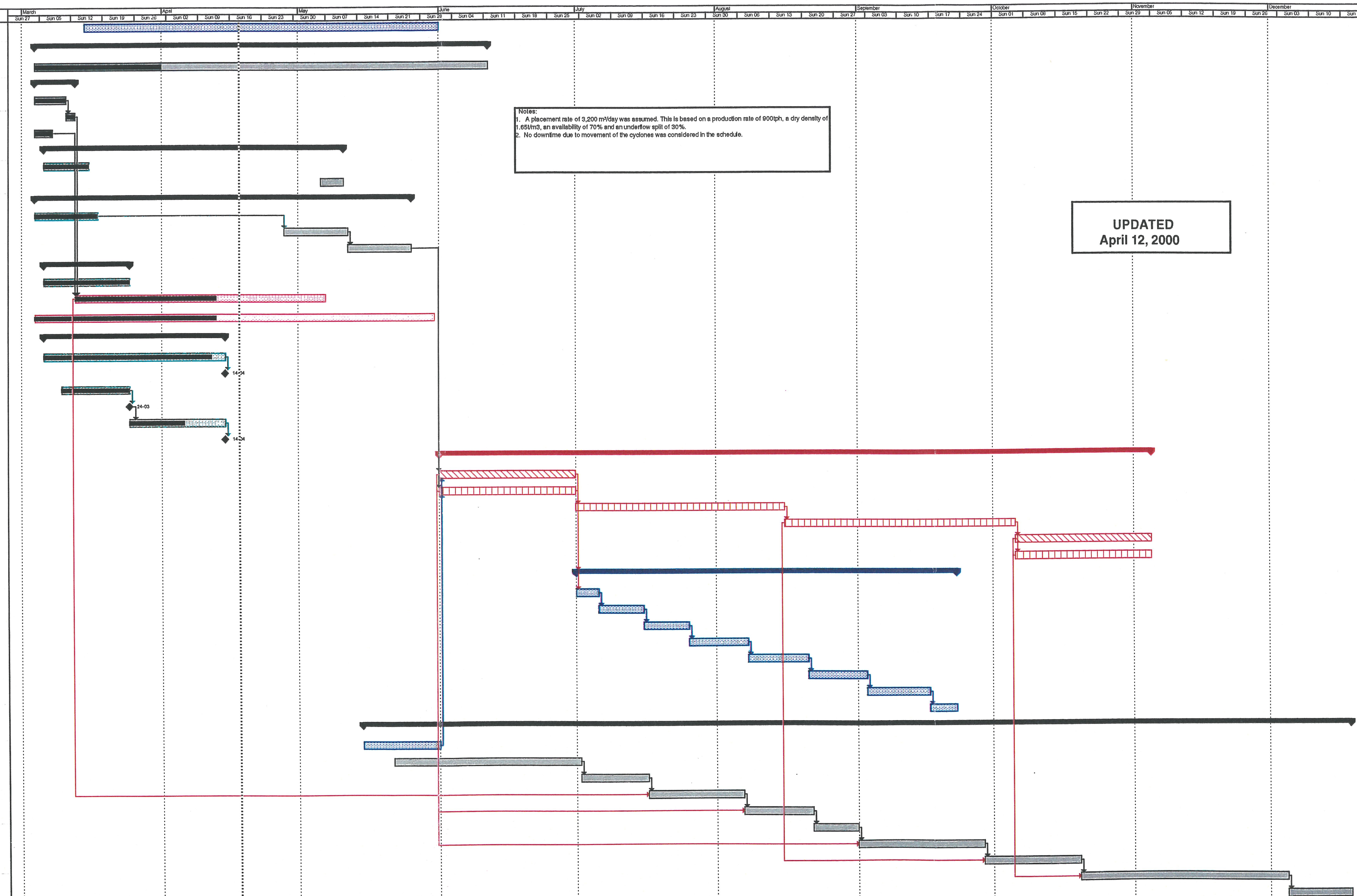
Date Sampled	Sample No.	Location	Elev. (m)	R1 Atterberg Limits PL %	R1 Atterberg Limits LL %	R1 Atterberg Limits PI %	R2 Field m/c %	LI %	R3 (Particle Size Distribution) Gravel %	R3 Sand %	R3 Silt %	R3 Clay %	R4 Standard Proctor Max Dry Density kg/m³	R4 Standard Proctor Optimum m/c %	R6 Specific Gravity	R7 Field Density Dry Density kg/m³	R7 Field Density Compaction %	R7 Field Density m/c %
27-Feb-98	R-ZB-1	Ch. 42+55, cL	932.2	14.6	18.6	4.0	8.7	-1.48	28.6	44.4	24.0	3.0	2120	8.8	-	2059	97.1%	10.0
29-Apr-98	R-ZB-2	24+10, 2.0m D/S from U/S shoulder	933.5	13.4	22.6	9.2	12.2	-0.13	19.3	32.0	31.1	17.6	2132	8.9	-	2052	96.2%	10.3
4-May-98	R-ZB-3	35+27, 3m U/S from D/S shoulder	935.7	13.2	22.6	9.4	10.2	-0.32	14.9	38.9	29.2	17.0	2075	10.2	-	2056	99.1%	10.7
7-May-98	R-ZB-4	19+79, 1m D/S from U/S shoulder	935.4	13.7	26.8	13.1	14.3	0.05	15.0	42.8	28.2	14.0	2026	10.4	-	1959	96.7%	10.8
12-May-98	R-ZB-5	22+50, 3m U/S from D/S shoulder	935.9	12.5	23.0	10.5	11.1	-0.13	27.4	36.2	23.4	13.0	2122	9.4	-	2054	96.8%	10.6
13-May-98	R-ZB-6	17+38, 3.5m U/S from D/S shoulder	936.0	13.6	25.3	11.7	9.8	-0.32	22.8	38.5	20.7	18.0	2094	8.5	-	2072	98.9%	8.6
			MEAN	13.3	24.1	10.8	11.5	-0.2	19.9	37.7	26.5	15.9	2090	9.5	-	2039	97.6%	10.2
			MEDIAN	13.4	23.0	10.5	11.1	-0.1	19.3	38.5	28.2	17.0	2094	9.4	-	2054	96.8%	10.6
			MAXIMUM	13.7	26.8	13.1	14.3	0.0	27.4	42.8	31.1	18.0	2132	10.4	-	2072	99.1%	10.8
			MINIMUM	12.5	22.6	9.2	9.8	-0.3	14.9	32.0	20.7	13.0	2026	8.5	-	1959	96.2%	8.6

Notes : Values for Standard Proctor maximum dry density and optimum moisture content include oversize correction.

R1 Atterberg Limits (ASTM D4318)
R2 Moisture Content (ASTM D2216)
R3 Particle Size Distribution (ASTM D422)
R4 Laboratory Compaction (ASTM D1557)
R6 Specific Gravity (ASTM D854)
R7 Density by Nuclear Methods (ASTM D2922)

MOUNT POLLEY MINING CORPORATION
MOUNT POLLEY MINE
STAGE 3 TAILINGS STORAGE FACILITY CONSTRUCTION SCHEDULE

ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names
1	**Install Groundwater Quality Monitoring Wells at South and Main Embankments**	78 days	Wed 15-03-00	Wed 31-05-00		
2	**Prepare for Cycloned Sand Stockpiling**	100 days	Sat 04-03-00	Sun 11-06-00		
3	Prepare Rock Borrow	100 days	Sat 04-03-00	Sun 11-06-00		
4	**Borrow Area #4**	9 days	Sat 04-03-00	Sun 12-03-00		
5	Prepare Floor	7 days	Sat 04-03-00	Fri 10-03-00		
6	Construct Drains	2 days	Sat 11-03-00	Sun 12-03-00	5	
7	Complete Pipeworks	4 days	Sat 04-03-00	Tue 07-03-00		
8	**Outside Impoundment**	66 days	Mon 06-03-00	Wed 10-05-00		
9	Complete Design	10 days	Mon 06-03-00	Wed 15-03-00		
10	Prepare Filter Sand	5 days	Sat 06-05-00	Wed 10-05-00		
11	**New Cyclones**	83 days	Sat 04-03-00	Thu 25-05-00		
12	Cyclone Study	14 days	Sat 04-03-00	Fri 17-03-00		
13	Order Parts	14 days	Fri 28-04-00	Thu 11-05-00	12	
14	Assemble Cyclones	14 days	Fri 12-05-00	Thu 25-05-00	13	
15	**Water Management**	19 days	Mon 06-03-00	Fri 24-03-00		
16	Complete design of Earthworks and Pipeworks	19 days	Mon 06-03-00	Fri 24-03-00		
17	**Cyclone in Borrow Area #4 (82,000 m³ - old cyclones)**	55 days	Mon 13-03-00	Sat 06-05-00	6,7	
18	**Build Beach at Perimeter Embankment**	88 days	Sat 04-03-00	Tue 30-05-00		
19	**Design of Stage 3 Raise**	40 days	Mon 06-03-00	Fri 14-04-00		
20	Complete design	40 days	Mon 06-03-00	Fri 14-04-00		
21	Issue Stage 3 Addendum	0 days	Fri 14-04-00	Fri 14-04-00	20	
22	Prepare Tender Package	15 days	Fri 10-03-00	Fri 24-03-00		
23	Issue Draft Tender Package to IMC review and comments	0 days	Fri 24-03-00	Fri 24-03-00	22	
24	Implement IMC comments	21 days	Sat 25-03-00	Fri 14-04-00	23	
25	Issue Tender Package	0 days	Fri 14-04-00	Fri 14-04-00	24	
26	**Stockpile Cycloned Sand (466,000m³)**	157 days	Thu 01-06-00	Sat 04-11-00		
27	Stockpile at NE abutment of ME SP-A (48,000m³) - Bank 1	30 days	Thu 01-06-00	Fri 30-06-00	14,43	
28	Stockpile at SW abutment of ME SP-A (48,000m³) - Bank 2	30 days	Thu 01-06-00	Fri 30-06-00	14,43	
29	Stockpile at NE abutment of ME SP-A (74,000m³) - Bank 2	46 days	Sat 01-07-00	Tue 15-08-00	28	
30	Stockpile inside TSF at BA#4 (82,000m³) - Bank 2	51 days	Wed 16-08-00	Thu 05-10-00	29	
31	Stockpile at NW abutment of ME SP-A (48,000 m³) - Bank 1	30 days	Fri 06-10-00	Sat 04-11-00	30	
32	Stockpile at SW abutment of ME SP-B (48,000m³) - Bank 2	30 days	Fri 06-10-00	Sat 04-11-00	30	
33	**Cell Construction - Hydraulic Placement of Cycloned Sand at Main Embankment (134,400m³)**	84 days	Sat 01-07-00	Fri 22-09-00	27	
34	Cell 1 - (8,000m³) - Bank 1	5 days	Sat 01-07-00	Wed 05-07-00	27	
35	Cell 2 - (16,000m³) - Bank 1	10 days	Thu 06-07-00	Sat 15-07-00	34	
36	Cell 3 - (16,000m³) - Bank 1	10 days	Sun 16-07-00	Tue 25-07-00	35	
37	Cell 4 - (20,800m³) - Bank 1	13 days	Wed 26-07-00	Mon 07-08-00	36	
38	Cell 5 - (20,800m³) - Bank 1	13 days	Tue 08-08-00	Sun 20-08-00	37	
39	Cell 6 - (20,800m³) - Bank 1	13 days	Mon 21-08-00	Sat 02-09-00	38	
40	Cell 7 - (22,400m³) - Bank 1	14 days	Sun 03-09-00	Sat 16-09-00	39	
41	Cell 8 - (9,600m³) - Bank 1	6 days	Sun 17-09-00	Fri 22-09-00	40	
42	**Embankment Construction**	218 days	Mon 15-05-00	Mon 18-12-00		
43	Construct earthworks for water management	17 days	Mon 15-05-00	Wed 31-05-00		
44	Prepare foundations and berms for ME and SP-A	41 days	Mon 22-05-00	Sat 01-07-00		
45	Construction of South Embankment using local borrow (8,300m³)	15 days	Sun 02-07-00	Sun 16-07-00	44	
46	Mechanically place cycloned sand from BA#4 at PE (82,000m³)	21 days	Mon 17-07-00	Sun 06-08-00	45,17SS+6 wks	
47	Mechanically place cycloned sand from SP-A at PE (60,000m³)	15 days	Mon 07-08-00	Mon 21-08-00	46,27SS+6 wks	
48	Place fill from local borrow at PE (16,000m³)	10 days	Tue 22-08-00	Thu 31-08-00	47	
49	Mechanically place cycloned sand from SP-A at ME (110,000m³)	28 days	Fri 01-09-00	Thu 28-09-00	48,28SS+6 wks	
50	Mechanically place cycloned sand from BA#4 at ME (82,000m³)	21 days	Fri 29-09-00	Thu 19-10-00	30SS+6 wks,49	
51	Mechanically place cycloned sand from SP-A at ME (184,000m³)	46 days	Fri 20-10-00	Mon 04-12-00	50,31SS,32SS	
52	Place remainder of fill from local borrow at ME - 23,000m³ in core zone	14 days	Tue 05-12-00	Mon 18-12-00	51	



Notes:
1. A placement rate of 3,200 m³/day was assumed. This is based on a production rate of 900tph, a dry density of 1.65t/m3, an availability of 70% and an underflow split of 30%.
2. No downtime due to movement of the cyclones was considered in the schedule.

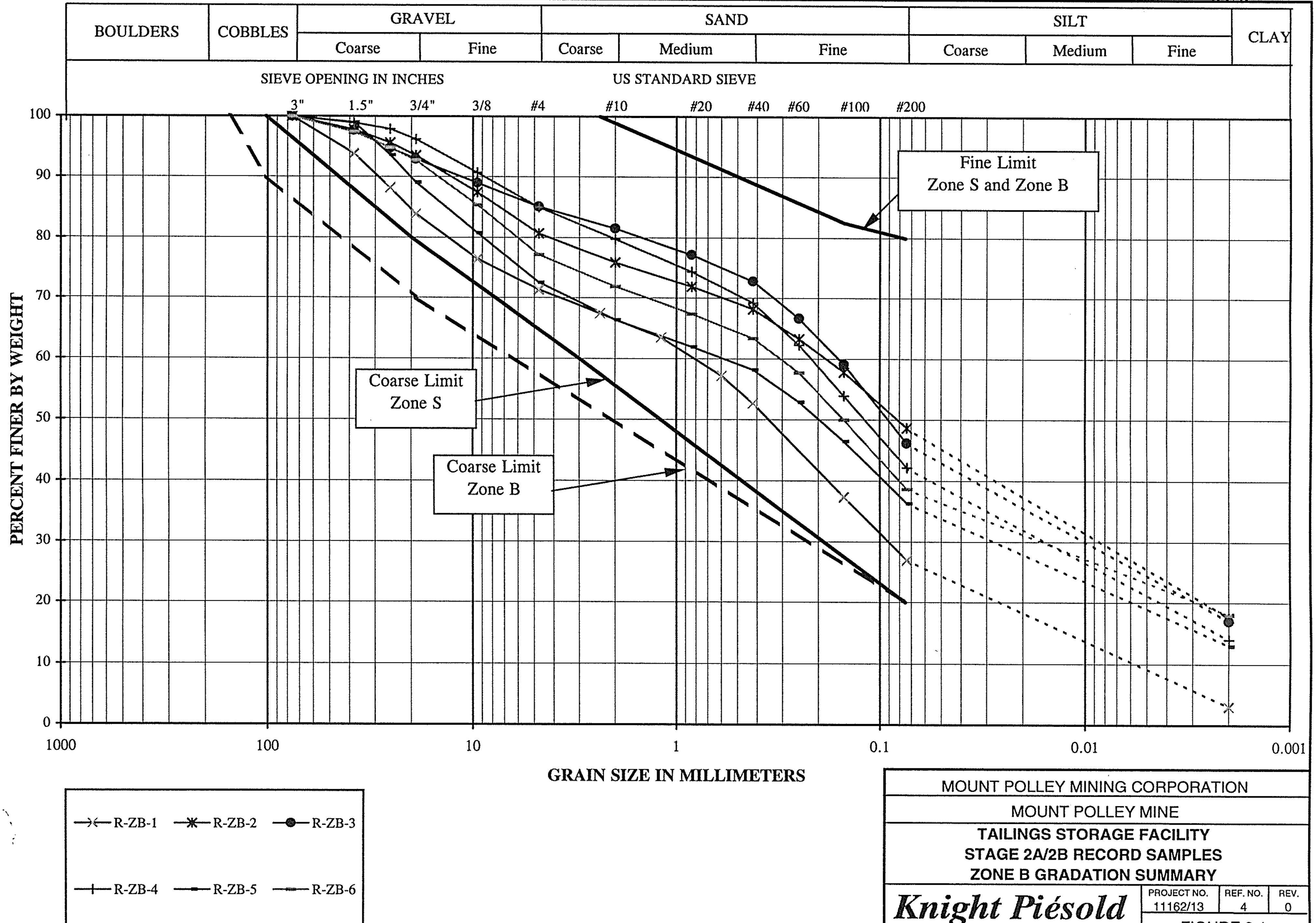
UPDATED
April 12, 2000

Project: jrk_temp_mar4
Date: Tue 18-04-00

Task | Split | Progress | Milestone | Summary | Rolled Up Task | Rolled Up Split | Rolled Up Milestone | Rolled Up Progress | External Tasks | Project Summary

Knight Piésold CONSULTING
Tue 18-04-00
Figure2-1.mpp

FIGURE 2.1



MOUNT POLLEY MINING CORPORATION

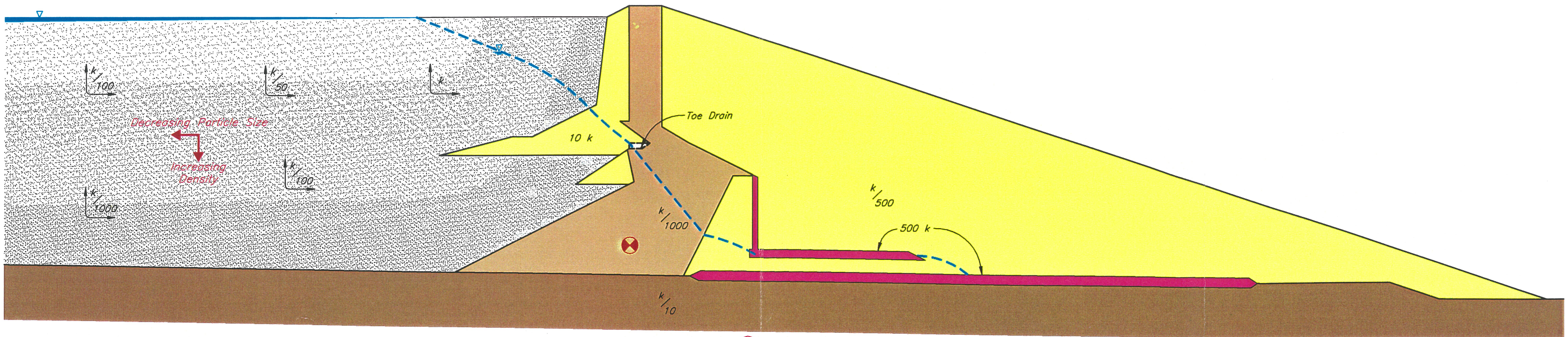
MOUNT POLLEY MINE

TAILINGS STORAGE FACILITY
STAGE 2A/2B RECORD SAMPLES
ZONE B GRADATION SUMMARY

Knight Piésold CONSULTING

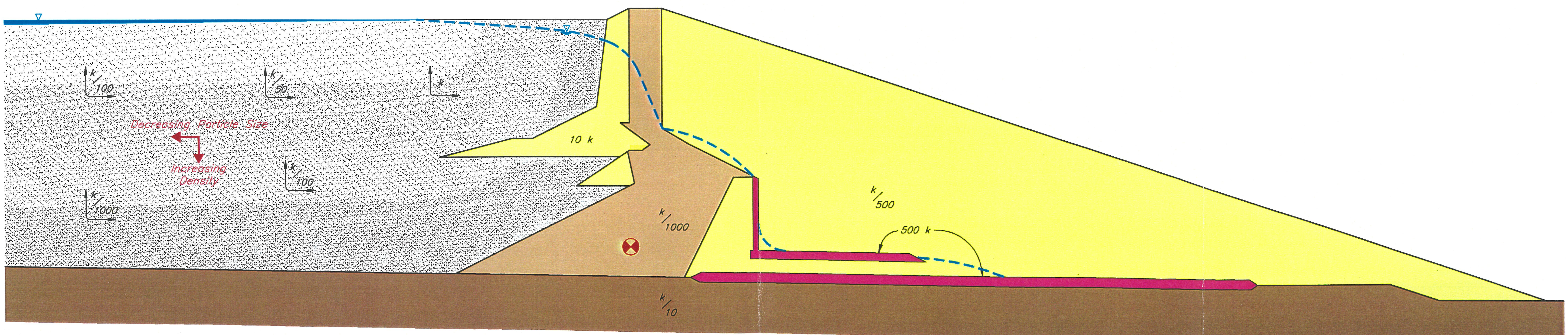
PROJECT NO.	REF. NO.	REV.
11162/13	4	0

FIGURE 3.1



Seepage Gradient (i) at ⊗ ≈ 0.5

WITH UPSTREAM TOE DRAIN



Seepage Gradient (i) at ⊗ ≈ 1.5

WITHOUT UPSTREAM TOE DRAIN

Scale 5 0 5 10 15 20 25 30 35 m

REV.	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	27MAR'00	ISSUED FOR REPORT REF. NO. 11162/13-4	JMTW	NSD		

REVISIONS

MOUNT POLLEY MINING CORPORATION

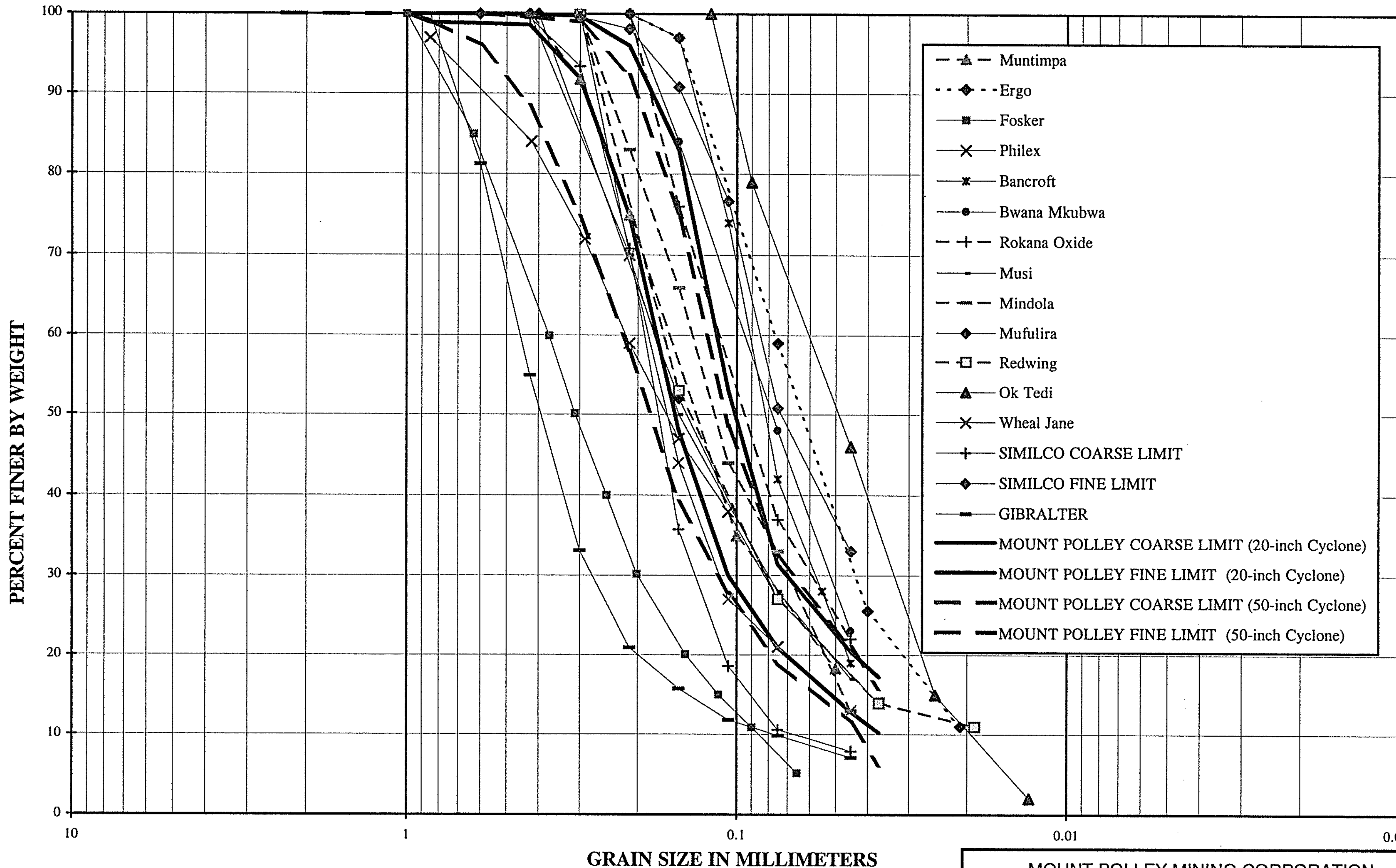
MOUNT POLLEY MINE

GENERALIZED EMBANKMENT SECTION
INUNDATED BEACH
WITH AND WITHOUT UPSTREAM TOE DRAIN

Knight Piésold CONSULTING

PROJECT NO.	REF. NO.	REV.
11162/13	4	0

FIGURE 3.2

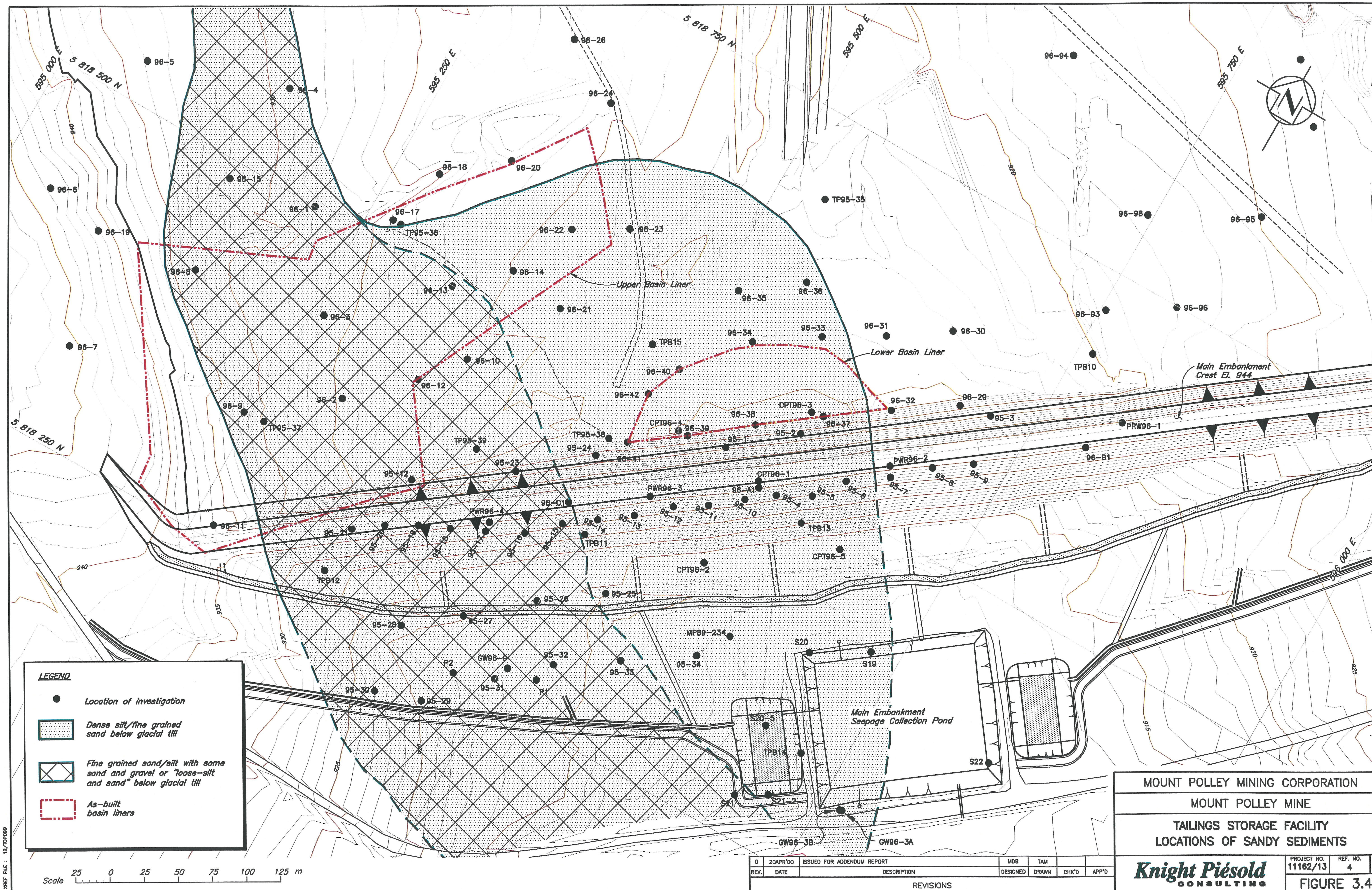


MOUNT POLLEY MINING CORPORATION

MOUNT POLLEY MINE

TAILINGS STORAGE FACILITY
GRADATION SUMMARY
UNDERFLOW AT OTHER MINES

Knight Piésold CONSULTING	PROJECT NO.	REF. NO.	REV.
	11162/13	4	0
	FIGURE 3.3		



MOUNT POLLEY MINING CORPORATION

MOUNT POLLEY MINE

TAILINGS STORAGE FACILITY
LOCATIONS OF SANDY SEDIMENTS

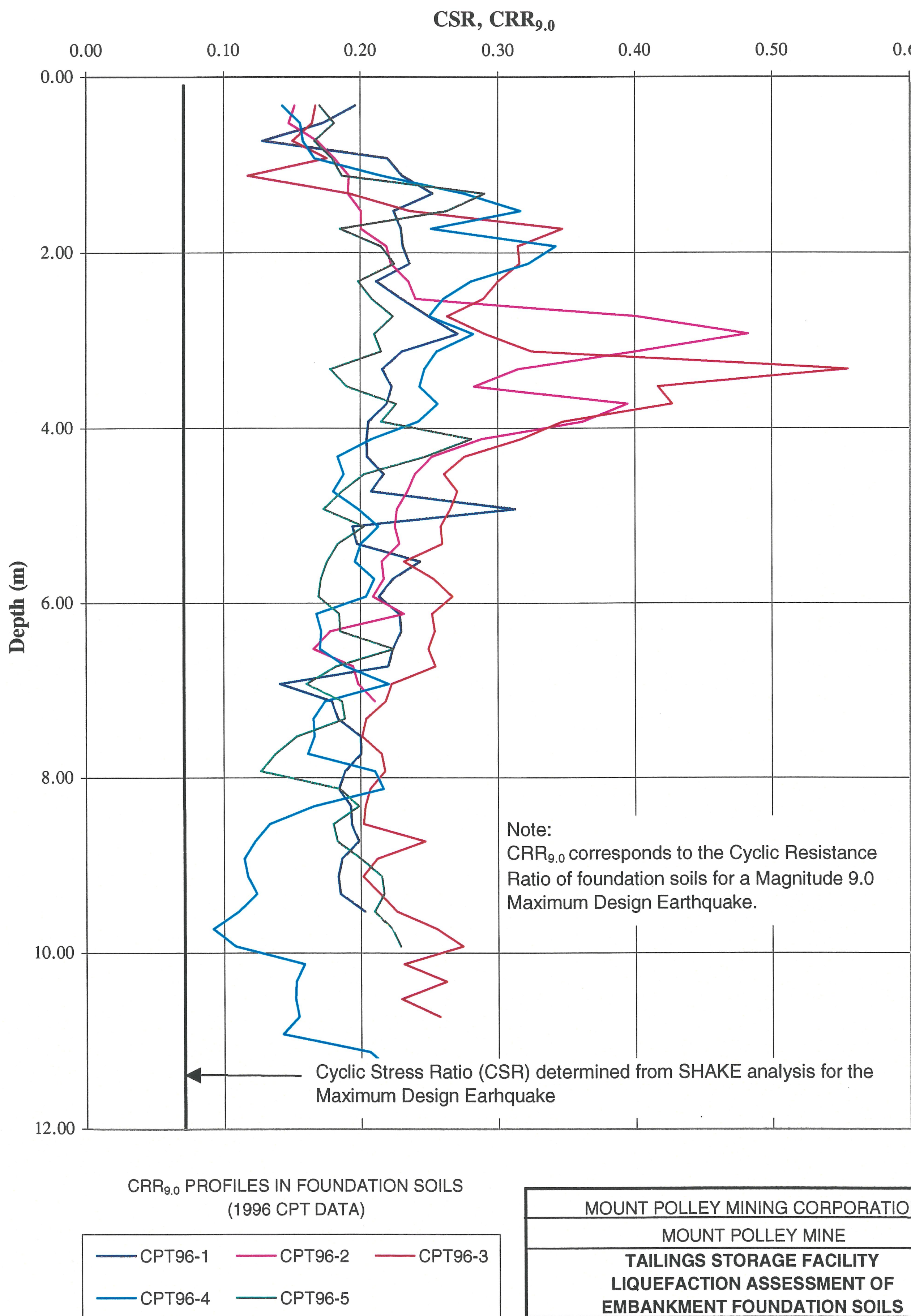
REV.	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	20APR'00	ISSUED FOR ADDENDUM REPORT	MDB	TAM		

REVISIONS

Knight Piésold CONSULTING

PROJECT NO.	REF. NO.	REV.
11162/13	4	0

FIGURE 3.4



$CRR_{9.0}$ PROFILES IN FOUNDATION SOILS
(1996 CPT DATA)

MOUNT POLLEY MINING CORPORATION

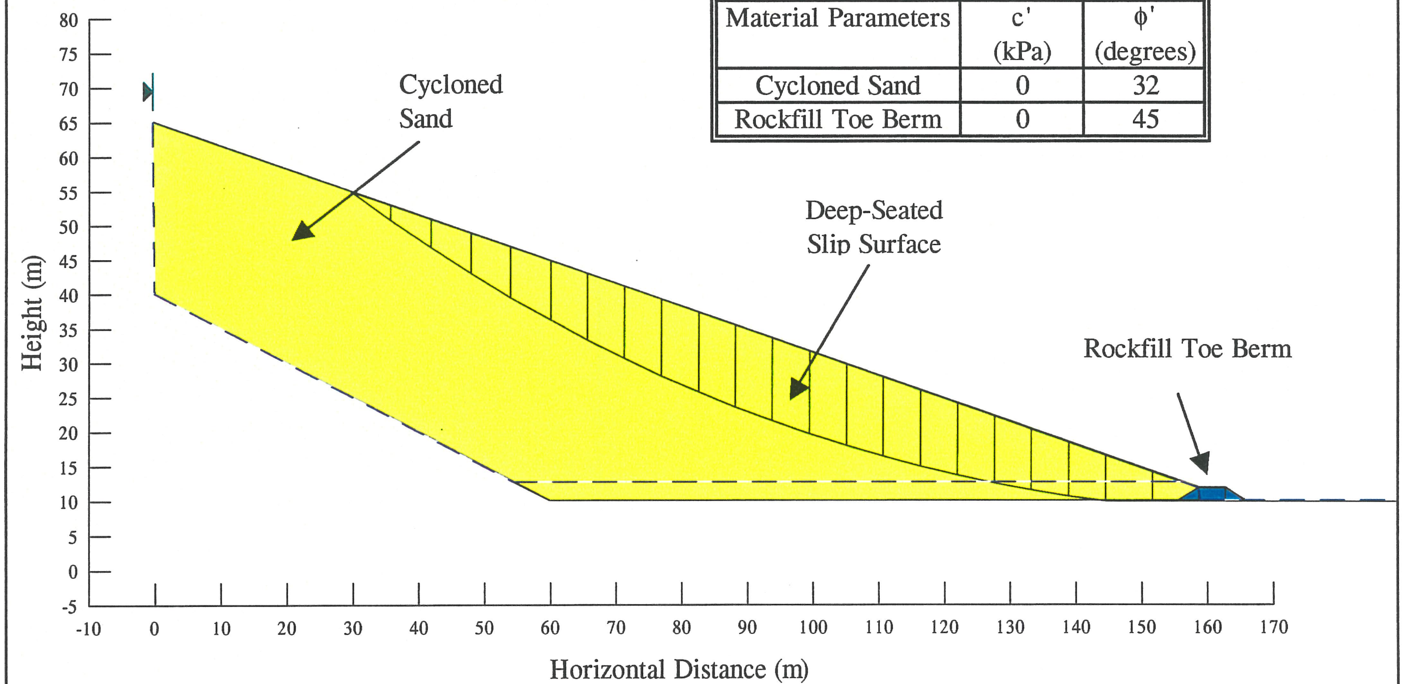
MOUNT POLLEY MINE

TAILINGS STORAGE FACILITY
LIQUEFACTION ASSESSMENT OF
EMBANKMENT FOUNDATION SOILS

Knight Piésold CONSULTING

PROJECT NO.	REF. NO.	REV.
11162/13	4	0

FIGURE 3.5



Material Parameters	c' (kPa)	φ' (degrees)
Cycloned Sand	0	32
Rockfill Toe Berm	0	45

Typical Section - Final Embankment

F.O.S. Against Failure in Cycloned Sand		
Height of Phreatic Surface*	Shallow Sloughing	Deep Failure
1.4 m	1.9	1.9
2.8 m (Design)	1.5	1.9
5.6 m	1.0	1.8

*Above transverse drains

MOUNT POLLEY MINING CORPORATION

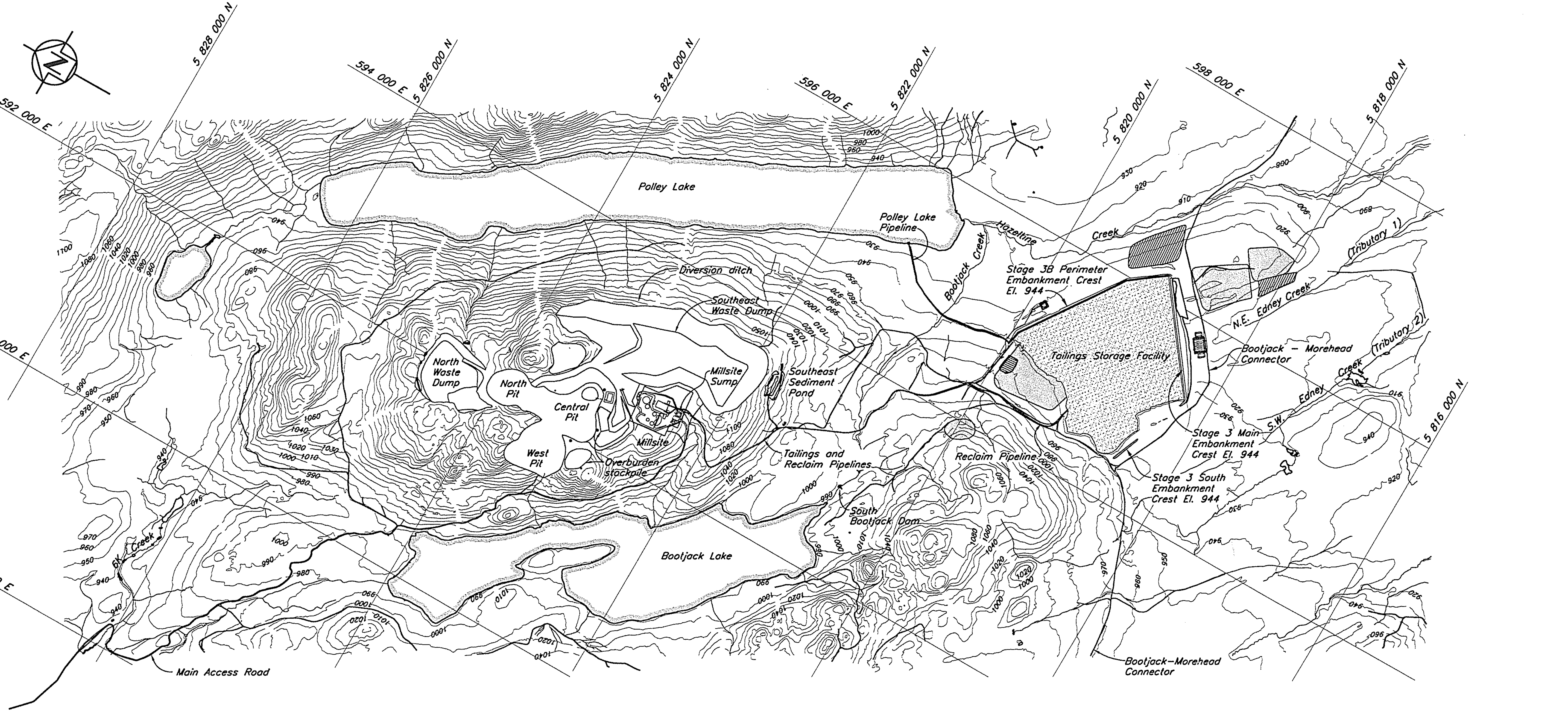
MOUNT POLLEY MINE

TAILINGS STORAGE FACILITY
STABILITY ANALYSIS
DOWNSTREAM SHELL ZONE

Knight Piésold CONSULTING

PROJECT NO.	REF. NO.	REV.
11162/13	4	0

FIGURE 3.6



NOTES

1. Open Pits and Waste Dumps are shown in their final configurations.
2. Topography at TSF generated from points and break lines sent from MPMC in July 1999. The topography outside the TSF area is from 1997 flyover.
3. Current size and location of potential and existing Borrow Areas and Topsoil Stockpiles are to be confirmed.

Scale 400 0 400 800 1200 1600 2000 m

NOT FOR CONSTRUCTION

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA K. D. KLEMBREE

MOUNT POLLEY MINING CORPORATION

MOUNT POLLEY MINE

TAILINGS STORAGE FACILITY
STAGE 3 TAILINGS EMBANKMENT
OVERALL SITE PLAN

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
1	20APR'00	ISSUED FOR ADDENDUM REPORT	MDB	TAM		
0	10DEC'00	ISSUED FOR DESIGN REPORT	MDB	TAM		

REVISIONS

DRG. NO.	DESCRIPTION

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D

REVISIONS

DESIGNED	CHECKED	SCALE	REVISION
MDB		AS SHOWN	1
DRAWN	APPROVED	DRAWING NO.	
TAM		11162-12-100	

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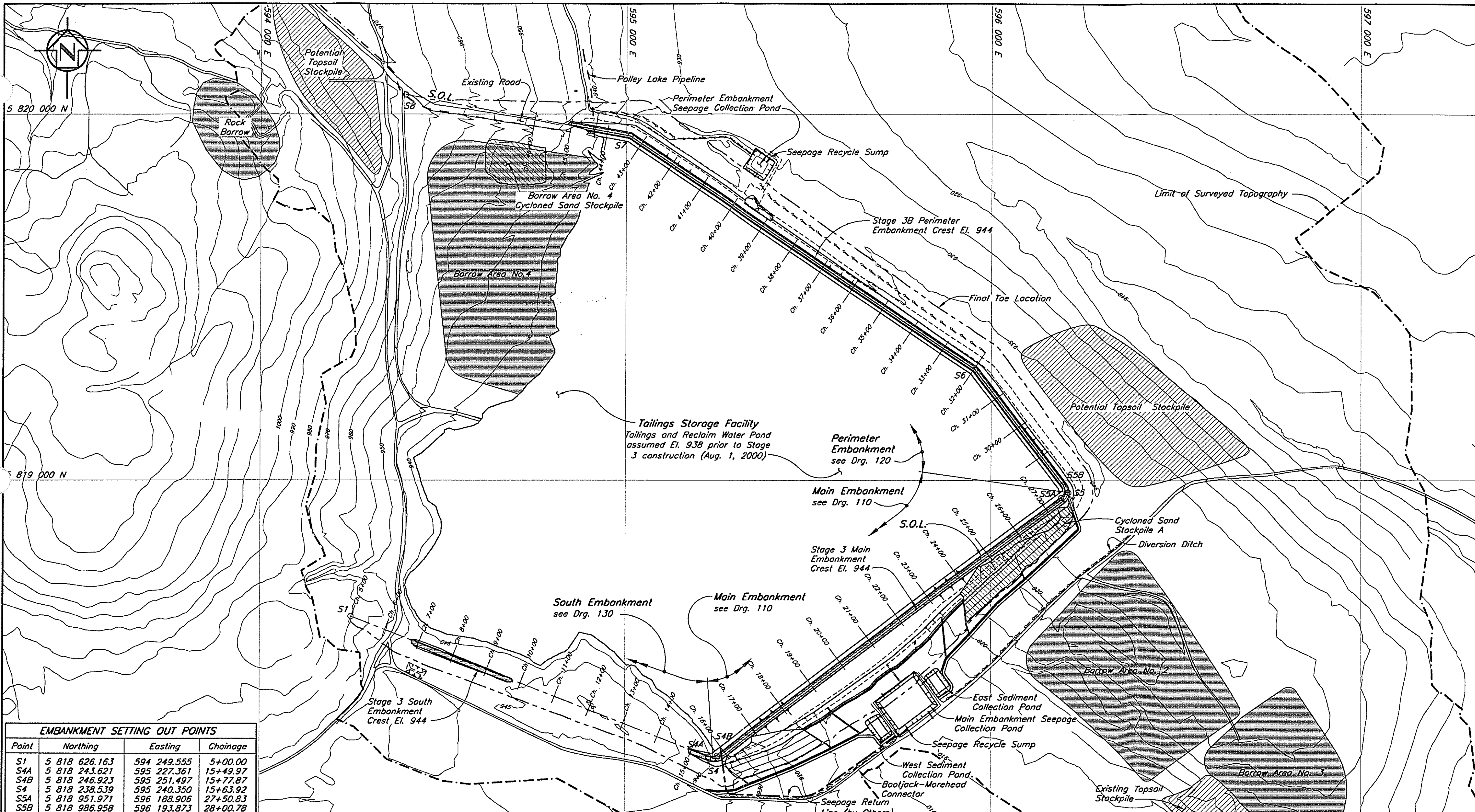
VANCOUVER B.C. CAD FILE: M:\11162\12\Acad\dwg\081\06 1=20000 Plot 1=1(PS) 17/04/00 tam

XREF FILE : TOPO99



EMBANKMENT SETTING OUT POINTS

Point	Northing	Easting	Chainage
S1	5 818 626.163	594 249.555	5+00.00
S4A	5 818 243.621	595 227.361	15+49.97
S4B	5 818 246.923	595 251.497	15+77.87
S4	5 818 238.539	595 240.350	15+63.92
S5A	5 818 951.971	596 188.906	27+50.83
S5B	5 818 986.958	596 193.873	28+00.78
S5	5 818 966.983	596 208.866	27+75.80
S6	5 819 304.035	595 955.881	31+97.23
S7	5 819 939.748	595 010.249	43+36.69
S8	5 820 053.034	594 396.471	49+60.83

NOTES

1. Topography at TSF generated from points and break lines sent from MPMC in July 1999. The topography outside the TSF area is from 1997 flyover.
2. Current size and location of potential and existing Borrow Areas and Topsoil Stockpiles are to be confirmed.

Scale 100 0 100 200 300 400 500 m

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PROVINCE OF BRITISH COLUMBIA
K. D. K. EMBREE

DRG. NO.	DESCRIPTION
130	T.S.F. – STAGE 3 SOUTH EMBANKMENT – PLAN AND SECTION
120	T.S.F. – STAGE 3 PERIMETER EMBANKMENT – PLAN
110	T.S.F. – STAGE 3 MAIN EMBANKMENT – PLAN

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	20APR'00	ISSUED FOR ADDENDUM REPORT	MDB	NSD		

REVISIONS

DESIGNED MDB
CHECKED
DRAWN TAM
APPROVED KDB

MOUNT POLLEY MINING CORPORATION

MOUNT POLLEY MINE

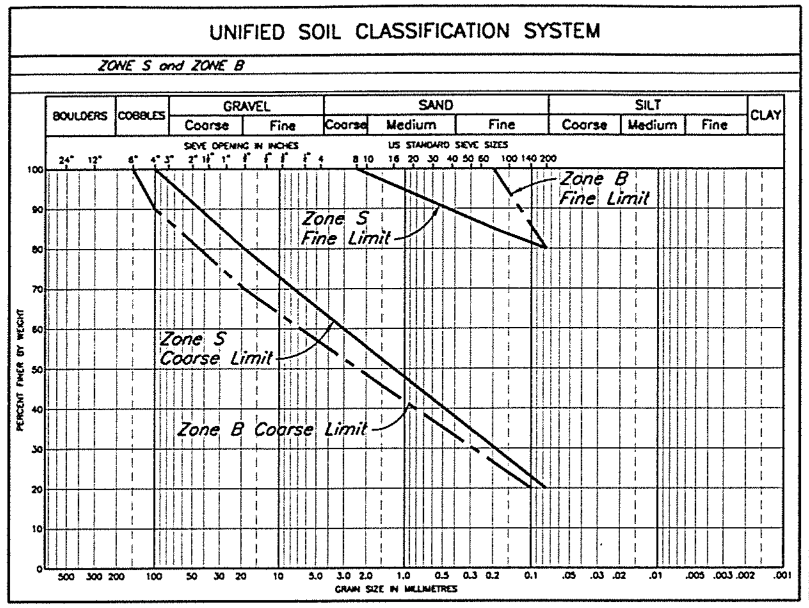
TAILINGS STORAGE FACILITY
STAGE 3 TAILINGS EMBANKMENT
GENERAL ARRANGEMENT

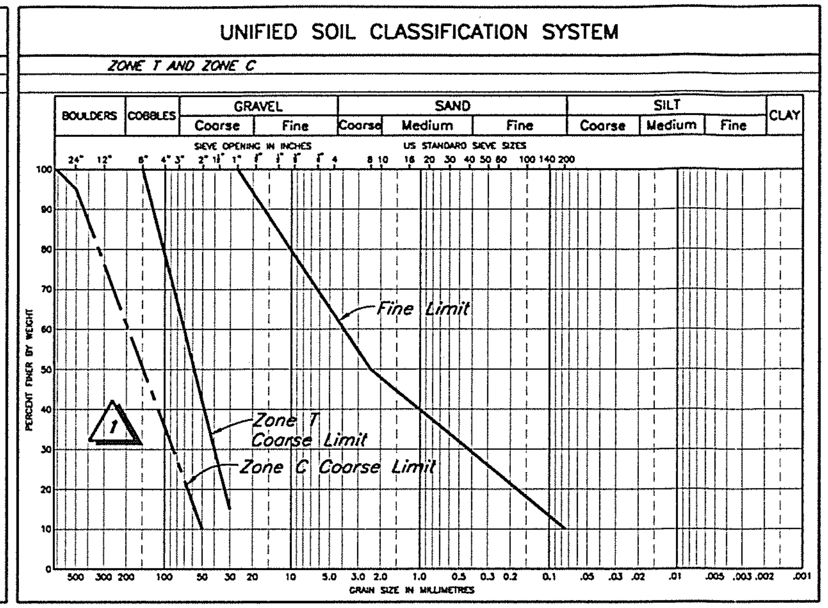
Knight Piésold CONSULTING

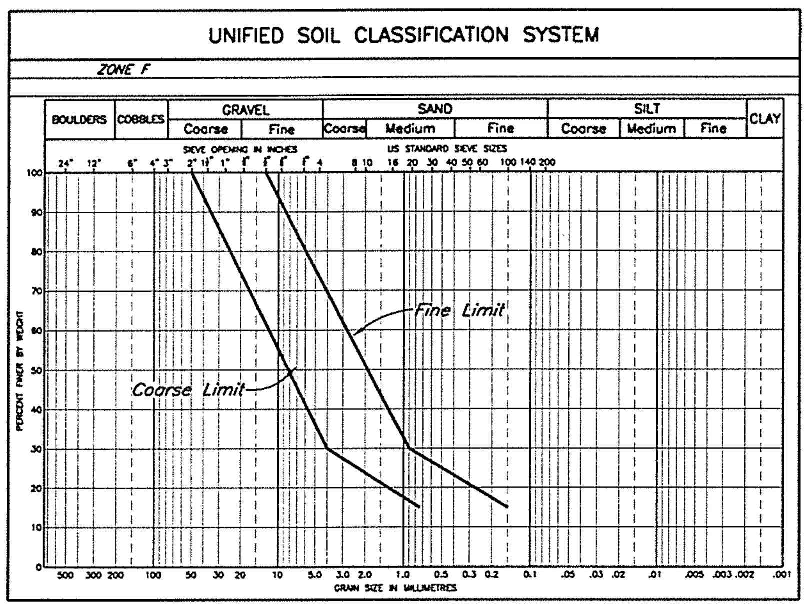
SCALE AS SHOWN
REVISION 0
DRAWING NO. 11162-12-102

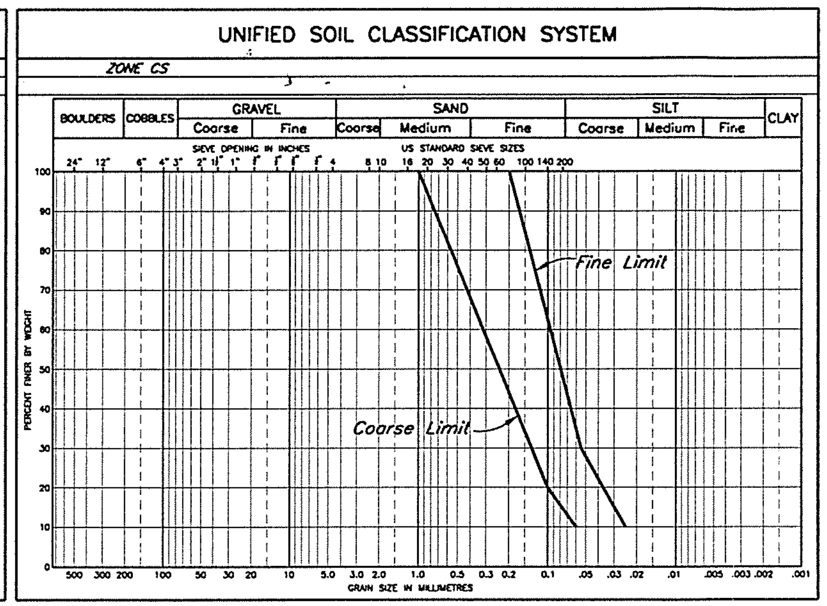
XREF FILE : TOPO99, STAGE3

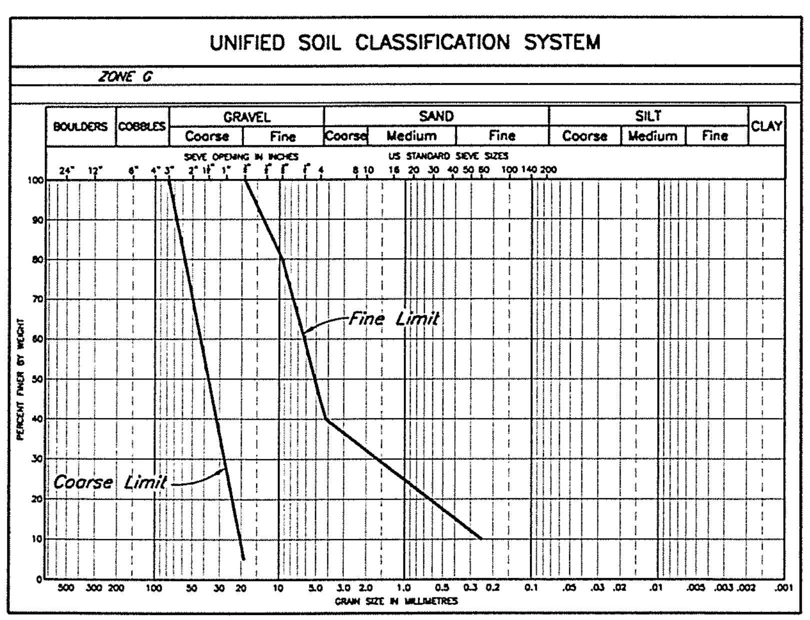
VANCOUVER B.C.

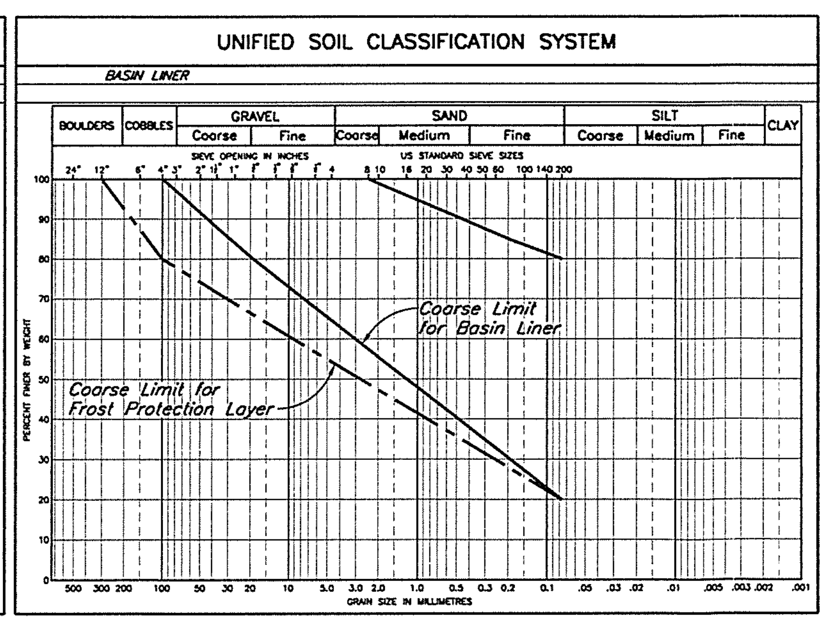












ZONE	MATERIAL TYPE	LOCATION	PLACEMENT AND COMPACTION REQUIREMENTS
S	Glacial till	Core Zone	Placed, moisture conditioned and spread in maximum 300 mm thick layers (after compaction). Vibratory compaction to 95% of Standard Proctor maximum dry density or as approved by the Engineer.
B	Glacial till, glaciolacustrine material	Fill Zone	Placed, moisture conditioned and spread in maximum 500 mm thick layers (after compaction). Vibratory compaction to 92% of Standard Proctor maximum dry density or as approved by the Engineer.
T	Rock	Transition Zone/ Confining Berm	Placed and spread in maximum 600 mm thick layers. Compaction as directed by the Engineer.
F	Filter sand	Chimney Drain	Placed and spread in maximum 600 mm thick lifts. Compaction as directed by the Engineer.
F	Filter Sand	Longitudinal/ Outlet Drain	Placed and spread carefully around filter fabric/drain gravel. Compaction as directed by the Engineer.
G	Drain Gravel	Foundation/ Longitudinal/ Outlet Drain	Placed and spread carefully around seepage collection pipes. Compaction as directed by the Engineer.
CBL	Random Rockfill	Coarse Bearing Layer	End dumped and spread as required for trafficability and fill placement.
–	Glacial till, glaciolacustrine material	Basin Liner	Placed and spread in maximum 150 mm thick lifts. Compacted to 92% of the Standard Proctor Maximum Dry Density, or as approved by the Engineer.
–	Glacial till, glaciolacustrine or granular material	Basin Liner Frost Protection	Placed and spread in maximum 300 mm thick lift. Compaction as directed by the Engineer.
CS	Cyclone Sand, Hydraulically placed	Shell Zone	Nominal compaction by construction equipment
CS	Cyclone Sand, Mechanically placed	Shell Zone	Placed, moisture conditioned and spread in maximum 500 mm thick layers (after compaction). Vibratory compaction to 95% of Standard Proctor Maximum Dry Density, or as approved by the Engineer.
	Zone B, Zone CS or Zone T	Shell Zone	See Zone T or Zone B above for Specifications
1 C	Rock	Shell Zone	Placed and spread in maximum 1000 mm thick lift. Compaction as directed by the Engineer.

NOT FOR CONSTRUCTION

VANCOUVER B.C. CAD FILE: M:\11162\12\ACAD\dwgs\07\07 1=1 Plot 1=1 18/04/00 TAM

REFERENCE DRAWINGS

DRG. NO.	DESCRIPTION
130	TSF – STAGE 3 SOUTH EMBANKMENT – PLAN AND SECTION
125	TSF – STAGE 3 PERIMETER EMBANKMENT – SECTIONS
115	TSF – STAGE 3 MAIN EMBANKMENT – SECTIONS

REVISIONS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
1	20APR'00	ISSUED FOR ADDENDUM REPORT	MDB	WAL		
0	10DEC'99	ISSUED FOR DESIGN REPORT	MDB	WAL	LAG	KJB

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
K. D. KEMBREE

DESIGNED MDB
CHECKED
DRAWN DSR
APPROVED

MOUNT POLLEY MINING CORPORATION

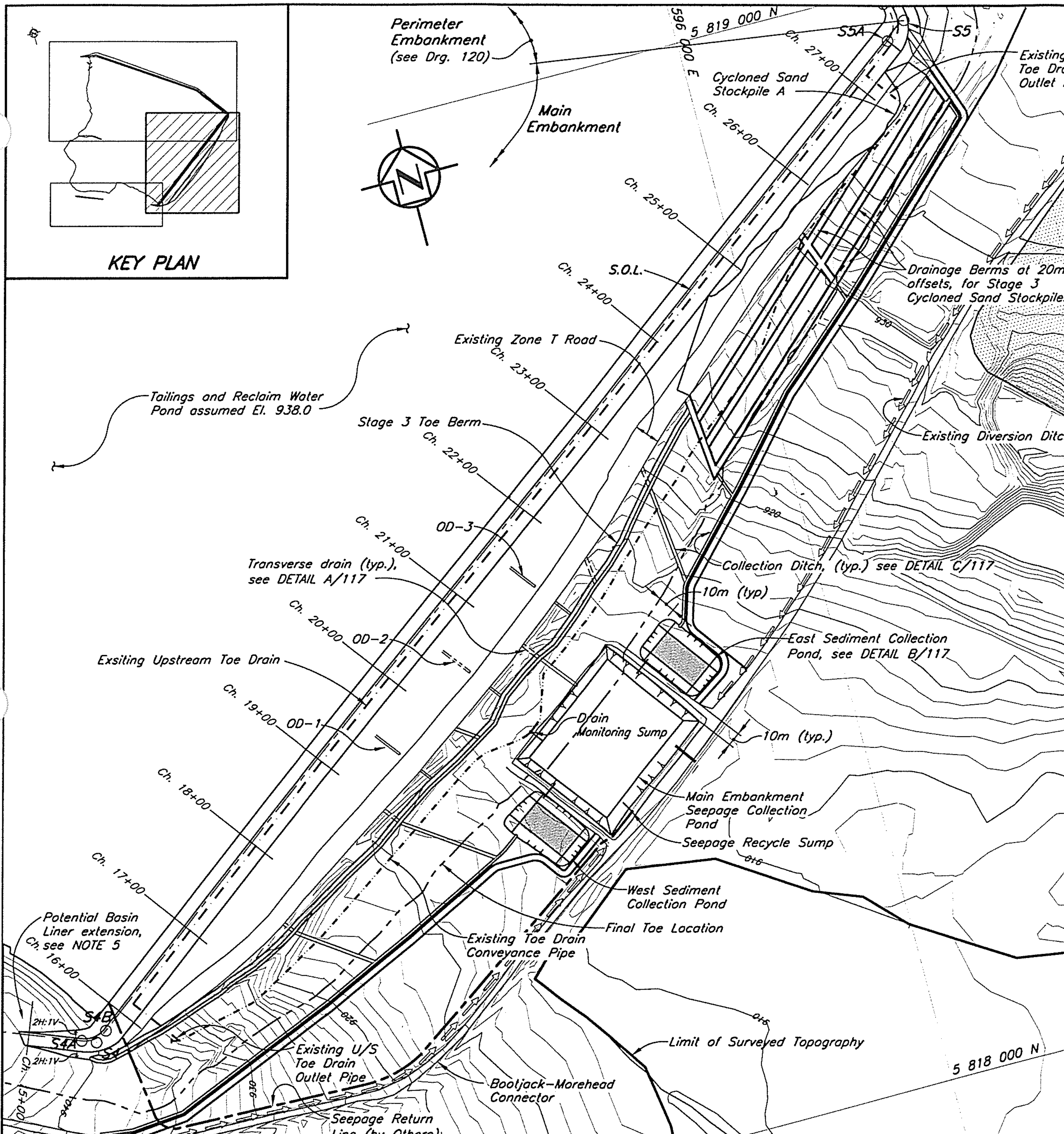
MOUNT POLLEY MINE

TAILINGS STORAGE FACILITY STAGE 3 TAILINGS EMBANKMENT MATERIAL SPECIFICATIONS

Knight Piésold CONSULTING

SCALE AS SHOWN
REVISION 1
DRAWING NO. 11162-12-104

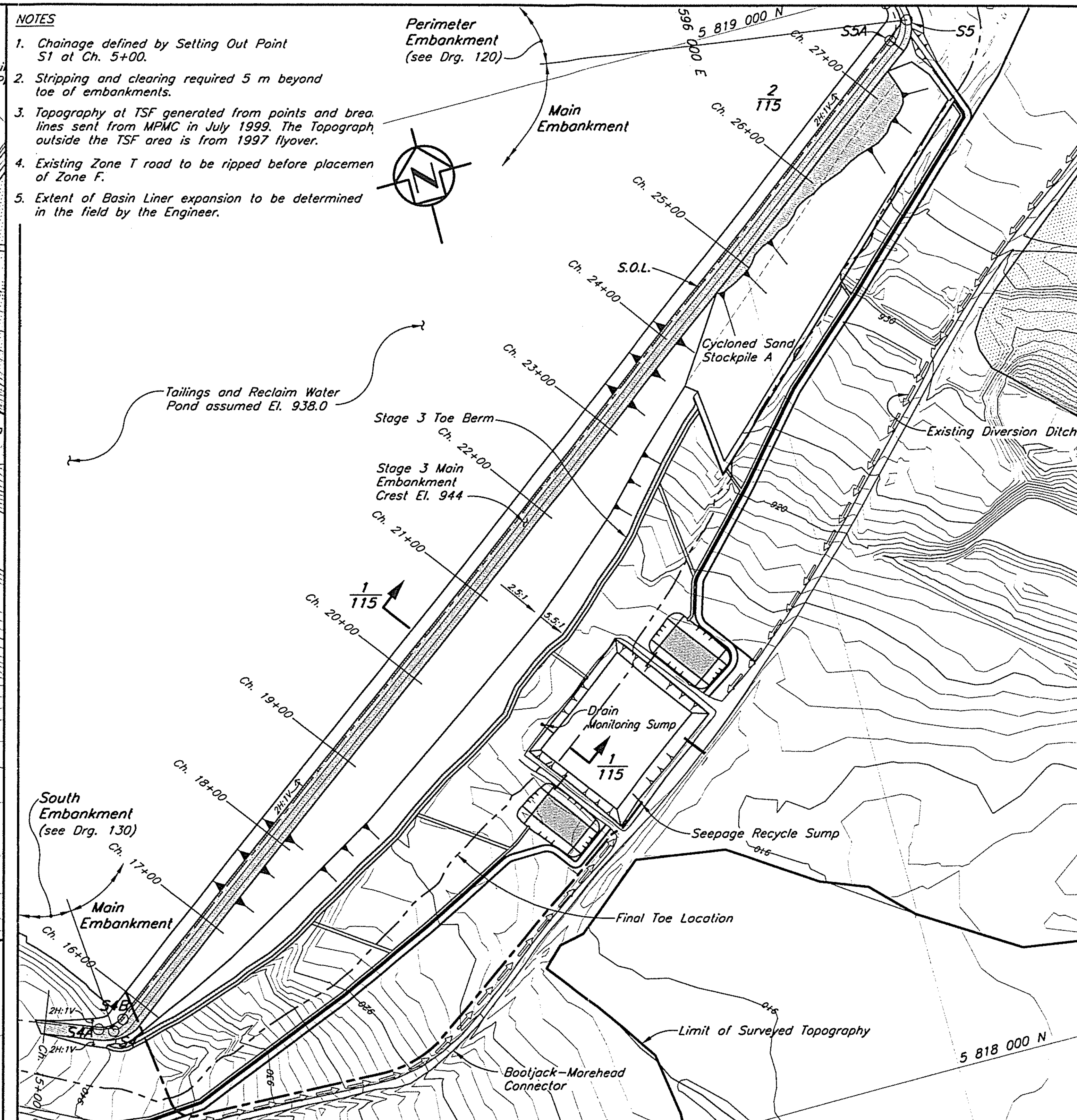
XREF FILE :



SURFACE WATER MANAGEMENT DETAILS

NOTES

1. Chainage defined by Setting Out Point S1 at Ch. 5+00.
2. Stripping and clearing required 5 m beyond toe of embankments.
3. Topography at TSF generated from points and brea[k] lines sent from MPMC in July 1999. The Topograph[y] outside the TSF area is from 1997 flyover.
4. Existing Zone T road to be ripped before placemen[t] of Zone F.
5. Extent of Basin Liner expansion to be determined in the field by the Engineer.



MAIN EMBANKMENT DETAILS

NOT FOR CONSTRUCTION

Scale 50 0 50 100 150 200 250 m

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — K. D. K. EMBREE

MOUNT POLLEY MINING CORPORATION

MOUNT POLLEY MINE

TAILINGS STORAGE FACILITY
STAGE 3 MAIN EMBANKMENT
PLAN

DRG. NO.	DESCRIPTION
117	TSF – STAGE 3 MAIN EMBANKMENT – DETAILS
130	TSF – STAGE 3 SOUTH EMBANKMENT – PLAN AND SECTION
120	TSF – STAGE 3 PERIMETER EMBANKMENT – PLAN
115	TSF – STAGE 3 MAIN EMBANKMENT – SECTIONS

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D

REVISIONS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
1	20APR'00	GENERAL REVISIONS, ISSUED FOR ADDENDUM REPORT	MDB	TAM	JRK	KB
0	10DEC99	ISSUED FOR TENDER	MDB	DSR		

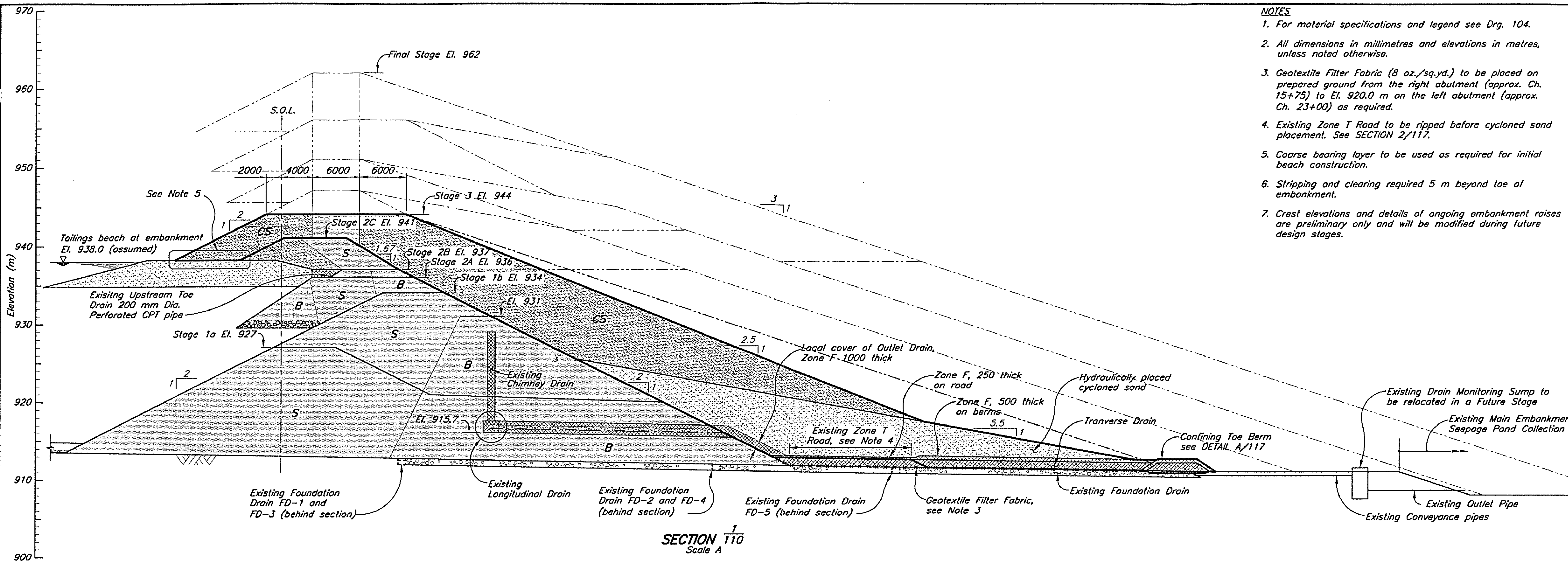
REVISIONS

DESIGNED	CHECKED	SCALE	REVISION
MDB	JRK	AS SHOWN	1
DRAWN	APPROVED	DRAWING NO.	
DSR		11162-12-110	

Knight Piésold CONSULTING

XREF FILE : TOPO99,STOCK99,

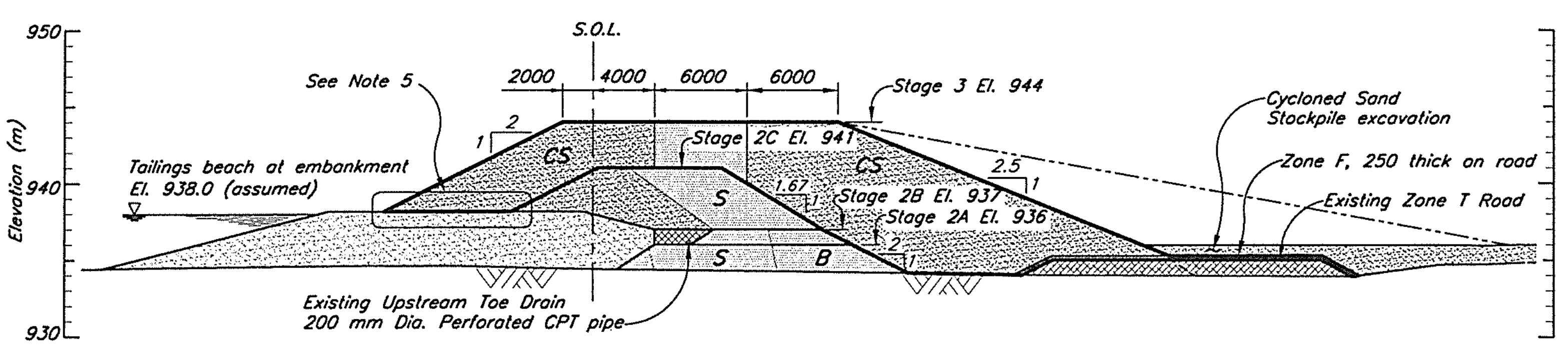
VANCOUVER B.C. CAD FILE: M:\11162\12\Acad\dwg\001\001 1=2500 Plot 1=1(PS) 18/04/00 tom



SECTION 1/110
Scale A

NOTES

1. For material specifications and legend see Drg. 104.
2. All dimensions in millimetres and elevations in metres, unless noted otherwise.
3. Geotextile Filter Fabric (8 oz./sq.yd.) to be placed on prepared ground from the right abutment (approx. Ch. 15+75) to El. 920.0 m on the left abutment (approx. Ch. 23+00) as required.
4. Existing Zone T Road to be ripped before cycloned sand placement. See SECTION 2/117.
5. Coarse bearing layer to be used as required for initial beach construction.
6. Stripping and clearing required 5 m beyond toe of embankment.
7. Crest elevations and details of ongoing embankment raises are preliminary only and will be modified during future design stages.



SECTION 2/110
Scale A

NOT FOR CONSTRUCTION

B 2 0 2 4 6 8 10 m

A 5 0 5 10 15 20 25 m

VANCOUVER B.C.   CAD FILE: M:\11162\12\ACAD\Stage3\04\04   1=250   Plot 1=1(PS)   18/04/00 tom

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — K. D. K. EMBREE

DRG. NO.	DESCRIPTION
110	TSF - STAGE 3 - MAIN EMBANKMENT - PLAN
104	TSF - STAGE 3 - MATERIALS SPECIFICATIONS

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
1	20APR'00	GENERAL REVISIONS, ISSUED FOR ADDENDUM REPORT	MDB	TAM		
0	10DEC'99	ISSUED FOR DESIGN REPORT	MDB	WAL	LAG	KJB

REVISIONS

MOUNT POLLEY MINING CORPORATION

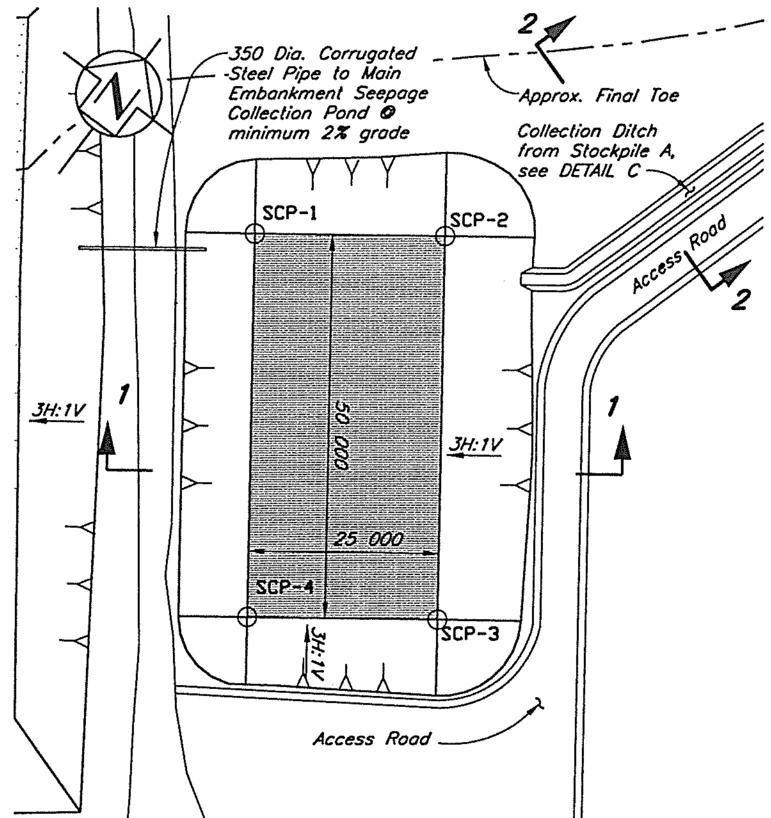
MOUNT POLLEY MINE

TAILINGS STORAGE FACILITY
STAGE 3 MAIN EMBANKMENT
SECTIONS

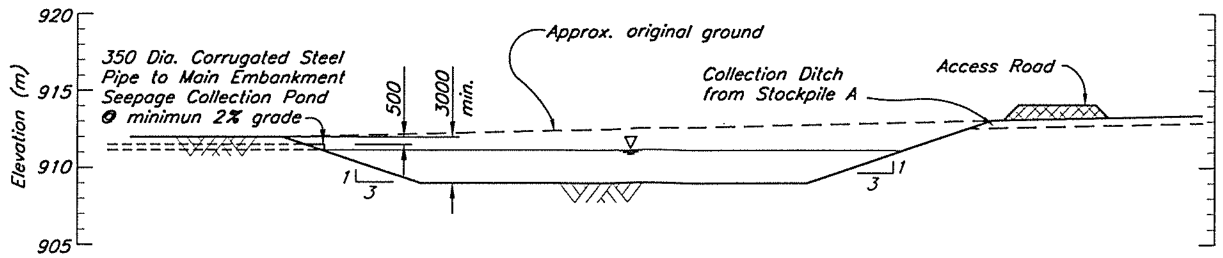
DESIGNED	CHECKED	SCALE	REVISION
MDB		AS SHOWN	1
DRAWN	APPROVED	DRAWING NO.	
DSR		11162-12-115	

Knight Piésold CONSULTING

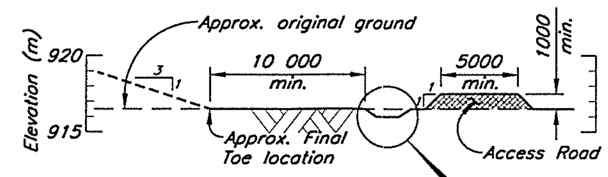
XREF FILE : -



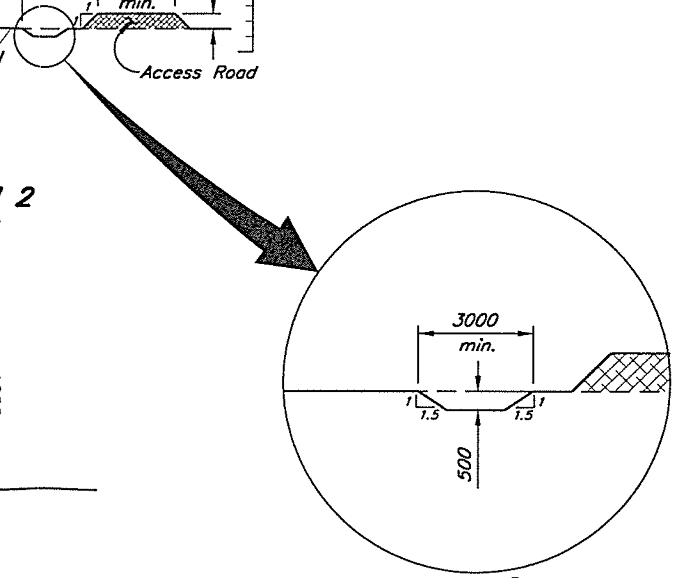
DETAIL B/115
EAST SEDIMENT COLLECTION POND (AS SHOWN)
(WEST SEDIMENT COLLECTION POND OPPOSITE HAND)
Scale A



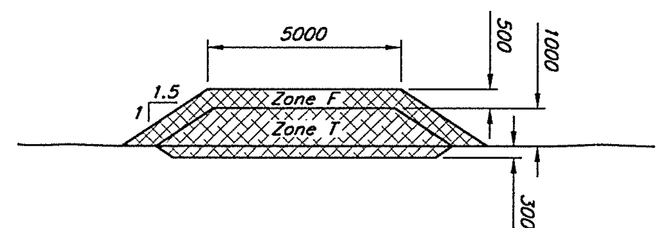
SECTION 1
Scale B



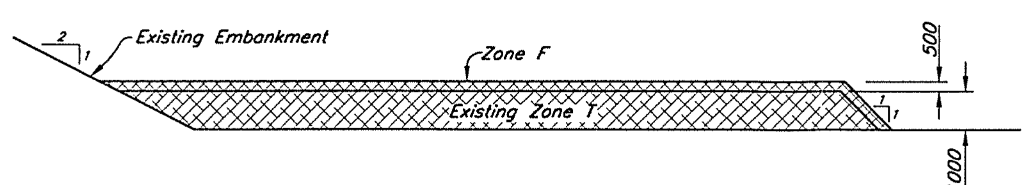
SECTION 2
Scale B



DETAIL C/110
TYPICAL COLLECTION DITCH
Scale C

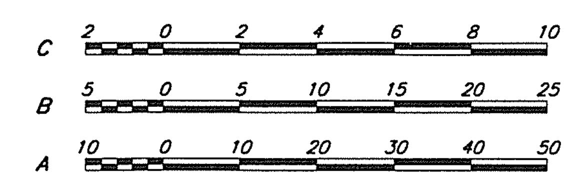


DETAIL A/115
TYPICAL CONFINING TOE BERM, TRANVERSE AND LONGITUDINAL DRAIN
Scale C



SECTION 2/115, 2/125
CAPPING OF EXISTING ZONE T ROAD
Scale C

SEDIMENT POND SETTING OUT POINTS				
	Point	Northing	Easting	Elevation
EAST	SCP-1	5 818 457.786	595 831.405	909.0
	SCP-2	5 818 472.495	595 851.620	909.0
	SCP-3	5 818 432.065	595 881.038	909.0
	SCP-4	5 818 417.356	595 860.823	909.0
WEST	SCP-5	5 818 334.846	595 672.935	908.0
	SCP-6	5 818 349.556	595 693.149	908.0
	SCP-7	5 818 309.126	595 722.568	908.0
	SCP-8	5 818 294.417	595 702.353	908.0



NOT FOR CONSTRUCTION

VANCOUVER B.C. CAD FILE: M:\11162\13\Acad\dwg\117\017 1-500 & 250 & 100 & 50 Plot 1=1(PS) 18/04/00 tam

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — K. D. K. EMBREE

MOUNT POLLEY MINING CORPORATION

MOUNT POLLEY MINE

TAILINGS STORAGE FACILITY
STAGE 3 MAIN EMBANKMENT
MISCELLANEOUS DETAILS

Knight Piésold CONSULTING

DESIGNED	CHECKED	DRAWN	APPROVED	SCALE	DRAWING NO.	REVISION
MDB		TAM		AS SHOWN	11162-12-117	0

REFERENCE DRAWINGS

DRG. NO.	DESCRIPTION
125	TSF - STAGE 3 PERIMETER EMBANKMENT - SECTIONS
115	TSF - STAGE 3 MAIN EMBANKMENT - SECTIONS
110	TSF - STAGE 3 MAIN EMBANKMENT - PLAN

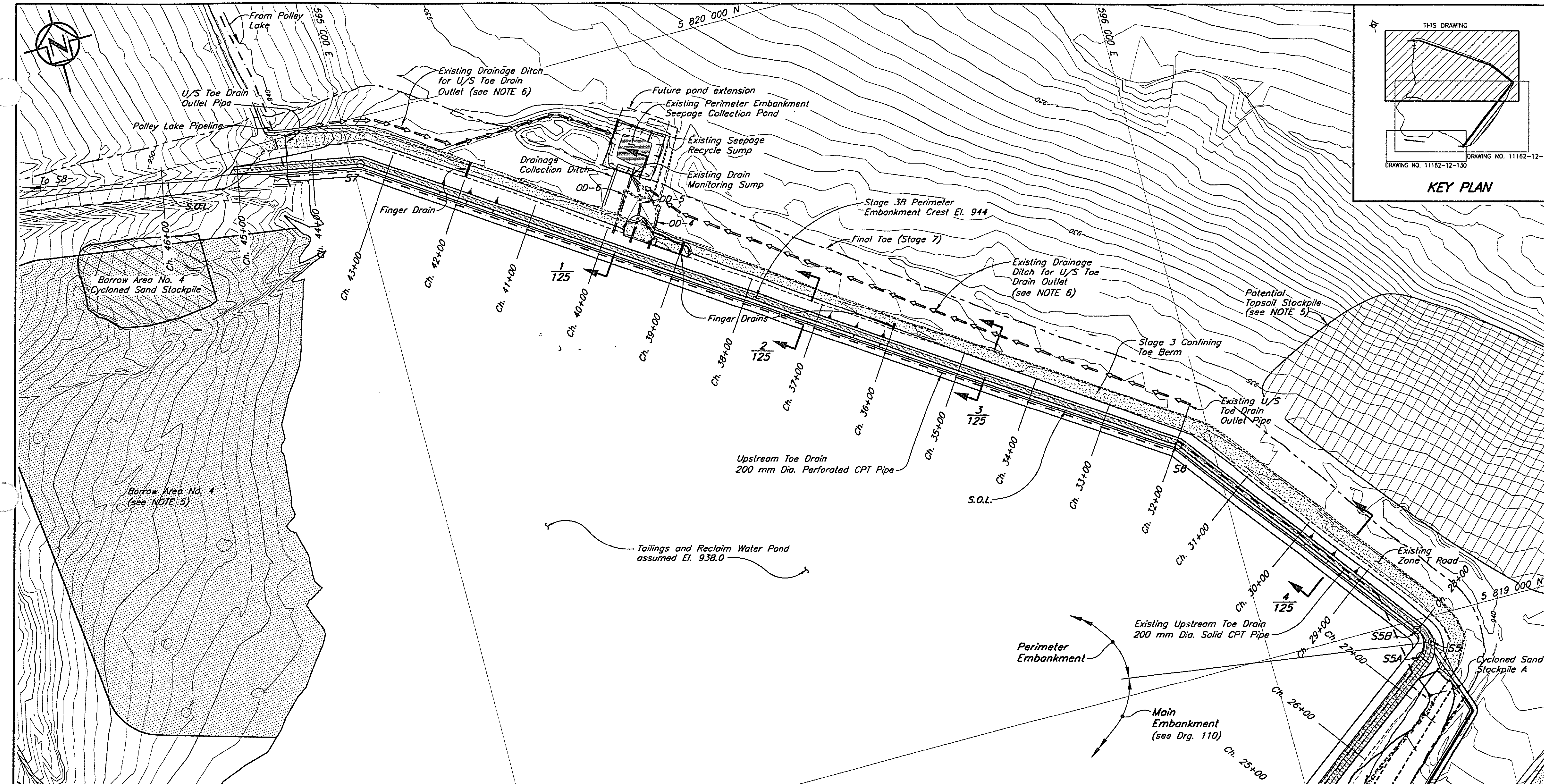
REVISIONS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D

REVISIONS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	20APR'00	ISSUED FOR ADDENDUM REPORT	MDB	NSD		

XREF FILE :



EMBANKMENT SETTING OUT POINTS			
Point	Northing	Easting	Chainage
S1	5 818 626.163	594 249.555	5+00.00
S4A	5 818 243.621	595 227.361	15+49.97
S4B	5 818 246.923	595 251.497	15+77.87
S4	5 818 238.539	595 240.350	15+63.92
S5A	5 818 951.971	596 188.906	27+50.83
S5B	5 818 986.958	596 193.873	28+00.78
S5	5 818 966.983	596 208.866	27+75.80
S6	5 819 304.035	595 955.881	31+97.23
S7	5 819 939.748	595 010.249	43+36.69
S8	5 820 053.034	594 396.471	49+60.83

NOTES

1. Chainage defined by Setting Out Point S1 at Ch. 5+00.
2. Stripping and clearing required 5 m beyond toe of embankments.
3. Topography at TSF generated from points and break lines sent from MPMC in July 1999. The Topography outside the TSF area is from 1997 flyover.
4. Tailings pipeline on embankment crest not shown for clarity.
5. Current size and location of potential and existing Borrow Areas and Topsoil Stockpiles are to be confirmed.
6. U/S Toe Drain Outlet Drainage Ditch to be extended to outlet location.

LEGEND

OD-4 Outlet Drain No.4

NOT FOR CONSTRUCTION

Scale 50 0 50 100 150 200 250 m

DRG. NO.	DESCRIPTION
125	TSF - STAGE 3 PERIMETER EMBANKMENT - SECTIONS
115	TSF - STAGE 3 MAIN EMBANKMENT - SECTIONS AND DETAILS
110	TSF - STAGE 3 MAIN EMBANKMENT - PLAN

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D

REVISIONS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
1	14APR'00	GENERAL REVISIONS, ISSUED FOR ADDENDUM REPORT	MDB	NSD	KDE	KJB
0	10DEC99	ISSUED FOR DESIGN REPORT	MDB	NSD		

REVISIONS

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — K. D. K. EMBREE

MOUNT POLLEY MINING CORPORATIOON

MOUNT POLLEY MINE

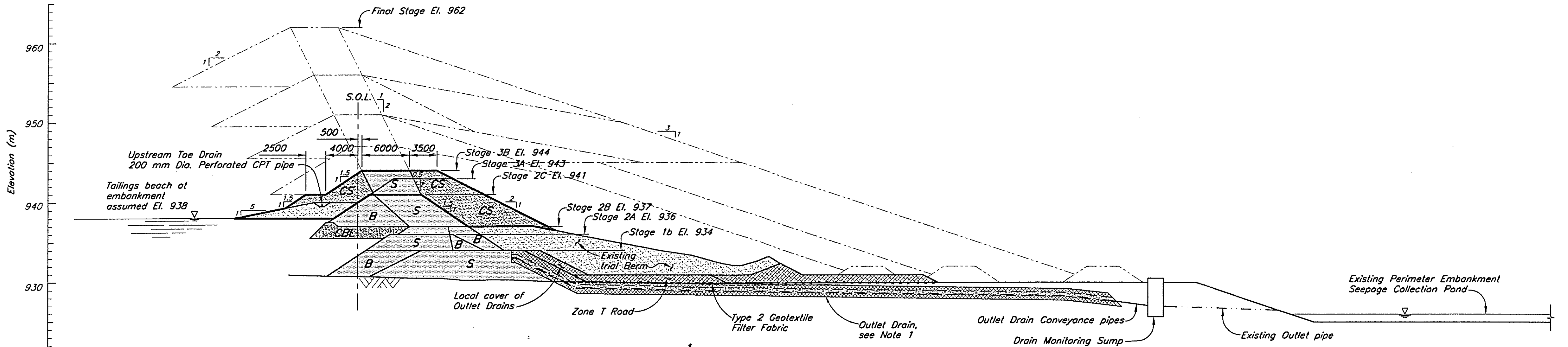
TAILINGS STORAGE FACILITY
STAGE 3 PERIMETER EMBANKMENT
PLAN

DESIGNED	CHECKED		SCALE	REVISION
MDB	KDE	Knight Piésold CONSULTING	AS SHOWN	1
DRAWN	APPROVED		DRAWING NO.	
DSR	KJB		11162-12-120	

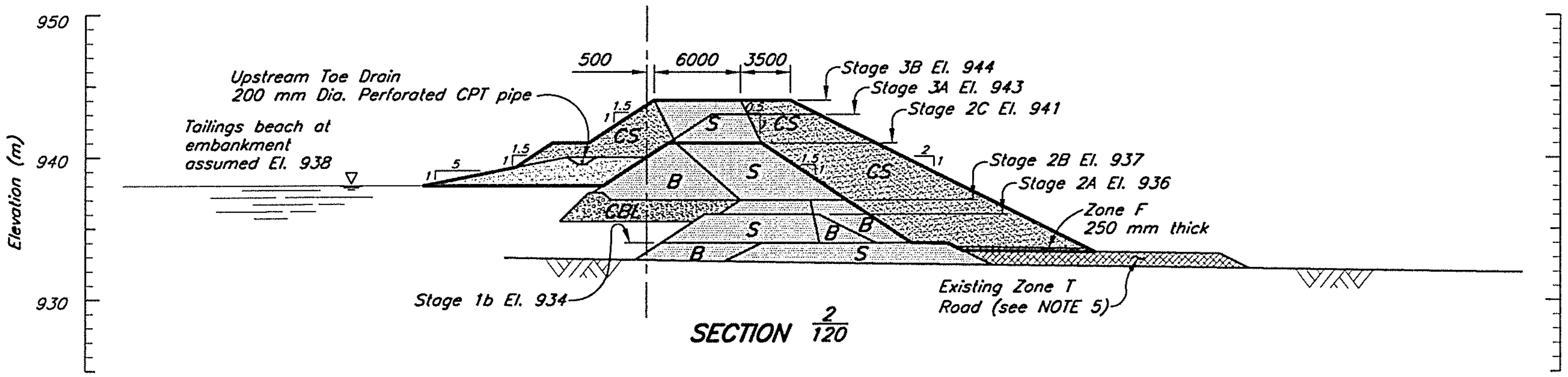
XREF FILE : TOPO99,STOCK99

CAD FILE: 11162\12\ACAD\stage3\Q2\Q2 1:2500 Plot 1=1(PS) 18/04/00 tom

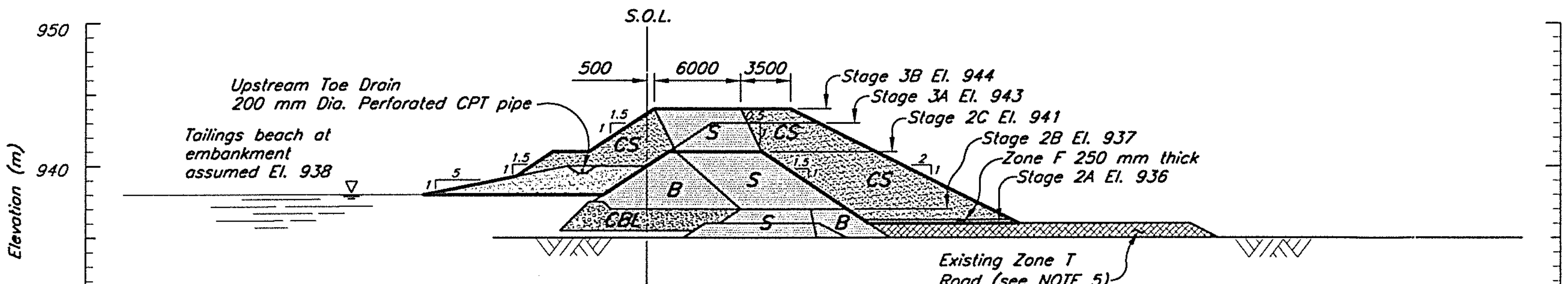
VANCOUVER B.C.



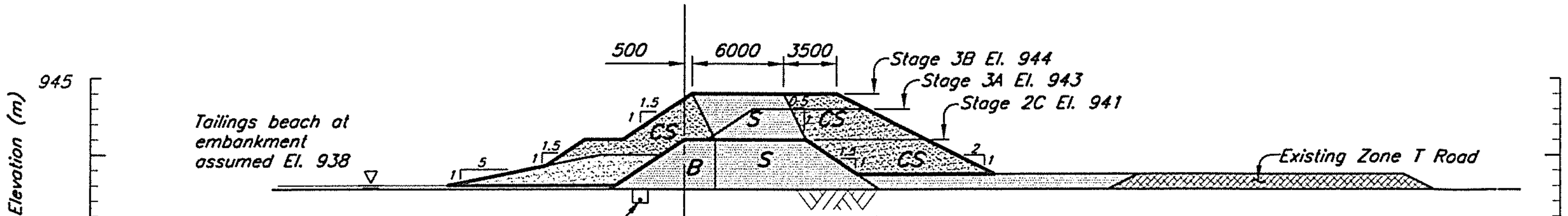
SECTION $\frac{1}{120}$



SECTION $\frac{2}{120}$



SECTION $\frac{3}{120}$



SECTION $\frac{4}{120}$

Upstream Toe Drain
200 mm Dia. Solid CPT pipe

NOTES

1. All dimensions in millimetres with elevations in metres, unless noted otherwise.
2. Geotextile Filter Fabric (8 oz./sq.yd.) to be placed on prepared ground as required.
3. For zone material specification and legend see Drg. 104.
4. Crest elevations and details of ongoing embankment raises are preliminary only and will be modified during future design stages.
5. Zone T road to be ripped prior to Zone F placement.

NOT FOR CONSTRUCTION

Scale 5 0 5 10 15 20 25 Metres

CAD FILE: M:\11162\12\Acad\Drg\05\05 1=250 Plot 1=0.25 12/04/00 tam VANCOUVER B.C.

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA K. D. EMBREE

MOUNT POLLEY MINE CORPORATION

MOUNT POLLEY MINE

TAILINGS STORAGE FACILITY
STAGE 3 PERIMETER EMBANKMENT
SECTIONS

Knight Piésold CONSULTING

DRG. NO.	DESCRIPTION
120	TSF - STAGE 3 - PERIMETER EMBANKMENT - PLAN
104	TSF - STAGE 3 - MATERIAL SPECIFICATIONS

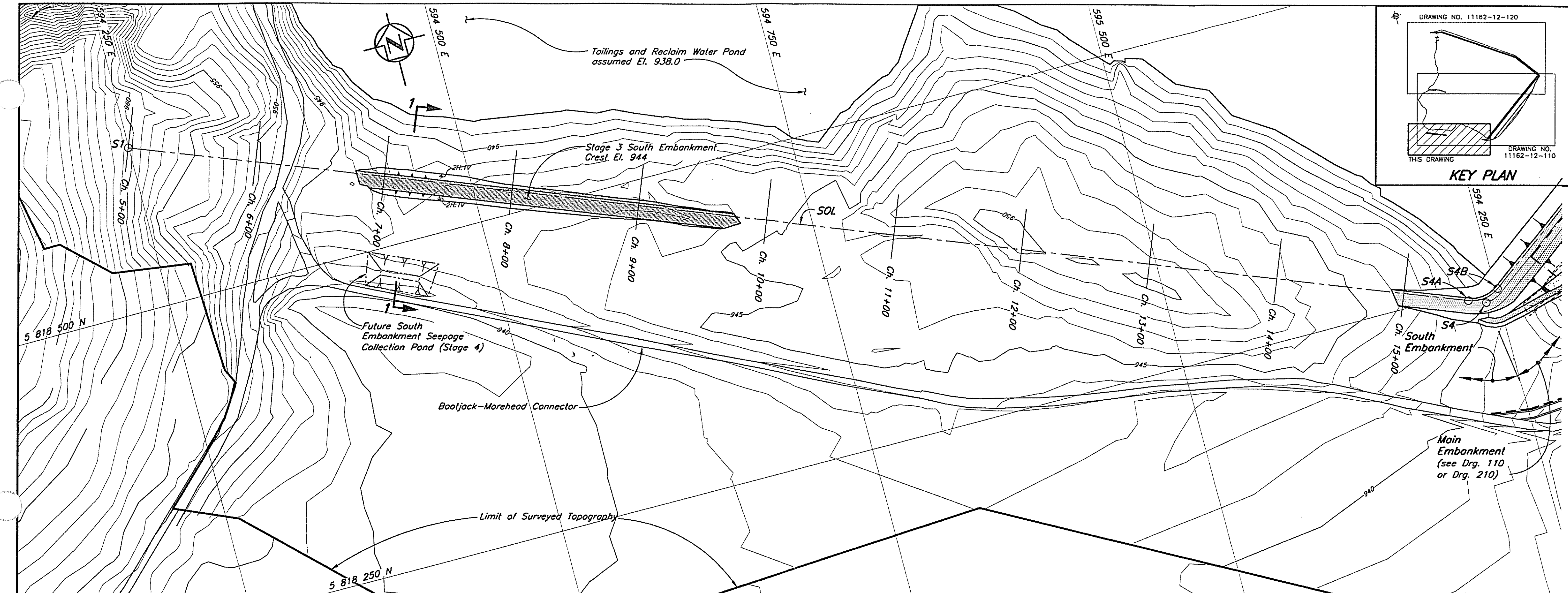
REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
1	20APR'00	GENERAL REVISIONS, ISSUED FOR ADDENDUM REPORT	MDB	TAM		
0	10DEC'99	ISSUED FOR DESIGN REPORT	MDB	NSD	LAG	KJB

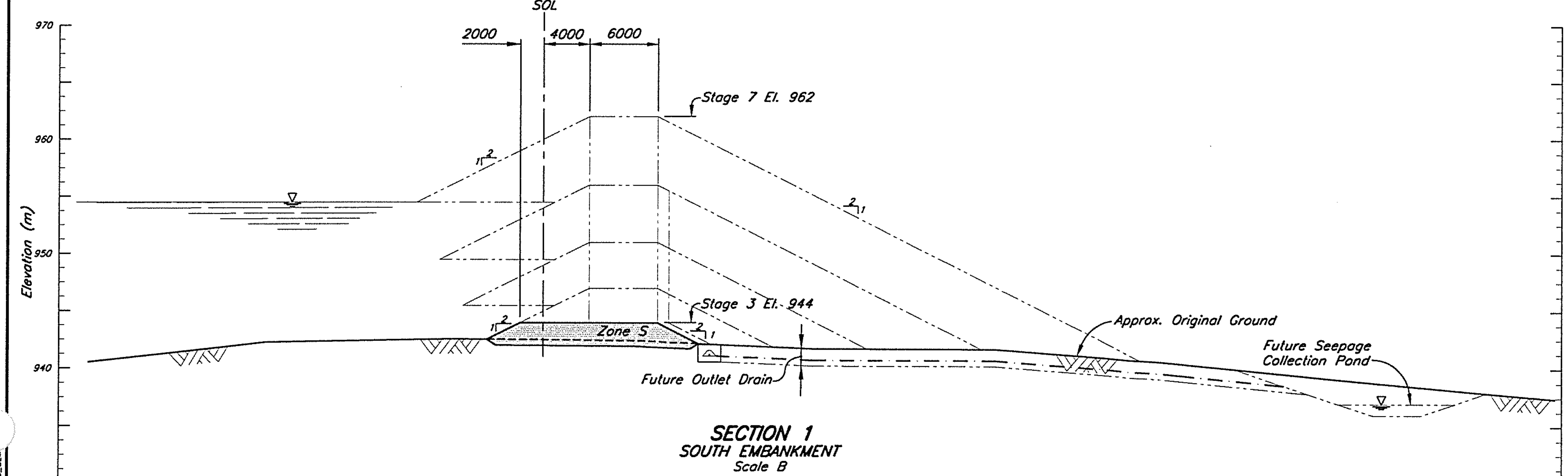
REVISIONS

DESIGNED	CHECKED	SCALE	REVISION
KDE		AS SHOWN	1
DRAWN	APPROVED	DRAWING NO.	
DSR	KJB	11162-12-125	

XREF FILE :



PLAN
Scale A



SECTION 1
SOUTH EMBANKMENT
Scale B

NOTES

1. All dimensions in millimeters and elevations in metres, unless noted otherwise.
2. Topography at TSF generated from points and break lines sent from MPMC in July 1999. The Topography outside the TSF area is from 1997 flyover.
3. For Materials Specifications and legend, see Drg. 104.
4. Stripping and clearing required for 5 m beyond toe of embankment.
5. Crest elevations and details of on going embankment raises are preliminary only and will be modified during future design stages.

B 5 0 5 10 15 20 25 m

A 30 0 30 60 90 120 150 m

NOT FOR CONSTRUCTION

DRG. NO.	DESCRIPTION
120	TSF – STAGE 3 PERIMETER EMBANKMENT – PLAN
110	TSF – STAGE 3 MAIN EMBANKMENT – PLAN
104	TSF – STAGE 3 TAILINGS EMBANKMENT – MATERIALS SPECIFICATIONS

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
1	14APR'00	ISSUED FOR ADDENDUM REPORT	MDB	AW		
0	10DEC'99	ISSUED FOR DESIGN REPORT	MDB	NSD	LAG	KJB

REVISIONS

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MOUNT POLLEY MINING CORPORATION

MOUNT POLLEY PROJECT

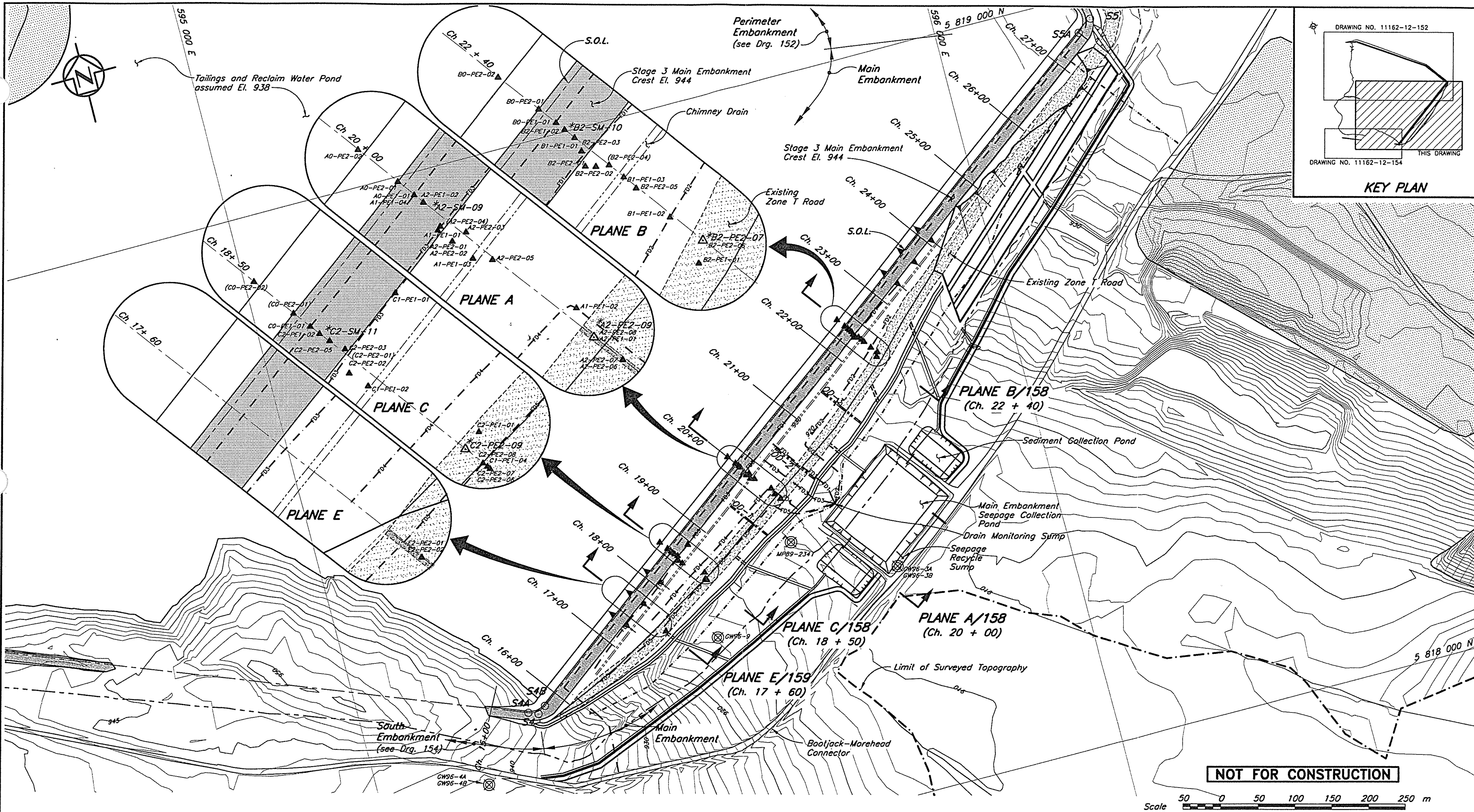
TAILINGS STORAGE FACILITY
STAGE 3 SOUTH EMBANKMENT
PLAN AND SECTION

DESIGNED: MDB · CHECKED · DRAWN: NSD · APPROVED: KJB

Knight Piésold CONSULTING

SCALE: AS SHOWN · REVISION: 1

DRAWING NO. 11162-12-130



NOTE

1. See Drg. No. 11162-12-156 for Summary of Instrumentation Installations, Typical Details, General Notes and Legend.

DRG. NO.	DESCRIPTION
154	TSF - STAGE 3 SOUTH EMBANKMENT - INSTRUMENTATION - PLAN
152	TSF - STAGE 3 PERIMETER EMBANKMENT - INSTRUMENTATION - PLAN
159	TSF - STAGE 3 TAILINGS EMBANKMENT - INSTRUMENTATION - SECTIONS - SHEET 2 OF 2
158	TSF - STAGE 3 TAILINGS EMBANKMENT - INSTRUMENTATION - SECTIONS - SHEET 1 OF 2
156	TSF-STAGE 3 TAILINGS EMBANKMENT-INSTRUMENTATION-SUMMARY OF INSTALLATION AND TYPICAL DETAILS

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D

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REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
1	20APR'00	ISSUED FOR ADDENDUM REPORT	MDB	AW		KJB
0	10DEC'99	ISSUED FOR DESIGN REPORT	MDB	WAL		KJB

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TAILINGS STORAGE FACILITY
STAGE 3 MAIN EMBANKMENT
INSTRUMENTATION
PLAN

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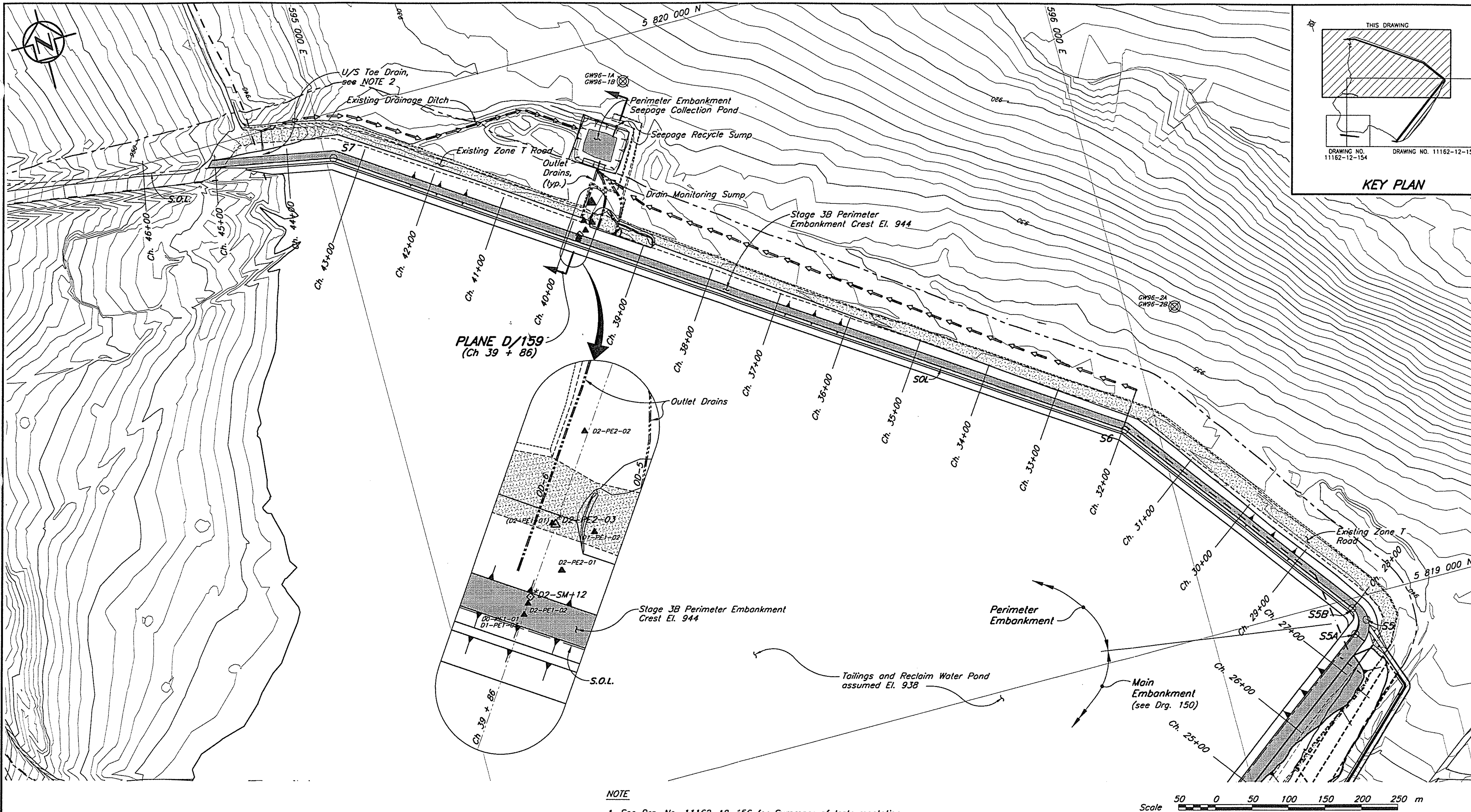
SCALE AS SHOWN | REVISION 1

DRAWING NO. 11162-12-150



NOTE

1. See Drg. No. 11162-12-156 for Summary of Instrumentation Installations, Typical Details, General Notes and Legend.

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K. D. K. EMBREE

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MOUNT POLLEY MINE

TAILINGS STORAGE FACILITY
STAGE 3 PERIMETER EMBANKMENT
INSTRUMENTATION
PLAN

DESIGNED	CHECKED	SCALE	REVISION
MDB		AS SHOWN	1
DRAWN	APPROVED	DRAWING NO.	
NSD	KJB	11162-12-152	

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DRG. NO.	DESCRIPTION
159	TSF - STAGE 3 TAILINGS EMBANKMENT - INSTRUMENTATION SECTIONS - SHEET 2 OF 2
156	TSF - STAGE 3 TAILINGS EMBANKMENT-INSTRUMENTATION-SUMMARY OF INSTALLATION & TYPICAL DETAILS
150	TSF - STAGE 3 MAIN EMBANKMENT - INSTRUMENTATION - PLAN

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D

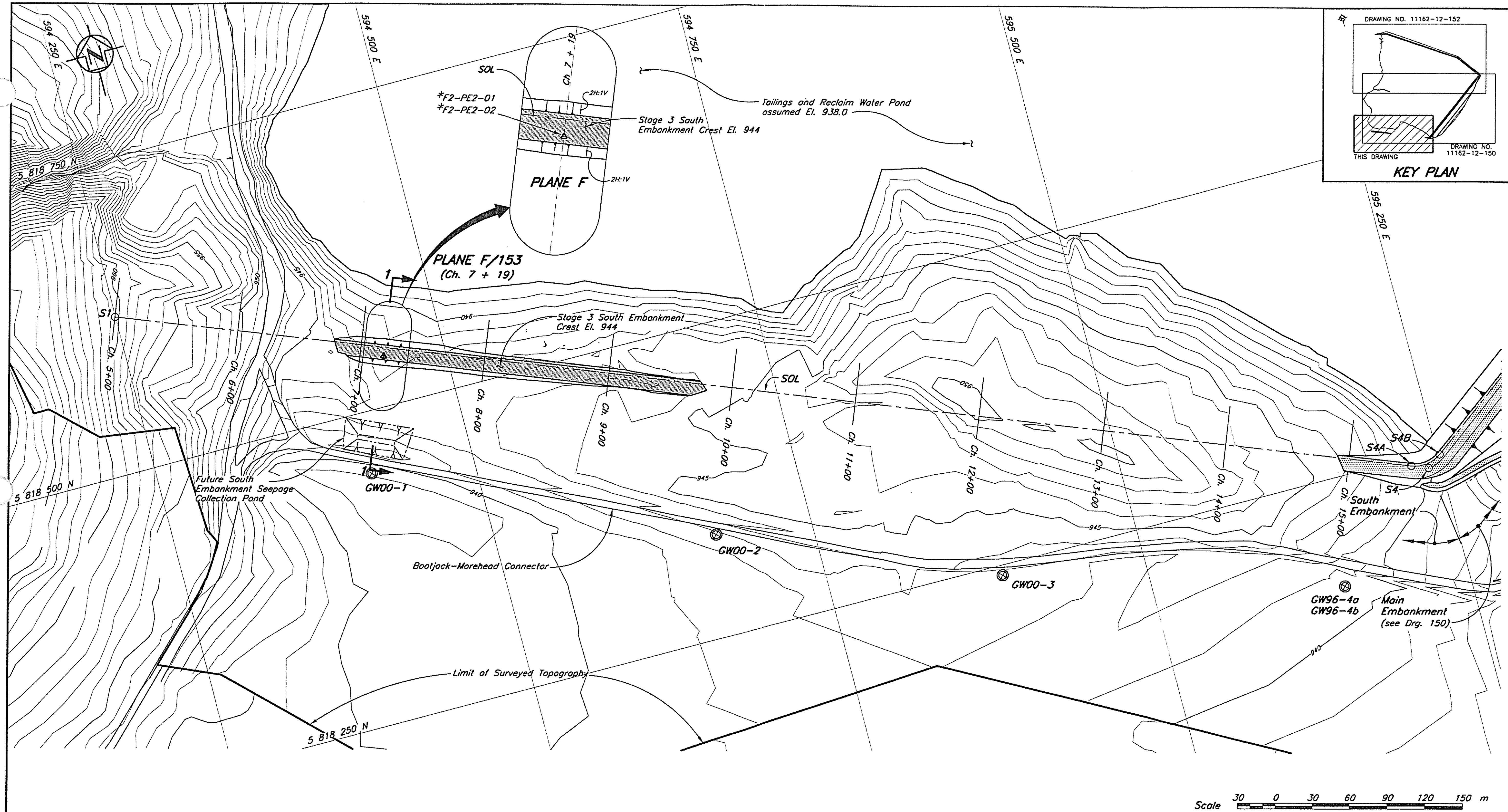
REVISIONS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
1	20APR'00	ISSUED FOR ADDENDUM REPORT	MDB	AW		KJB
0	10DEC'99	ISSUED FOR DESIGN REPORT	MDB	NSD	LAG	KJB

REVISIONS

XREF FILE : TOPO99,STOCK99

VANCOUVER B.C. CAD FILE: M:\1\11162\12\Acad\dwg\010\010 1=2500 Plot 1=1(PS) 18/04/00 tdm



NOT FOR CONSTRUCTION

NOTES

1. See Drg. No. 11162-12-156 for Summary of Instrumentation Installations, Typical Details, General Notes and Legend.

REFERENCE DRAWINGS

DRG. NO.	DESCRIPTION
150	TSF – STAGE 3 MAIN EMBANKMENT – INSTRUMENTATION – PLAN 2
159	TSF – STAGE 3 TAILINGS EMBANKMENT – INSTRUMENTATION SECTIONS – SHEET 2 OF 2
156	TSF – STAGE 3 TAILINGS EMBANKMENT – INSTRUMENTATION – SUMMARY OF INSTALLATION AND TYPICAL DETAILS

REVISIONS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
1	20APR'00	ISSUED FOR ADDENDUM REPORT	MDB	AW		
0	10DEC'99	ISSUED FOR DESIGN REPORT	MDB	NSD	LAG	KJB

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CHECKED	
DRAWN	NSD
APPROVED	KJB

MOUNT POLLEY MINING CORPORATION

MOUNT POLLEY PROJECT

TAILINGS STORAGE FACILITY
STAGE 3 SOUTH EMBANKMENT
INSTRUMENTATION PLAN

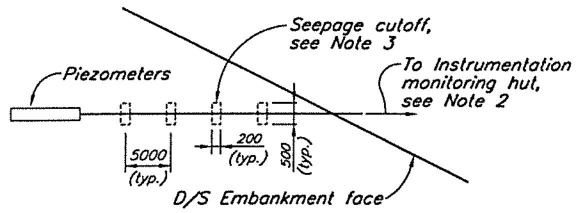
Knight Piésold CONSULTING

SCALE: AS SHOWN — REVISION: 1

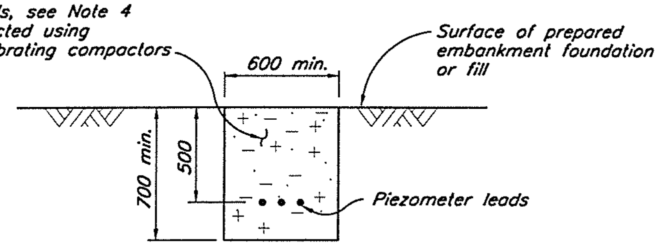
DRAWING NO. 11162-12-154

XREF FILE : TOPO99, S3_SEN

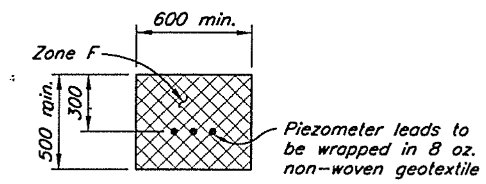
VANCOUVER B.C. CAD FILE: M:\11162\12\Acad\dwg\D11\D11 1=1500 Plot 1=1(PS) 12/04/00 tom



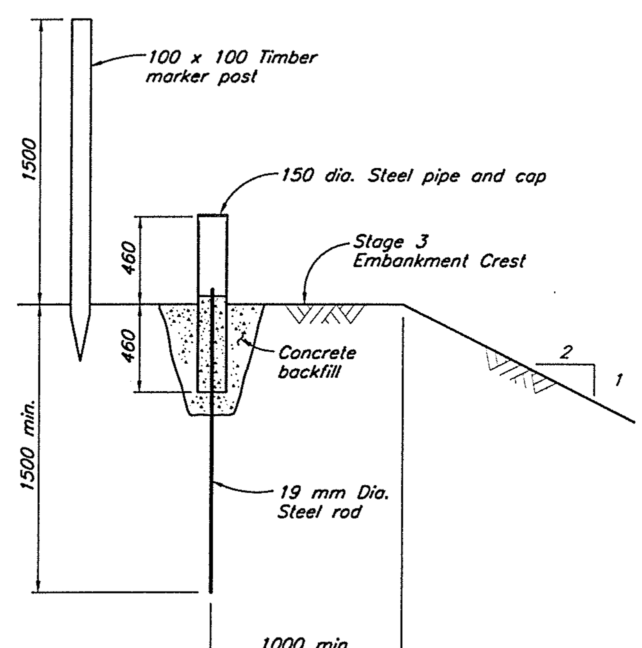
DETAIL $\frac{A}{158}$
TYPICAL INSTALLATION DETAIL OF SEEPAGE CUTOFF FOR PIEZOMETER LEADS IN GLACIAL TILL
NTS



TYPICAL SECTION THROUGH PIEZOMETER LEAD TRENCH IN PREPARED EMBANKMENT FOUNDATION OR FILL



DETAIL $\frac{B}{158}$
TYPICAL INSTALLATION DETAIL FOR PIEZOMETER LEADS IN ZONE F



TYPICAL DETAIL OF SURFACE MOVEMENT MONUMENT

SUMMARY OF INSTRUMENTATION INSTALLATIONS

PIEZOMETER ID	NORTHING	EASTING	ELEV.	DATE INSTALLED
A0-PE1-01			938.5	
A0-PE2-01	–	–	928	09/03/98
A0-PE2-02	–	–	928	09/03/98
A1-PE1-01	5 818 486.650	595 595.060	912.99	27/08/96
A1-PE1-02	5 818 456.420	595 626.250	912.14	27/08/96
A1-PE1-03	5 818 476.822	595 602.380	917.17	22/10/96
A1-PE1-04	–	–	936.5	
A2-PE1-01	5 818 446.550	595 628.010	912	26/08/98
A2-PE1-02	–	–	938.5	
A2-PE2-01	5 818 482.710	595 598.140	903.7	25/07/96
A2-PE2-02	5 818 482.710	595 598.140	909.8	25/07/96
A2-PE2-03	5 818 484.196	595 598.140	919.43	12/02/97
(A2-PE2-04)	5 818 487.510	595 595.995	926.07	22/02/97
A2-PE2-05	5 818 475.061	595 607.560	921.87	22/02/97
A2-PE2-06	5 818 453.926	595 648.458	903	21/06/98
A2-PE2-07	5 818 453.926	595 648.458	909	21/06/98
A2-PE2-08	5 818 447.045	595 627.758	910	23/06/98
*A2-PE2-09			912.6	
* A2-SM-09				
B0-PE1-01	–	–	938.5	
B0-PE2-01	–	–	928	06/03/98
B0-PE2-02	–	–	928	06/03/98
B1-PE1-01	5 818 632.550	595 787.910	917.27	10/09/96
B1-PE1-02	5 818 609.040	595 806.770	915.95	10/09/96
B1-PE1-03	5 818 622.780	595 797.260	918.69	22/10/96
B2-PE1-01	5 818 594.940	595 811.260	935	26/08/98
B2-PE1-02	–	–	938.5	
B2-PE2-01	5 818 628.270	595 787.880	902.00	25/07/96
B2-PE2-02	5 818 627.470	595 790.660	909.50	25/07/96
B2-PE2-03	5 818 636.530	595 786.970	921.00	22/10/96
(B2-PE2-04)	5 818 626.940	595 794.190	921.00	22/10/96
B2-PE2-05	5 818 619.014	595 799.804	921.70	14/03/97
B2-PE2-06	5 818 595.767	595 810.605	914.59	23/06/98
*B2-PE2-07			918.2	
* B2-SM-10				
C0-PE1-01	–	–	938.5	
(C0-PE2-01)	–	–	928	09/03/98
(C0-PE2-02)	–	–	928	09/03/98
C1-PE1-01	5 818 410.500	595 496.070	914.70	28/09/96
C1-PE1-02	5 818 410.500	595 496.070	916.60	22/10/96
C1-PE1-04	–	–	915	03/04/98
C2-PE1-01	5 818 367.670	595 508.900	917	26/08/98
C2-PE1-02			938.5	
(C2-PE2-01)	5 818 392.410	595 478.240	907.50	25/07/96
C2-PE2-02	5 818 392.410	595 478.240	910.50	25/07/96
C2-PE2-03	5 818 399.106	595 478.824	920.97	12/02/97
C2-PE2-05	5 818 402.343	595 475.326	924.84	12/02/97
C2-PE2-06	5 818 359.734	595 513.663	913	18/06/98
C2-PE2-07	5 818 359.734	595 513.663	915	18/06/98
C2-PE2-08	5 818 367.087	595 509.351	935	19/06/98
*C2-PE2-09			917.5	
*C2-SM-11				
*D0-PE1-01			938.5	
D1-PE1-02	5 819 775.449	595 310.522	929	30/01/98
*D1-PE1-03			936.5	
(D2-PE1-01)	5 819 775.449	595 310.522	930	26/08/98
D2-PE1-02			938.5	
D2-PE2-01	5 819 756.360	595 316.210	931.00	15/12/96
*D2-PE2-02			922	22/06/98
*D2-PE2-03			931.3	
*D2-SM-12				
E2-PE2-01	5 818 307.454	595 435.983	908	17/06/98
E2-PE2-02	5 818 307.454	595 435.983	913	17/06/98
* F1-PE2-01			937	
* F2-PE2-02			942.5	

( ) Piezometer no longer functioning.
* To be installed during Stage 3 construction.

NOTES

1. Dimensions are in millimeters unless otherwise noted.
2. Piezometer leads are to be extended as directed by the Engineer.
3. Seepage cutoffs placed at 5 m intervals with 10% bentonite added to fine grained till backfill.
4. Fine grained till backfill must have all particles exceeding 25 mm removed.

LEGEND

A0-PE1-01
- Plane I.D. (A, B etc.)
- Area (0-Tailings, 1-Drain, 2-Embankment)
- Number I.D.
- Pressure Rating (1-Low, 2-High)
- Type of Instrumentation (PE-Piezometer electric, SM-Survey Monument)

A1-PE1-01 ▲ Previously installed Piezometer
*A2-PE2-06 △ New Stage 3 Piezometer
*A2-SM-02 ◇ New Embankment Survey Monument
A2-SM-01 ◆ Current Embankment Survey Monument
⊕ Ground water well

NOT FOR CONSTRUCTION

Scale 1000 500 0 1000 2000 mm

VANCOUVER B.C. CAD FILE: M:\11162\12\acad\dwg\D14\D14 1-20 Plot 1=0.0 18/04/00 lam

DRG. NO.	DESCRIPTION
159	TSF - STAGE 3 TAILINGS EMBANKMENT - INSTRUMENTATION SECTIONS - SHEET 2 OF 2
158	TSF - STAGE 3 TAILINGS EMBANKMENT - INSTRUMENTATION SECTIONS - SHEET 1 OF 2
154	TSF - STAGE 3 SOUTH EMBANKMENT - INSTRUMENTATION - PLAN
152	TSF - STAGE 3 PERIMETER EMBANKMENT - INSTRUMENTATION - PLAN
150	TSF - STAGE 3 MAIN EMBANKMENT - INSTRUMENTATION - PLAN

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D

REVISIONS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
1	20APR'00	ISSUED FOR ADDENDUM REPORT	MDB	AW	[signature]	
0	10DEC'99	ISSUED FOR DESIGN REPORT	MDB	NSD	LAG	KJB

REVISIONS

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — K. D. K. EMBREE

DESIGNED MDB | CHECKED [signature] | DRAWN DSR | APPROVED [signature]

MOUNT POLLEY MINING CORPORATION

MOUNT POLLEY MINE

TAILINGS STORAGE FACILITY
STAGE 3 TAILINGS EMBANKMENT
INSTRUMENTATION
SUMMARY OF INSTALLATION & TYPICAL DETAILS

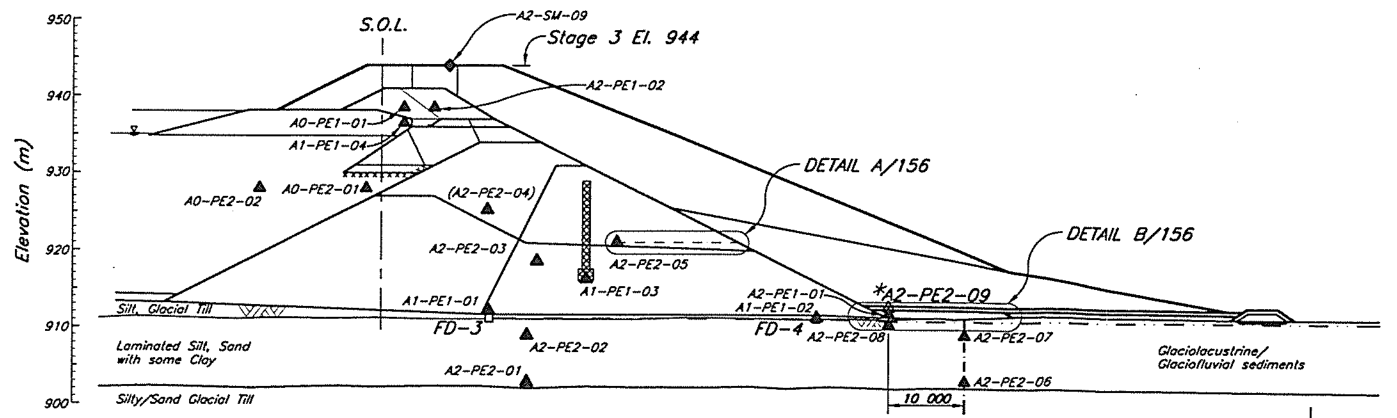
Knight Piésold CONSULTING

SCALE AS SHOWN | REVISION 1 | DRAWING NO. 11162-12-156

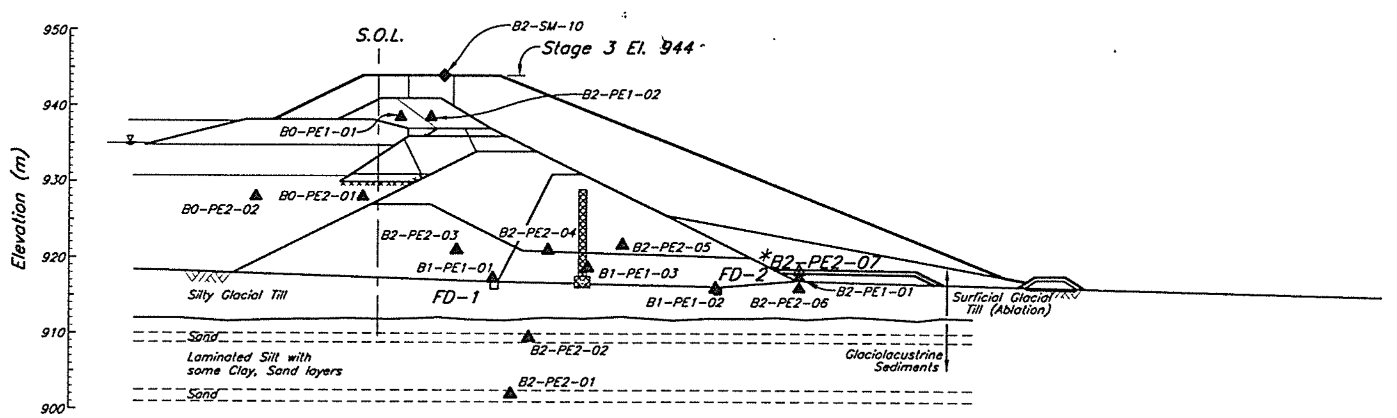
XREF FILE :

NOTES

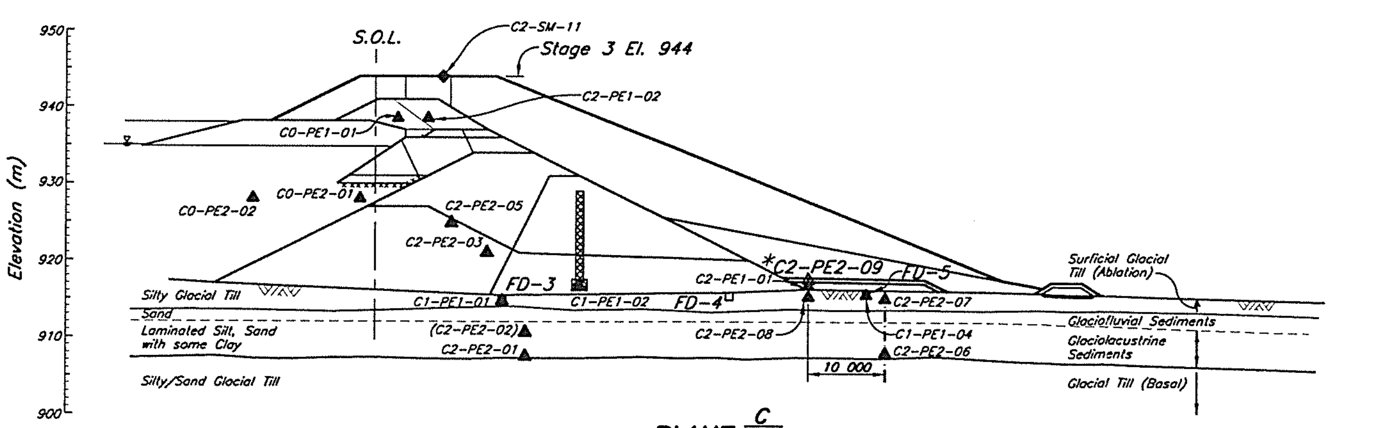
1. Piezometers are vibrating wire type, SINCA Model 52611030 and RST Model 45005-0100 with a pressure rating of 100 psi or equivalent, connected to a readout panel via standard non-vented direct burial cable.
2. Piezometer leads extended as directed by the Engineer.
3. Zone fill materials and drain pipes not shown in drawing for clarity. For Details see Drg. 115, 125 and 130
4. See Drg. No. 11162-12-156 for Installation typical details.



PLANE A/150
CH. 20+00



PLANE B/150
CH. 22+40



PLANE C/150
CH. 18+50

NOT FOR CONSTRUCTION

Scale 10 0 10 20 30 40 50 m

VANCOUVER B.C. CAD FILE: M:\11162\12\acad\dwg\012\012 1=500 Plot 1=0.5 18/04/00 tom

DRG. NO.	DESCRIPTION
159	TSF - STAGE 3 TAILINGS EMBANKMENT - INSTRUMENTATION - SECTIONS 2 OF 2
156	TSF - STAGE 3 TAILINGS EMBANKMENT - INSTRUMENTATION - SUMMARY OF INSTALLATION & TYP. DETAILS
150	TSF - STAGE 3 MAIN EMBANKMENT - INSTRUMENTATION - PLAN

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D

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REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
1	20APR'00	ISSUED FOR ADDENDUM REPORT	MDB	AW		
0	10DEC'99	ISSUED FOR DESIGN REPORT	MDB	WAL	LAG	KJB

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PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA K. D. K. EMBREE

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MOUNT POLLEY MINING CORPORATION

MOUNT POLLEY MINE

TAILINGS STORAGE FACILITY
STAGE 3 TAILINGS EMBANKMENT
INSTRUMENTATION
SECTIONS - SHEET 1 OF 2

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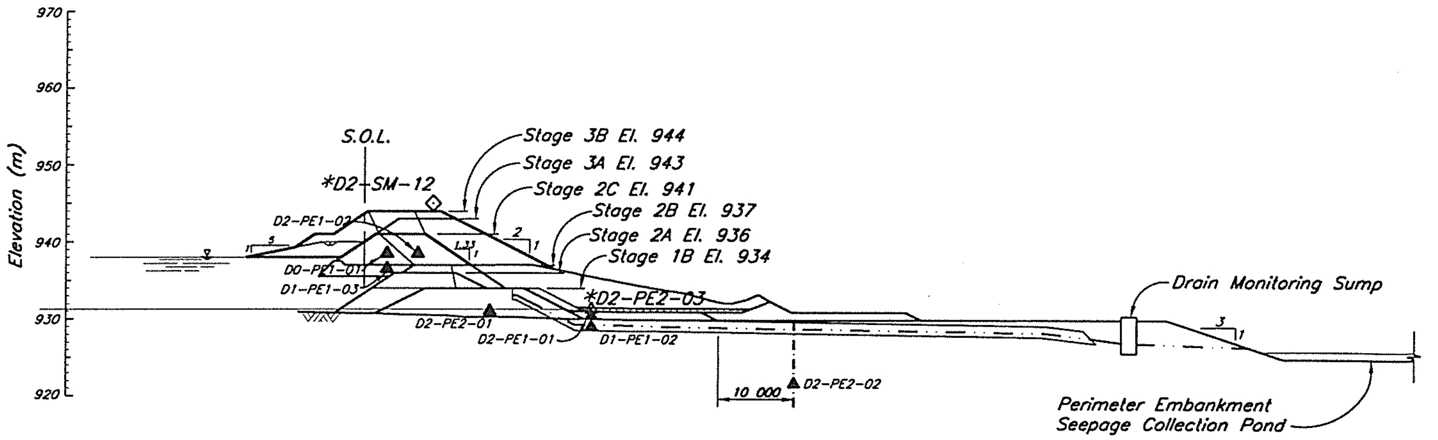
SCALE AS SHOWN
REVISION 1
DRAWING NO. 11162-12-158

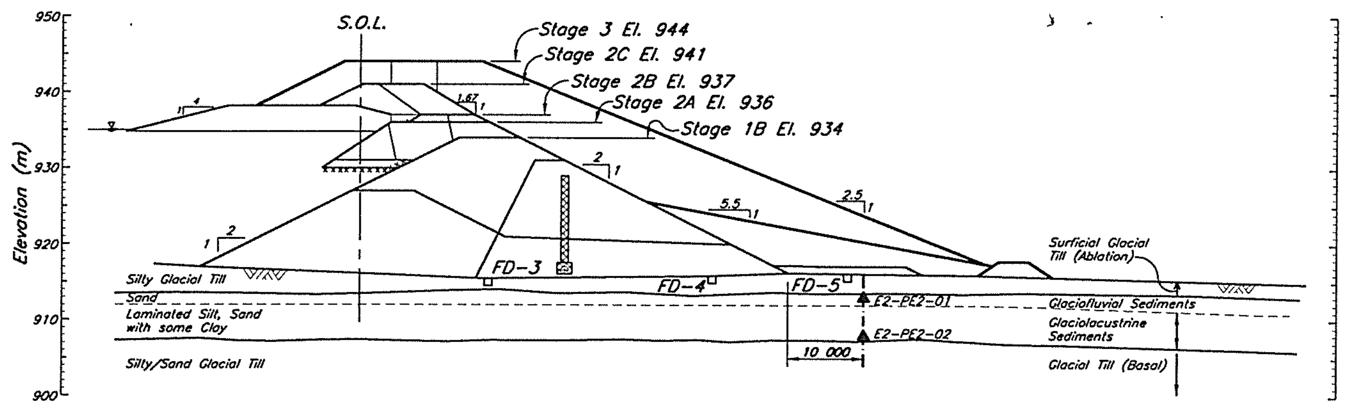
XREF FILE :

NOTE

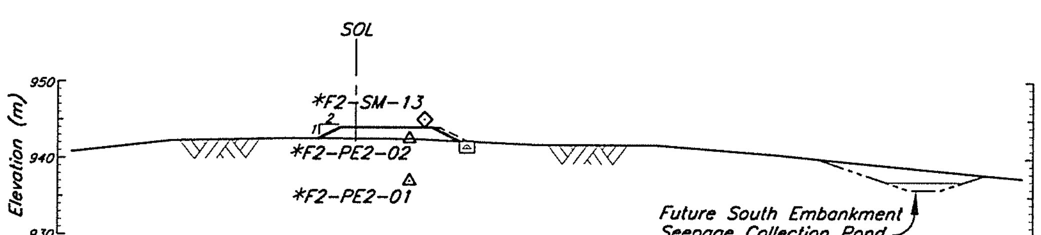
1. *See Drg. No. 11162-12-156 for Summary of Instrumentation Installations, Typical Details, General Notes and Legend.*



PLANE $\frac{D}{152}$
CH. 39+86



PLANE $\frac{E}{150}$
CH. 17+60



PLANE $\frac{F}{154}$
CH. 7+19

NOT FOR CONSTRUCTION

Scale 10 0 10 20 30 40 50 m

DRG. NO.	DESCRIPTION
156	TSF - STAGE 3 TAILINGS EMBANKMENT - INSTRUMENTATION SUMMARY OF INSTALLATION & TYPICAL DETAILS
154	TSF - STAGE 3 TAILINGS EMBANKMENT - SOUTH EMBANKMENT - INSTRUMENTATION PLAN
152	TSF - STAGE 3 TAILINGS EMBANKMENT - PERIMETER EMBANKMENT - INSTRUMENTATION PLAN
150	TSF - STAGE 3 TAILINGS EMBANKMENT - MAIN EMBANKMENT - INSTRUMENTATION PLAN
130	TSF - STAGE 3 SOUTH EMBANKMENT - PLAN AND SECTION
125	TSF - STAGE 3 PERIMETER EMBANKMENT - SECTIONS
115	TSF - STAGE 3 MAIN EMBANKMENT - SECTIONS AND DETAILS

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
1	20APR'00	ISSUED FOR ADDENDUM REPORT	MDB	AW		
0	10DEC'99	ISSUED FOR DESIGN REPORT	JMTW	NSD	LAG	KJB

REVISIONS

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — K. D. K. EMBREE

MOUNT POLLEY MINING CORPORATION

MOUNT POLLEY MINE

TAILINGS STORAGE FACILITY
STAGE 3 TAILINGS EMBANKMENT
INSTRUMENTATION
SECTIONS - SHEET 2 OF 2

DESIGNED	CHECKED	DRAWN	APPROVED	SCALE	DRAWING NO.	REVISION
MDB		DSR		AS SHOWN	11162-12-159	1

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APPENDIX A

AGENCY REVIEW COMMENTS

BRITISH COLUMBIA

January 24, 2000

14745-40/MTPO/01

Mr. Ken Brouwer
Knight Piesold Ltd.
750 West Pender Street
Vancouver, BC V6C 2T8

Dear Mr. Brouwer:

RE: MOUNT POLLEY TAILINGS DAM CYCLONE SAND DAM PROPOSAL

The report Report on Cycloned Sand Construction of Stage 3 and On-going Stages of the Tailings Storage Facility Vol I and II by Knight Piesold Ltd. dated December 13, 1999 was reviewed.

The following aspects require more detailed information or discussions in our meeting planned for Jan 26, 2000. I anticipate that they would be the starting point for our discussions. This is a challenging design change and operating / construction project.

Operations

- Operations manual content
- Personnel training
- Supervision training and experience in similar operations
- Management and technical control and communications

Construction Methodology

- Detailed discussion of proposed method
- Detailed discussion of alternative more efficient or expedient cycloning construction methods and limitations due to stability concerns

Design

- Cyclone sand downstream toe and finger underdrain design configuration, spacing, capacity, redundancy, piping and blockage risks
- Other vertical drainage
- Upstream drainage system design configuration, capacity, piping and blockage risks
- Containment berms or sumps for drainage and tailings failures, especially below Main Embankment

Stability Analysis

- Downstream cyclone sand stability during cycloning construction
- Downstream cyclone sand phreatic surface location during cycloning downstream ~~and upstream~~
- Evaluation of cyclone sand piping potential and behavior
- Evaluation of cyclone sand static/dynamic liquefaction potential
- Sensitivity to phreatic surface, particle size gradation effects, permeability
- Effective stress

Ministry of Energy and Mines

Mines Branch
Energy and Minerals Division

Mailing Address:
PO Box 9320 Stn Prov Govt
Victoria BC V8W 9N3
Telephone: (250) 952-0462
Facsimile: (250) 952-0481

Location:
5th Floor, 1810 Blanshard Street
Victoria

Risk Assessment

- Risk minimization
- Detailed discussion of medium and high risk potential problems
- Vertical drainage
- Detailed risk assessment of operating problems and construction methodology with monitoring or operational controls and contingency controls in event of failures
  - liquefaction
  - piping
  - erosion from what ever sources including line flushing
  - operator error
  - .production decisions
- use of sensitivity analysis to set piezometric trigger levels for phreatic surface in active cycloning construction

Monitoring and Operational Controls

- detailed discussion of operation control measurements of cycloned tailings sand
- detailed discussion of operation control monitoring systems of cycloned tailings especially for phreatic surface eg piezometers, observational information and stability

I will contact you tomorrow if you have any questions regarding the above.

Yours sincerely;

George S. Headley, P. Eng.
Senior Geotechnical Engineer

cc: D. Parsons, MPMC
T. Eaton
E. Beswick/D. Morgan MEM, Prince George

BRITISH COLUMBIA

KNIGHT PIESOLD LTD.
2/24/00

Name	Routing	Date Read	Action By	Reply Date
	6			
	5			
	KB			
RDC	1			
JRK	2			
JMW	3			
LAG	4			

11162/13.01

MINISTRY OF ENERGY AND MINES
MINES BRANCH
PROVINCE OF BRITISH COLUMBIA

Location: 5th Floor, 1810 Blanshard Street, Victoria, BC
Mailing Address: PO Box 9320, Stn. Prov. Gov't, V8W 9N3
Victoria, BC

DATE SENT: *February 22, 2000*

TO: Bryan Kynoch MPMC, Don Parsons MPMC, Ken Brouwer KP

PHONE NUMBER: (250)

FAX NUMBERS: (604) 687-4030, (604) 685-0147, (250) 790-2268

FROM: George Headley, P.Eng.
Senior Geotechnical Engineer
Phone: (250) 952-0480 FAX: (250) 952-0481
Email: george.headley@gems7.gov.bc.ca

COMMENTS: Enclosed comments are a review of the dam design report by Chuck Brawner for MEM. Please note his Recommendations and Past Experience sections. I will refer to this letter in my final review comments and in permit conditions.

George

Facsimilie sent by: GSHeadley

NUMBER OF PAGES INCLUDING COVER SHEET: 5

14745-40/MTPO

c.o. Brawner Engineering LTD.

CONSULTING GEOTECHNICAL ENGINEERING

Capilano Business Park
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February 16, 2000

Ministry of Energy & Mines
Mines Inspection Branch
5th. Floor, 1810 Blanshard St.
Victoria, B.C.
V8W 9N3

Attn: Tim Eaton, P. Eng.
Manager, Geotechnical Engineering

Dear Mr. Eaton;

Re: Mount Polley Mining Corp.
Tailings Storage Facility Cyclone Sand Review

Further to your request of February 4, 2000 I have reviewed the report by Knight Piesold Ltd. on Cycloned Sand Construction of Stage 3 and Ongoing Stages of the Tailings Storage Facility at Mount Polley Mine.

INTRODUCTION

I note that Mt. Polley is anxious to move to cyclone sand construction for their TSF dam. EMPR is concerned that they may have not completed realistic cost estimates and recognized all the construction difficulties.

In addition:

i) The fill has shifted upstream a bit and might be narrow above the existing dam crest.

ii) The need and effectiveness of the upstream drainage pipe has not been clearly demonstrated.

iii) The cycloned sand has a high silt content and therefore lower permeability.

I also have received concerns from Mr. G. Headley, Senior Geotechnical Engineer on February 11, 2000. The project involves three embankments - The main, perimeter and south dams. The main embankment is the highest 57 meters - which represents a medium-high structure, certainly not unusual.

DESIGN

The design is a modified centerline design with a clay till core and a hydrauliced silty sand downstream section. The silty sand is obtained by cycloning the tailings. To recognize the somewhat finer gradation than usual for this type of structure the downstream slope has been flattened from 2H:1V to 3H:1V. This is a reasonable trade-off provided vertical permeability is available. The downstream zone will be developed with ongoing raises.

DESIGN AND CONSTRUCTION CONTROL

The design proposed is sensitive to many features which will require close control. These include:

- an adequate materials balance
- successful control of piezometric pressures in the dam and foundations
- reasonable vertical drainability of the hydrauliced tailings
- adequate density of the hydrauliced tailings
- adequate under-drainage
- optimization of cyclone operation over 7 months
- adequate Q_c/Q_c field inspection program
- adequate cyclone and hydraulicing operating personnel and facilities

FIELD AND DESIGN PROGRAMS

Knight Piesold have performed considerable geotechnical and materials characteristics tests. They include:

- review of a very large scale field cyclone and hydraulicing test program (200,000 m^3)
- field gradation and density testing
- field permeability and drainage evaluation
- tailings gradation and density testing
- seepage analysis
- stability analysis - static and dynamic for the dam and foundations
- final design stability allows for plugged drains
- shear strength and permeability assessment of the tailings
- emphasis that the ongoing design may be modified based on experience - the observational approach

I would note that the testing, evaluation and analysis generally meet the standard of the industry requirements. Conservation has been incorporated in tailings properties and the stability analysis.

PAST EXPERIENCE

The use of the centerline method was used successfully at Gibraltar and Brenda Mines. It is recognized that the gradation of Mt. Polley is finer, therefore it is recommended that Knight Piesold - Mt. Polley Mines provide some further information such as:

- other projects internationally where a reasonably similar tailings gradation has been used successfully
- foundation finger drains have been used under hydraulically placed tailings for downstream construction
- adequate density has been obtained using hydraulic placement of tailings
- the cell deposition system they propose has been successful elsewhere
- the foundation glacial fluvial sand is not subject to liquefaction under the site load conditions

RECOMMENDATIONS

The first year of hydraulic tailings disposal is critical.

It is recommended that Knight Piesold and Mt. Polley Mines meet the following requirements:

- Develop redundancy in the hydraulic tailings disposal system - pipelines and cyclones.
- Establish a comprehensive Q/Q monitoring system and report data to EMPR monthly. This frequency may be relaxed pending successful procedures and results after year one.
- Review the hydraulicing program annually and redesign the following year's program if necessary.
- Install adequate instrumentation to allow the observational approach to be successful.
- Incorporate a top filter in the finger drain design.
- Ensure the width of the center clayey core is wide enough to be constructed effectively.
- Monitor the mass tailings balance to ensure the yearly volumes are available.
- Develop the year one design of pipelines and cyclones and submit it to EMPR for information.
- Review the estimated cost estimate.
- Re-assess the need of the upstream drainage pipe.
- Communicate with EMPR immediately if the hydraulic tailings program develops problems and advise operational changed proposed.

- Develop a hydraulic tailings deposition operating manual as soon as reasonably possible. — Do we have.
- Ensure the surface drainage collection systems and pressure relief wells are operational at the commencement of the hydraulicing program.

Providing the list of recommendations listed herein are met or agreed to, I consider you can recommend the use of the hydrauliced downstream design be approved subject to annual review.

If you have any questions please contact me.

Yours truly,

for C.O. Brawner, P. Eng.

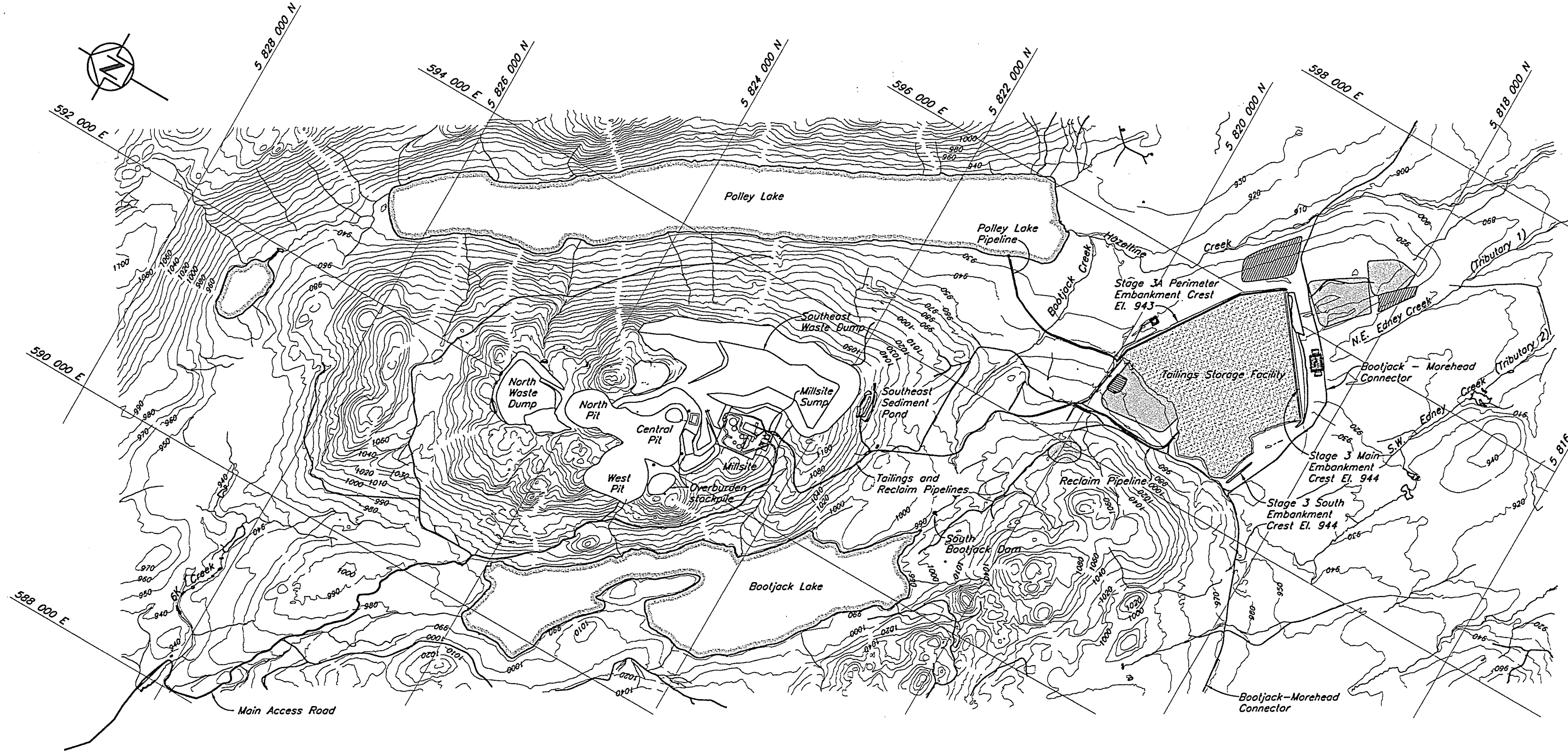
COB/pm

Knight Piésold
CONSULTING

APPENDIX B

STAGE 3 CONSTRUCTION – TENDER DRAWINGS

DWG. NO.	REV.	TITLE
11162-13-100	0	Stage 3 Tailings Embankment - Overall Site Plan
11162-13-102	0	Stage 3 Tailings Embankment - General Arrangement
11162-13-104	0	Stage 3 Tailings Embankment - Material Specifications
11162-13-110	0	Stage 3 Main Embankment - Plan - Option 1
11162-13-115	0	Stage 3 Main Embankment - Sections - Option 1
11162-13-117	0	Stage 3 Main Embankment - Miscellaneous Details
11162-13-120	0	Stage 3 Perimeter Embankment - Plan - Option 1
11162-13-125	0	Stage 3 Perimeter Embankment - Sections - Option 1
11162-13-130	0	Stage 3 South Embankment - Plan and Section
11162-13-210	0	Stage 3 Main Embankment - Plan - Option 2
11162-13-215	0	Stage 3 Main Embankment - Section - Option 2
11162-13-220	0	Stage 3 Perimeter Embankment - Plan - Option 2
11162-13-225	0	Stage 3 Perimeter Embankment - Sections - Option 2



NOTES

1. Open Pits and Waste Dumps are shown in their final configurations.
2. Topography at TSF generated from points and break lines sent from MPMC in July 1999. The topography outside the TSF area is from 1997 flyover.
3. Current size and location of potential and existing Borrow Areas and Topsoil Stockpiles are to be confirmed.
4. Alternative 1 layout is shown.

Scale 400 0 400 800 1200 1600 2000 m

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — K. J. BROUWER

MOUNT POLLEY MINING CORPORATION

MOUNT POLLEY MINE

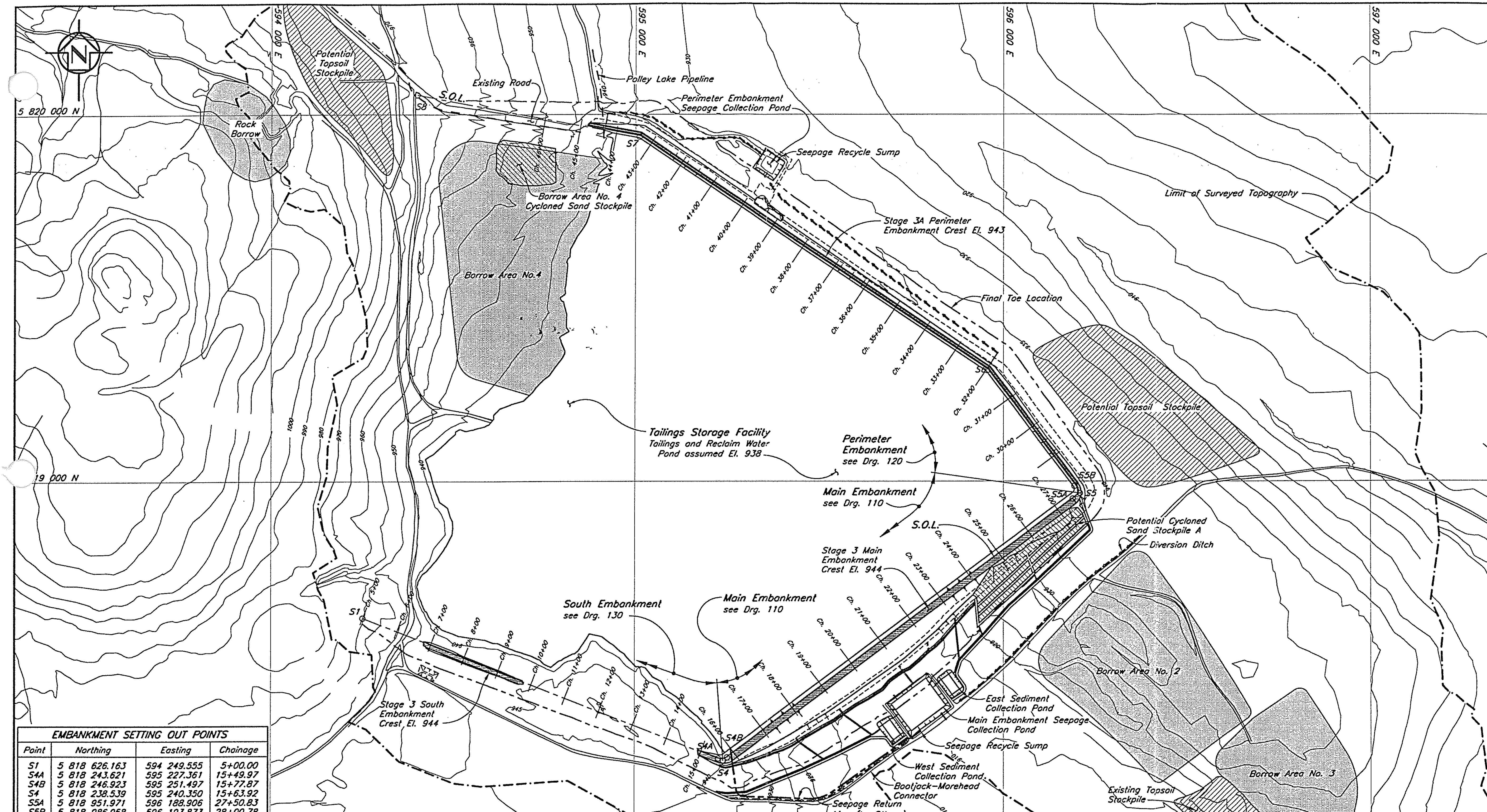
TAILINGS STORAGE FACILITY
STAGE 3 TAILINGS EMBANKMENT
OVERALL SITE PLAN

DRG. NO.	DESCRIPTION	REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
		0	14APR'00	ISSUED FOR TENDER	MDB	TAM	JKK	KJB
REFERENCE DRAWINGS		REVISIONS						

DESIGNED	CHECKED	SCALE	REVISION
MDB	JKK	AS SHOWN	0
DRAWN	APPROVED	DRAWING NO.	
TAM	KJB	11162-13-100	

Knight Piésold CONSULTING

XREF FILE : TOP099



EMBANKMENT SETTING OUT POINTS			
Point	Northing	Easting	Chainage
S1	5 818 626.163	594 249.555	5+00.00
S4A	5 818 243.621	595 227.361	15+49.97
S4B	5 818 246.923	595 251.497	15+77.87
S4	5 818 238.539	595 240.350	15+63.92
S5A	5 818 951.971	596 188.906	27+50.83
S5B	5 818 986.958	596 193.873	28+00.78
S5	5 818 966.983	596 208.866	27+75.80
S6	5 819 304.035	595 955.881	31+97.23
S7	5 819 939.748	595 010.249	43+36.69
S8	5 820 053.034	594 396.471	49+60.83

NOTES

1. Topography at TSF generated from points and break lines sent from MPMC in July 1999. The topography outside the TSF area is from 1997 flyover.
2. Current size and location of potential and existing Borrow Areas and Topsoil Stockpiles are to be confirmed.
3. Alternative 1 layout is shown.

Scale 100 0 100 200 300 400 500 m

DRG. NO.	DESCRIPTION
130	T.S.F. – STAGE 3 SOUTH EMBANKMENT – PLAN AND SECTION
120	T.S.F. – STAGE 3 PERIMETER EMBANKMENT – PLAN – OPTION 1
110	T.S.F. – STAGE 3 MAIN EMBANKMENT – PLAN – OPTION 1

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D

REVISIONS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	14APR'00	ISSUED FOR TENDER	MDB	NSD	JRK	KJB

REVISIONS

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA K. J. BROUWER

MOUNT POLLEY MINING CORPORATION

MOUNT POLLEY MINE

TAILINGS STORAGE FACILITY
STAGE 3 TAILINGS EMBANKMENT
GENERAL ARRANGEMENT

DESIGNED	CHECKED
MDB	JRK
DRAWN	APPROVED
TAM	KJB

Knight Piésold CONSULTING

SCALE AS SHOWN | REVISION 0

DRAWING NO. 11162–13–102

XREF FILE: TOPO99, STAGE3

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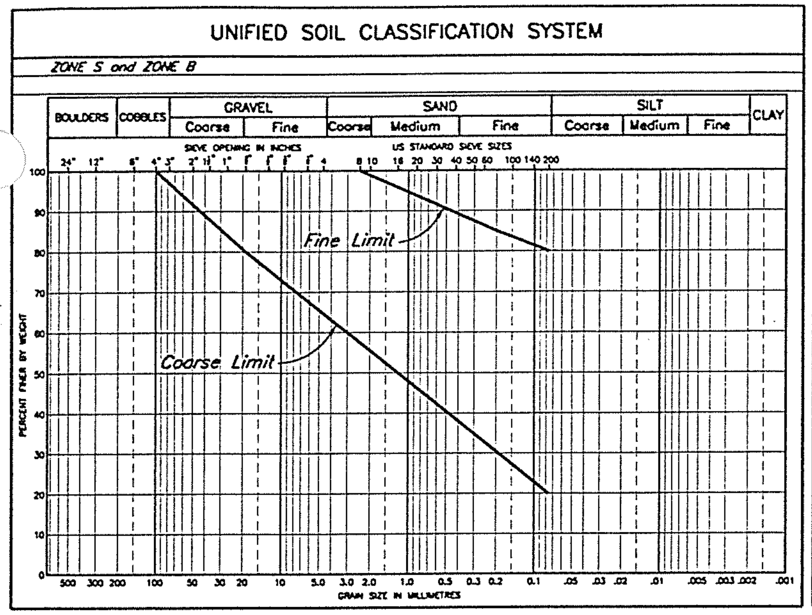

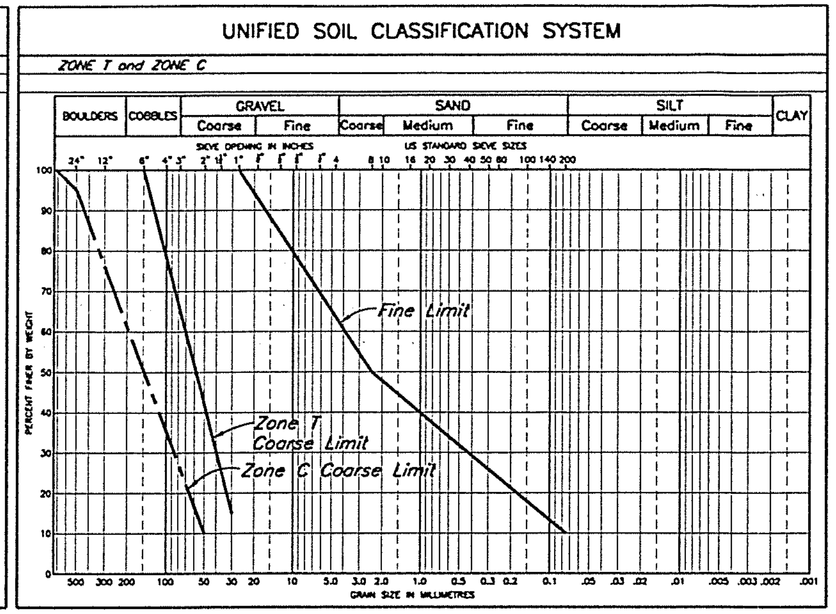

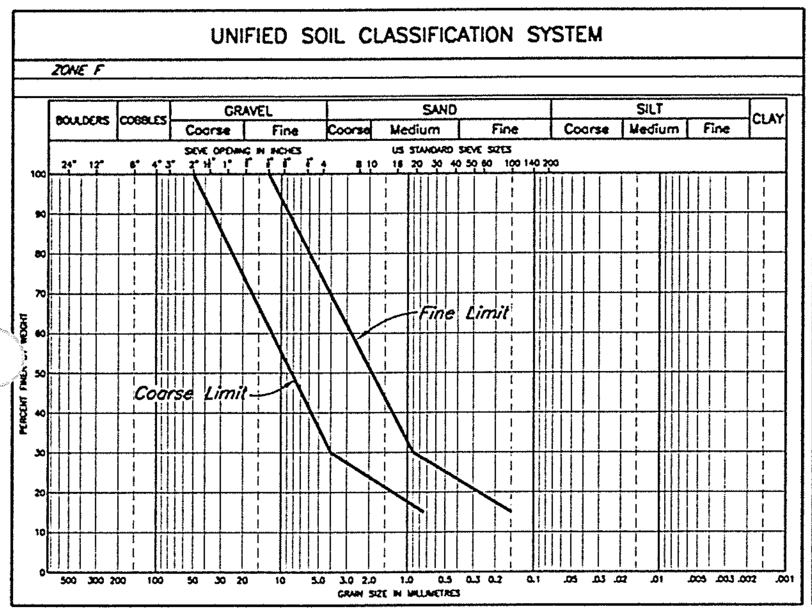

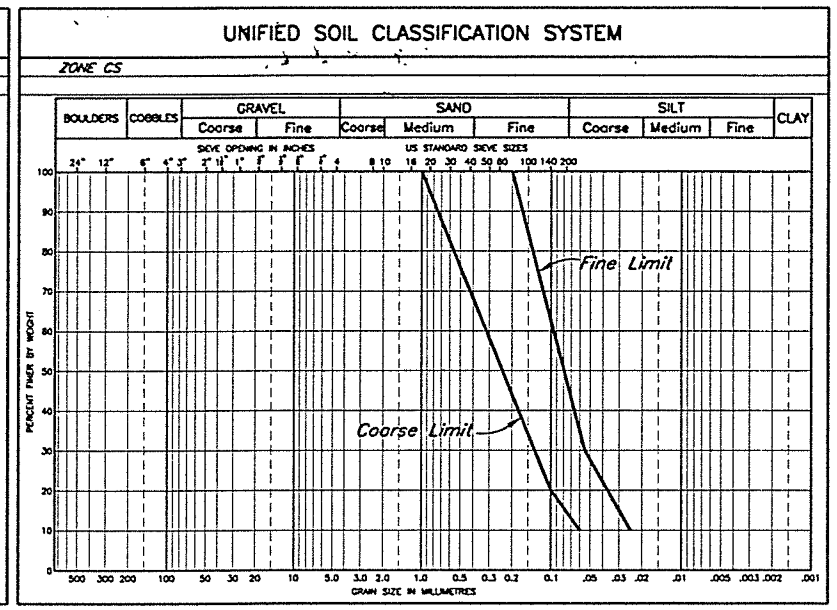

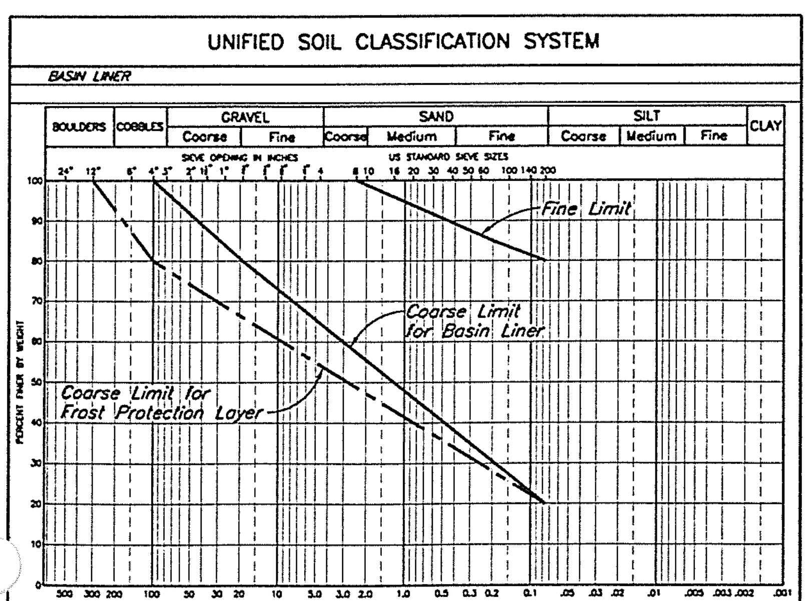

ZONE	MATERIAL TYPE	LOCATION	PLACEMENT AND COMPACTION REQUIREMENTS
S	Glacial till	Core Zone	Placed, moisture conditioned and spread in maximum 300 mm thick layers (after compaction). Vibratory compaction to 95% of Standard Proctor maximum dry density or as approved by the Engineer.
C	Rock	Shell Zone	Placed and spread in maximum 1000 mm thick lift. Compaction as directed by the Engineer.
T	Rock	Transition Zone/ Confining Berm	Placed and spread in maximum 600 mm thick layers. Compaction as directed by the Engineer.
F	Filter sand	Chimney Drain	Placed and spread in maximum 600 mm thick lifts. Compaction as directed by the Engineer.
CS	Cyclone Sand, Mechanically placed	Shell Zone	Placed, moisture conditioned and spread in maximum 500 mm thick layers (after compaction). Vibratory compaction to 95% of Standard Proctor Maximum Dry Density, or as approved by the Engineer.
CS	Cyclone Sand, Hydraulically placed	Shell Zone	Nominal compaction by construction equipment
CBL	Random Rockfill	Coarse Bearing Layer	End dumped and spread as required for trafficability and fill placement.
-	Glacial till, glaciolacustrine material	Basin Liner	Placed and spread in maximum 150 mm thick lifts. Compacted to 92% of the Standard Proctor Maximum Dry Density, or as approved by the Engineer.
-	Glacial till, glaciolacustrine or granular material	Basin Liner Frost Protection	Placed and spread in maximum 300 mm thick lift. Compaction as directed by the Engineer.

DRG. NO.	DESCRIPTION
225	TSF - STAGE 3 PERIMETER EMBANKMENT - SECTION - OPTION 2
215	TSF - STAGE 3 MAIN EMBANKMENT - SECTION - OPTION 2
130	TSF - STAGE 3 SOUTH EMBANKMENT - PLAN AND SECTION
125	TSF - STAGE 3 PERIMETER EMBANKMENT - SECTIONS - OPTION 1
115	TSF - STAGE 3 MAIN EMBANKMENT - SECTIONS - OPTION 1

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	14APR'00	ISSUED FOR TENDER	MDB	WAL	JRK	KJB

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BROUWER

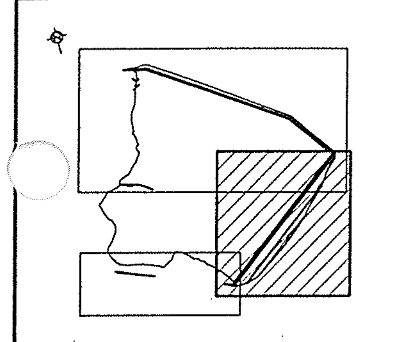
MOUNT POLLEY MINING CORPORATION

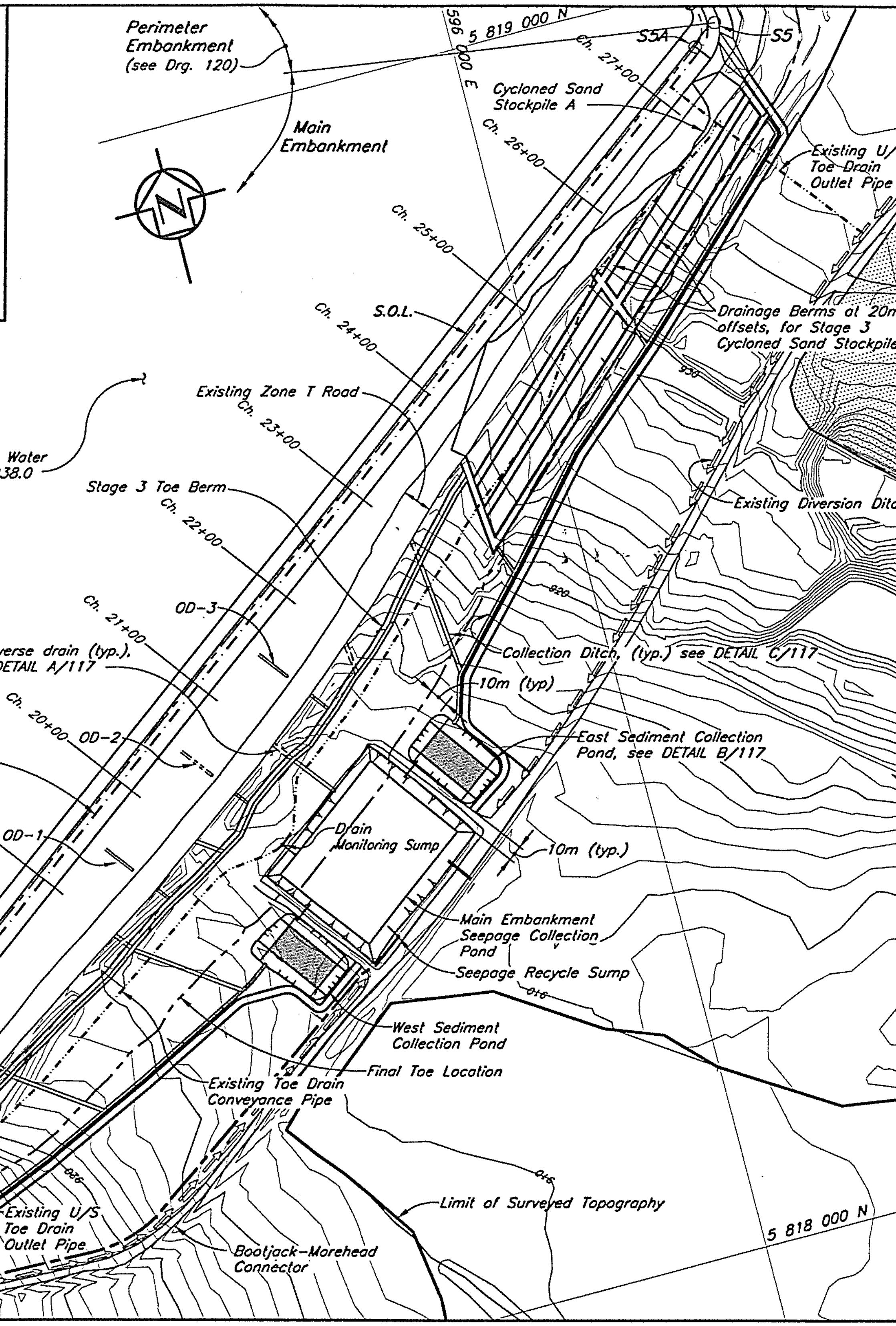
MOUNT POLLEY MINE

TAILINGS STORAGE FACILITY
STAGE 3 TAILINGS EMBANKMENT
MATERIAL SPECIFICATIONS

DESIGNED	CHECKED		SCALE	REVISION
MDB	JRK	Knight Piésold	AS SHOWN	0

VANCOUVER B.C.

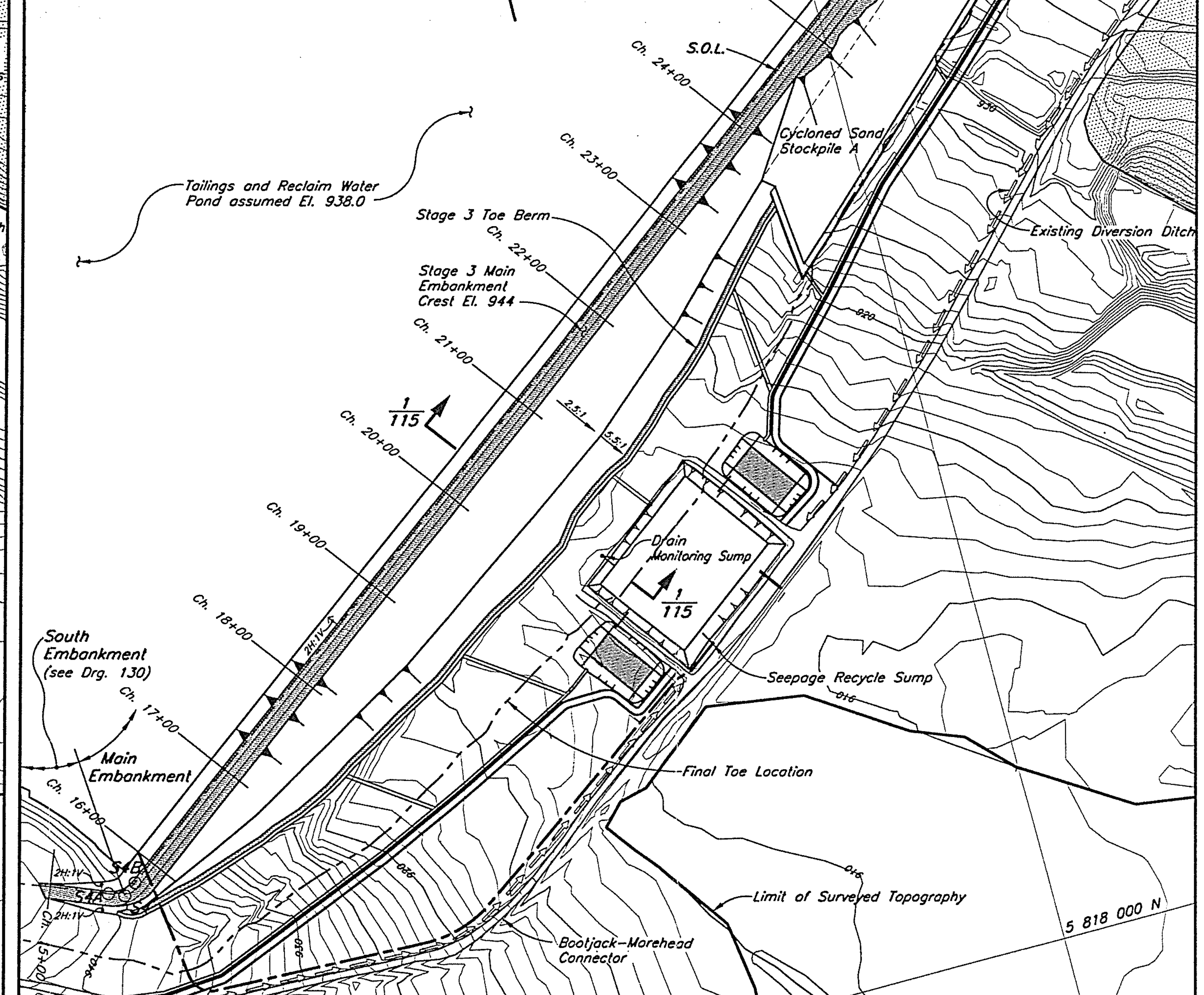




SURFACE WATER MANAGEMENT DETAILS

NOTES

1. Chainage defined by Setting Out Point S1 at Ch. 5+00.
2. Stripping and clearing required 5 m beyond toe of embankments.
3. Topography at TSF generated from points and bre lines sent from MPMC in July 1999. The Topogra outside the TSF area is from 1997 flyover.
4. Existing Zone T road to be ripped before placem of Zone F.
5. Extent of Basin Liner expansion to be determined in the field by the Engineer.



MAIN EMBANKMENT DETAILS

Scale 50 0 50 100 150 200 250 m

DRG. NO.	DESCRIPTION
117	TSF – STAGE 3 MAIN EMBANKMENT – DETAILS
130	TSF – STAGE 3 SOUTH EMBANKMENT – PLAN AND SECTION
120	TSF – STAGE 3 PERIMETER EMBANKMENT – PLAN – OPTION 1
115	TSF – STAGE 3 MAIN EMBANKMENT – SECTIONS – OPTION 1

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D

REVISIONS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	14APR'00	ISSUED FOR TENDER	MDB	DSR		

REVISIONS

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — K.J. BROUWER

MOUNT POLLEY MINING CORPORATION

MOUNT POLLEY MINE

TAILINGS STORAGE FACILITY
STAGE 3 MAIN EMBANKMENT
PLAN
OPTION 1

DESIGNED	CHECKED		SCALE	REVISION
MDB		Knight Piésold	AS SHOWN	0
DRAWN	APPROVED		DRAWING NO.	

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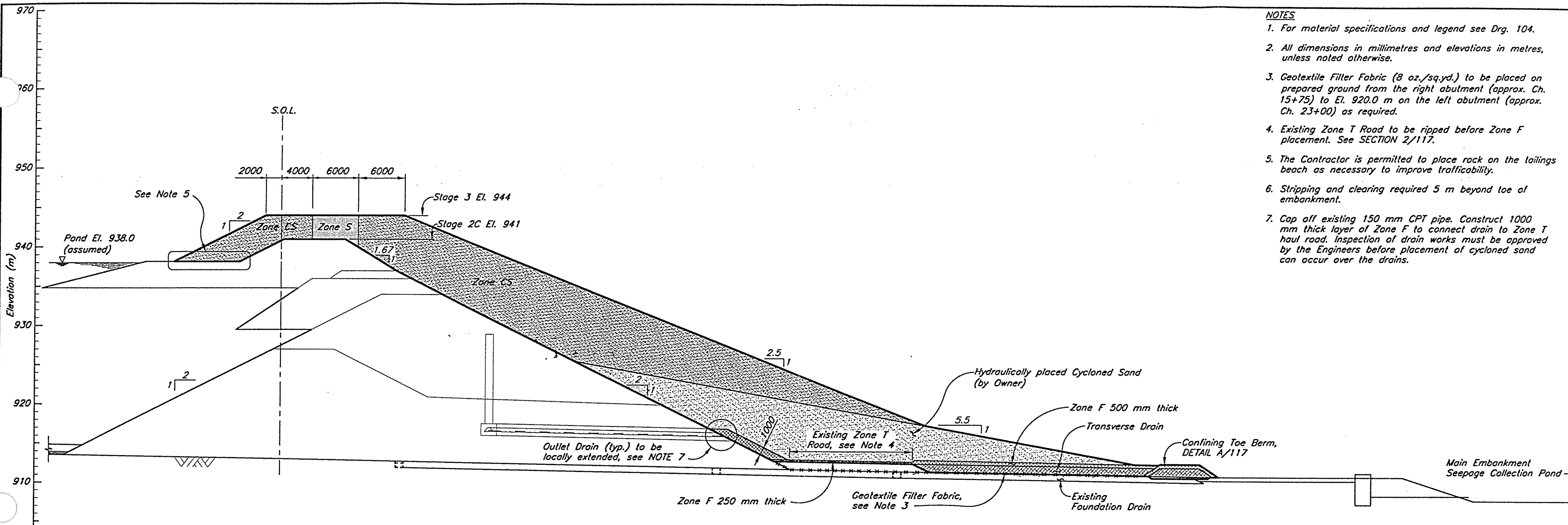
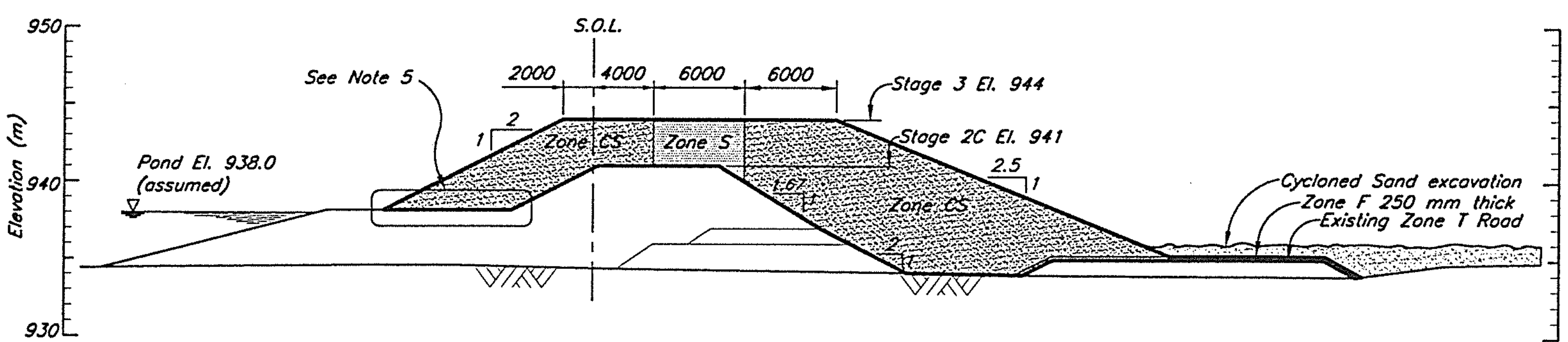
NOTES

1. For material specifications and legend see Drg. 104.
2. All dimensions in millimetres and elevations in metres, unless noted otherwise.
3. Geotextile Filter Fabric (8 oz./sq.yd.) to be placed on prepared ground from the right abutment (approx. Ch. 15+75) to El. 920.0 m on the left abutment (approx. Ch. 23+00) as required.
4. Existing Zone T Road to be ripped before Zone F placement. See SECTION 2/117.
5. The Contractor is permitted to place rock on the tailings beach as necessary to improve trafficability.
6. Stripping and clearing required 5 m beyond toe of embankment.
7. Cap off existing 150 mm CPT pipe. Construct 1000 mm thick layer of Zone F to connect drain to Zone T haul road. Inspection of drain works must be approved by the Engineers before placement of cycloned sand can occur over the drains.



SECTION $\frac{1}{110}$ 115
SECTION AT TRANSVERSE DRAIN



SECTION $\frac{2}{110}$ 115
TYPICAL SECTION

Scale 5 0 5 10 15 20 25 m

DRG. NO.	DESCRIPTION
117	TSF - STAGE 3 - MAIN EMBANKMENT - DETAILS
110	TSF - STAGE 3 - MAIN EMBANKMENT - PLAN - OPTION 1
104	TSF - STAGE 3 - MATERIALS SPECIFICATIONS

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	14APR'00	ISSUED FOR TENDER	MDB	NSD		

REVISIONS

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA K. J. BROUWER

DESIGNED MDB CHECKED JRK

MOUNT POLLEY MINING CORPORATION

MOUNT POLLEY MINE

TAILINGS STORAGE FACILITY
STAGE 3 MAIN EMBANKMENT
SECTIONS
OPTION 1

Knight Piésold

SCALE AS SHOWN REVISION 0

DRAWING NO.

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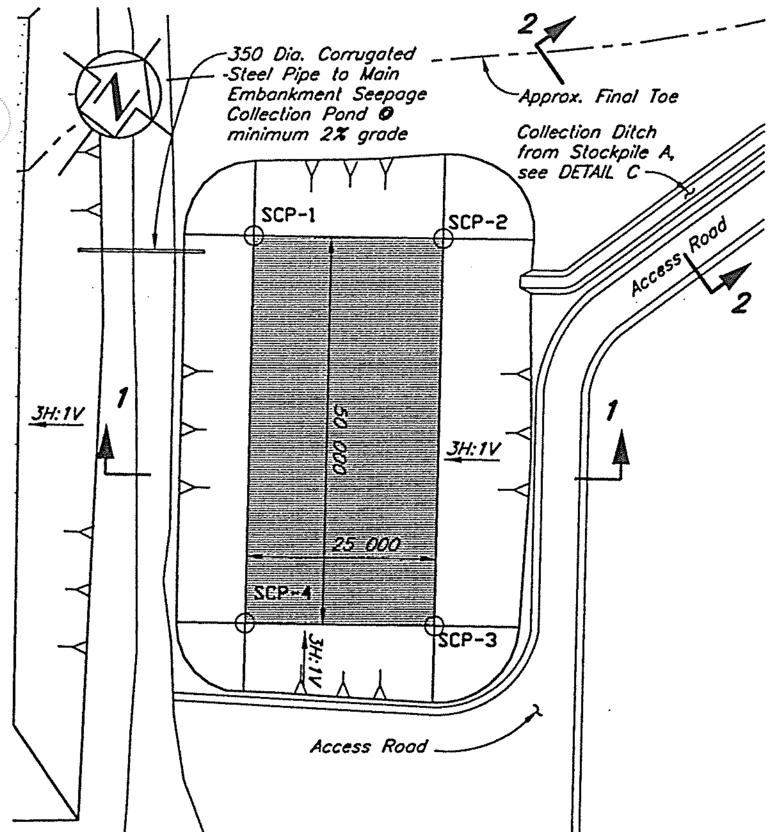
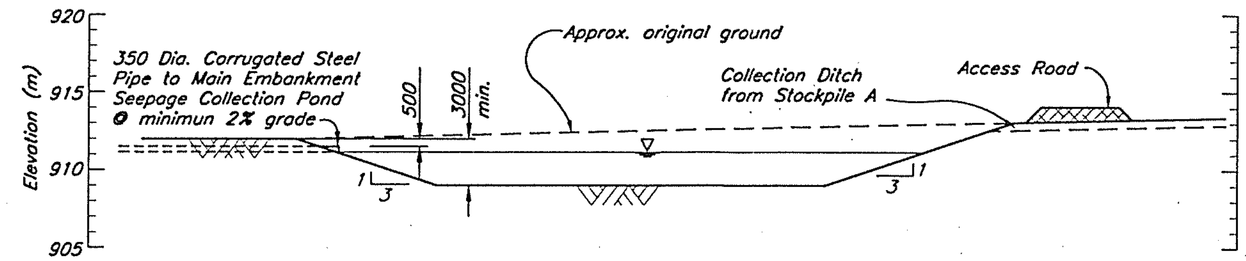
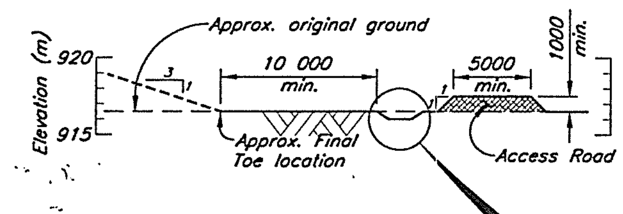


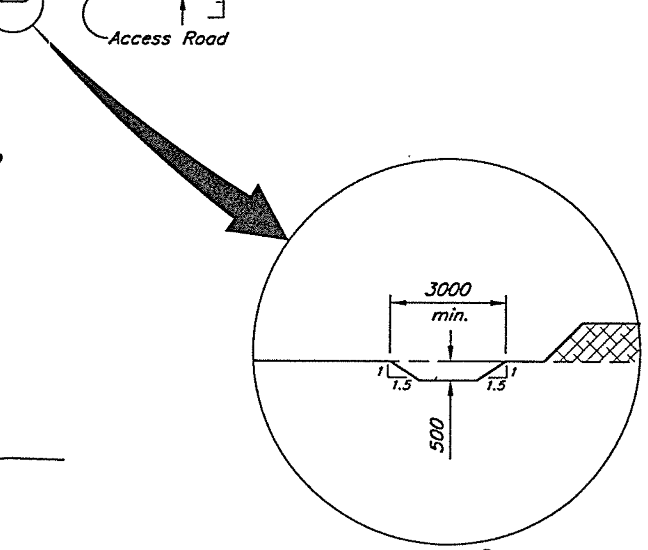
DETAIL B/115
EAST SEDIMENT COLLECTION POND (AS SHOWN)
(WEST SEDIMENT COLLECTION POND OPPOSITE HAND)
Scale A



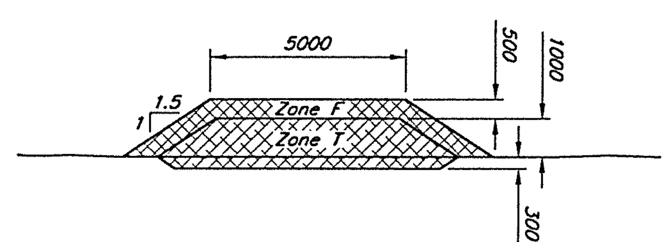
SECTION 1
Scale B



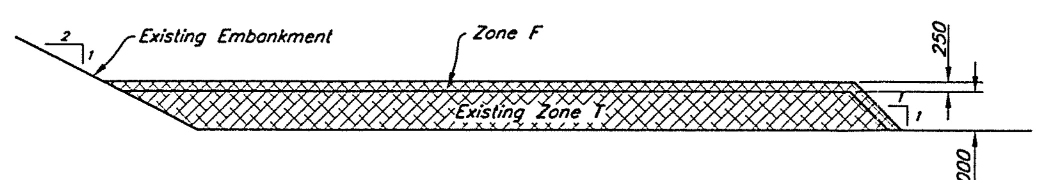
SECTION 2
Scale B



DETAIL C/110
TYPICAL COLLECTION DITCH
Scale C

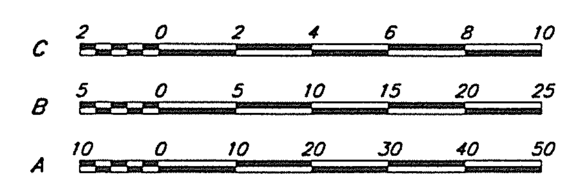


DETAIL A/115
TYPICAL CONFINING TOE BERM, TRANVERSE AND LONGITUDINAL DRAIN
Scale C



SECTION 2/115, 2/125
CAPPING OF EXISTING ZONE T ROAD
Scale C

SEDIMENT POND SETTING OUT POINTS				
Point		Northing	Easting	Elevation
EAST	SCP-1	5 818 457.786	595 831.405	909.0
	SCP-2	5 818 472.495	595 851.620	909.0
	SCP-3	5 818 432.065	595 881.038	909.0
	SCP-4	5 818 417.356	595 860.823	909.0
WEST	SCP-5	5 818 334.846	595 672.935	908.0
	SCP-6	5 818 349.556	595 693.149	908.0
	SCP-7	5 818 309.126	595 722.568	908.0
	SCP-8	5 818 294.417	595 702.353	908.0



DRG. NO.	DESCRIPTION
215	TSF - STAGE 3 MAIN EMBANKMENT - SECTION - OPTION 2
210	TSF - STAGE 3 MAIN EMBANKMENT - PLAN - OPTION 2
125	TSF - STAGE 3 PERIMETER EMBANKMENT - SECTIONS
115	TSF - STAGE 3 MAIN EMBANKMENT - SECTIONS - OPTION 1
110	TSF - STAGE 3 MAIN EMBANKMENT - PLAN - OPTION 1

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	14APR'00	ISSUED FOR TENDER	MDB	NSD		

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — K.J. BROUWER

DESIGNED MDB | CHECKED | DRAWN | APPROVED

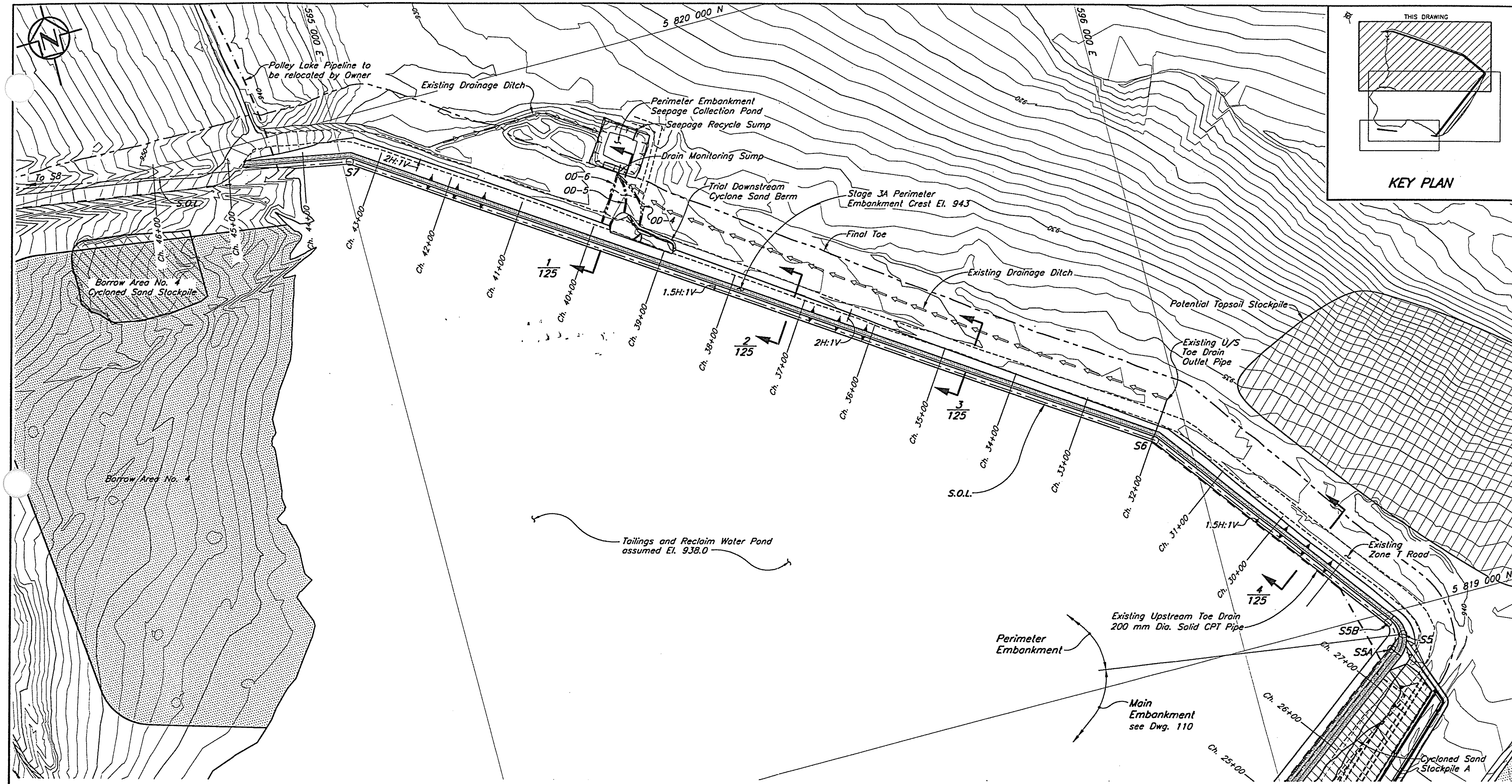
MOUNT POLLEY MINING CORPORATION

MOUNT POLLEY MINE

TAILINGS STORAGE FACILITY
STAGE 3 MAIN EMBANKMENT
MISCELLANEOUS DETAILS

Knight Piésold

SCALE AS SHOWN | REVISION 0 | DRAWING NO.



EMBANKMENT SETTING OUT POINTS			
Point	Northing	Easting	Chainage
S1	5 818 626.163	594 249.555	5+00.00
S4A	5 818 243.621	595 227.361	15+49.97
S4B	5 818 246.923	595 251.497	15+77.87
S4	5 818 238.539	595 240.350	15+63.92
S5A	5 818 951.971	596 188.906	27+50.83
S5B	5 818 986.958	596 193.873	28+00.78
S5	5 818 966.983	596 208.866	27+75.80
S6	5 819 304.035	595 955.881	31+97.23
S7	5 819 939.748	595 010.249	43+36.69
S8	5 820 053.034	594 396.471	49+60.83

NOTES

1. Chainage defined by Setting Out Point S1 at Ch. 5+00.
2. Stripping and clearing required 5 m beyond toe of embankments.
3. Topography at TSF generated from points and break lines sent from MPMC in July 1999. The Topography outside the TSF area is from 1997 flyover.

Scale 50 0 50 100 150 200 250 m

DRG. NO.	DESCRIPTION
125	TSF - STAGE 3 PERIMETER EMBANKMENT - SECTIONS - OPTION 1
110	TSF - STAGE 3 MAIN EMBANKMENT - PLAN - OPTION 1

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	14APR'00	ISSUED FOR TENDER	KDE	DSR		

REVISIONS

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA K. J. BROUWER

MOUNT POLLEY MINING CORPORATION

MOUNT POLLEY MINE

TAILINGS STORAGE FACILITY
STAGE 3 PERIMETER EMBANKMENT
PLAN
OPTION 1

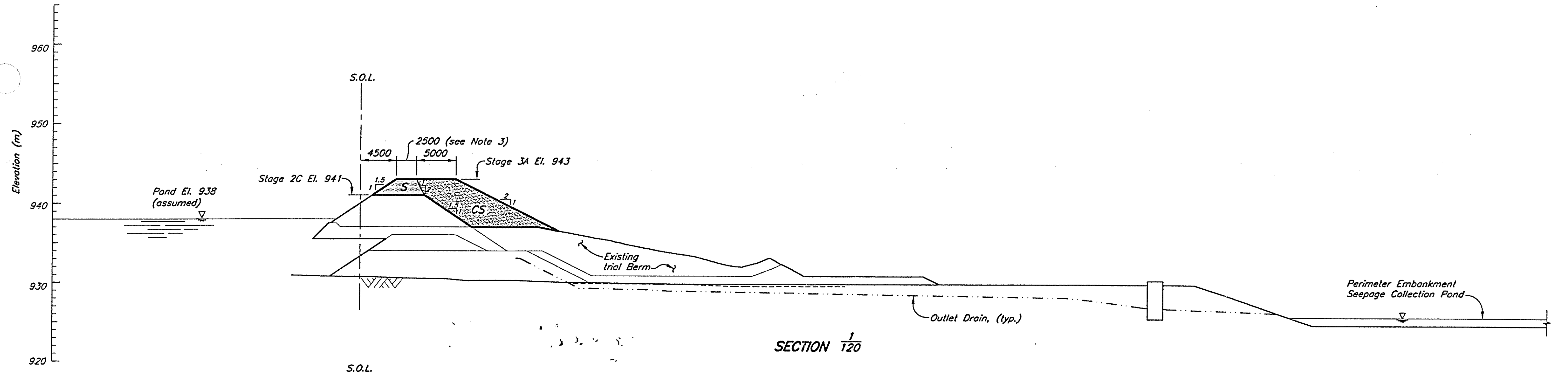
DESIGNED KDE | CHECKED | DRAWN | APPROVED

Knight Piésold

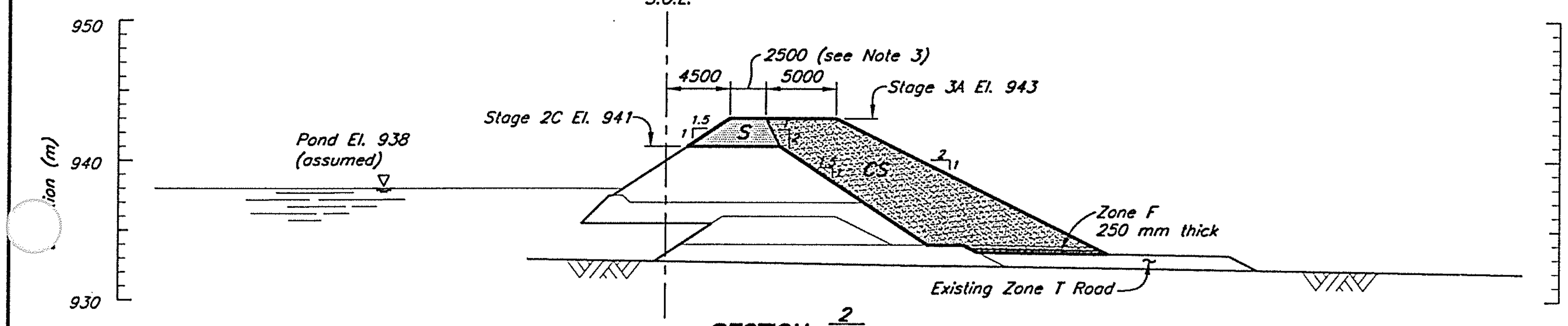
SCALE AS SHOWN | REVISION 0 | DRAWING NO.

VANCOUVER B.C.

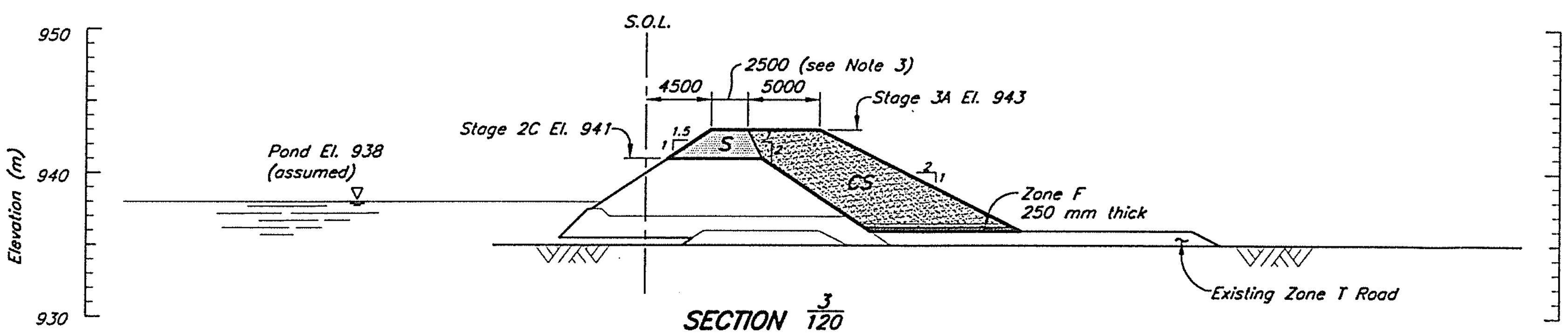
XREF FILE : TOPO99,STOCK99



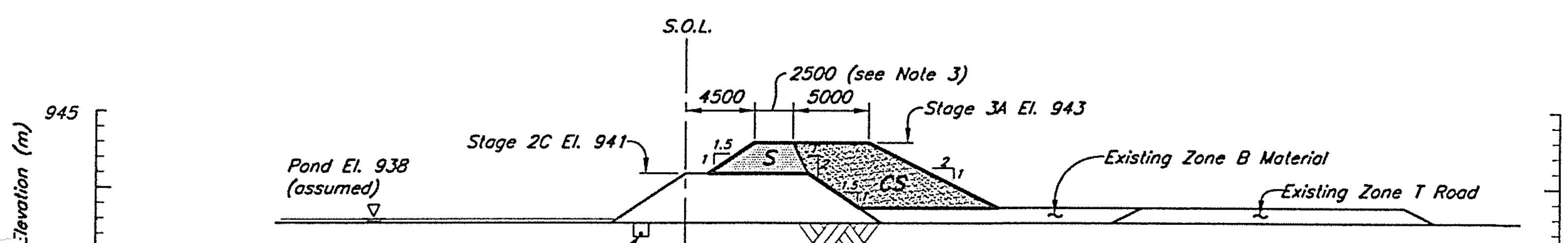
SECTION 1/120



SECTION 2/120



SECTION 3/120



SECTION 4/120

Upstream Toe Drain
200 mm Dia. Solid CPT pipe

NOTES

1. All dimensions in millimetres with elevations in metres, unless noted otherwise.
2. For material specifications and legend see Drg. 104.
3. Zone S width will be increased to 6 m during Stage 3B construction, as needed to maintain freeboard requirements.

Scale 5 0 5 10 15 20 25 Metres

DRG. NO.	DESCRIPTION
120	TSF – STAGE 3 – PERIMETER EMBANKMENT – PLAN – OPTION 1
117	TSF – STAGE 3 – MAIN EMBANKMENT – MISCELLANEOUS DETAILS
104	TSF – STAGE 3 – MATERIAL SPECIFICATIONS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	14APR'00	ISSUED FOR TENDER	JRK	TAM	KDE	KJB

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PROVINCE OF BRITISH COLUMBIA
K. J. BROUWER

DESIGNED KDE
CHECKED KDE

MOUNT POLLEY MINE CORPORATION

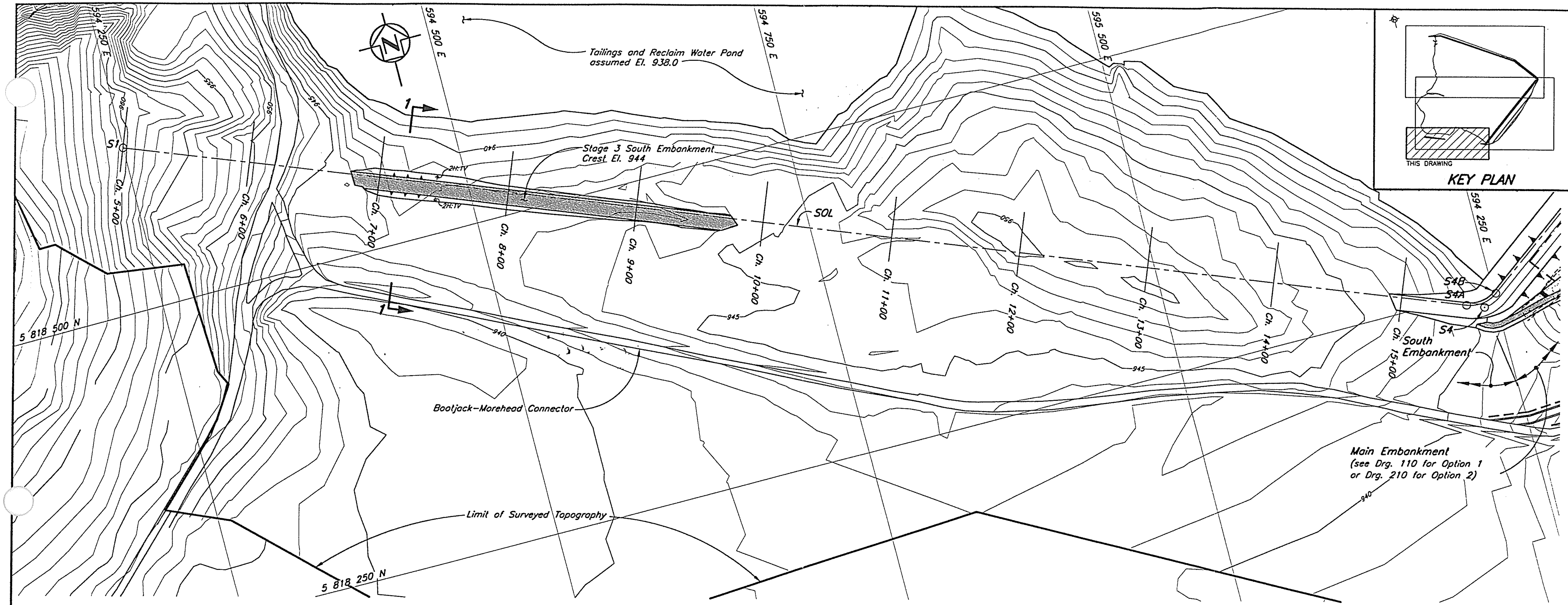
MOUNT POLLEY MINE

TAILINGS STORAGE FACILITY
STAGE 3 PERIMETER EMBANKMENT
SECTIONS
OPTION 1

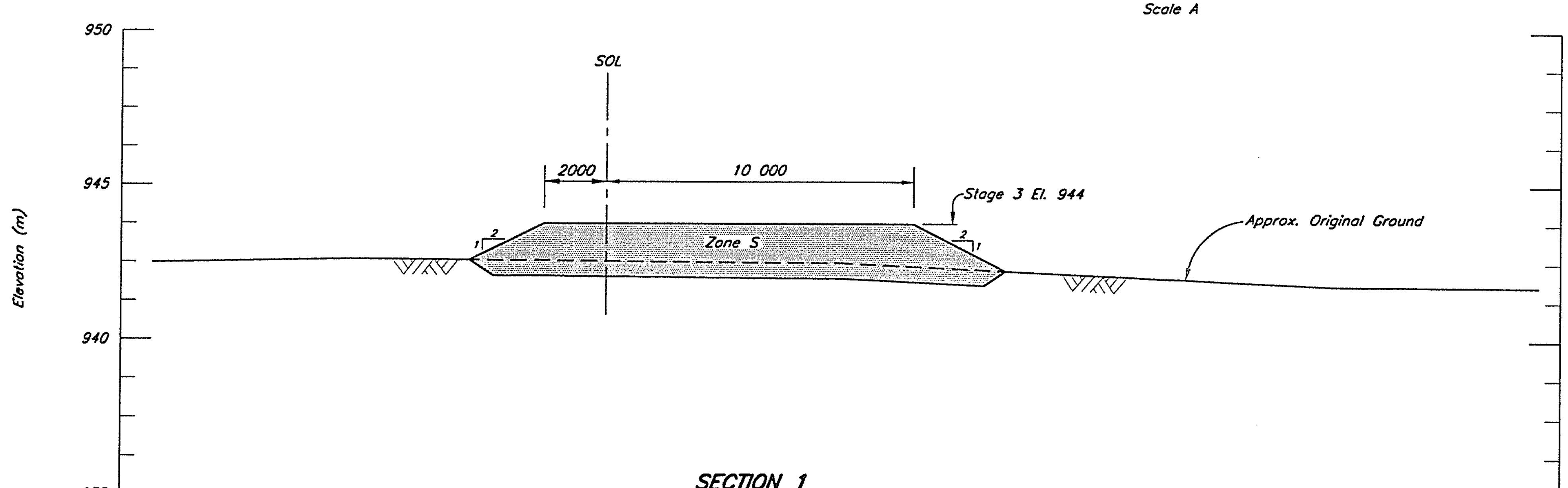
Knight Piésold

SCALE AS SHOWN
REVISION 0

VANCOUVER B.C. CAD FILE: M:\1\11162\13\Acad\dwg\0011\001 1=250 Plot 1=0.25 07/04/00 SC



PLAN
Scale A



SECTION 1
Scale B

NOTES

1. All dimensions in millimeters and elevations in metres, unless noted otherwise.
2. Topography at TSF generated from points and break lines sent from MPMC in July 1999. The Topography outside the TSF area is from 1997 flyover.
3. For Zone Materials Specifications and legend, see Drg. 104.
4. Stripping and clearing required for 5 m beyond toe of embankment.

B 2 0 2 4 6 8 10 m

A 30 0 30 60 90 120 150 m

DRG. NO.	DESCRIPTION
120	TSF – STAGE 3 MAIN EMBANKMENT – PLAN – OPTION 2
110	TSF – STAGE 3 MAIN EMBANKMENT – PLAN – OPTION 1
104	TSF – STAGE 3 TAILINGS EMBANKMENT – MATERIALS SPECIFICATIONS

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	14APR'00	ISSUED FOR TENDER	MDB	AW	JRK	KJB

REVISIONS

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PROVINCE OF BRITISH COLUMBIA
K. J. BROUWER

MOUNT POLLEY MINING CORPORATION

MOUNT POLLEY PROJECT

TAILINGS STORAGE FACILITY
STAGE 3 SOUTH EMBANKMENT
PLAN AND SECTION

DESIGNED MDB | CHECKED JRK | DRAWN | APPROVED

Knight Piésold

SCALE AS SHOWN | REVISION 0 | DRAWING NO.

XREF FILE: TOPO99, S3_SEMB

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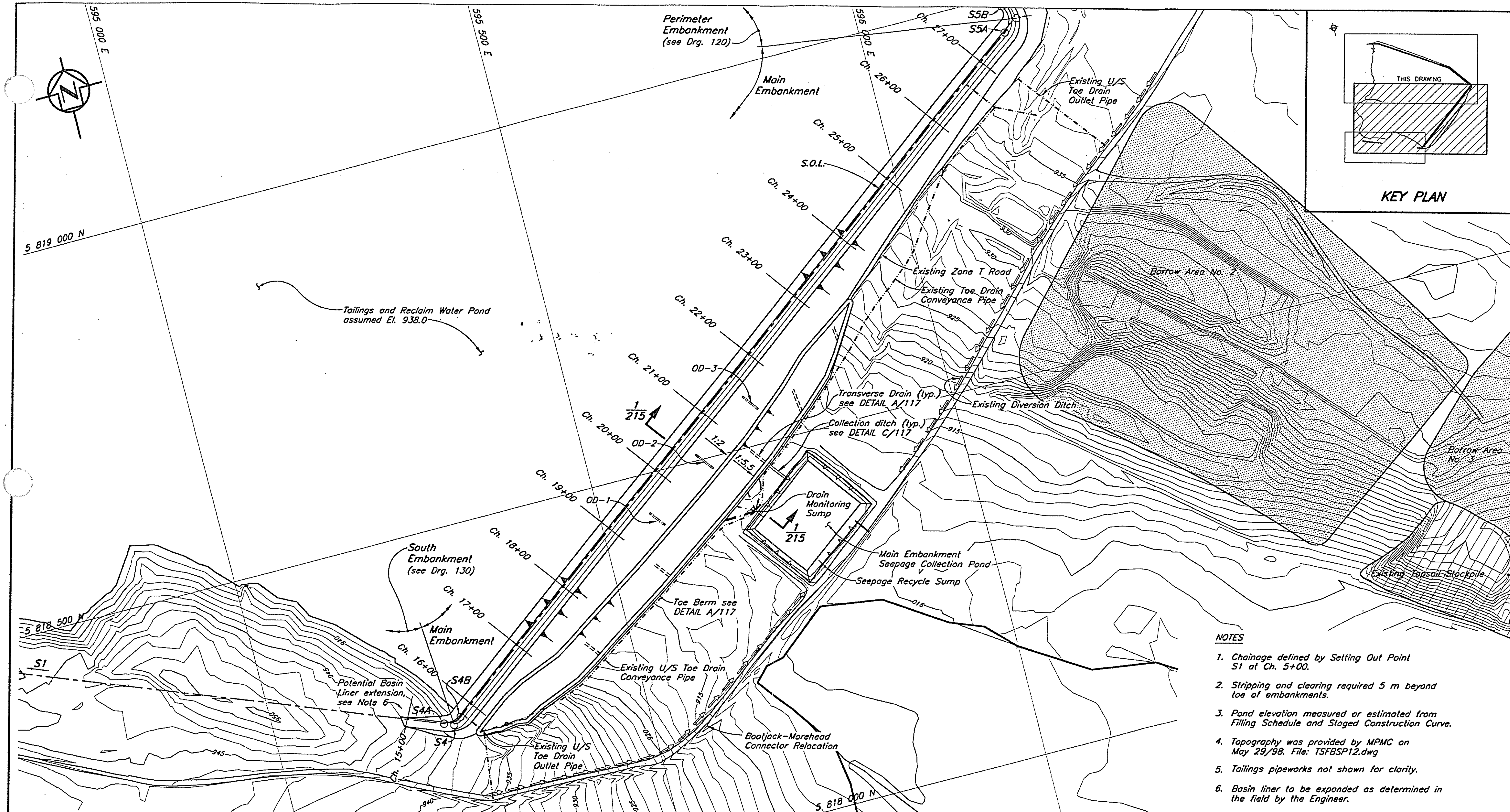


NOTES

1. Chainage defined by Setting Out Point S1 at Ch. 5+00.
2. Stripping and clearing required 5 m beyond toe of embankments.
3. Pond elevation measured or estimated from Filling Schedule and Staged Construction Curve.
4. Topography was provided by MPMC on May 29/98. File: TSFBSP12.dwg
5. Tailings pipeworks not shown for clarity.
6. Basin liner to be expanded as determined in the field by the Engineer.

Scale 50 0 50 100 150 200 250 Metres

DRG. NO.	DESCRIPTION
130	TSF – STAGE 3 SOUTH EMBANKMENT – PLAN AND DETAILS
120	TSF – STAGE 3 PERIMETER EMBANKMENT – PLAN – OPTION 1
117	TSF – STAGE 3 MAIN EMBANKMENT – MISCELLANEOUS DETAILS

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	14APR'00	ISSUED FOR TENDER	JRK	WAL	KDE	KJB

REVISIONS

PROFESSIONAL ENGINEER, PROVINCE OF BRITISH COLUMBIA, K. J. BROUWER

DESIGNED JRK
CHECKED KDE

MOUNT POLLEY MINING CORPORATION

MOUNT POLLEY MINE

TAILINGS STORAGE FACILITY
STAGE 3 MAIN EMBANKMENT
PLAN
OPTION 2

Knight Piésold

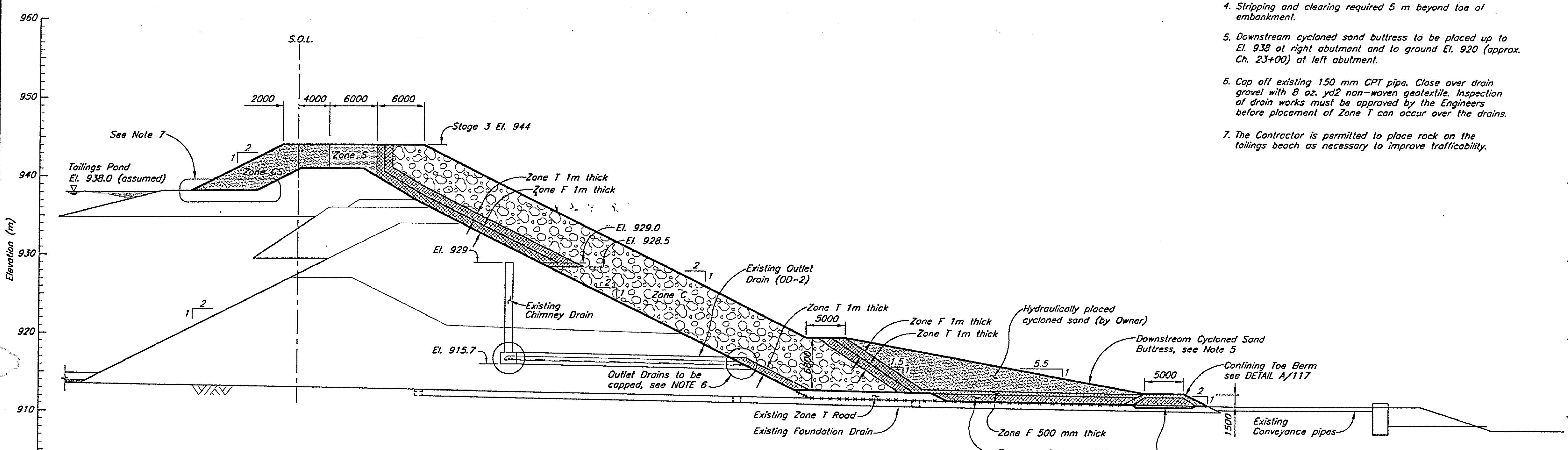
SCALE AS SHOWN
REVISION 0

VANCOUVER B.C.

XREF FILE :

NOTES

1. For zone material specifications and legend see Drg. 104.
2. All dimensions in millimetres and elevations in metres, unless noted otherwise.
3. Geotextile Filter Fabric (8 oz./sq.yd.) to be placed on prepared ground from the right abutment (approx. Ch. 15+75) to El. 920.0 m on the left abutment (approx. Ch. 23+00) as required.
4. Stripping and clearing required 5 m beyond toe of embankment.
5. Downstream cycloned sand buttress to be placed up to El. 938 at right abutment and to ground El. 920 (approx. Ch. 23+00) at left abutment.
6. Cap off existing 150 mm CPT pipe. Close over drain gravel with 8 oz. yd2 non-woven geotextile. Inspection of drain works must be approved by the Engineers before placement of Zone T can occur over the drains.
7. The Contractor is permitted to place rock on the tailings beach as necessary to improve trafficability.



SECTION 1/210
SECTION AT TRANSVERSE DRAIN

Scale 5 0 5 10 15 20 25 m

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DRG. NO.	DESCRIPTION
210	TSF - STAGE 3 - MAIN EMBANKMENT - PLAN - OPTION 2
117	TSF - STAGE 3 - MAIN EMBANKMENT - MISCELLANEOUS DETAILS
104	TSF - STAGE 3 - MATERIALS SPECIFICATIONS

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	14APR'00	ISSUED FOR TENDER	MDB	WAL		

REVISIONS

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA K. J. BROUWER

DESIGNED MDB
CHECKED
DRAWN
APPROVED

MOUNT POLLEY MINING CORPORATION

MOUNT POLLEY MINE

TAILINGS STORAGE FACILITY
STAGE 3 MAIN EMBANKMENT
SECTION
OPTION 2

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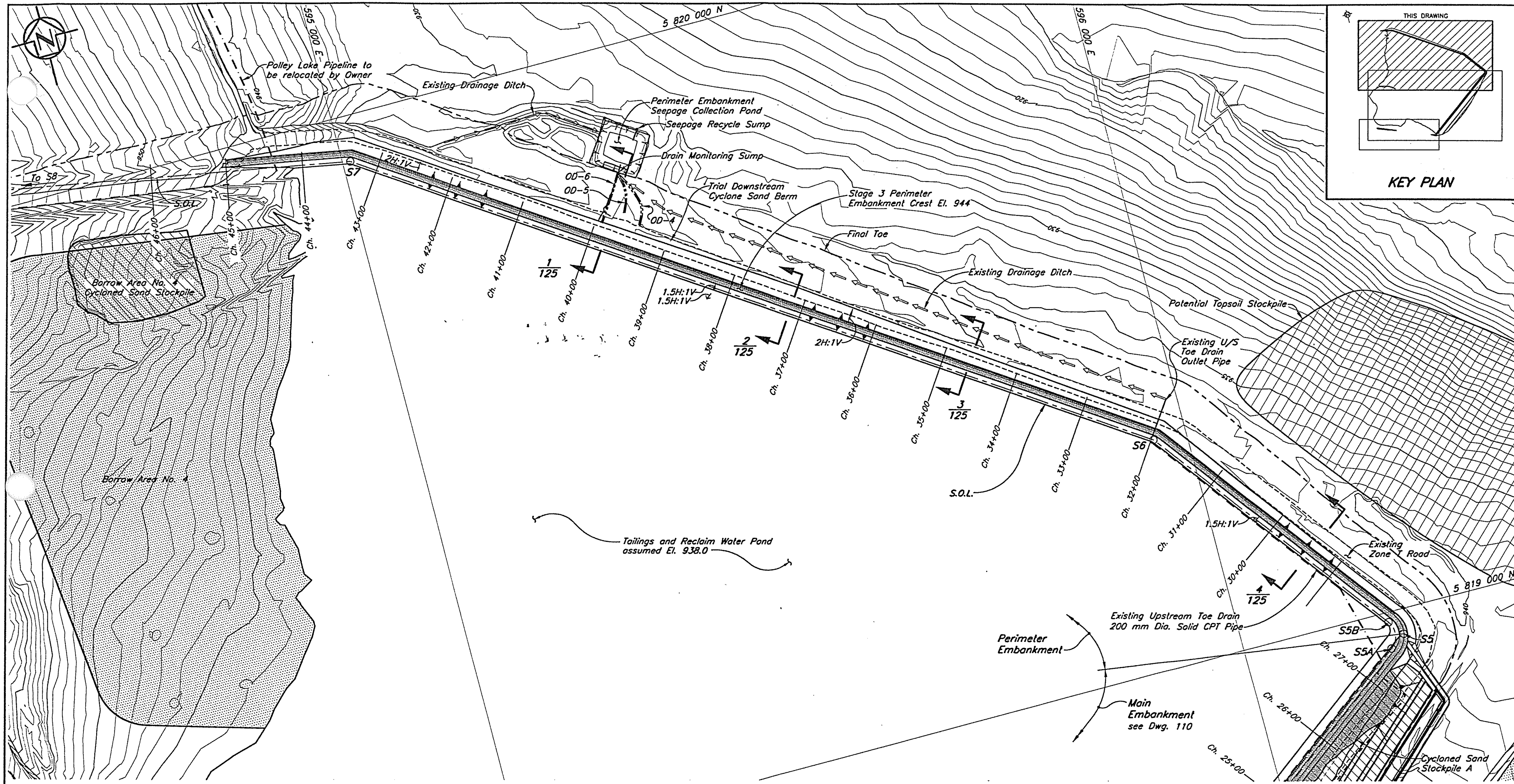
SCALE AS SHOWN
REVISION 0
DRAWING NO.
XREF FILE :



EMBANKMENT SETTING OUT POINTS			
Point	Northing	Easting	Chainage
S1	5 818 626.163	594 249.555	5+00.00
S4A	5 818 243.621	595 227.361	15+49.97
S4B	5 818 246.923	595 251.497	15+77.87
S4	5 818 238.539	595 240.350	15+63.92
S5A	5 818 951.971	596 188.906	27+50.83
S5B	5 818 986.958	596 193.873	28+00.78
S5	5 818 966.983	596 208.866	27+75.80
S6	5 819 304.035	595 955.881	31+97.23
S7	5 819 939.748	595 010.249	43+36.69
S8	5 820 053.034	594 396.471	49+60.83

NOTES

1. Chainage defined by Setting Out Point S1 at Ch. 5+00.
2. Stripping and clearing required 5 m beyond toe of embankments.
3. Topography at TSF generated from points and break lines sent from MPMC in July 1999. The Topography outside the TSF area is from 1997 flyover.

Scale 50 0 50 100 150 200 250 m

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MOUNT POLLEY MINING CORPORATION

MOUNT POLLEY MINE

TAILINGS STORAGE FACILITY
STAGE 3 PERIMETER EMBANKMENT
PLAN
OPTION 2

DRG. NO.	DESCRIPTION
225	TSF - STAGE 3 PERIMETER EMBANKMENT - SECTIONS - OPTION 2
110	TSF - STAGE 3 MAIN EMBANKMENT - PLAN - OPTION 1

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	14APR'00	ISSUED FOR TENDER	JRK	TAM	KJB	KJB

REVISIONS

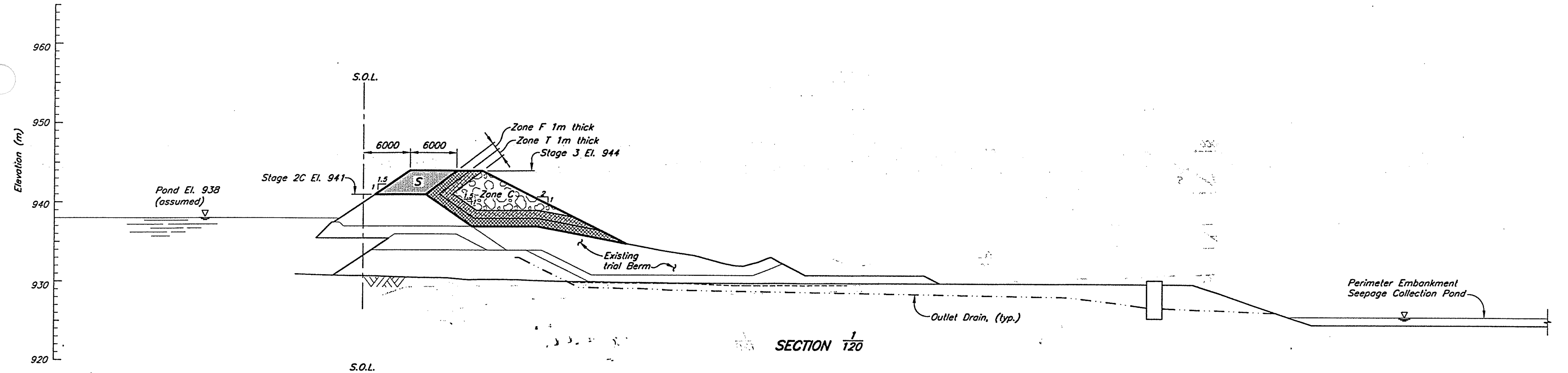
DESIGNED JRK | CHECKED KJB | DRAWN | APPROVED

Knight Piésold

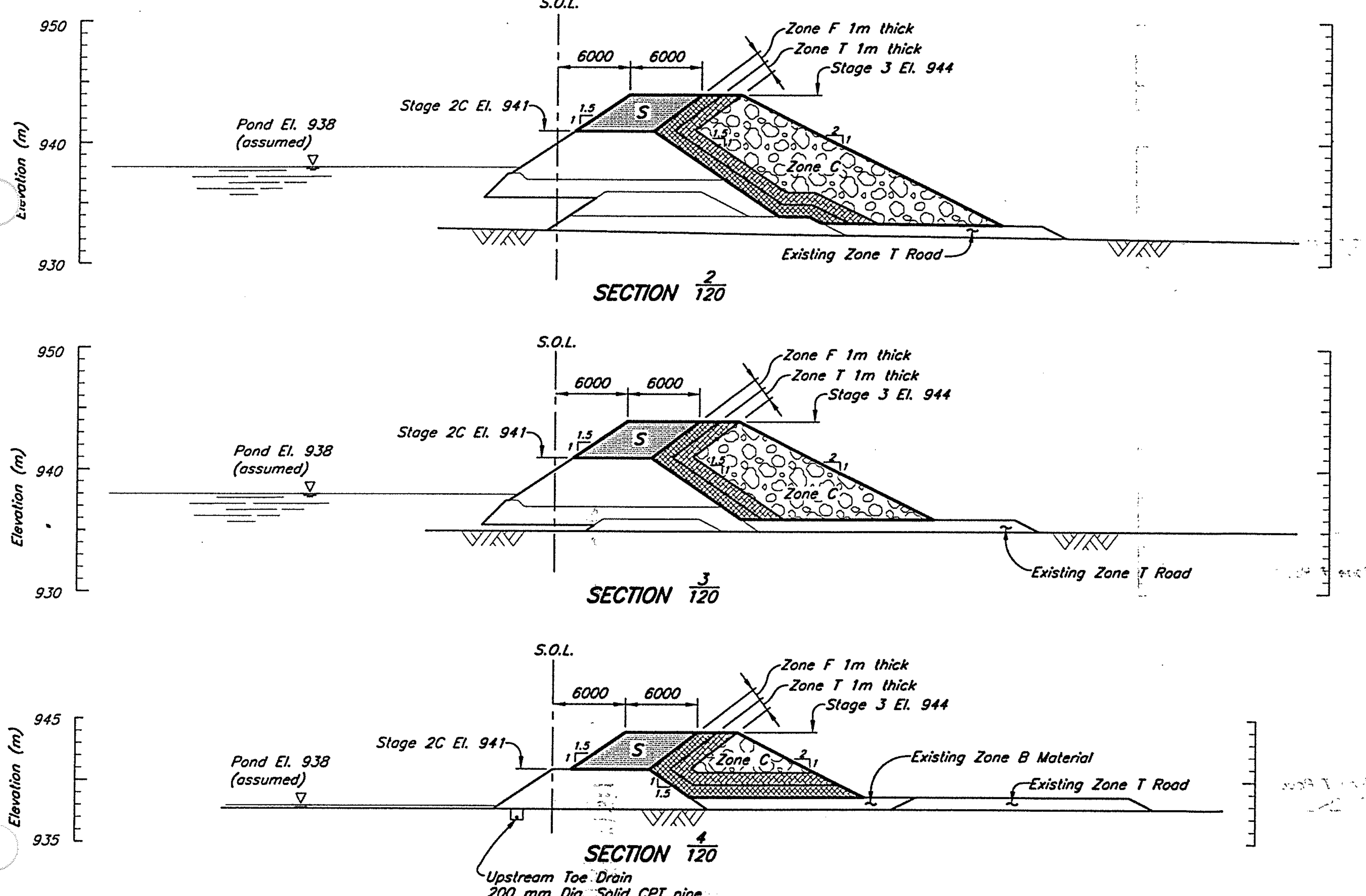
SCALE AS SHOWN | REVISION 0

DRAWING NO.

VANCOUVER B.C.



SECTION $\frac{1}{120}$



SECTION $\frac{2}{120}$

SECTION $\frac{3}{120}$

SECTION $\frac{4}{120}$

NOTES

1. All dimensions in millimetres with elevations in metres, unless noted otherwise.
2. For material specifications and legend see Drg. 104.

Scale 5 0 5 10 15 20 25 Metres

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MOUNT POLLEY MINE CORPORATION

MOUNT POLLEY MINE

TAILINGS STORAGE FACILITY
STAGE 3 PERIMETER EMBANKMENT
SECTIONS
OPTION 2

Knight Piésold

DESIGNED	CHECKED	SCALE	REVISION
JRK	WDE	AS SHOWN	0
DRAWN	APPROVED	DRAWING NO.	

DRG. NO.	DESCRIPTION
220	TSF - STAGE 3 PERIMETER EMBANKMENT - PLAN - OPTION 2
117	TSF - STAGE 3 - MAIN EMBANKMENT - MISCELLANEOUS DETAILS
104	TSF - STAGE 3 - MATERIAL SPECIFICATIONS

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	14APR'00	ISSUED FOR TENDER	JRK	TAM	WDE	KJB

REVISIONS