MOUNT POLLEY MINING CORPORATION
MOUNT POLLEY PROJECT
TAILINGS STORAGE FACILITY

OPERATION, MAINTENANCE AND SURVEILLANCE MANUAL FOR STAGE Ia EMBANKMENT (El. 927m) (REF. NO. 1627/1)

MARCH 11, 1997

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OPERATION, MAINTENANCE AND SURVEILLANCE MANUAL FOR STAGE Ia EMBANKMENT (El. 927m) (REF. NO. 1627/1)

SECTION 1.0 - GENERAL INFORMATION

1.1 PURPOSE OF PROJECT

Stage Ia is the first of the staged embankments for the Mount Polley Mine Tailings Storage Facility. Stage Ia construction was started in June, 1996 and was completed to El. 927 m in December, 1996 after a shutdown period for winter freeze-up. The Stage Ia embankment will initially function as a water storage dam and will store sufficient runoff and make-up water to enable the milling operations to commence. The embankment is currently being raised to the Stage Ib El. 934 m to allow for tailings discharge into the impoundment in June, 1997. The Stage II El. 937 m expansion is scheduled for completion in 1998, with ongoing expansions as required to provide storage retention for tailings.

The principal requirements of the Stage Ia embankment and associated facilities are :

- Secure and total confinement of all water within an engineered storage facility.
- Transport of runoff from future waste rock storage areas to the facility.
- Provision of make-up water for mine start-up and as required during the winter months when runoff values are low, thereby facilitating a controlled water balance over the life of the project.

- Inclusion of monitoring features for all aspects of the facility to ensure performance goals are achieved.

General features of the design are summarized below:

(i) An earthfill Main Embankment to retain runoff and make-up water within the facility. The Main Embankment has a vertical chimney drain, with a longitudinal collection drain and three outlet drains.

(ii) A foundation drainage system below the Main Embankment to prevent the build-up of pore pressures in foundation materials and to collect and convey any seepage away from the base of the embankment.

(iii) A low permeability soil liner within the reservoir basin.

(iv) A seepage collection pond excavated in low permeability soils downstream of the Main Embankment to store seepage and local runoff for recycle back into the facility.

(v) Instrumentation in the embankment foundations, fill and drains including vibrating wire piezometers and survey monuments.

(vi) A make-up water supply system comprising an intake on Polley Lake, with a pump and pipeline which discharges into the tailings storage facility.

(vii) Additional make-up water provided as runoff from future waste rock storage areas. Runoff is conveyed in a collection ditch to the Southeast Sediment Pond, located below the waste rock storage area. From the Southeast Sediment Pond, water can be directed to either the Reclaim Booster Pump Station or the T2 Tailings Drop Box. Runoff water then flows by gravity to the storage facility.

The general arrangement for Stage Ia is shown on Drawing No. 1625.205 in Appendix A. The design basis and operating criteria are presented on Table 1.1.

1.2 DAM ACCESS INFORMATION

The Mount Polley Mine is located in central British Columbia, approximately 60 km northeast of Williams Lake. The main access route is via the paved highway to Likely. The turn to the Mine is located approximately 1.5 km east of Morehead Lake. The Mine and Mill Site are located a further 11 km to the southeast, on the Bootjack Lake Forest Service Road.

Access to the Tailings Storage Facility is provided along the road for the tailings and reclaim pipelines which starts at the Mill Site. The Main Embankment is located approximately 5 km southeast of the Mine.

The Tailings Storage Facility can also be accessed from the Likely Highway by taking the Gavin Lake Forest Service Road which is approximately 14 km south of Morehead Lake. The Main Embankment is located at approximately km 16 on this road. The Gavin Lake Forest Service Road leads to Likely and a new section of the road was constructed, the Bootjack-Morehead Connector, where the previously existing road was crossed inside the Tailings Storage Facility.

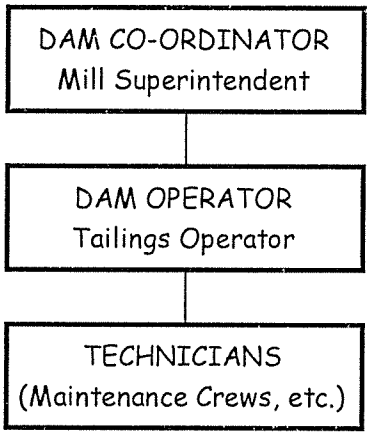
The location of the Mine and access roads are shown on Figure 1.1.

1.3 ASSIGNMENT OF RESPONSIBILITY

The administrative structure for the operation, maintenance and surveillance of the Stage Ia Embankment and related structures is illustrated by the preliminary organizational flow chart shown on the following page.

The responsibility for the day to day operation, maintenance and surveillance of the facility lies with the Dam Co-ordinator. During an emergency, any decisions regarding the procedures to be carried are the responsibility of the Dam Co-ordinator. In the event that the Dam Co-ordinator is not available, the responsibility is then delegated to the Dam Operator.

The Dam Co-ordinator's responsibilities include the preparation of reports covering all aspects of the operation, maintenance and surveillance of the facility. This will serve as a permanent record of operations which may then be available to other persons operating the facility, the Design Engineer or regulatory authorities, as necessary. The reports shall include all records of maintenance, inspection and monitoring and shall be kept in a centralized location.



Note: This preliminary organizational flow chart will be updated during development of the overall Tailings Facility Operating, Maintenance and Surveillance Manual.

1.4 INSPECTION FREQUENCIES AND COMMUNICATION

The Dam Co-ordinator is responsible for organizing an Annual Inspection and Formal Report on the condition of the Tailings Storage Facility. The Dam Operator, under the direction of the Dam Co-ordinator, is required to conduct daily visual inspections of the facility. This is in addition to the requirements for surveillance described in Section 4.0. The annual inspection of the entire tailings storage facility will be by a suitably qualified Professional Engineer.

Communication will be achieved by means of radio contact from the Mill Site to the Tailings Storage Facility. Telephones are available for off-site communication at the Mill Site.

A list of all parties and organizations involved in both the normal and emergency operation of the Tailings Storage Facility is included in Appendix C.

1.5 OTHER AGENCIES

Other relevant agencies involved in the operation, maintenance and surveillance of the Tailings Storage Facility include the Ministry of Employment and Investment (MEI), Ministry of Environment Lands and Parks (MELP), Ministry of Forests (MOF) and Department of Fisheries and Oceans (DFO).

1.6 TRAINING SCHEDULES

Training programs are required for the Dam Co-ordinator and Dam Operators or other person(s) involved in the operation, inspection and surveillance of the Tailings Storage Facility. The training program shall be conducted by a qualified Professional Engineer familiar with the design, operation, maintenance and inspection of all civil and mechanical works associated with the facility.

A refresher course shall be conducted once per year during the annual inspection by the Professional Engineer for all person(s) involved in the operation, maintenance and surveillance of the Tailings Storage Facility.

1.7 DATA REPORTING

A suitably qualified Professional Engineer shall provide Annual Inspection Reports for the Tailings Storage Facility. These reports shall be filed both at the Mount Polley Mine Site and with MELP, Water Management Branch. The Dam Co-ordinator and Dam Operators shall maintain a daily log of all visual inspections and readings, which shall be filed in the office at the Mine in a central location. This information should be available at all times for review by Government Agencies or other relevant parties.

All instrumentation data, including piezometer, water level and flow meter readings, or others as prescribed in Section 4.0, shall be recorded on an on-going basis. These records shall be filed on-site in an organized manner to allow immediate access.

Details of instrumentation and data reporting are included in Section 4.0.

1.8 OPERATING LOG

An Operating Log shall be maintained for each of the components of the Tailings Storage Facility, including the following:

- Southeast Sediment Pond and Pipeline
- Polley Lake Pump Station
- Polley Lake Pipeline
- Tailings Pipeline
- T2 Dropbox
- Main Embankment
- Main Embankment Foundation Drain System
- Main Embankment Seepage Collection Pond

The log should contain a chronological record of all events in order to provide a continuing record of the operating activities, as well as to provide information on possible equipment problems or the development of unusual conditions for each of the components. The logged record shall be maintained by the Dam Co-ordinator or designated operating personnel.

1.9 PUBLIC SAFETY

It is the duty of the person(s) operating the Tailings Storage Facility to report any unsafe working conditions or unsafe conditions relating to the operation of the facility to the Dam Co-ordinator.

Public access shall not be permitted to the tailings storage facility from the Mine and Mill Site. However, the Bootjack-Morehead Connector is a forestry road which

passes along the downstream side of the Main Embankment Seepage Collection Pond. In the event that emergency services are required, the closest medical emergency station is at the Mill Site. Emergencies requiring medical evacuation will be by vehicle or helicopter to Williams Lake. Emergency procedures and protocol shall follow the procedures for the Mill Site, as prescribed by the Mount Polley Mining Corporation. The closest police station is in Williams Lake. Details of the medical and emergency facilities are included in the Communications Directory in Appendix C.

1.10 RESTRICTED AREAS

Certain areas are restricted to unauthorized workers and include, but may not be limited to, the following:

- T2 Tailings Dropbox
- Reclaim Pump Station
- Southeast Sediment Pond Sump
- Polley Lake Pump Station
- Stage Ia Main Embankment
- Main Embankment Drain Monitoring Sump
- Main Embankment Seepage Collection Pond and Seepage Recycle Sump
- Main Embankment Instrumentation Hut
- Reclaim Barge Pump Station

It is the responsibility of the Dam Co-ordinator to post restricted access signs in the appropriate areas, when and as required.

1.11 SECURITY PLANS

There are no security plans at present other than those required for Emergency Plans, included in Section 5.0.

1.12 DISTRIBUTION OF MANUAL

The following is the distribution list for the Operation, Maintenance and Surveillance Manual:

- One (1) copy for Mount Polley Mining Corporation (Vancouver office)
- One (1) copy for Dam Co-ordinator's office
- One (1) copy for Dam Operator
- Three (3) copies for Comptroller of Water Rights
- One (1) copy for the Regional Water Manager (Williams Lake)
- Two (2) copies for the Director of the Provincial Emergency Program (P.E.P)
- One (1) copy for the MELP, Dam Safety Engineer
- One (1) copy for the MEI, Geotechnical Manager
- One (1) copy for Design Engineer of Record.

Mount Polley Mining Corporation is responsible for maintaining the record of the location of each copy of the Manual and to ensure all copies are updated as and when required.

1.13 REVISIONS TO MANUAL

This Operation, Maintenance and Surveillance Manual will be updated and reissued in April, 1997, prior to the commencement of mining operations. It will form a part of the overall Tailings Storage Facility Operating Manual.

Reviews to the Manual will be conducted on an annual basis as per the Emergency Plan outlined in Section 5.0 and as part of the annual inspection for the Tailings Storage Facility. Revisions to the Manual will be made as and when required to reflect current operating, maintenance and surveillance practices. This Manual will be finalized one (1) year after the start of operations.

1.14 SUPPORTING DOCUMENTS

The following is a list of the relevant supporting documents and information to support the operation, maintenance and surveillance of Stage Ia of the facility:

1. Construction Drawings, Appendix A (Current "For Construction" Drawings are included. These Drawings will be updated with as-built information when Stage Ib construction is complete.
2. Design Basis and Operating Criteria, Table 1.1
3. Instrumentation Installations (see Drawings)
4. Facilities Security Plan, Provincial Emergency Program (P.E.P.)
5. Maintenance Procedures (see Section 3.0)
6. Communications Directory, Appendix C

1.15 REFERENCE MATERIAL

The following documents provide background information to support this manual.

1. Imperial Metals Corp., Mt. Polley Project, Report on Project Water Management, Ref. No. 1624/1, February 6, 1995.

2. Imperial Metals Corp., Mt. Polley Project, Groundwater Monitoring Program, Ref. No. 1624/2, June 3, 1996.

3. Imperial Metals Corp., Mt. Polley Project, Tailings Storage Facility, Design Report, Ref. No. 1625/1, May 26, 1995.

4. Imperial Metals Corp., Mt. Polley Project, Tailings Storage Facility, Site Inspection Manual, Ref. No. 1625/2, May 26, 1995.

5. Imperial Metals Corp., Mt. Polley Project, Response to Review Comments on Tailings Embankment Design, Ref. No. 1625/6, January 25, 1996.

6. Imperial Metals Corp., Mt. Polley Project, Report on Geotechnical Investigations and Design of Open Pits and Waste Dumps, Ref. No. 1628/1, July 5, 1996.

The following additional reference documents are currently in progress :

7. Imperial Metals Corp., Mt. Polley Project, Tailings Storage Facility, Updated Design Report, Ref. No. 1627/2.

8. Imperial Metals Corp., Mt. Polley Project, 1996 Groundwater Monitoring Well Installation Program, Ref. No. 1628/4.

In addition, a Construction Report for the Tailings Storage Facility will be issued after Stage Ib construction has been completed.

SECTION 2.0 - OPERATION

2.1 GENERAL

This section specifies the operating procedures and restrictions which must be followed for the operation of Stage Ia of the Tailings Storage Facility. The operating criteria for each component are summarized in Table 2.1.

The Stage Ia embankment will function as a water storage dam and will store sufficient runoff and make-up water to enable the milling operations to commence in June, 1997. The components for the facility are shown on the Drawings in Appendix A.

The consequence of failure of the Stage Ia embankment is considered to be significant due to the loss of storage, potential damage to downstream structures and possible impact on fisheries habitat due to erosion and siltation. Failure of the Stage Ia dam would not represent a significant threat to human life or property.

2.2 RESERVOIR LEVELS AND FLOOD OPERATION

(a) Freeboard and Reservoir Levels

The minimum operating and flood levels for the embankment are shown on Table 2.1 and on Figure 2.1. Adequate freeboard will be maintained so that the design storm event (24 hour PMP) can be contained within the facility. In addition, one metre of freeboard will be maintained above the PMP level for wave run-up. The embankment is currently being raised to El. 934 m (Stage Ib) as part of the initial construction program, thereby providing an additional contingency for ensuring that all inflows will be contained.

(b) Normal Operation

During normal operation of the facility, surface runoff from the tailings area catchment will flow into the facility and will be impounded against the Main Embankment. Make-up water originating from the Southeast Sediment Pond

will flow through the tailings line via gravity and will be discharged into the facility through the tailings dump valve (Mark I) at the northwest corner of the facility. Additional make-up water from the Polley Lake Pump Station will enter the facility from the pipeline on the tailings access road above the Perimeter Embankment. This component of the make-up water will be pumped as required and the volume can therefore be controlled.

The Stage Ia embankment has a total storage capacity of 2,700,000 cubic metres at crest El. 927 m. The maximum volume of water that can be stored within the Stage Ia facility is approximately 1,400,000 cubic metres, corresponding to a pond level at El. 924.5 m. This level is based on the provision for 1 m for wave run-up and additional freeboard to contain the design storm event (24 hour PMP), which has a volume of 679,000 cubic metres. The water will be stored during the three (3) month period from March to June, 1997.

Details of the operation of Stage Ia of the Tailings Storage Facility are included in Appendix B.

(c) Flood Operation

No special flood operating procedures are required for Stage Ia of the Tailings Storage Facility because there is sufficient capacity to store the design storm event within the facility at all times. As stated above, the Stage Ia embankment is currently being raised during Stage 1b construction which is scheduled for completion in March, 1997. In addition, the flow of make-up water from the Polley Lake Pump Station is controlled and can be stopped when and as required.

Provisions are included at the Tailings Storage Facility for storing the 24 hour Probable Maximum Precipitation (PMP) event for all stages of operations. Also, the Stage 1b crest elevation of 934 m includes an allowance to store 2.5 million cubic metres of make-up water in the facility.

2.3 RESERVOIR FILLING AND DRAWDOWN

There are no restrictions on the filling of the facility with respect to dam safety. Also, there are no special provisions for emergency drawdown within the impoundment. The only time that the water level is expected to drop is during the commissioning of the mill, when the initial filling of the system occurs. In the event that an unusual or unexpected requirement for drawdown of the pond water is required, drawdown will be facilitated by pumping using the reclaim barge or the Polley Lake Pump which could be temporarily relocated to the tailings facility.

2.4 DISCHARGE FACILITIES

No discharge facilities have been incorporated in the design because the freeboard required to store the design storm event will be maintained within the facility at all times. Also, the Stage Ia embankment is currently being raised during Stage Ib construction, and will be complete in early 1997. In addition, the flow of make-up water from the Polley Lake Pump Station is controlled and can be stopped when and as required.

SECTION 3.0 - MAINTENANCE

3.1 GENERAL

Regularly scheduled maintenance is required for some facilities to ensure the serviceability and integrity of the Tailings Storage Facility. Maintenance is also required as defined by inspection requirements or by unsatisfactory performance.

3.2 MAINTENANCE REQUIREMENTS

The maintenance requirements for Stage Ia of the Tailings Storage Facility, including all associated facilities and works, are the responsibility of the Mount Polley Mining Corporation.

The following facilities require regular inspection and maintenance to ensure on-going safety and operation of the system:

- Runoff collection ditch at base of future waste rock storage area, including removal of slough or debris material.
- Southeast Sediment Pond, including decant tower and pipework.
- Tailings Pipeline and Pipe Containment Channel.
- Reclaim Sumps, valves and pipework.
- T2 dropbox and pipework.
- Polley Lake Pump Station, including intake, pumps, flow monitor, and pipeline.
- Seepage collection sumps and pumping systems.

Other items which require periodic maintenance, as determined by inspection and/or performance include:

- Survey control pins.
- Surface movement monuments.
- Piezometers and terminal panels.
- Drain Monitoring Sump.
- Dam slopes, including removal of debris and vegetation .
- Seepage Collection Pond slopes.
- Communication system.

A list of items requiring maintenance for dam safety is included in Table 3.1. Records shall be kept of all maintenance activities in accordance with this Manual so that they may be reviewed during each Annual Inspection or as required at any time during operations.

SECTION 4.0 - SURVEILLANCE

4.1 GENERAL

The continuing satisfactory and safe performance of the Tailings Storage Facility is determined by surveillance which includes detailed monitoring, inspection and testing. All components of the facility are designed for the required design loading conditions and as per the design criteria, relating to the hydrologic parameters and the flow control/release requirements and commitments.

The following subsections discuss the requirements for the surveillance of the embankment and its associated facilities, including inspections, monitoring, evaluation and correction of any deficiencies for the safe and effective operation of the facility.

4.2 INSPECTIONS AND TESTS

4.2.1 General

To ensure the serviceability and integrity of the Tailings Storage Facility, all components required for the proper operation and monitoring of the embankment and associated structures shall be regularly inspected. The information obtained during the inspections is to be retained and filed for use in assessing the current condition of the facilities, to detect any deterioration or signs of deterioration, and to determine a program of regular or special maintenance and repair. If at any time an inspection reveals that structures or equipment are inoperative or in a condition which could jeopardize the safety or continued operation of the facility, prompt repair or replacement shall be carried out.

All components essential to the safe operation or to the continued monitoring of the facility shall be operated and/or tested on a regular basis to demonstrate their serviceability and reliability.

The type and scope of inspections and testing requirements for each component of Stage Ia of the Tailings Storage Facility are outlined in the following subsections. The minimum frequency of inspections and tests is specified in Table 4.1. The frequency of monitoring for the instrumentation is included in Table 4.2.

4.2.2 Routine Inspections

Routine inspections provide, to the maximum extent practical, continuous surveillance of the facility. The inspections shall be carried out by a Dam Operator, under the direction of the Dam Co-ordinator, with sufficient training, experience and demonstrated understanding of the operation of the facilities to recognize abnormal and/or potentially dangerous conditions with respect to dam safety. The Operator shall have a working knowledge of the operational and design features of the system relevant to the inspection requirements.

Routine Inspection Checklists are to be used to ensure that all appropriate observations are made and abnormal conditions reported. Photographs should be taken of any abnormal conditions and filed with the inspection reports.

An Inspection Log Form is to be kept on-site at the office of the Dam Co-ordinator for routine inspections. The Log is to be signed by the Dam Operator following each inspection. If abnormal conditions are observed, it is the responsibility of the Dam Operator to identify the nature of the conditions in the Log and submit the completed checklist describing the conditions in detail to the Dam Co-ordinator. A copy of the checklist is to be sent to the Design Engineer and the Geotechnical Branch of the Ministry of Employment and Investment. The Dam Co-ordinator shall take appropriate action to resolve any abnormal conditions. Any changes or defects which could affect the safety of the facility are to be promptly reported to the Design Engineer, as outlined in the Emergency Preparedness Plan (EPP).

4.2.3 Intermediate Inspections

(i) Civil and Structural

Inspections of the civil and structural works are to be carried out on an annual basis, or as required, if abnormal conditions or a particular hazard arises. The inspections shall be performed according to the schedules listed in Table 4.1.

The extent and detail of the Civil Inspections shall be sufficient to assess the integrity and performance of the civil and structural works and shall be carried out by a suitably qualified person. Civil Inspection Checklists are to be completed with appropriate comments and descriptions.

An inspection report summarizing the results of the inspection shall be prepared.

(ii) Mechanical Equipment

Intermediate inspections shall be performed for all the mechanical equipment according to the schedule listed in Table 4.1. Equipment Inspection Checklists are to be used to ensure that appropriate observations are made and abnormal conditions reported.

The extent and detail of the Equipment Inspections shall be sufficient to assess the integrity and performance of the mechanical equipment and shall be carried out by a suitably qualified person. Intermediate Equipment Inspection Checklists are to be completed with appropriate comments and descriptions.

An inspection report summarizing the results of the inspection shall be prepared.

4.2.4 Equipment Tests

(i) Pumps:

Any pumps (including backups) shall be operated or tested on a regular basis. These tests should be carried out prior to reservoir filling.

(ii) Valves:

Valves should be tested twice per year, or as required, to ensure effective operation.

4.2.5 Special Inspections

Special inspections will be required during initial reservoir filling and may be required following a major flood, earthquake or other event which may have affected the operation of the equipment or damaged the facilities. Special inspections may also be required to investigate a problem noted during any inspection or review, or to comply with EPP requirements.

4.3 INSTRUMENTATION

Instrumentation is installed at the Tailings Storage Facility to monitor the performance of the embankment and associated structures, and to detect abnormal conditions relevant to dam safety. The instrumentation is to be maintained in a serviceable and operational state and includes the following:

- Piezometers in the foundation, drains and embankment fill to monitor pore water pressures.

- Individual outlet pipes for the embankment foundation drains for measuring flows and to enable the collection of water quality samples.

- Surface movement monuments to monitor vertical and lateral movement of the earthfill dams.

Instrumentation records, and any additions or modifications to the instrumentation is the responsibility of the Dam Co-ordinator. All instrumentation is to be clearly marked and buried in trenches, as shown on the Drawings, to prevent damage. The frequency of readings for the instrumentation is shown in Table 4.2.

4.4 INCREASED LEVELS OF SURVEILLANCE

Increased levels of surveillance are required during the construction period, during initial reservoir filling, or during or following any major flood, earthquake, or other event which may affect the operation of the facility. Increased site surveillance shall also be initiated whenever immediate on-site observation is required for the following:

- To rapidly evaluate conditions and to initiate operational or remedial measures to ensure the safety of the facility.

- To implement the EPP.

- To monitor unusual operating conditions for future assessments.

The Design Engineer of Record shall be consulted and/or advised in the event that such circumstances arise requiring increased surveillance. The level of increased surveillance shall then be determined in direct consultation with the Design Engineer. In any case, increased site surveillance shall be maintained until the condition posing the safety concern has been assessed and it has been determined that there is no longer a danger to the facility.

Increased site surveillance will be required, but not limited to, the following conditions or circumstances:

(i) During Initial Reservoir Filling

(ii) Floods

- Reservoir levels exceeding the specified maximum flood levels.
- Excessive rise in the reservoir levels.

(iii) Earthquake

- Immediately following a major earthquake.

(iv) Unusual Observations

- Abnormally high piezometric levels.
- Settlement, cracks and/or slumping of the embankment.
- Sinkholes along slope(s) of the embankment.
- Failure or substantial movement of reservoir slopes.
- Slope failure or seepage flows from the embankment slopes.
- Increased or contaminated flow from foundation drain outlet pipes.
- Damage to any component of the facility.

Downstream toe + foundation soils, at about 4

SECTION 5.0 - EMERGENCY PLANNING AND COMMUNICATIONS DIRECTORY

5.1 GENERAL

The Emergency Preparedness Plan (EPP) facilitates mobilization of manpower and equipment, and allows emergency officials to establish warning and evacuation procedures for the protection of downstream facilities.

Due to the remote location of the Mount Polley Mine, there is no increased potential for loss of life to the public in the event of failure of the Tailings Storage Facility. As such, the primary intent of the EPP is to minimize environmental impacts associated with failure of the Embankment, and to minimize costs for remediation during operations. At closure the tailings surface will be revegetated and a wetlands area will be constructed, with a spillway to re-establish original flows.

Note: Details of the EPP will be finalized during the first year of operations and will form part of the overall emergency plan for the Mine.

5.2 EMERGENCY PLAN

The operation of the Tailings Storage Facility is the responsibility of the Dam Co-ordinator. During an emergency any decisions regarding the procedures to be carried out for the facility will be made by the Dam Co-ordinator. In the event that the Dam Co-ordinator is not available, responsibility is then delegated to the Dam Operator, General Foreman or other Supervisory Personnel.

The Dam Co-ordinator shall be responsible for briefing the Dam Operator, General Foreman and all Supervisory Personnel on the EPP, including relevant emergency procedures and protocol. The EPP shall be distributed as follows:

- One (1) copy for the Dam Co-ordinator's Office
- One (1) copy for the Office (near office radio and telephone)
- One (1) copy for the Dam Operator

- Three (3) copies for the Comptroller of Water Rights
- One (1) copy for the Regional Water Manager (Williams Lake, B.C.)
- Two (2) copies for the Director of the EPP
- One (1) copy for the Manager of MELP, Water Branch
- One (1) copy for the Design Engineer of Record.

5.3 EMERGENCY SITUATIONS AND RESPONSES

The emergency situations and corresponding responses and action measures to be taken for the Tailings Storage Facility are listed in Table 5.1. This list is subject to change and should be reviewed following the first year of operations.

5.4 COMMUNICATION SYSTEMS AND DIRECTORIES

The communication systems include a listing of all relevant Government Ministries, EPP Personnel, Police authorities and emergency assistance agencies which the Dam Co-ordinator and his supervisory office may need to contact in the event of an emergency. The Communications Directory is included in Appendix C.

Note: This directory is preliminary only and will need to be revised prior to issuing the overall Operations, Maintenance and Surveillance Manual for the tailings impoundment.

5.5 CONSTRUCTION EQUIPMENT AND MATERIALS

Construction equipment will be available at the Mine, approximately 5 km from the Tailings Storage Facility. The equipment will include, but will not be limited to, an excavator, a grader and a bulldozer. The equipment will be used to repair any slumped or scoured areas along embankment slopes, or to construct other key cuts or fills etc.

Materials will be available both at the Tailings Storage Facility and at the Mine for use in repairing or remediating any damaged areas. Local stockpiles of riprap, glacial till and sands and gravels will be available for periodic maintenance or for

emergency use. Sources of cement, plastic sheeting, filter fabric, miscellaneous pipework and spare parts etc. will be available at the Mine, as required.

The tailings solids can also be used for mitigating and controlling seepage losses through foundation materials or fill zones if necessary. The tailings deposition requirement and contingency discharge measures will be outlined in the updated version of this document.

5.6 REVIEWS

Reviews of the Emergency Plan shall be administered by the Dam Co-ordinator on an annual basis as follows:

- Names and phone numbers of designated officials shall be verified and updated as required.

- All relevant personnel shall be given a refresher briefing on the EPP and routine inspection procedures, particularly with respect to any changes to the EPP or the inspection procedures.

- The EPP shall be reviewed for the adequacy following each inspection by the Ministry of Environment, Lands and Parks, Water Management Branch (once every 2 years, or as required).

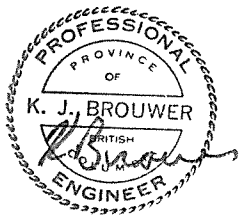


TABLE 1.1

MOUNT POLLEY MINING CORPORATION
MOUNT POLLEY PROJECT
TAILINGS STORAGE FACILITY
STAGE Ia El. 927m

DESIGN BASIS AND OPERATING CRITERIA

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1.0 GENERAL DESIGN CRITERIA	
Item	**Design Criteria**
Scope	Generally applicable to all components and structures including those summarized in the sections that follow
Regulations	MEI MELP (Water Management Branch)
Codes and Standards	NBC and related codes CAN/CSA HSRC (Health, Safety and Reclamation Code for Mines in B.C.) ASTM ACI ANSI
Design Life	14 Years
Operational Criteria: General	NBC where relevant
Rainfall/Precipitation:	Section 2.1 (Ref. No. 1625/1) and (Ref. No. 1624/1)
Seismic:	
DBE (operations)	M = 6.5, A max. = 0.037 g
MDE (closure)	M = 6.5, A max. = 0.065 g

State numbers

TABLE 1.1 (CONT'D)

DESIGN BASIS AND OPERATING CRITERIA

2.0 TAILINGS BASIN	
Item	**Design Criteria**
Site Selection	Section 4.0 (Ref. No. 1625/1) and (Ref. No. 1621/1) • Capacity and filling characteristics. • Hydrology and downstream water usage. • Hydrogeology and groundwater regime. • Aesthetics and visual impact. • Foundation conditions. • Construction requirement. • Closure and reclamation requirements. • Capital and operating costs.
Geotechnical Conditions	Section 5.0 (Ref. No. 1625/1) and (Ref. No. 1623/1). Also, see Updated Design Report (Ref. No. 1627/2), soon to be issued.
Basin Liner	• Compacted glacial till with frost protection layer required in areas with <2 m in-situ glacial till. • Liner placed in 3 - 150 mm lifts. • Liner compacted to 95% Std. Proctor max. dry density (ASTM D698) at optimum moisture content minus 1% to plus 2%.
Embankment Foundation Drains	• Installed in Main Embankment Foundation. • Geotextile wrapped 1m x 1m gravel/drain with 4" perforated CPT drain pipe. • Drain conveyance pipes are HDPE. • Discharge to seepage collection pond via drain monitoring sump.
Stripping	• Required only at areas directly affected by construction (embankments, basin liners, seepage collection ponds, reclaim barge channel, stockpiles, roads etc.). • Remove organic soil to topsoil stockpiles.

TABLE 1.1 (CONT'D)

DESIGN BASIS AND OPERATING CRITERIA

3.0 TAILINGS EMBANKMENT		
Item		**Design Criteria**
Function		• Storage of tailings and process water for design life. • Provide storage for 24 hour PMP storm. • Provision for routing PMF at closure.
Embankment Crest Width		8 m starter dam and 8 m final dam.
Embankment Height (Max):	Starter	15 m (Crest El. 927 m)
	Final	53 m (Crest El. 965 m)
Embankment Crest Length:	Starter	800 m
	Final	4500 m
Design Tonnage		6,500,000 tpy (17,808) tpd
Solids Content of Tailings Stream		• 35% (before Mill Site and waste dump runoff added to tailings stream)
Freeboard:	Operations	24 hour PMP event (679,000 m^3) plus 1.0m wave runup on 2.5 million m^3 operational storage pond.
	Closure	Sufficient to provide routing of PMF plus wave run-up.
Storage Capacity		84.5 million tonnes.
Tailings Density:	Year 1	1.1 t/m^3
	Year 2	1.2 t/m^3
	Year 3-14	1.3 t/m^3
Tailings Specific Gravity		2.78
Borrow Material Properties		1995 Site Investigation Report (Ref No 1623/1), plus Section 5.2 (Ref No 1625/1). Also, see Updated Design Report (Ref No 1627/2) soon to be issued.
Construction Diversion		Not required.
Emergency Spillway Flows:	Operations	Not required.
	Closure	Design flow for routing PMF event.
Filling Rate		Figure 6.3 (Ref. No. 1625/1). Also, see Updated Design Report (Ref. No. 1627/2), soon to be issued.
Fill Material Properties		Drg. No. 1625.212
Compaction Requirements		Drg. No. 1625.211
Geotechnical Data		1995 Site Investigation Report (Ref. No. 1623/1), plus Section 5.1 (Ref. No. 1625/1). Also, see Updated Design Report (Ref. No. 1627/2), soon to be issued.
Stability Analysis		Section 6.7 (Ref. No. 1625/1). Revised for Updated Design Report (Ref, No. 1627/2), soon to be issued.
Seepage Analysis		Section 7.0 (Ref. No. 1625/1). Revised for Updated Design Report (Ref, No. 1627/2), soon to be issued.
Sediment Control		Primary control from Main Embankment. Main Embankment Seepage Collection Pond provides secondary sediment control.
Seepage Control		Seepage collection pond and pumpback well system.
Seismic Parameters		Section 2.3, (Ref. No. 1625/1).
Spillway Discharge Capacity		Not required during operations.
Settlement		Section 6.0, (Ref. No. 1625/1).
Surface Erosion Protection		Revegetation with grasses on final embankment slope.

TABLE 1.1 (CONT'D)

DESIGN BASIS AND OPERATING CRITERIA

4.0 PIPEWORKS	
Item	**Design Criteria**
4.1 Tailings Delivery and Discharge Pipework	Section 9.2 (Ref. No. 1625/1) and Drg. Nos. 1625.218, 225, 226, 227, 228.
Function	Transport tailings slurry and mill site and waste dump runoff to Tailings Storage Facility (TSF).
Tailings Pipeline	• Free draining, gravity flow pipeline. • Butt fusion welded HDPE with 30" DR15.5, 22" DR17 and 24" DR15.5.
Spigots	• Pipeline sectioned on tailings embankment crest.
Flow Rate	• Design throughput 900 tonnes/hr dry solids. • Slurry solids content 35%. • Design flow 19.6 cfs (0.55m^3/s). Increases to 23.8cfs (0.67m^3/s) at 30% solids content with addition of 4.2cfs storm water runoff.. • Waste dump runoff will be added to tailings stream, increasing flow and decreasing solids content (possibly Mill Site runoff also).
Spill Containment: - Mill site to Bootjack Creek - Bootjack Creek Crossing - Bootjack Creek to TSF	 Pipeline laid in pipe containment channel. There is an overflow pond for the T2 dropbox. Pipeline sleeved in pipe containment channel. Pipeline laid in pipe containment channel.
Millsite and Waste Dump Runoff	• Collected in sediment control ponds. • Added to tailings stream at in-line drop boxes. • See Drg Nos. 1625.218, 225, 226, 227, 228.
4.2 Reclaim Water System	
Function	Primary source of water for milling process. (Designed by Others.)
Reclaim Barge	• Prefabricated pump station on barge in excavated channel in TSF. • Local and remote control from millsite.
Reclaim Pipeline	• 24" pipeline with a steel section at the reclaim barge and HDPE with varying pressure ratings along length.
Reclaim Booster Pump Station	• Prefabricated pump station located between TSF and mill site. • Identical pumps, sensors and controls as reclaim barge for ease of maintenance.
Spill Containment	• See Item 4.1 above, all same for pipelines. • Booster pump station has closed sump.
4.3 Seepage Recycle System	
Function	Return seepage and foundation drain flows to TSF.
Drain Monitoring Sumps	Flow quantity and water quality measurements on individual drains.
Seepage Collection Ponds	• Sized to hold 10 times max. weekly flow quantity. • Low permeability natural soil liner, operated as groundwater sink.
Seepage Recycle Pumps	• Set in vertical pump sumps. • 4" submersible pumps. • Pumps discharge back to TSF via 4" HDPE pipes.

TABLE 1.1 (CONT'D)

DESIGN BASIS AND OPERATING CRITERIA

5.0 MAKE-UP WATER SUPPLY	
Item	**Design Criteria**
5.1 General	
Function	To direct runoff from the mill site and Southeast Sediment pond to the TSF, providing additional water for recycle to the mill. Also, to implement the Polley Lake Pump Station when and as required to meet the project Water Management Plan objectives.
Reference	• Section 8 and Appendix A (Ref. No. 1615/1). Revised for Updated Design Report (Ref, No. 1627/2), soon to be issued. • Dwg. Nos. 1625.114 and 1625.115.
5.2 Mill Site Sump	
Catchment Area	Approx. 20 ha direct catchment, plus pit dewatering.
Design Storm	1.5 x 1 in 10 yr. 24 hour event runoff (6,000 m^3)
Sump Cross-Section	3:1 inside slope, 2:1 outside slope, 4m crest width. See Dwg. No. 1625.232.
Normal Operating Level	1102.7 m
Maximum Operating Level	1103.8 m
Flow Control Structures	See Dwg. No. 1625.232 for layout details.
Discharge Pipe	300 mm HDPE DR 21 to plant or tailings line.
Flow Monitoring	None.
5.3 Southeast Sediment Pond	
Catchment Area	Approx. 150 ha direct catchment.
Design Storm	1 in 10 yr. 24 hour event runoff (25,000 m^3)
Sump Cross-Section	3:1 inside slope, 2:1 outside slope, 4m crest width. See Dwg. No. 1625.2324.
Normal Operating Level	(to be confirmed when completed)
Maximum Operating Level	(to be confirmed when completed)
Flow Control Structures	See Dwg. No. 1625.232 for layout details.
Discharge Pipe	250mm HDPE DR 21 to Reclaim sump or T2 dropbox
Flow Monitoring	None.
5.4 Polley Lake Pump Station	Report and Drawings soon to be issued.
Max. Volume to be extracted	1,000,000 m^3 annually
Period for water extraction	Freshet
Max. Intake Velocity	0.11 m/s
Intake Screen Opening	0.1 inch (No. 8 Mesh wire cloth)
Spill Containment at Pump	Collection into a Holding Basin
Discharge Pipe	22 ½ inch ID, 350 ft of 19 ½ inch ID and 5200 ft of 17 ½ inch ID pipe.
Max. Flow	7,500 US GPM (to be determined after alignment finalized)
Flow Monitoring	Water level on Polley Lake, pumping hours times measured flow rate.
Security and Access	Signs for buried or submerged components, buoys attached to intake in Polley Lake.

TABLE 1.1 (CONT'D)

DESIGN BASIS AND OPERATING CRITERIA

6.0 INSTRUMENTATION AND MONITORING	
Item	**Design Criteria**
6.1 General	
Function	To quantify environmental conditions and performance characteristics of the TSF to ensure compliance with design objectives.
Reference	• Section 10.0 (Ref. No. 1625/1) • Drg. Nos. 1625.202, 210, 220, 221
6.2 Geotechnical I & M	
Piezometers	• Measure pore pressures in drains, foundations, fills and tailings. • Vibrating wire piezometers. • Installed by qualified technical personnel. • Three instrumentation planes for Main Embankment and one for Perimeter Embankment.
Survey Monuments	• Deformation and settlement monitoring of embankments.
6.3 Flow Monitoring	• To provide data for on-going water balance calculations. • Drain flows regularly monitored. • Reclaim and seepage pump systems flow meters. • Tailings output monitored at millsite. • Streamflow monitoring.
6.4 Water Quality Monitoring	• To ensure environmental compliance. • Water quality samples taken at regular intervals from sediment ponds, drains (at drain monitor sump), groundwater monitoring wells, seepage ponds and tailings pond. • Upstream and downstream samples for impact analysis.
6.5 Hydrometeorology	• Operator weather station for input to water balance calculations. • Precipitation (rain and snow). • Evaporation. • Air quality monitoring (dust, etc.).
6.6 Operational Monitoring	• Quantify operation of tailings storage facility. • Rate of tailings accumulation in terms of mass and volume. • Tailings characteristics and water recovery. • Supernatant pond (depth, area and volume).

TABLE 1.1 (CONT'D)

DESIGN BASIS AND OPERATING CRITERIA

7.0 CLOSURE REQUIREMENTS	
Item	**Design Criteria**
7.1 General	Return impoundment to equivalent pre-mining use and productivity by establishing a wetland area adjacent to a final spillway and re-vegetating remainder of tailings surface with indigenous species of trees, shrubs and grasses adjacent to embankment grading to aquatic species along and adjacent to final pond.
7.2 Spillway	Two stage spillway with lower channel outlet designed to pass 1 in 200 yr. 24 hour flood event and upper wider outlet section designed to pass Probable Maximum Flood without overtopping embankments.

Notes:

1. The closure plan will remain flexible during operations to allow for future changes in the mine plan and to incorporate information from on-going reclamation programs.

TABLE 1.1 (CONT'D)

DESIGN BASIS AND OPERATING CRITERIA

7.0 CLOSURE REQUIREMENTS	
Item	**Design Criteria**
7.1 General	Return impoundment to equivalent pre-mining use and productivity by establishing a wetland area adjacent to a final spillway and re-vegetating remainder of tailings surface with indigenous species of trees, shrubs and grasses adjacent to embankment grading to aquatic species along and adjacent to final pond.
7.2 Spillway	Two stage spillway with lower channel outlet designed to pass 1 in 200 yr. 24 hour flood event and upper wider outlet section designed to pass Probable Maximum Flood without overtopping embankments.

Notes:

1. The closure plan will remain flexible during operations to allow for future changes in the mine plan and to incorporate information from on-going reclamation programs.

TABLE 4.1

MOUNT POLLEY MINING CORPORATION
MOUNT POLLEY PROJECT
TAILINGS STORAGE FACILITY
STAGE Ia El. 927m

MINIMUM FREQUENCY OF INSPECTIONS AND TESTS

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ITEM	INSPECTION FREQUENCY	
	Weekly	Annually
1. INSPECTIONS:		
a. Routine	x	
b. Intermediate		
- earthfills	x	
- pipelines	x	
- civil	x	
- mechanical equipment		x
- electrical equipment		x
2. TESTS:		
a. Portable Generators / Pumps		
- no load		x
- under full load		x
b. Valves / Flowmeters		x
3. EPP TESTS *:		
a. Communications Tests		x
b. Operational Tests		x

* EPP = Emergency Preparedness Plan

Knight Piésold Ltd.
CONSULTING ENGINEERS

TABLE 4.2

MOUNT POLLEY MINING CORPORATION
MOUNT POLLEY PROJECT
TAILINGS STORAGE FACILITY
STAGE Ia El. 927m

FREQUENCY OF INSTRUMENTATION MONITORING

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INSTRUMENTATION	No. Installed	No. Working	Frequency of Monitoring	Monitored By [3]	Comments
1. PIEZOMETERS:					
Stage Ia Main Embankment					Additional piezometers to be installed when construction re-starts.
- Foundation	6	6	Weekly		
- Drains	8	8	Weekly		
- Embankment Fill	2	2	Weekly		
2. DRAIN OUTLETS:					
Stage Ia Main Embankment					Chimney Drain outlets to be extended to Drain Monitoring sump later.
- Foundation Drains	4	4	Weekly		
- Chimney Drain Outlets	3	3	Weekly		
2. SURFACE MOVEMENT MONUMENTS: [1]					Not yet installed.
Stage Ia Main Embankment	3		Twice per year		
3. SURVEY CONTROL POINTS: [2]					To Be Determined
Stage Ia Main Embankment			Twice per year		
4. FLOW MONITORING					Not yet installed.
- Polley Lake Pump Station	1		Weekly		

Notes:

1. Surface movement monuments used to monitor lateral and vertical displacements along slopes and crests of dams not yet installed. As-Built survey of Stage Ia Main Embankment completed in December, 1996.
2. Survey control points to be established during construction and will act as survey control for surface monuments.
3. Instrumentation to be monitored during initial construction (by Design Engineer) and during operations (by Dam Co-ordinator).

TABLE 5.1

MOUNT POLLEY MINING CORPORATION
MOUNT POLLEY PROJECT
TAILINGS STORAGE FACILITY
STAGE Ia El. 927m

EMERGENCY SITUATIONS AND RESPONSES

I. EMERGENCY SITUATIONS:

EMERGENCY		RESPONSE (SEE BELOW)
1.	DAM BREACH Large and rapidly increasing uncontrolled release of water due to failure of the dam.	Steps 1 to 5 inclusive.
2.	POTENTIAL DAM BREACH Any condition that could result in dam failure and uncontrolled release of water from the reservoir.	Steps 1 to 5 inclusive.
3.	EARTHQUAKE An earthquake alert exists or if an earthquake is felt at the Mine Site.	The Dam Co-ordinator shall immediately direct a dam inspection and take the following action:
	a. Severe Damage	Steps 3 to 5 inclusive.
	b. Significant Damage	Steps 3 to 5 inclusive.
	c. Minor Damage	File written report.
	d. No Damage	File written report.
4.	FLOODS	
	- Slumping of dam slopes.	Steps 1 to 5 inclusive.

TABLE 5.1 (CONT'D)

EMERGENCY SITUATIONS AND RESPONSES

-	Significant seepage or springs.	Steps 1 to 5 inclusive.
5.	CRIMINAL ACTION	
-	Destruction or threat of Dam or associated structures.	The Dam Co-ordinator shall notify the R.C.M.P. and take action as required.

II. RESPONSE PROCEDURES:

Due to the remote location of the Tailings Storage Facility, the response procedures and all necessary remedial action shall be the entire responsibility of on-site personnel. The relevant Government Ministries and Officials shall be notified as soon as practically possible. The following is a preliminary listing of protocol to be followed in the event of an emergency, as detailed above:

STEP 1:

In the event of an emergency the Dam Co-ordinator shall be notified immediately by radio page or direct communication.

STEP 2:

The Dam Co-ordinator (Don Ingram) shall contact the following Supervisory Personnel:

Personnel:	Radio Call No.:
(a) Dam Operator (Don Parsons or Ron Martel)	
(b) Technician (Eric Leneve)	
(c) Technician (Nick Foucard)	
(d) Technician (Andy Horton)	

TABLE 5.1 (CONT'D)

EMERGENCY SITUATIONS AND RESPONSES

STEP 3:

The designated Supervisory Personnel above, or other, shall contact the relevant off-site personnel, including Government Ministry representatives and Regional Authorities (e.g. R.C.M.P.), as necessary.

STEP 4:

The Dam Co-ordinator or Dam Operator, under instruction from the Dam Co-ordinator, shall complete a brief status report describing the nature of the emergency and recommendations for immediate action. If the nature or severity of the emergency is uncertain, or if there are any uncertainties regarding the action to be taken, then the following person(s) who have expertise in earthfill dams, should be contacted for assistance:

(a)	Ken Brouwer, Knight Piesold Ltd.	Office Ph: 604 - 685 - 0543 Home Ph:
(b)	Bruce Brown, Knight Piesold Ltd.	Office Ph: 604 - 685 - 0543 Home Ph:
(c)	Jeremy Haile, Knight Piesold Ltd.	Office Ph: 604 - 685 - 0543 Home Ph:

STEP 5:

If the Dam Co-ordinator, or designated replacement, considers the emergency to be serious and urgent, then he will advise the following personnel on the status of the emergency and of the action to be taken:

TABLE 5.1 (CONT'D)

EMERGENCY SITUATIONS AND RESPONSES

(a)	Regional Emergency Program	Ph: _____
(b)	Provincial Emergency Program	Ph: _____
(c)	MELP, Water Management Branch, Dam Safety Officer	Ph: _____
(d)	MEI, Geotechnical Branch	Ph: (250)952-0485 or CI
(e)	MEI, Mines Inspector	Ph: (250)565-4246
(f)	RCMP, Williams Lake, B.C.	Ph: (250)392-6211

III. POSSIBLE ACTION:

The necessary action to be taken in an emergency will depend on the type of emergency and may include, but not be limited to the following:

1. EVACUATION

Require immediate evacuation of areas downstream of the Tailings Storage Facility in the event of Dam Breach or full reservoir.

2. EQUIPMENT AND MATERIALS

Require the immediate mobilization of all necessary equipment from the Mine Site to repair any damage, repair dam slopes or slumping areas, etc.

3. RESERVOIR LOWERING

Require the immediate lowering of the reservoir by mobilizing and commissioning pump(s) as required. An emergency spillway may be permitted in natural ground on the left or right abutment. *In no case shall the reservoir be lowered by excavating through the earthfill.*

TABLE 5.1 (CONT'D)

EMERGENCY SITUATIONS AND RESPONSES

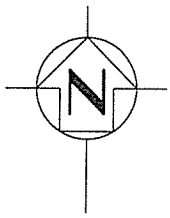
4. INSPECTION

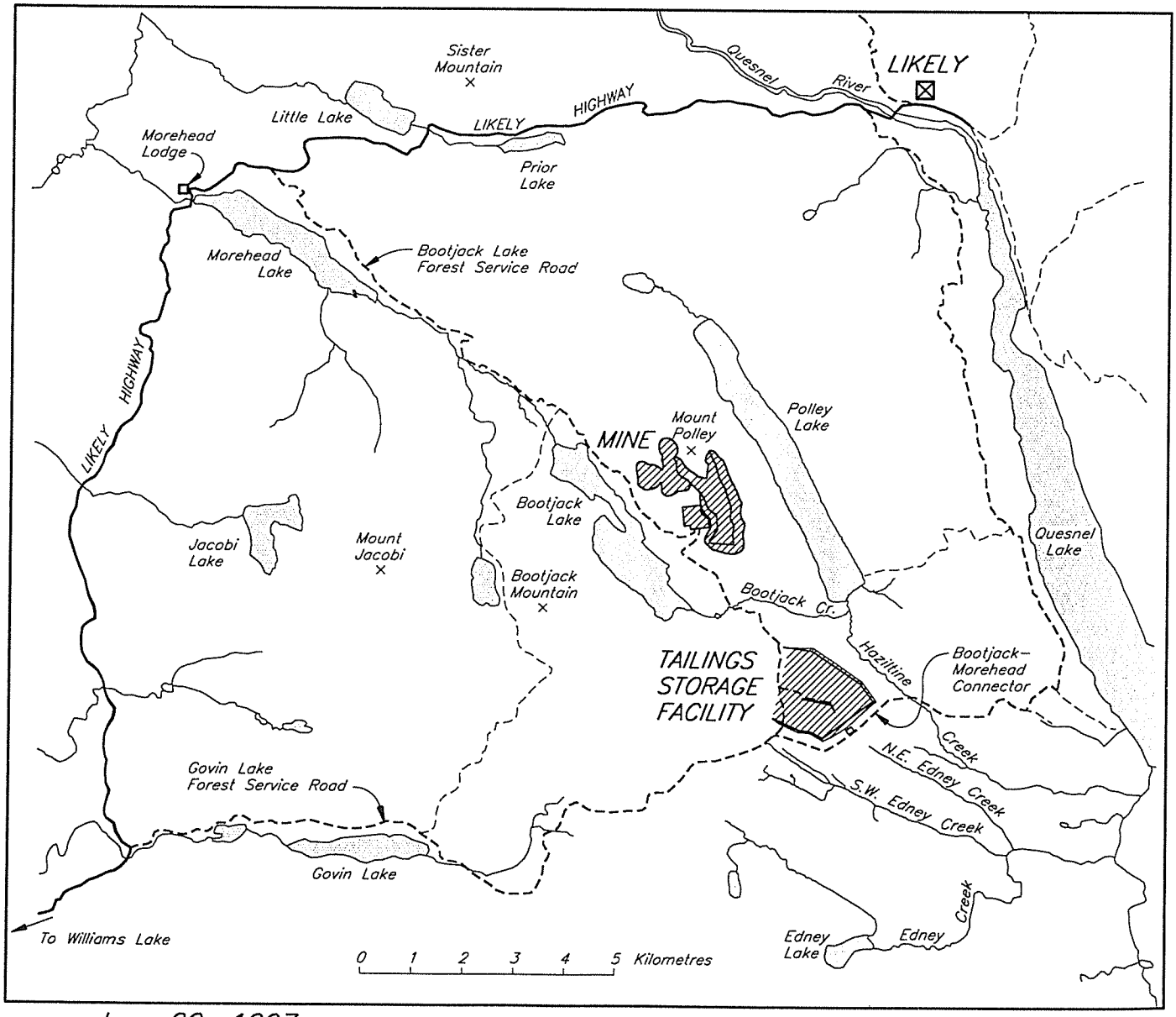
Require a site inspection within 24 hours in the event of significant deterioration of embankment fill, or structures, etc. which may affect the integrity of the system.

1627.A1

MOUNT POLLEY MINING CORPORATION
MOUNT POLLEY PROJECT
PROJECT LOCATION AND ACCESS PLAN

KEY MAP





LOCATION MAP

FIGURE 1.1

Jan. 22, 1997

KNIGHT PIESOLD LTD.
CONSULTING ENGINEERS

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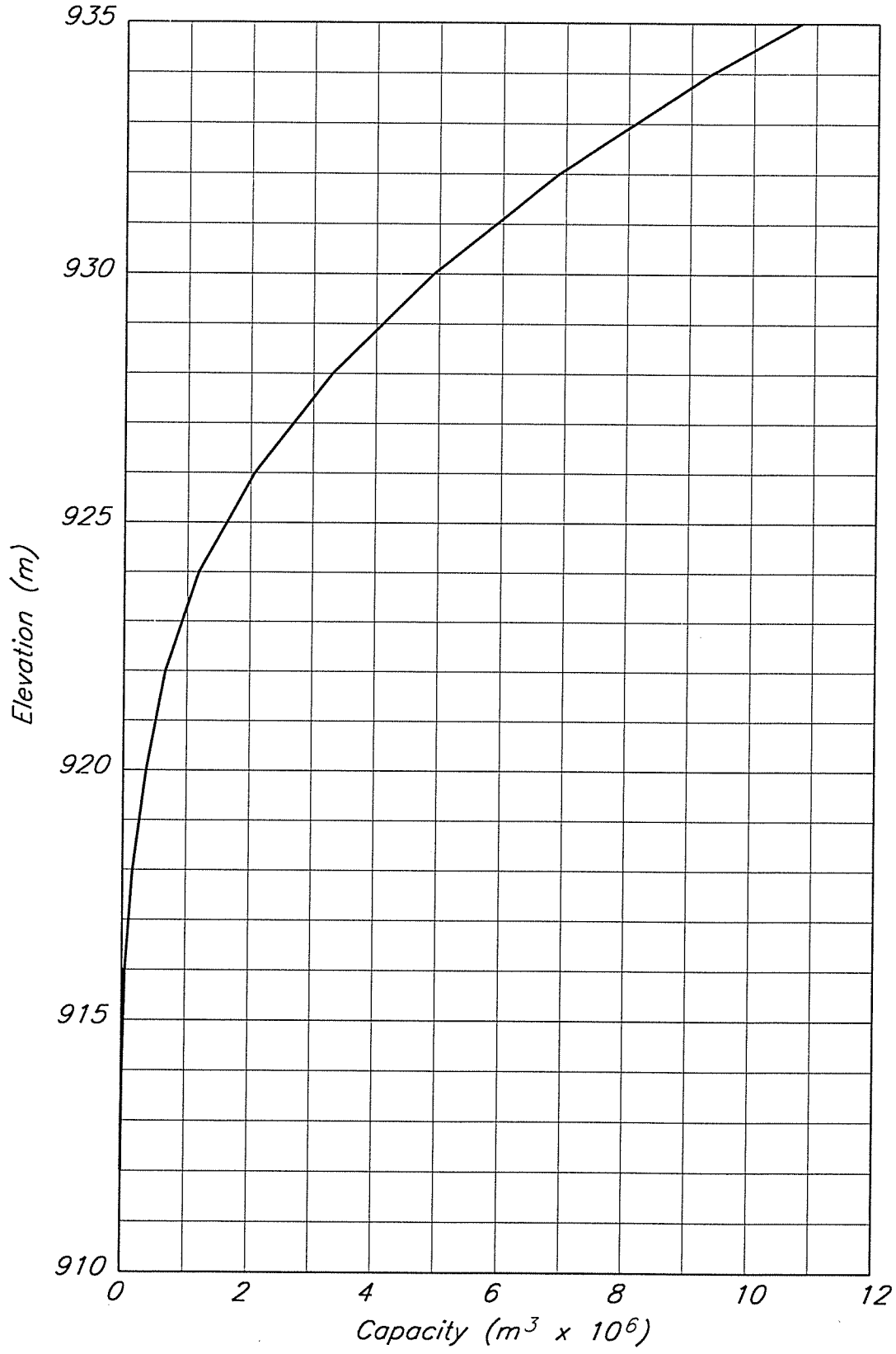
MOUNT POLLEY MINING CORPORATION
MOUNT POLLEY PROJECT
RESERVOIR DEPTH/CAPACITY



Jan. 22, 1997

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CONSULTING ENGINEERS

FIGURE 2.1

APPENDIX A

DRAWINGS

TABLE A1

TAILINGS STORAGE FACILITY
DRAWING LIST

DRG. NO.	REV.	TITLE
1625.200	3	Overall Site Plan
1625.201	5	Tailings Storage Facility - Basin Preparation and Basin Liner
1625.202	5	Tailings Storage Facility - Foundation Preparation and Basin Liner - Sections and Details
1625.205	5	Tailings Storage Facility - Stage Ib Tailings Impoundment - General Arrangement
1625.206	0	Tailings Storage Facility - Reclaim Barge Channel Excavation Details
1625.207	0	Tailings Storage Facility - Tailings Dam Chimney Drain
1625.210	4	Tailings Storage Facility - Main and Perimeter Embankments - Plan
1625.211	6	Tailings Storage Facility - Tailings Embankment - Sections and Details
1625.212	1	Tailings Storage Facility - Material Specifications
1625.213	6	Tailings Storage Facility - Sediment Control and Seepage Collection
1625.214	6	Tailings Storage Facility - Sediment Control and Seepage Collection - Sections and Details
1625.218	5	Tailings Storage Facility - Tailings Distribution and Reclaim System - Plan
1625.219	5	Tailings Storage Facility - Tailings Distribution and Reclaim System - Sections and Details
1625.220	6	Tailings Storage Facility - Instrumentation
1625.221	3	Tailings Storage Facility - Instrumentation - Sections and Details
1625.222	0	Tailings Storage Facility - Tailings Impoundment - Tailings and Reclaim Pipework Plan
1625.223	0	Tailings Storage Facility - Reclaim Pipeline Details
1625.224	0	Tailings Storage Facility - Tailings Distribution System - Details
1625.225	0	Tailings Storage Facility - Tailings Pipework Details Drop Box No 2
1625.226	0	Tailings Storage Facility - Reclaim Booster Pump Station Area - General Arrangement

TABLE A1 (CONT'D)

DRAWING LIST

1625.227	0	Tailings Storage Facility - Tailings Pipework Details Drop Box No 1
1625.228	0	Tailings Storage Facility - Tailings Impoundment - Tailings and Reclaim Pipework Profiles
1625.230	4	Drainage Plan - Mine Site
1625.231	5	Drainage Plan - Mill Site
1625.232	4	Drainage Plan - Sections and Details

NOTE

1. Mill site layout as per CSFM Engineering.
2. Diversion ditch not required for 1996 construction.

Scale 1000 500 0 1000 2000 m

CAD FILE\1625\D19\D19 1-20000 Plot 1-20 May 23, 1996

DRG. NO.	DESCRIPTION

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	APPROVED

REVISIONS

REV.	DATE	DESCRIPTION	APPROVED
3	MAY 24/96	ISSUED FOR CONSTRUCTION	KJB
2	APRIL 1/95	MILLSITE AND CONTROL POND REVISED	
1	MAR 25/96	UPDATE OPEN PITS, WASTE DUMP, SITE DRAINAGE & ROADS	
0	JUNE 2/95	ISSUED FOR TENDER	

REVISIONS

KNIGHT PIESOLD LIMITED
CONSULTING ENGINEERS – VANCOUVER, B.C.

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

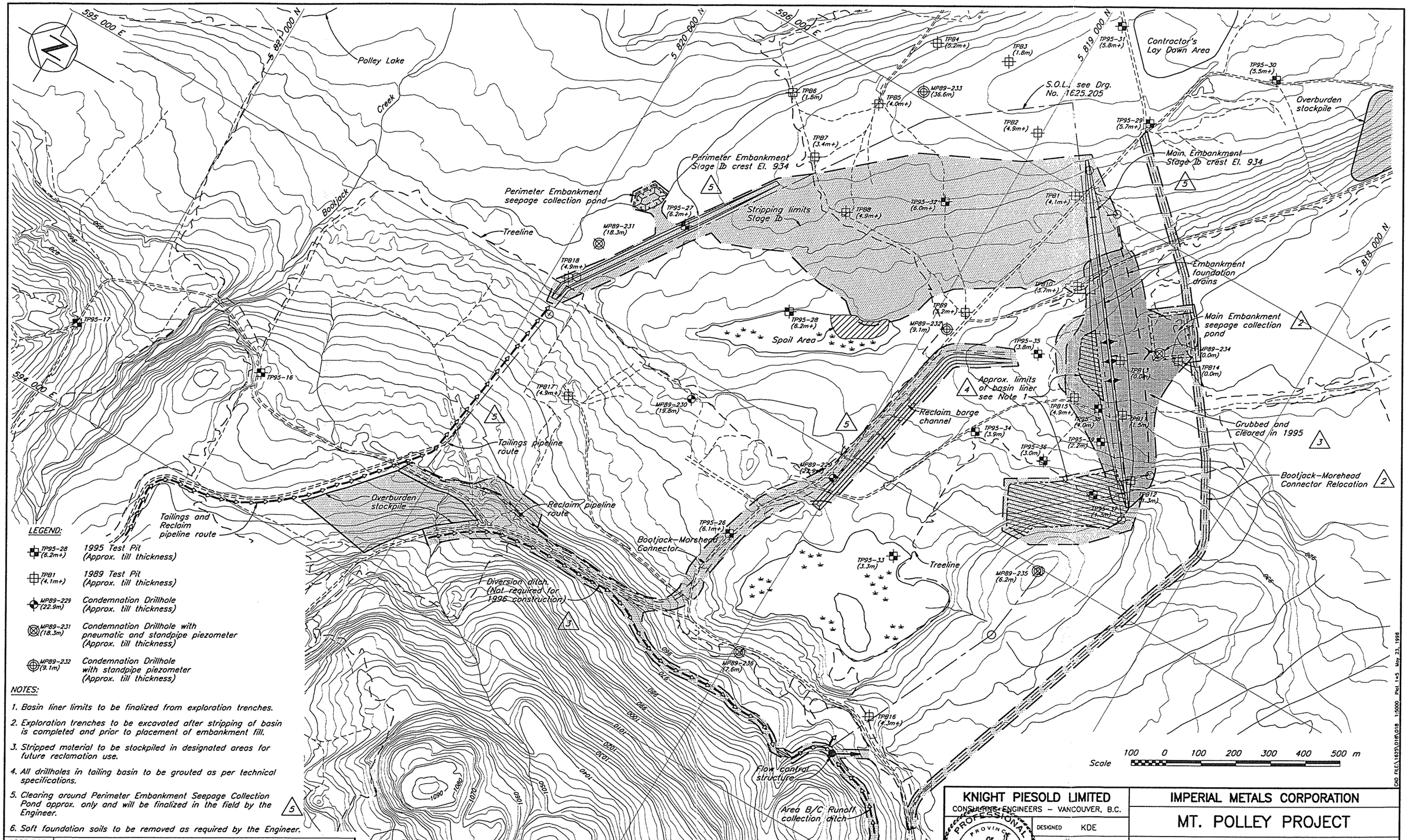
IMPERIAL METALS CORPORATION

MT. POLLEY PROJECT

OVERALL SITE PLAN

DESIGNED	KDE/KGB
DRAWN	RDT/NSD
CHECKED	KDB
APPROVED	KJB

DATE JUNE 2, 1995 | SCALE AS SHOWN | DRG. NO. 510-12-01-1625.200 | REV. 3



LEGEND:

- TP95-28 (6.2m+) — 1995 Test Pit (Approx. till thickness)
- TPB1 (4.1m+) — 1989 Test Pit (Approx. till thickness)
- MP89-229 (22.9m) — Condemnation Drillhole (Approx. till thickness)
- MP89-231 (18.3m) — Condemnation Drillhole with pneumatic and standpipe piezometer (Approx. till thickness)
- MP89-232 (9.1m) — Condemnation Drillhole with standpipe piezometer (Approx. till thickness)

NOTES:

1. Basin liner limits to be finalized from exploration trenches.
2. Exploration trenches to be excavated after stripping of basin is completed and prior to placement of embankment fill.
3. Stripped material to be stockpiled in designated areas for future reclamation use.
4. All drillholes in tailing basin to be grouted as per technical specifications.
5. Clearing around Perimeter Embankment Seepage Collection Pond approx. only and will be finalized in the field by the Engineer.
6. Soft foundation soils to be removed as required by the Engineer.

DRG. NO.	DESCRIPTION
1625.202	TAILINGS STORAGE FACILITY – FOUNDATION PREPARATION AND BASIN LINER – SECTIONS AND DETAILS
1625.205	TAILINGS STORAGE FACILITY – STAGE Ib IMPOUNDMENT – GENERAL ARRANGEMENT

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	APPROVED
5	MAY 24/96	ISSUED FOR CONSTRUCTION	KJB
4	APR 11/96	RE-ISSUED FOR TENDER	
3	APRIL 1/96	NOTE 4 AND STRIPPING LIMITS	
2	MAR 25/96	UPDATE ROADS & DRAINAGE	
1	JULY 27/95	NOTE 4 AND STRIPPING LIMITS	
0	JUNE 2/95	ISSUED FOR TENDER	

REVISIONS

KNIGHT PIESOLD LIMITED
CONSULTING ENGINEERS – VANCOUVER, B.C.

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

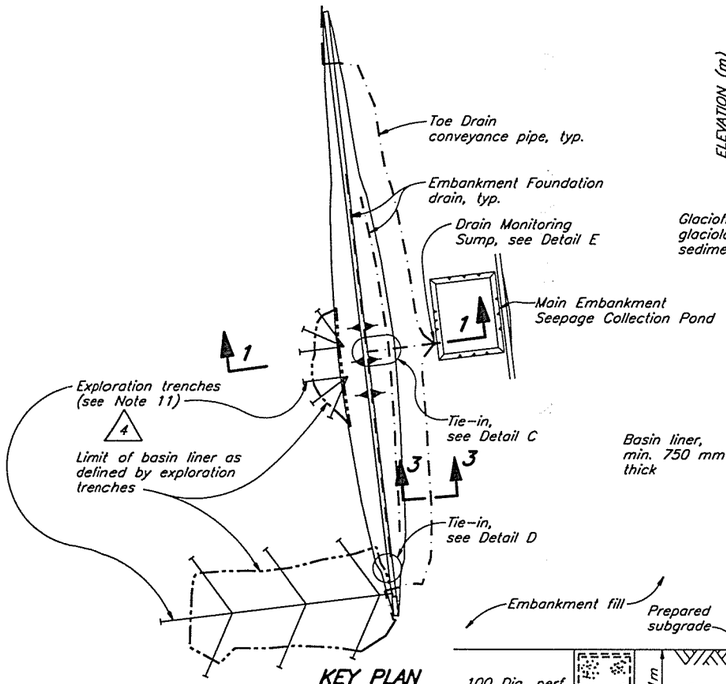
IMPERIAL METALS CORPORATION

MT. POLLEY PROJECT

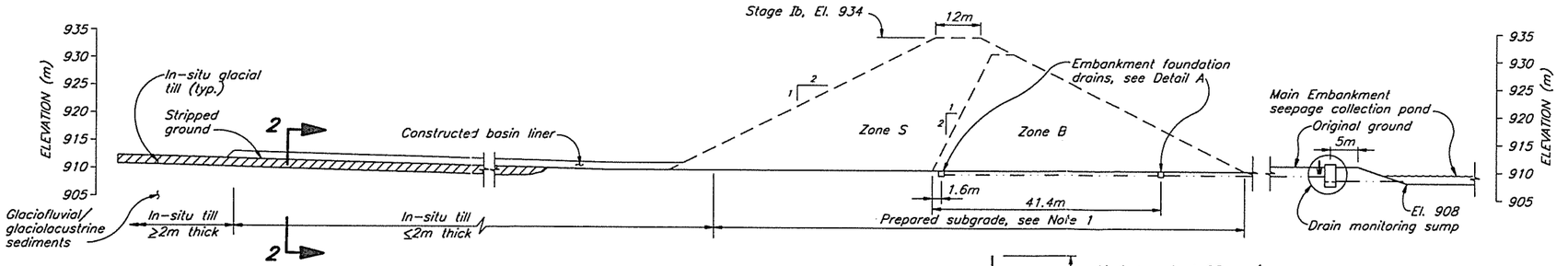
TAILINGS STORAGE FACILITY
BASIN PREPARATION
AND BASIN LINER

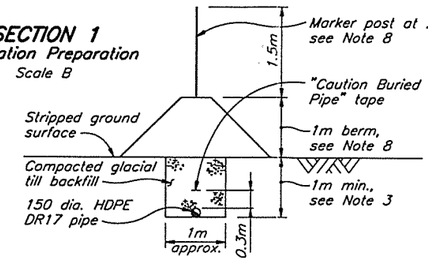
DESIGNED	KDE
DRAWN	RDT
CHECKED	MDB
APPROVED	KJB
DATE	JUNE 2, 1995
SCALE	AS SHOWN
DRG. NO.	510-11-01-1625.201
REV.	5

CAD FILE: \1625\DIB\018 1:5000 Plot 1=5 May 23, 1996



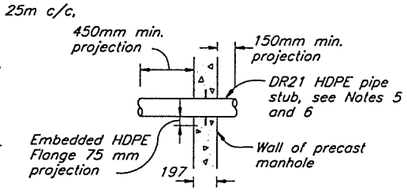
KEY PLAN
Scale A



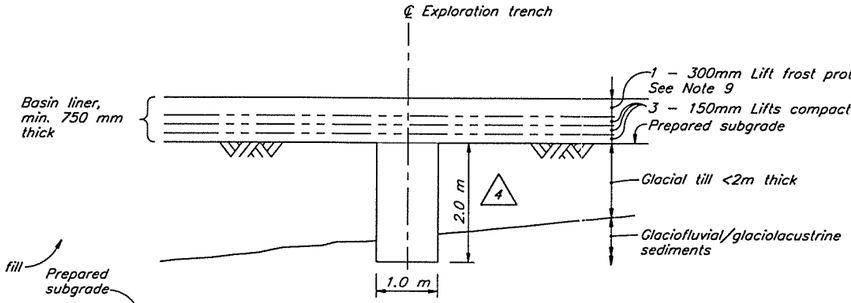


SECTION 1
Foundation Preparation
Scale B

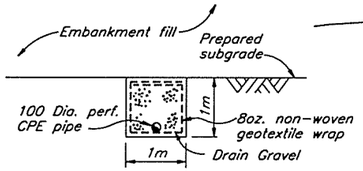
SECTION 3
Toe Drain Conveyance Pipe
Scale D



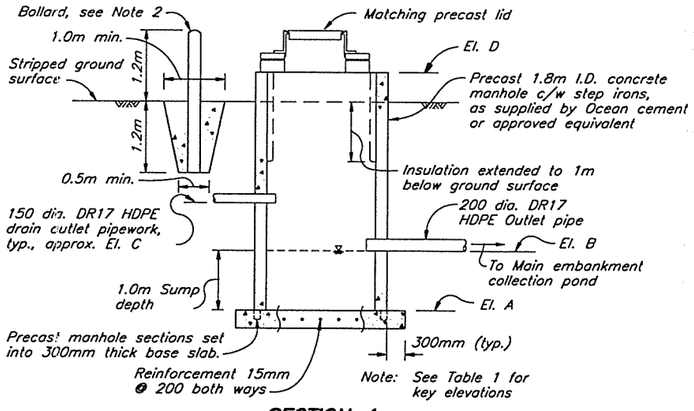
DETAIL F
HDPE Stub and Flange
Scale C



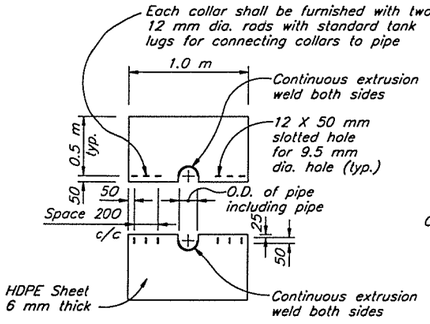
SECTION 2
Basin Liner
Scale D



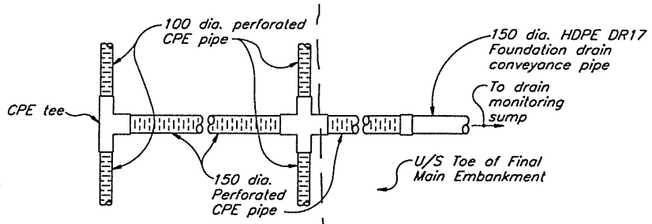
DETAIL A
Embankment Foundation Drain
Scale D



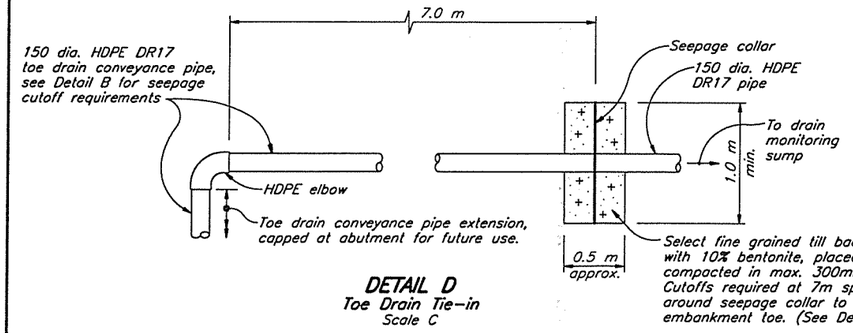
SECTION 4
Scale D



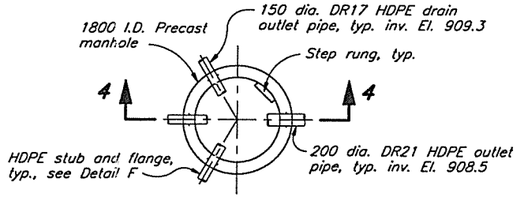
DETAIL B
HDPE Seepage Collar
Scale C



DETAIL C
Embankment Foundation Drain Tie-in
Scale C



DETAIL D
Toe Drain Tie-in
Scale C



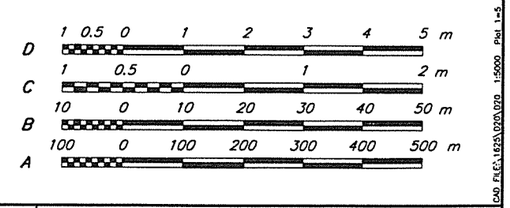
DETAIL E
Drain Monitoring Sump
Scale D

NOTES

1. Subgrade preparation to comprise stripping of topsoil and organics and removing saturated materials to establish a competent, bearing surface for fill placement as directed by the Engineer.
2. Three bollards required at 120°, 1.0m from sump. Bollards to be 200 dia. Std. Weight steel pipe filled with concrete.
3. All pipeworks to have a minimum of 1m of cover for frost protection.
4. HDPE stubs and flanges to be cast into manhole.
5. For Main Embankment drain monitoring sump 150 dia. pipe stubs @ invert El. 909.3, 3 required. 200 dia. pipe stub @ invert El. 908.5, 1 required.
6. For Perimeter Embankment drain monitoring sump 150 dia. pipe stub, 1 required. 200 dia. pipe stub, 1 required.
7. Drain monitoring sump invert elevations shown on Table 1 may be adjusted in the field by the Engineer.
8. Buried pipework to be covered by a berm and clearly marked by a line of stakes.
9. Frost protection layer to be placed only on right abutment area of basin liner. Not required in valley bottom.
10. All perforated pipe to have drain gravel and geotextile wrap, as shown on Detail A.
11. (4) Exploration trenches to be fit in field in order to adjust for terrain.

Table 1

ELEV.	MAIN EMBANKMENT	PERIMETER EMBANKMENT
A	907.5	924.5
B	908.5	925.5
C	909.3	926.5
D	911.5	930.5



CAD FILE: 1625\020\020 1:5000 Plot 1=5 May 24, 1996

DRG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV.	DATE	DESCRIPTION	APPROVED
5	MAY 24/96	ISSUED FOR CONSTRUCTION	DB
REVISIONS			

REV.	DATE	DESCRIPTION	APPROVED
4	APR 18/96	UPDATE FOR EXPLORATION TRENCH	
3	MAR 25/96	UPDATE DRAINAGE & SEEPAGE COLLAR	
2	JAN 18/96	REVISIONS FOR REVIEW COMMENTS	
1	JULY 15/95	FROST LAYER REVISED AND NOTE 9 ADDED	
0	JUNE 2/95	ISSUED FOR TENDER	
REVISIONS			

KNIGHT PIESOLD LIMITED
CONSULTING ENGINEERS – VANCOUVER, B.C.

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

DESIGNED	KDE
DRAWN	RDT/WAL/NSD
CHECKED	KDE
APPROVED	KJB

IMPERIAL METALS CORPORATION

MT. POLLEY PROJECT

TAILINGS STORAGE FACILITY FOUNDATION PREPARATION AND BASIN LINER SECTION AND DETAILS

DATE JUNE 2, 1995 | SCALE AS SHOWN | DRG. NO. 510-15-01-1625.202 | REV. 5

SETTING OUT POINTS

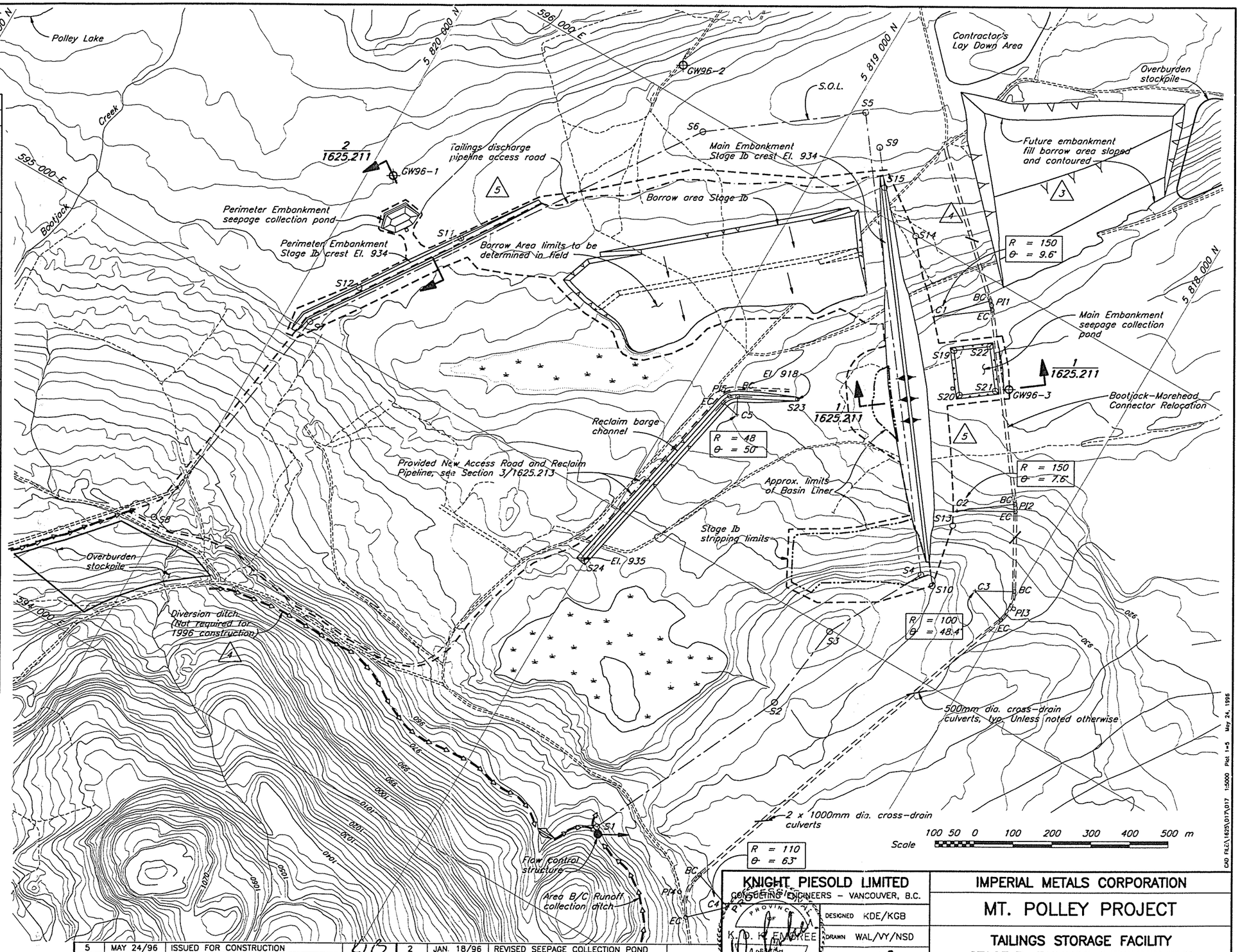
Description	Point	Northing	Easting
Setting Out Line (S.O.L.) △5	S1	5 818 622.590	594 258.688
	S2	5 818 392.402	594 765.778
	S3	5 818 365.375	594 995.246
	S4	5 818 238.539	595 240.350
	S5	5 818 966.983	596 208.866
	S6	5 819 304.035	595 955.881
	S7	5 819 932.926	595 020.397
	S8	5 820 025.632	594 375.061
Stage Ib Main Embankment ℄	S9	5 818 891.014	596 150.000
	S10	5 818 199.059	595 230.000
Perimeter Embankment ℄	S11	5 819 705.338	595 404.339
	S12	5 819 869.082	595 160.766
Stripping Limits	S13	5 818 233.372	595 392.851
	S14	5 818 696.416	595 997.943
	S15	5 818 828.350	596 066.684
Main Embkmnt. Seepage Collection Pond	S19	5 818 461.203	595 790.290
	S20	5 818 391.047	595 697.013
	S21	5 818 317.351	595 752.085
	S22	5 818 387.678	595 845.590
Reclaim Barge Channel	S23	5 818 743.870	595 479.103
	C5	5 818 856.841	595 365.834
	BC	5 818 879.675	595 408.055
	EC	5 818 903.862	595 375.481
	PI5	5 818 899.065	595 397.857
	S24	5 819 007.126	594 840.706
△3	C1	5 818 550.264	595 840.492
	BC	5 818 447.016	595 949.303
	EC	5 818 430.386	595 930.655
	PI1	5 818 437.922	595 940.674
△3	C2	5 818 243.100	595 432.097
	BC	5 818 123.222	595 522.260
	EC	5 818 112.295	595 505.514
	PI2	5 818 117.199	595 514.252
Bootjack – Moorehead Connector Relocation	C3	5 818 096.998	595 273.949
	BC	5 818 009.797	595 322.894
	EC	5 818 002.473	595 241.322
	PI3	5 817 987.827	595 283.752
	C4	5 818 228.844	594 248.367
	BC	5 818 333.078	594 283.514
	EC	5 818 307.478	594 171.448
	PI4	5 818 354.995	594 220.025

LEGEND:

- GW96-1 ⊕ – Groundwater monitoring well
- C1 – Curve No. 1 (typ.)
- BC – Begin Curve
- EC – End Curve
- PI1 – Point of Intersection for Curve No. 1

NOTES

1. Setting Out Line (SOL) is the upstream shoulder of the Stage VII embankment.
2. Stripping and clearing required 5m beyond seepage collection ponds and pipeworks.
3. Perimeter Embankment Seepage Collection Pond to be located in the field by the Engineer.



CAD FILE:\1625\017\017 1:5000 Plot 1=5 May 24, 1996

1625.211	TAILINGS STORAGE FACILITY – TAILINGS EMBANKMENT – SECTIONS AND DETAILS
DRG. NO.	DESCRIPTION

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	APPROVED
5	MAY 24/96	ISSUED FOR CONSTRUCTION	KJB
4	APR 1/96	DIVERSION DITCH NOTE AND CULVERT	
3	MAR 22/96	UPDATE ROAD & BORROW AREA ADDED	

REVISIONS

REV.	DATE	DESCRIPTION	APPROVED
2	JAN. 18/96	REVISED SEEPAGE COLLECTION POND	
1	JULY 27/95	POINT S16 AND S17 DELETED	
0	JUNE 2/95	ISSUED FOR TENDER	

REVISIONS

KNIGHT PIESOLD LIMITED
CONSULTING ENGINEERS – VANCOUVER, B.C.

PROFESSIONAL ENGINEER – PROVINCE OF BRITISH COLUMBIA – K. D. KEMPREE

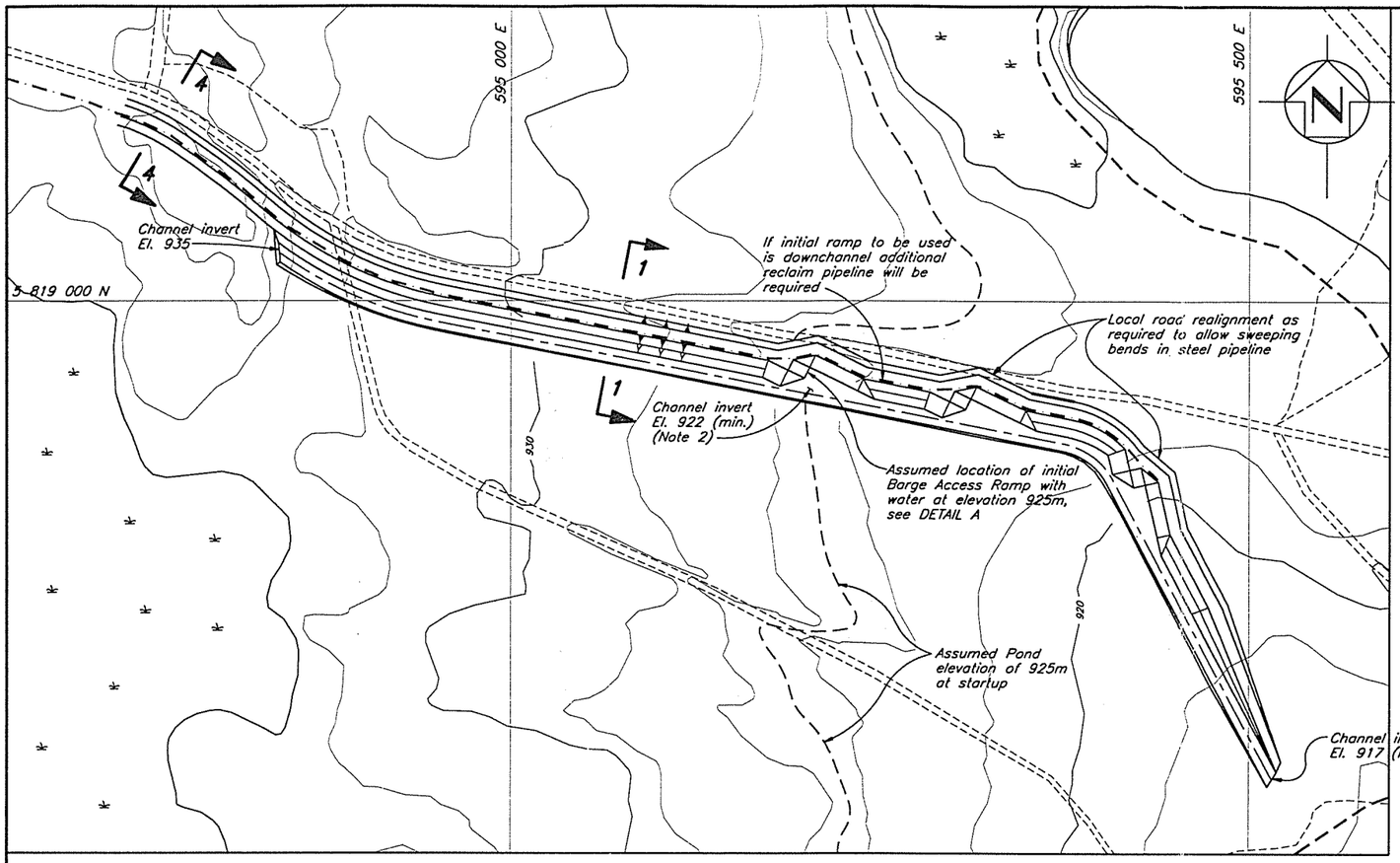
DESIGNED KDE/KGB
DRAWN WAL/VY/NSD
CHECKED MDB
APPROVED KJB

IMPERIAL METALS CORPORATION

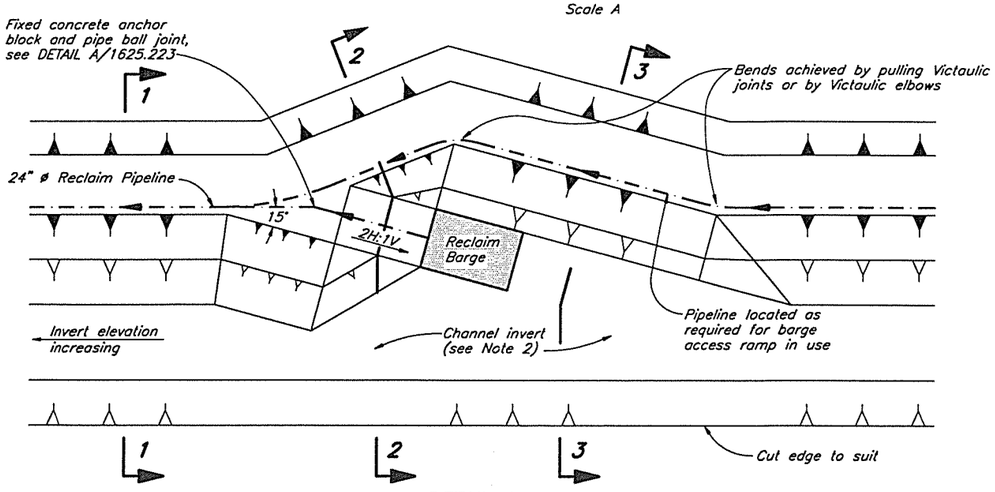
MT. POLLEY PROJECT

TAILINGS STORAGE FACILITY STAGE Ib TAILINGS IMPOUNDMENT GENERAL ARRANGEMENT

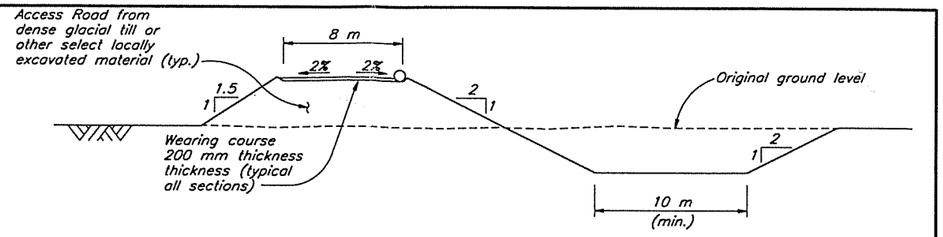
DATE JUNE 2, 1995 | SCALE AS SHOWN | DRG. NO. 510-12-02-1625.205 | REV. 5



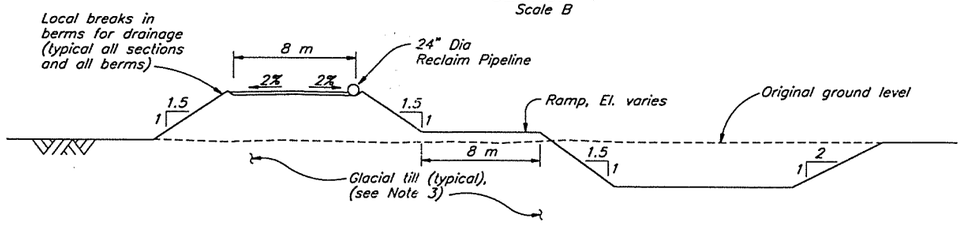
PLAN – RECLAIM BARGE CHANNEL
Scale A



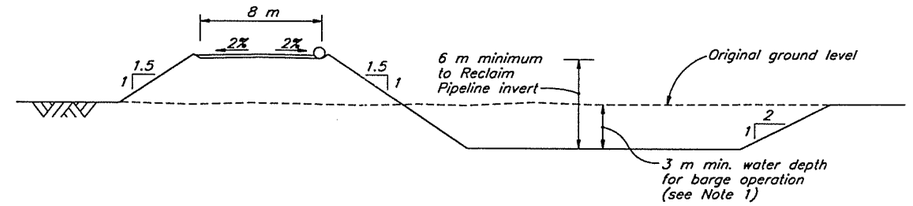
DETAIL A
TYPICAL BARGE ACCESS RAMP (LOCATED TO SUIT)
Scale C



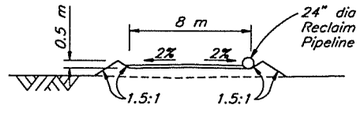
SECTION 1
Scale B



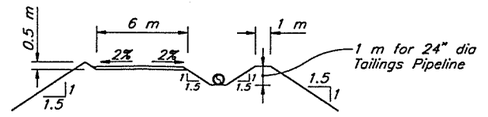
SECTION 2
Scale B



SECTION 3
Scale B



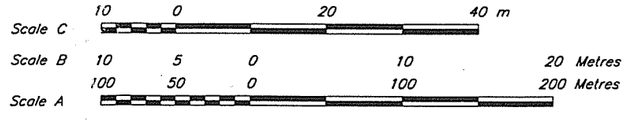
SECTION 4, 4/1625.218, 1/1625.222
Scale B



SECTION 5/1625.218, 2/1625.222
Scale B

NOTES:

1. Barge requires a minimum water depth of 3m for operation and can operate over a 3m range of water depth (See Dwg 1625.223)
2. Assumes water depth of 925m in TSF at startup. Optimum initial barge ramp location assumes access road and ball joint elevation of 928m and channel invert of 922m or lower. Uncertainties in initial water depth and need to relocate barge with each 3m rise in water level require additional access ramps upchannel and downchannel at 3m elevation increments. Alternatively, to allow for initial water levels lower than 925m, the initial access ramp could be redesigned with a significantly deeper channel, and longer access ramp to allow the initial location of the onshore ball joint to be fixed at an elevation appropriate to the level of the water in storage at startup. In the event that the initial ramp is moved down channel from the assumed location additional reclaim pipe will be required.
3. Compacted glacial till shall be placed along the barge channel excavation to meet basin liner requirements, as directed by the Engineer.



DRG. NO.	DESCRIPTION
1626.223	TAILINGS STORAGE FACILITY – RECLAIM PIPELINE DETAILS
1626.222	TAILINGS STORAGE FACILITY – TAILINGS IMPOUNDMENT – TAILINGS AND RECLAIM PIPEWORK PLAN

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	APPROVED

REVISIONS

REV.	DATE	DESCRIPTION	APPROVED
0	JULY 15/96	ISSUED FOR CONSTRUCTION	DB

REVISIONS

KNIGHT PIESOLD LIMITED
CONSULTING ENGINEERS – VANCOUVER, B.C.

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA H. P. DEW ENGINEER

DESIGNED	HPD
DRAWN	NSD
CHECKED	DB
APPROVED	DB

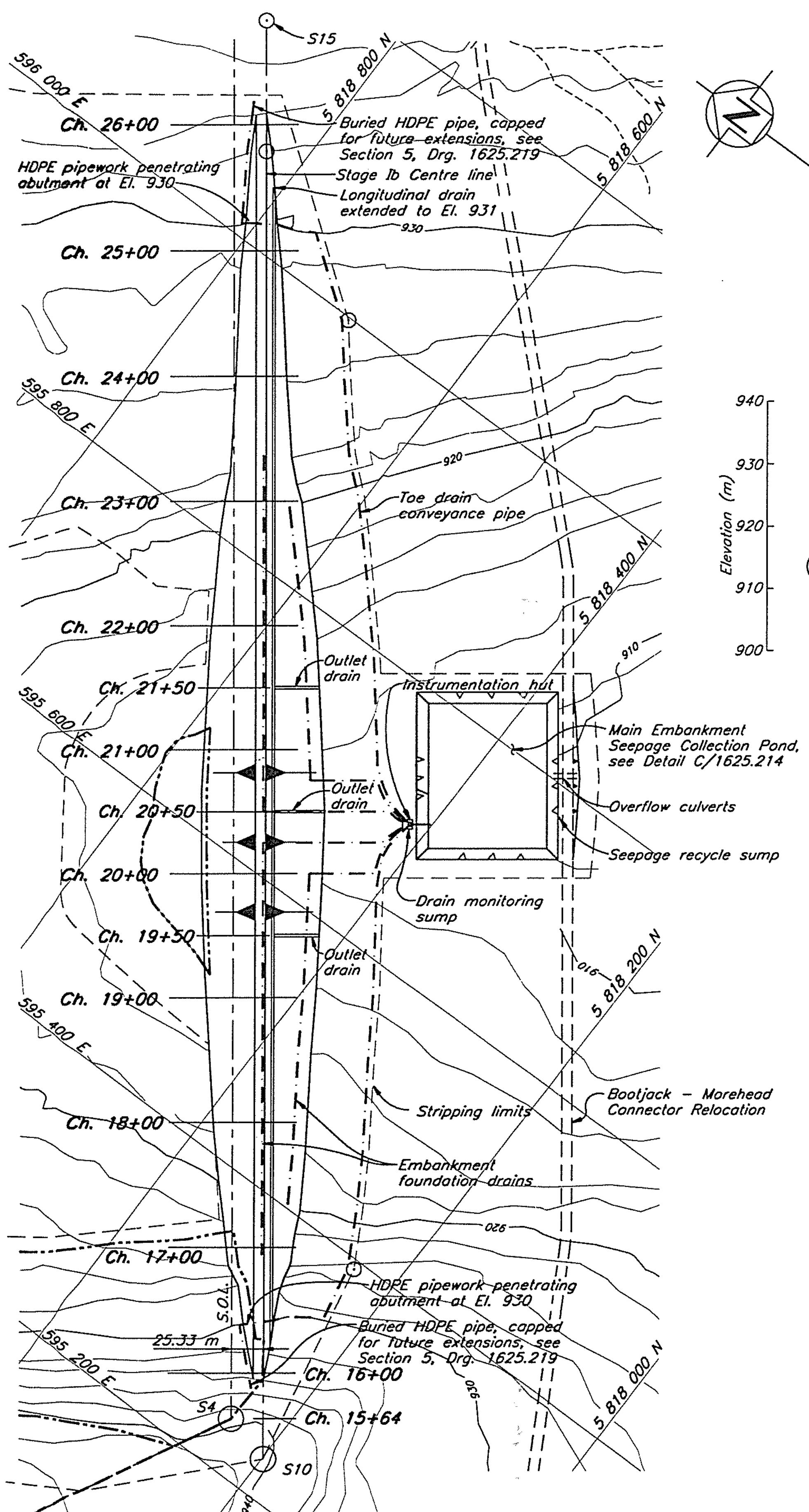
IMPERIAL METALS CORPORATION

MT. POLLEY PROJECT

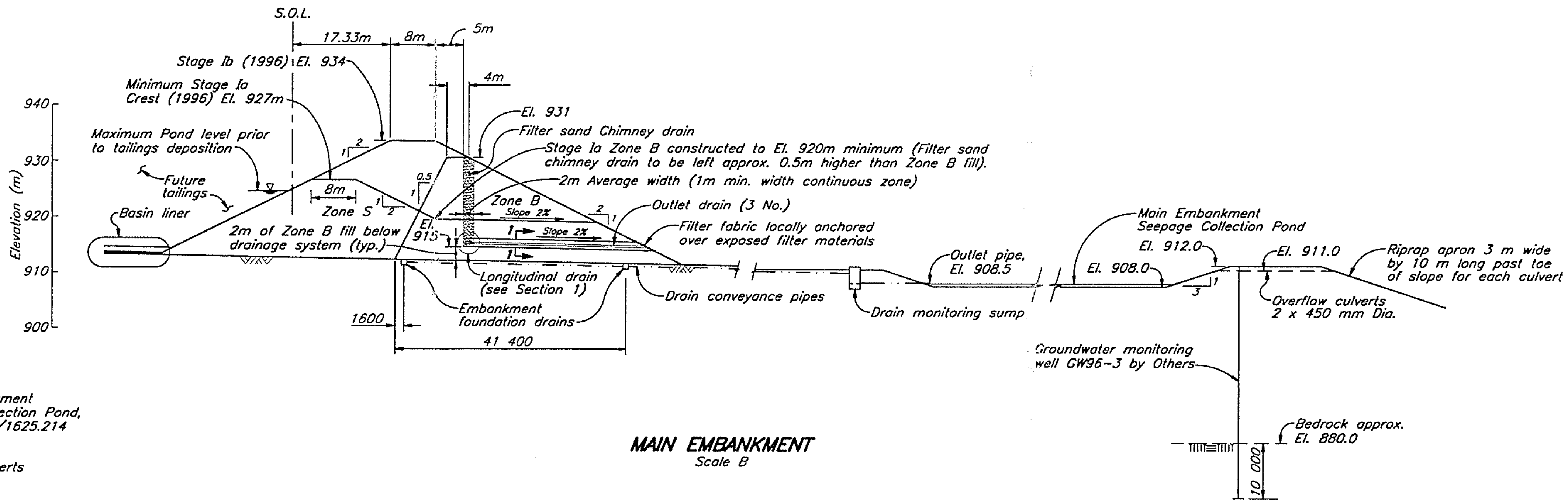
TAILINGS STORAGE FACILITY
RECLAIM BARGE CHANNEL
EXCAVATION DETAILS

DATE JULY 15, 1996 | SCALE AS SHOWN | DRG. NO. 1625.206 | REV. 0

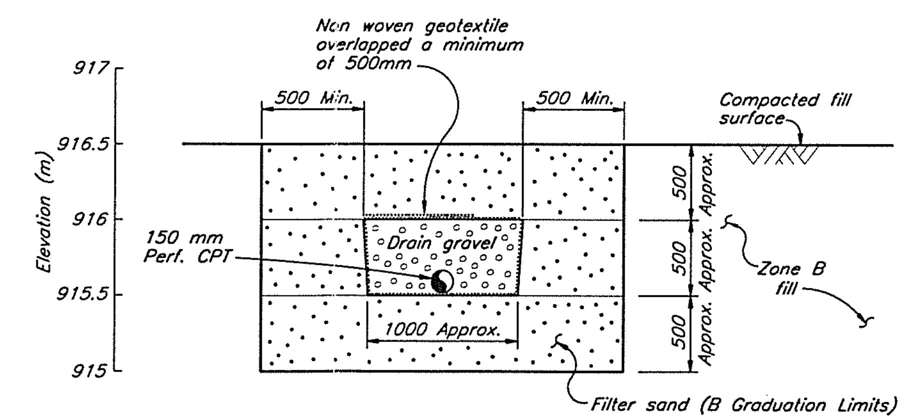
CAD FILE\ 1625/051/051 1:2000 Plot 1=2 STD.1 July 11, 1996



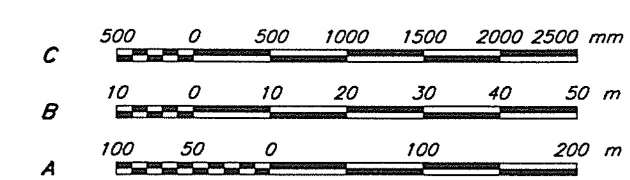
MAIN EMBANKMENT
Scale A



MAIN EMBANKMENT
Scale B



SECTION 1 – OPTION 2
LONGITUDINAL DRAIN/OUTLET DRAIN DETAIL
Scale C



CAD FILE: 1625\055\055 1:2500 Plot 1=2.5 SEP 5, 1996

DRG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV.	DATE	DESCRIPTION	APPROVED
REVISIONS			

REV.	DATE	DESCRIPTION	APPROVED
0	SEP 4/96	ISSUED FOR CONSTRUCTION	KJB
REVISIONS			

KNIGHT PIESOLD LIMITED
CONSULTING ENGINEERS – VANCOUVER, B.C.

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

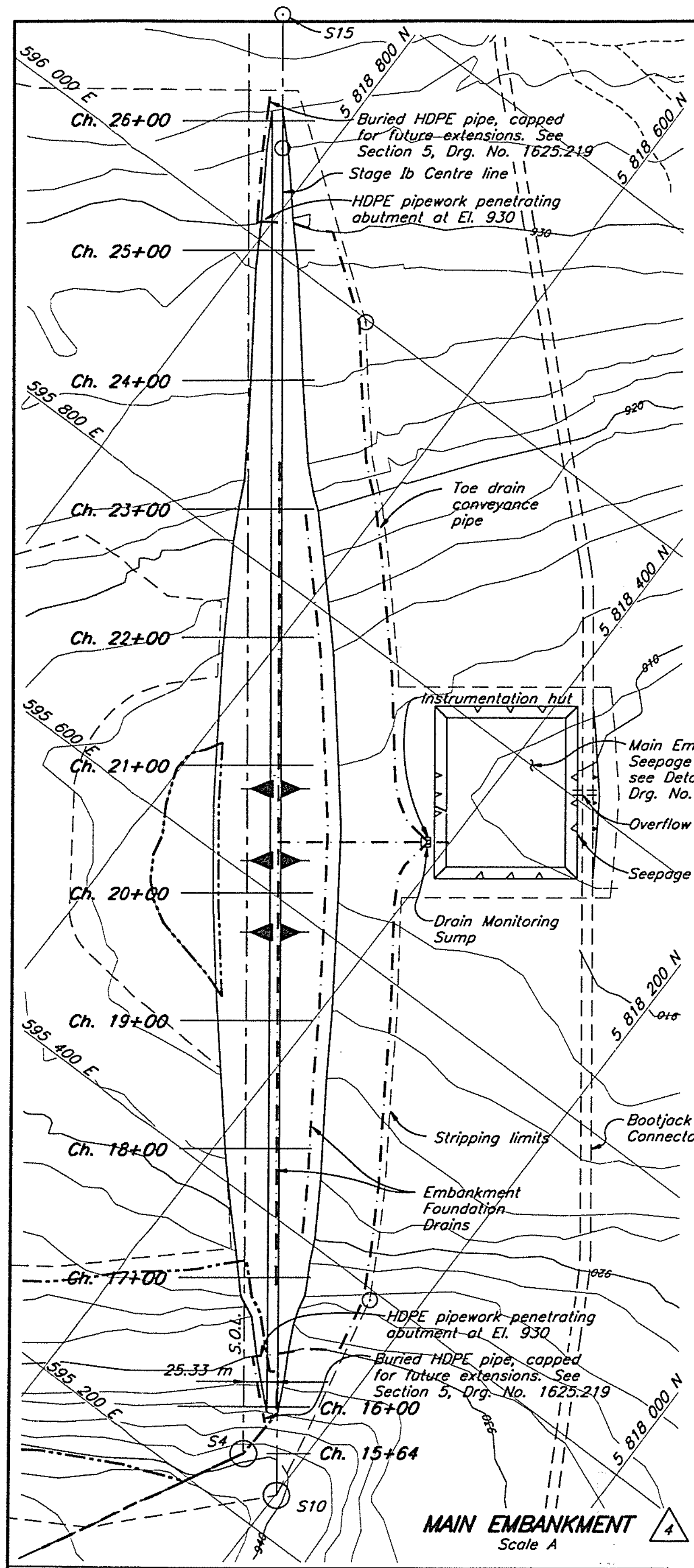
DESIGNED	KJB
DRAWN	WAL/DHS
CHECKED	KJB
APPROVED	KJB

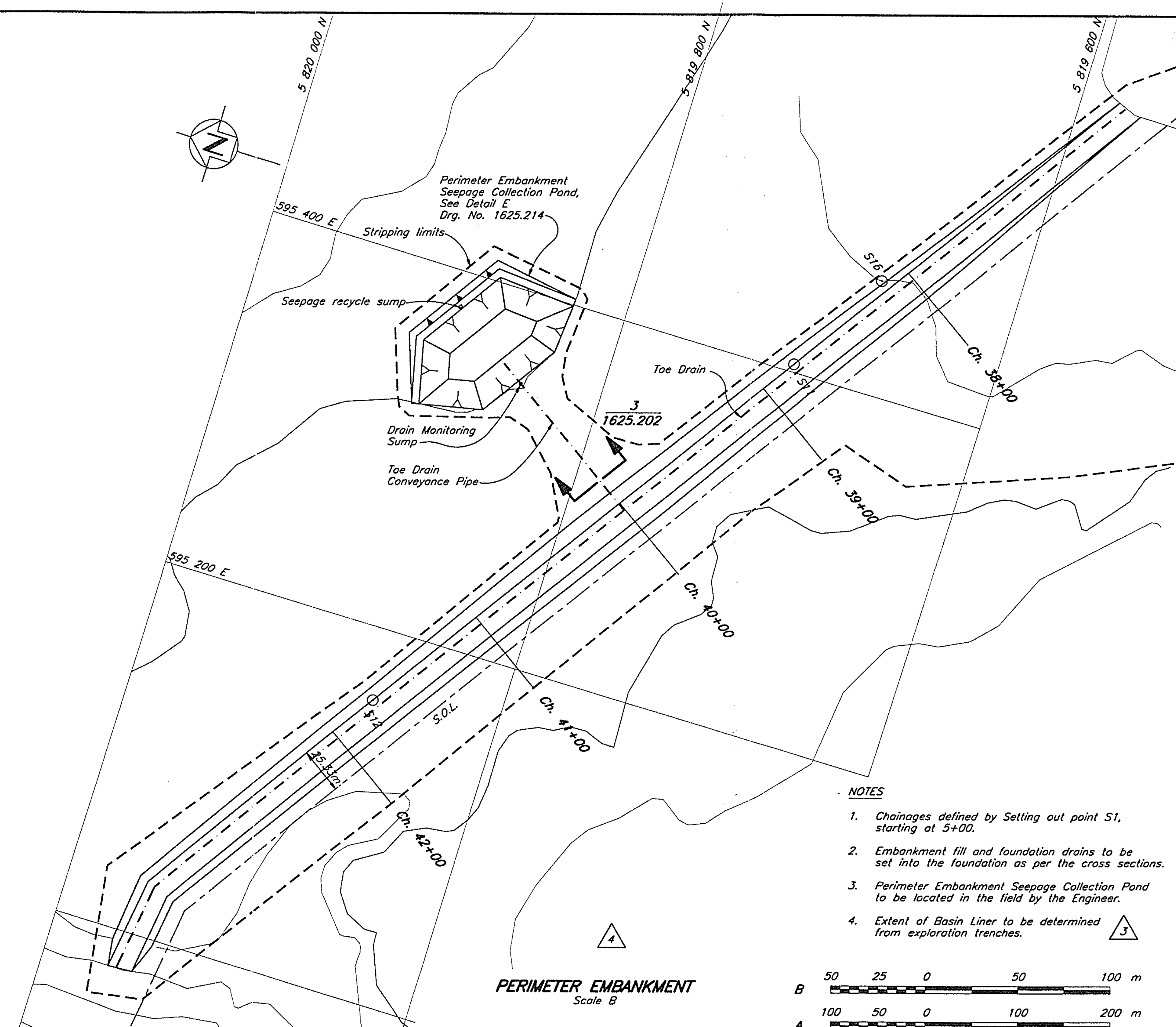
IMPERIAL METALS CORPORATION

MT. POLLEY PROJECT

TAILINGS STORAGE FACILITY
TAILINGS DAM CHIMNEY DRAIN

DATE SEPT. 4, 1996	SCALE AS SHOWN	DRG. NO. 1625.207	REV. 0





NOTES

1. Chainages defined by Setting out point S1, starting at 5+00.
2. Embankment fill and foundation drains to be set into the foundation as per the cross sections.
3. Perimeter Embankment Seepage Collection Pond to be located in the field by the Engineer.
4. Extent of Basin Liner to be determined from exploration trenches. △3

B 50 25 0 50 100 m

A 100 50 0 100 200 m

CAD FILE:\1625\D31\D31 1:2500 Plot 1=2.5 May 24, 1996

REFERENCE DRAWINGS

DRG. NO.	DESCRIPTION
1625.202	TAILINGS STORAGE FACILITY – FOUNDATION PREPARATION AND BASIN LINER – SECTIONS AND DETAILS
1625.214	TAILINGS STORAGE FACILITY – SEDIMENT CONTROL AND SEEPAGE COLLECTION – SECTIONS AND DETAILS

REVISIONS

REV.	DATE	DESCRIPTION	APPROVED
4	MAY 24/95	ISSUED FOR CONSTRUCTION	KJB

REVISIONS

REV.	DATE	DESCRIPTION	APPROVED
3	APR 1/96	OVERFLOW CULVERTS ADDED	
2	MAR 25/96	UPDATE ROADS AND DRAINS	
1	JULY 27/95	BASIN LINER AND DRAINAGE REVISED	
0	JUNE 2/95	ISSUED FOR TENDER	

KNIGHT PIESOLD LIMITED
CONSULTING ENGINEERS – VANCOUVER, B.C.

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

DESIGNED	KDE
DRAWN	RDT
CHECKED	KDE
APPROVED	KJB

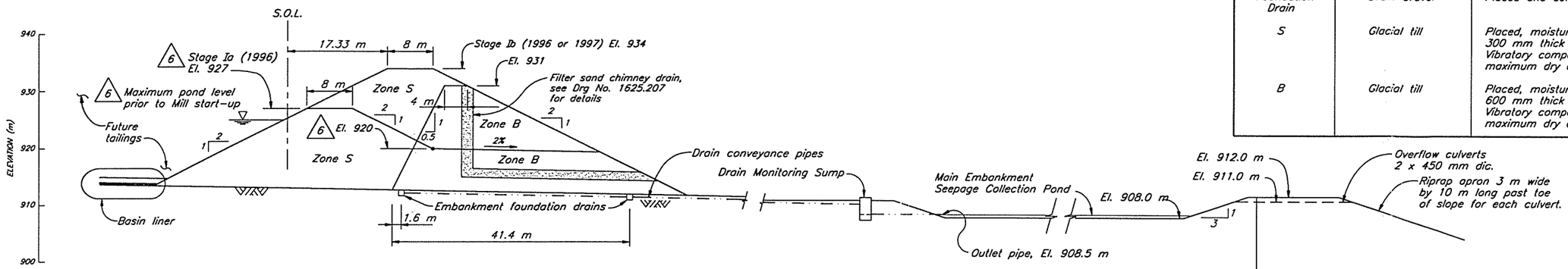
IMPERIAL METALS CORPORATION

MT. POLLEY PROJECT

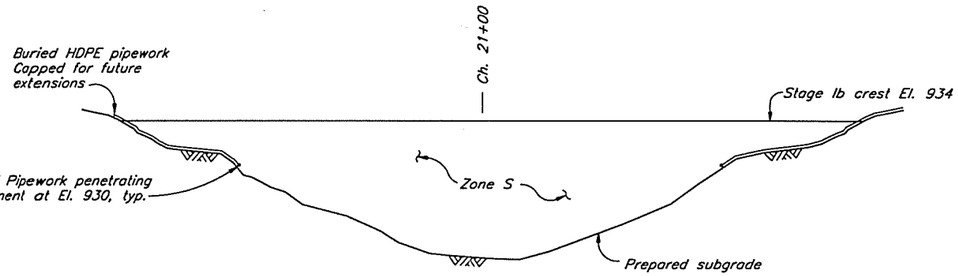
TAILINGS STORAGE FACILITY
MAIN AND PERIMETER EMBANKMENTS
PLAN

DATE JUNE 2, 1995 | SCALE AS SHOWN | DRG. NO. 510–14–01–1625.210 | REV. 4

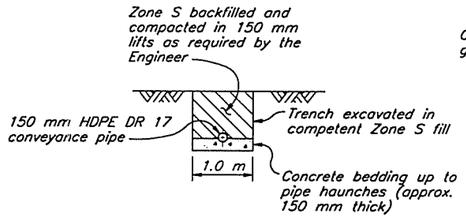
ZONE	MATERIAL TYPE	PLACEMENT AND COMPACTION REQUIREMENTS
Blanket/Toe Drain	Filter sand	Placed and spread in maximum 1.0 m thick layers. Vibratory compaction as directed by the Engineer.
Foundation Drain	Drain Gravel	Placed and compacted as shown on the Drawings
S	Glacial till	Placed, moisture conditioned and spread in maximum 300 mm thick layers (after compaction). Vibratory compaction to 98% of standard proctor maximum dry density or as approved by the Engineer. 6
B	Glacial till	Placed, moisture conditioned and spread in maximum 600 mm thick layers (after compaction). Vibratory compaction to 98% of standard proctor maximum dry density or as approved by the Engineer. 6



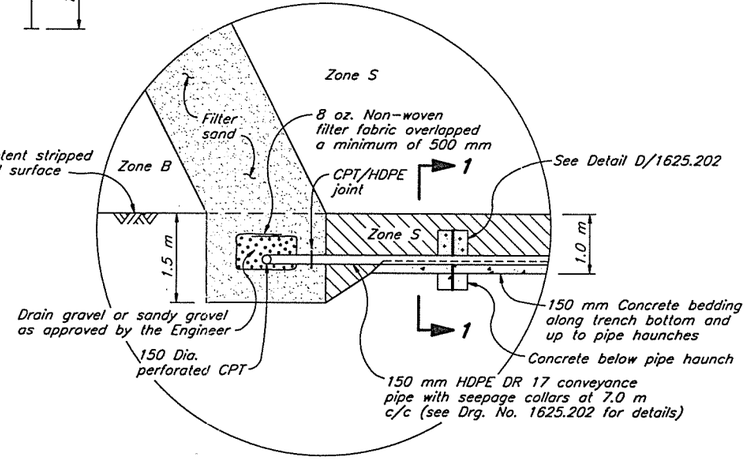
MAIN EMBANKMENT
Scale A



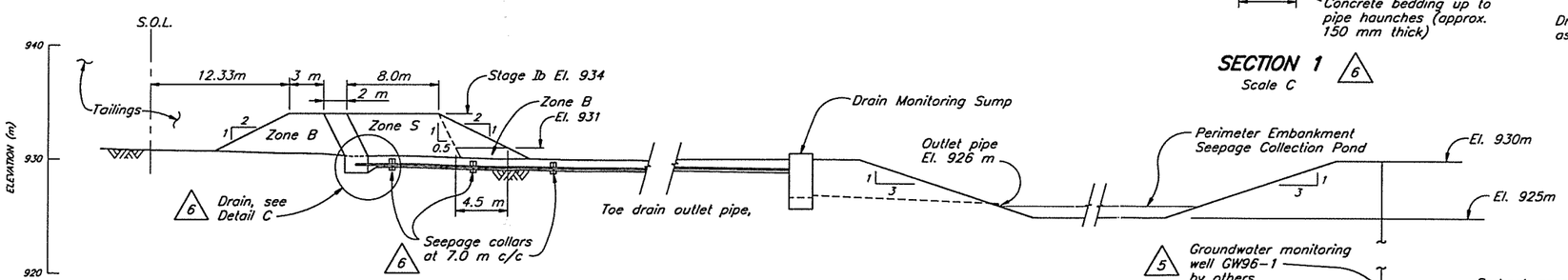
U/S VIEW OF MAIN EMBANKMENT



SECTION 1 6
Scale C



DETAIL C
PERIMETER EMBANKMENT LONGITUDINAL DRAIN AND OUTLET PIPE DRAIN 6
Scale C



PERIMETER EMBANKMENT
Scale B

C 1 0 1 2 3 4 5 m
B 10 5 0 10 20 m
A 10 5 0 10 20 30 40 m

NOTES

1. Perimeter Embankment seepage collection pond to be located in the field by the Engineer. Pipework invert elevations may be adjusted in the field by the Engineer.
2. Fill placement rates to be modified by the Engineer if excess pore pressures monitored in fill or foundation piezometers.
3. Groundwater monitoring wells to be installed by others.

DRG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV.	DATE	DESCRIPTION	APPROVED
6	SEP 4/96	STAGE Ia ADDED, MODIFIED DRAINAGE DETAIL	KJB
5	MAY 28/96	ISSUED FOR CONSTRUCTION	
4	APR 19/96	EMBANKMENT EROSION PROTECTION	
3	APR 11/96	RE-ISSUED FOR TENDER	
2	APR 1/96	OVERFLOW CULVERTS ADDED	
1	MAR 22/96	UPDATE DRAINAGE	
0	JUNE 2/95	ISSUED FOR TENDER	

REVISIONS

KNIGHT PIESOLD LIMITED
CONSULTING ENGINEERS – VANCOUVER, B.C.

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA K.J. BROUWER

DESIGNED	KDE
DRAWN	WAL/YY
CHECKED	KJB
APPROVED	KJB

IMPERIAL METALS CORPORATION

MT. POLLEY PROJECT

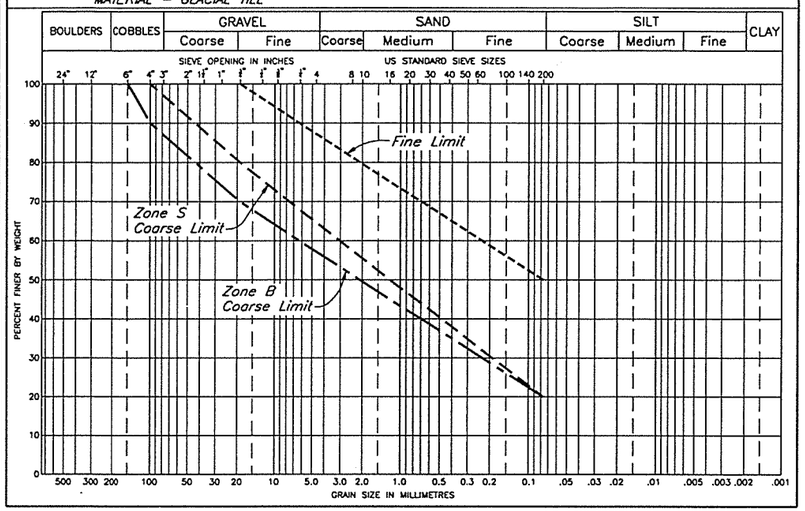
TAILINGS STORAGE FACILITY
TAILINGS EMBANKMENT
SECTIONS AND DETAILS

DATE JUNE 2, 1995 | SCALE AS SHOWN | DRG. NO. 510-14-02-1625.211 | REV. 6

CAD FILE\1625\021\021 1:500 Plot 1=0.5 SEP 5, 1996

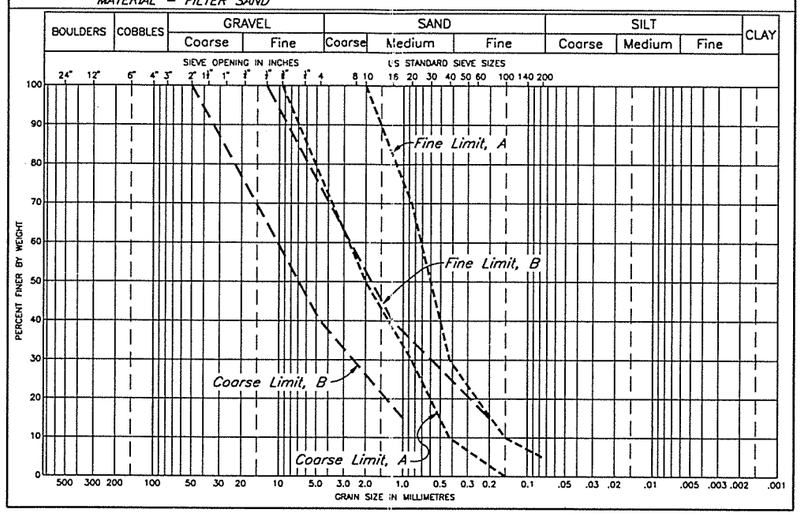
UNIFIED SOIL CLASSIFICATION SYSTEM

PROJECT: *ZONE – S AND B*
MATERIAL – GLACIAL TILL



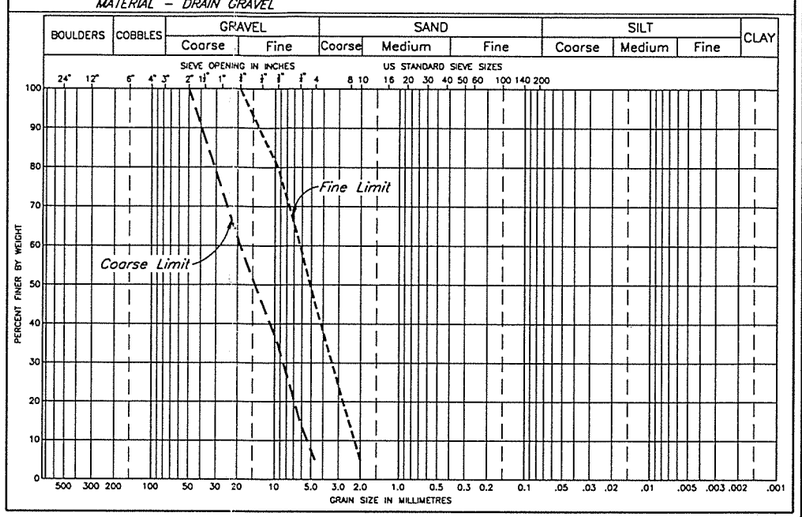
UNIFIED SOIL CLASSIFICATION SYSTEM

PROJECT: *ZONE – TOE DRAIN*
MATERIAL – FILTER SAND



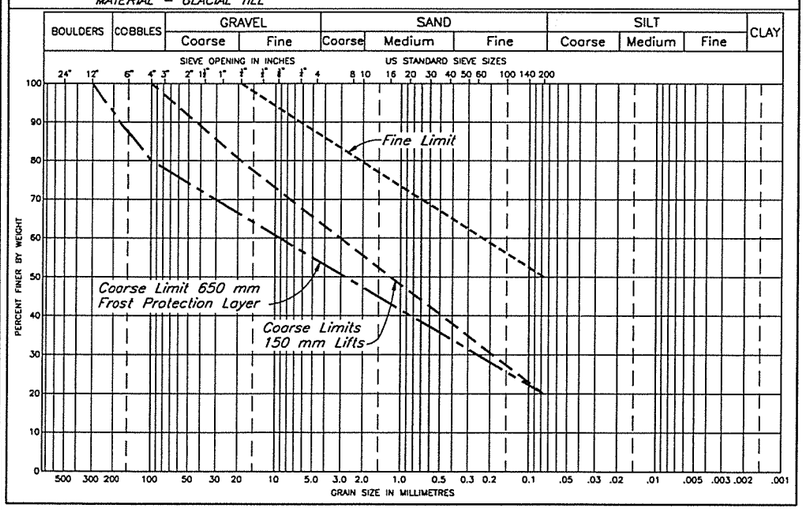
UNIFIED SOIL CLASSIFICATION SYSTEM

PROJECT: *ZONE – PIPE SURROUND*
MATERIAL – DRAIN GRAVEL



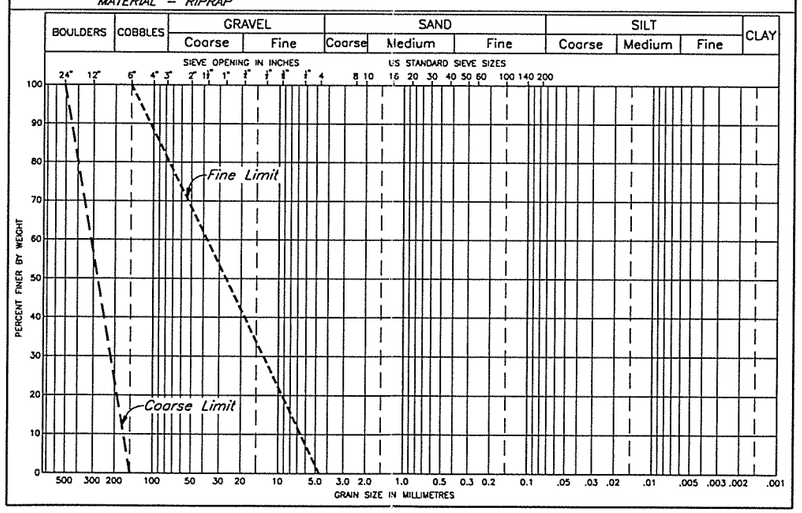
UNIFIED SOIL CLASSIFICATION SYSTEM

PROJECT: *ZONE – BASIN LINER*
MATERIAL – GLACIAL TILL



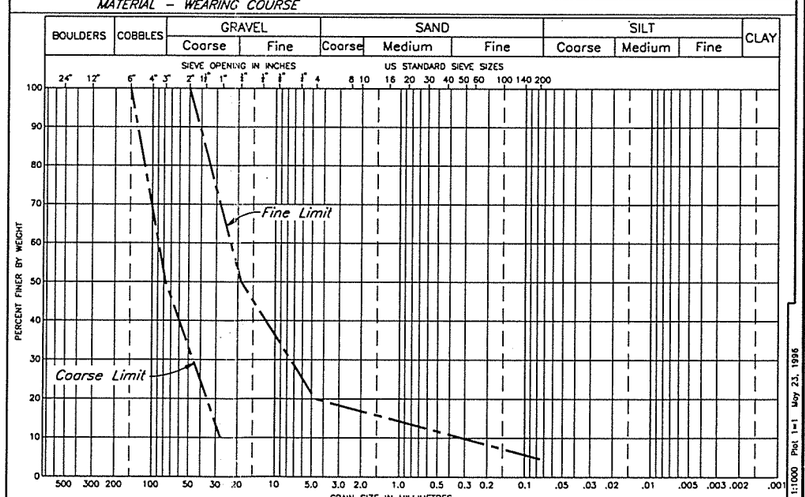
UNIFIED SOIL CLASSIFICATION SYSTEM

PROJECT: *ZONE – DITCH EROSION PROTECTION*
MATERIAL – RIPRAP



UNIFIED SOIL CLASSIFICATION SYSTEM

PROJECT: *ZONE – ROAD SURFACING*
MATERIAL – WEARING COURSE



NOTES

1. *No more than 10% of Zone S material shall be coarser than the Zone S Coarse Limit and such material shall be finer than the Zone B coarse limit. Zone S material which has a gradation between the Zone S and B coarse limits shall be well spaced out and shall not form continuous layers or sizeable lenses.*

2. *For Filter sand, the portion passing the No. 40 sieve must have a plasticity index (PI) of zero.*

DRG. NO.	DESCRIPTION
	REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	APPROVED
		REVISIONS	

REV.	DATE	DESCRIPTION	APPROVED
1	MAY 24/96	ISSUED FOR CONSTRUCTION	KJB
0	JUNE 2/95	ISSUED FOR TENDER	
		REVISIONS	

KNIGHT PIESOLD LIMITED
CONSULTING ENGINEERS – VANCOUVER, B.C.

PROFESSIONAL ENGINEER – PROVINCE OF BRITISH COLUMBIA – K. D. K. ELLIS

DESIGNED	KDE
DRAWN	RDT
CHECKED	KDE
APPROVED	KJB

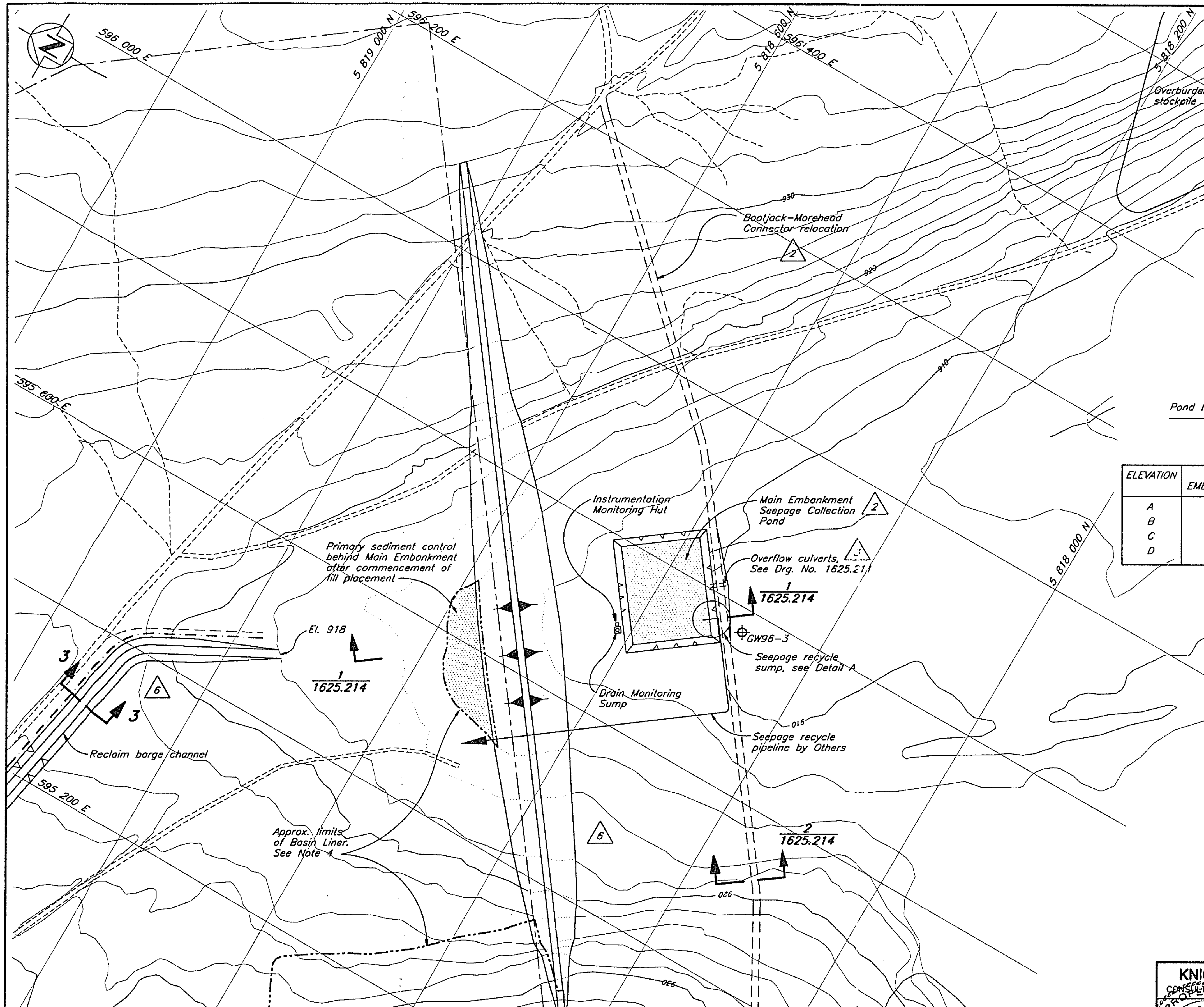
IMPERIAL METALS CORPORATION

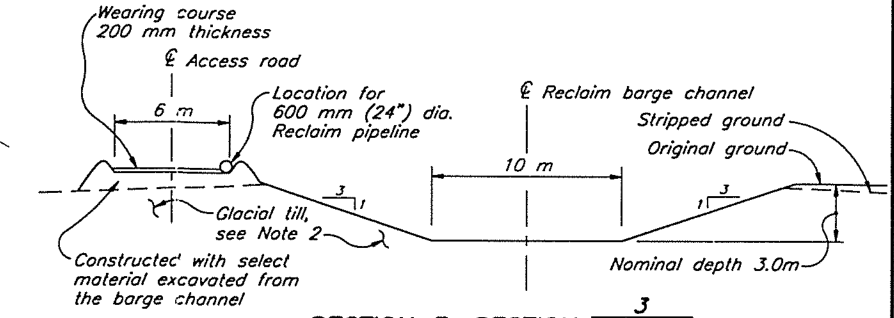
MT. POLLEY PROJECT

TAILINGS STORAGE FACILITY
MATERIAL SPECIFICATIONS

DATE JUNE 2, 1995 | SCALE AS SHOWN | DRG. NO. 510-14-03-1625.212 | REV. 1

CAD FILE: \1625\035\030 1:1000 Plot 1=1 May 23, 1996

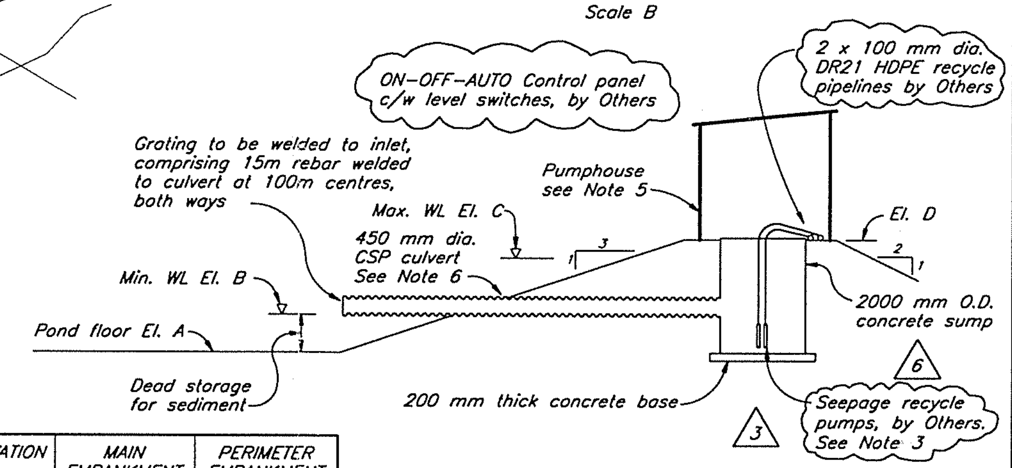




SECTION 3, SECTION $\frac{3}{1625.218}$

RECLAIM BARGE CHANNEL

Scale B



ELEVATION	MAIN EMBANKMENT	PERIMETER EMBANKMENT
A	908.0	925.0
B	908.5	926.0
C	909.5	927.5
D	911.0	930.0

DETAIL A

SEEPAGE COLLECTION AND RECYCLE SYSTEM

NTS

NOTE

1. Test pits indicate 4m thickness of till in proposed location of barge channel. Additional test pits will be required to confirm adequate thickness of till to finalize barge channel alignment.
2. Compacted glacial till shall be placed along the barge channel excavation to meet basin liner requirements as directed by the Engineer.
3. (3) Seepage recycle pumps to be 2 – 100 mm electric submersible pumps, discharging to 2 – 100 mm pipelines extended up D/S face of tailings embankment. Pump sump to be fully enclosed with an insulated building c/w venting and I beam suitable for raising the pumps.
4. (3) Extent of basin liner to be determined from exploration trenches.
5. Pumphouse by C.S.F.M. Engineering. Ltd. see Drg. No. 903
6. Penetration of concrete sump by CSP culvert to be water tight.

Scale B: 10 5 0 10 20 m

Scale A: 100 50 0 100 200 m

CAD FILE\1625\022\022 1:2500 Plot 1=2.5 May 24, 1996

DRG. NO.	DESCRIPTION
1625.214	SEDIMENT CONTROL AND SEEPAGE COLLECTION – SECTIONS AND DETAILS

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	APPROVED
6	MAY 24/96	ISSUED FOR CONSTRUCTION	KJB
5	APR 26/96	CHANGE NOTE	

REVISIONS

REV.	DATE	DESCRIPTION	APPROVED
4	APR 19/96	RECLAIM CHANNEL ACCESS ROAD	
3	APR 1/96	CULVERTS & SEEPAGE DETAILS ADDED	
2	MAR 25/96	UPDATE ROAD & DRAINAGE	
1	JUL 27/95	BASIN LINER REVISED	
0	JUN 2/95	ISSUED FOR TENDER	

REVISIONS

KNIGHT PIESOLD LIMITED
CONSULTING ENGINEERS – VANCOUVER, B.C.

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

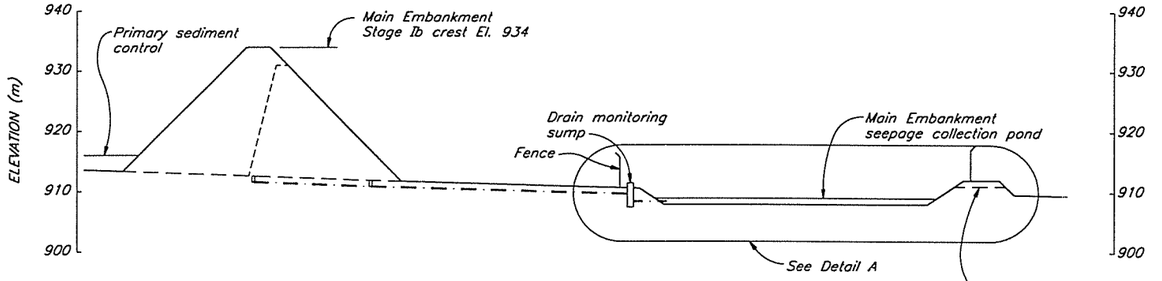
DESIGNED	KDE
DRAWN	RDT/VY
CHECKED	MOB
APPROVED	KJB

IMPERIAL METALS CORPORATION

MT. POLLEY PROJECT

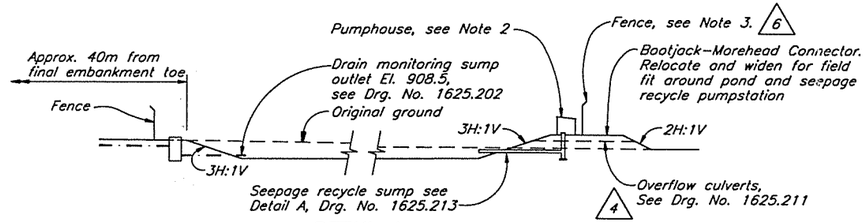
TAILINGS STORAGE FACILITY
SEDIMENT CONTROL AND
SEEPAGE COLLECTION

DATE JUNE 2, 1995 | SCALE AS SHOWN | DRG. NO. 510–19–01–1625.213 | REV. 6



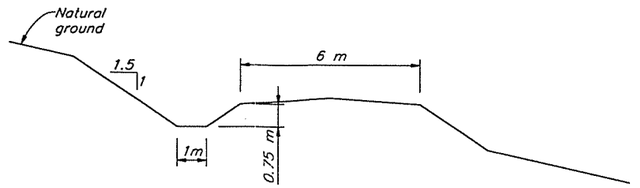
SECTION 1/1625.213
SEEPAGE PROFILE
Horiz. Scale C, Vert. Scale A

3

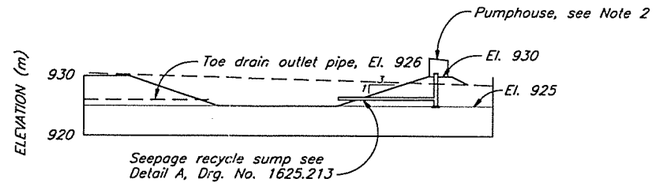


DETAIL A
MAIN EMBANKMENT SEEPAGE COLLECTION POND
Scale A

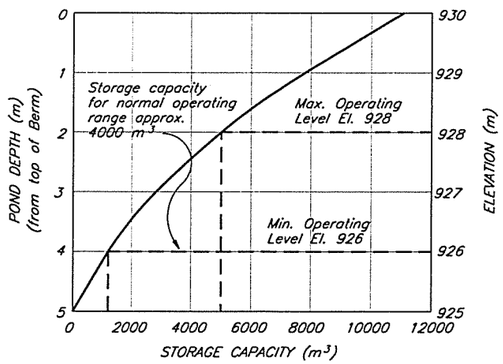
3



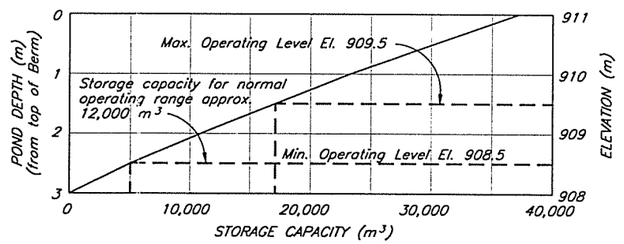
SECTION 2/1625.213
TYPICAL SECTION FOR BOOTJACK-MOREHEAD CONNECTOR RELOCATION
Scale B



DETAIL E/1625.210
PERIMETER EMBANKMENT SEEPAGE COLLECTION POND
Scale A



PERIMETER EMBANKMENT SEEPAGE COLLECTION POND
DEPTH/CAPACITY RELATIONSHIP



MAIN EMBANKMENT SEEPAGE COLLECTION POND
DEPTH/CAPACITY RELATIONSHIP

NOTES

1. Perimeter embankment seepage collection pond will be sized to have a min. live storage capacity of approx. 4000 m³.
2. Pumphouse by C.S.F.M. Engineering Ltd. see Drg. No. 903
3. Fence to be six feet high, chain link with 2 inch galvanized posts and two six foot wide access gates.

C 20 10 0 20 40 60 80 100 m
B 2 1 0 2 4 6 8 10 m
A 10 5 0 10 20 30 40 50 m

CAD FILE: \1625\023\023 1:500 Plot 1=0.5 JUNE 6, 1996

* "SIGNATURES AND PROFESSIONAL SEAL ON REV.5 ORIGINAL"

DRG. NO.	DESCRIPTION
1625.213	TAILINGS STORAGE FACILITY – SEDIMENT CONTROL AND SEEPAGE COLLECTION
1625.202	TAILINGS STORAGE FACILITY – FOUNDATION PREPARATION AND BASIN LINER – SECTIONS AND DETAILS

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	APPROVED
6	JUN 6/96	FENCE NOTE ADDED	LJB
5	MAY 24/96	RE-ISSUED FOR CONSTRUCTION	

REVISIONS

REV.	DATE	DESCRIPTION	APPROVED
4	APR 1/96	OVERFLOW CULVERTS ADDED	
3	MAR 22/96	UPDATE DRAINAGE AND ROAD	
2	SEPT. 5/95	ISSUED FOR CONSTRUCTION	
1	JULY 27/95	RIPRAP APRON ADDED	
0	JUNE 2/95	ISSUED FOR TENDER	

REVISIONS

KNIGHT PIESOLD LIMITED
CONSULTING ENGINEERS – VANCOUVER, B.C.

*

DESIGNED KDE
DRAWN VY/NSD
CHECKED *
APPROVED *

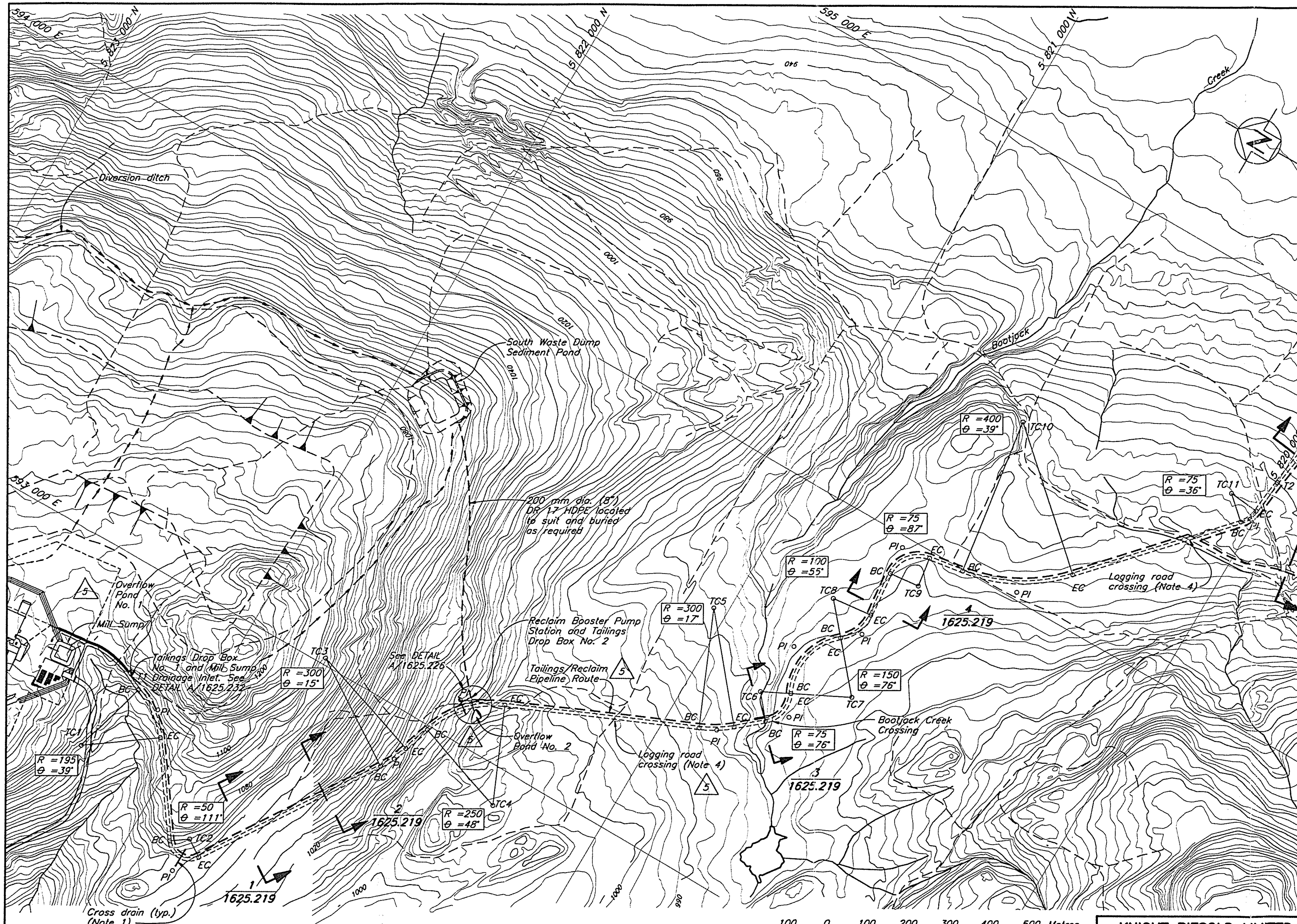
DATE JUNE 2, 1995

IMPERIAL METALS CORPORATION

MT. POLLEY PROJECT

TAILINGS STORAGE FACILITY
SEDIMENT CONTROL AND SEEPAGE COLLECTION – SECTIONS AND DETAILS

SCALE AS SHOWN | DRG. NO. 510-19-02-1625.214 | REV. 6



SETTING OUT POINTS (Note 8)		
Point	Northing	Easting
T1	Field locate	Field locate
TC1	5 822 212.426	592 528.348
BC	5 822 161.106	592 716.473
EC	5 822 054.012	592 642.057
PI	5 822 094.357	592 698.264
TC2	5 821 864.147	592 463.292
BC	5 821 904.766	592 434.135
EC	5 821 822.231	592 436.033
PI	5 821 862.111	592 374.711
TC3	5 821 802.714	593 016.314
BC	5 821 551.219	592 852.758
EC	5 821 517.947	592 921.933
PI	5 821 530.122	592 885.200
TC4	5 821 258.152	592 911.135
BC	5 821 495.458	592 989.786
EC	5 821 357.902	593 140.373
PI	5 821 460.320	593 095.808
TC5	5 821 034.980	593 608.059
BC	5 820 915.281	593 332.973
EC	5 820 841.176	593 379.061
PI	5 820 874.841	593 350.570
TC6	5 820 828.199	593 488.298
BC	5 820 779.748	593 431.048
EC	5 820 761.122	593 521.849
PI	5 820 734.752	593 469.130
TC7	5 820 626.968	593 588.951
BC	5 820 761.122	593 521.849
EC	5 820 724.705	593 702.739
PI	5 820 813.467	593 626.498
TC8	5 820 789.863	593 778.597
BC	5 820 724.705	593 702.739
EC	5 820 690.352	593 788.480
PI	5 820 685.206	593 736.666
TC9	5 820 626.991	593 909.389
BC	5 820 701.624	593 901.976
EC	5 820 638.300	593 983.531
PI	5 820 708.658	593 972.800
TC10	5 820 612.021	594 392.165
BC	5 820 551.708	593 996.739
EC	5 820 314.310	594 125.018
PI	5 820 410.028	594 018.349
TC11	5 820 083.239	594 494.822
BC	5 820 027.418	594 444.732
EC	5 820 008.600	594 487.469
PI	5 820 011.009	594 463.018

NOTES

1. Final location of cross drain culverts to be determined in the field by the Engineer.
2. Final location of Bootjack Creek crossing to be determined in the field by the Engineer.
3. Setting out points for roadway are to be adjusted in the field to achieve a cut/fill balance to the greatest extent possible and to avoid oversteep grades or low spots in pipeline.
4. (5) Pipelines under logging roads to be sleeved in 900mm ø x 2mm minimum wall CSP culverts with 500mm minmum depth of cover. Backfill to be well graded and compacted sand and gravel.
5. (5) Profiles and quantities moved to Drg. No. 1625.228.

* "SIGNATURES AND PROFESSIONAL SEAL ON REV.0 ORIGINAL"

CAD FILE\1625\026\026 1:5000 Plot 1=5 STD.1 July 12, 1996

Scale 100 0 100 200 300 400 500 Metres

DRG. NO.	DESCRIPTION
1625.206	TAILINGS STORAGE FACILITY – RECLAIM BARGE CHANNEL – EXCAVATION DETAILS
1625.219	TAILINGS STORAGE FACILITY – TAILINGS DISTRIBUTION AND RECLAIM SYSTEM – SECTIONS AND DETAILS
1625.222	TAILINGS STORAGE FACILITY – TAILINGS IMPOUNDMENT – TAILINGS AND RECLAIM PIPEWORK PLAN
1625.228	TAILINGS STORAGE FACILITY – TAILINGS DISTRIBUTION AND RECLAIM SYSTEM – PROFILES

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	APPROVED

REVISIONS

REV.	DATE	DESCRIPTION	APPROVED
5	JULY 15/96	PIPELINES RELOCATED, SEE NOTE 5	CJB
4	MAY 24/96	ISSUED FOR CONSTRUCTION	
3	APR 19/95	NOTE ADDED	
2	APR 1/96	MILLSITE AND CONTROL POND REVISED	
1	MAR 25/96	RE-ISSUED FOR TENDER	
0	JUNE 2/95	ISSUED FOR TENDER	

REVISIONS

KNIGHT PIESOLD LIMITED
CONSULTING ENGINEERS – VANCOUVER, B.C.

*

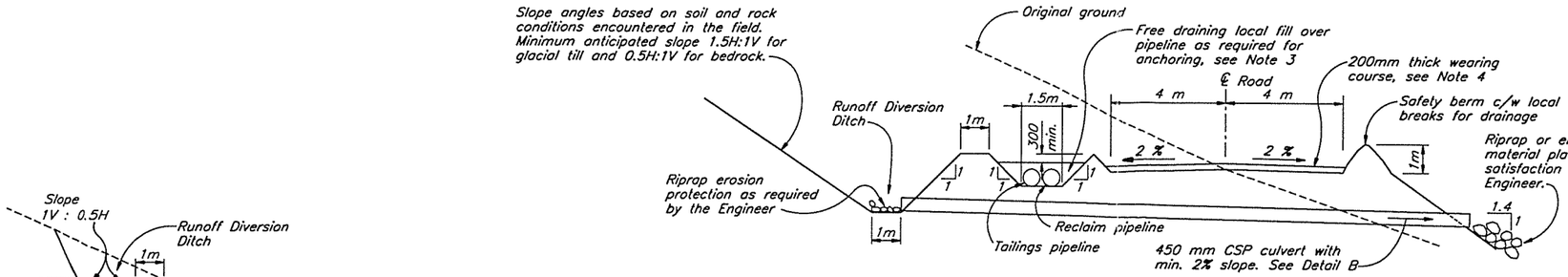
DESIGNED	MBS
DRAWN	VY/RDT/NSD
CHECKED	*
APPROVED	*

IMPERIAL METALS CORPORATION

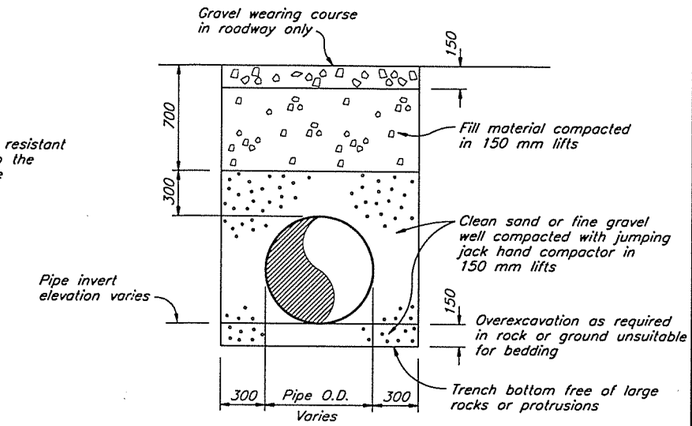
MT. POLLEY PROJECT

TAILINGS STORAGE FACILITY
TAILINGS DISTRIBUTION AND
RECLAIM SYSTEM – PLAN

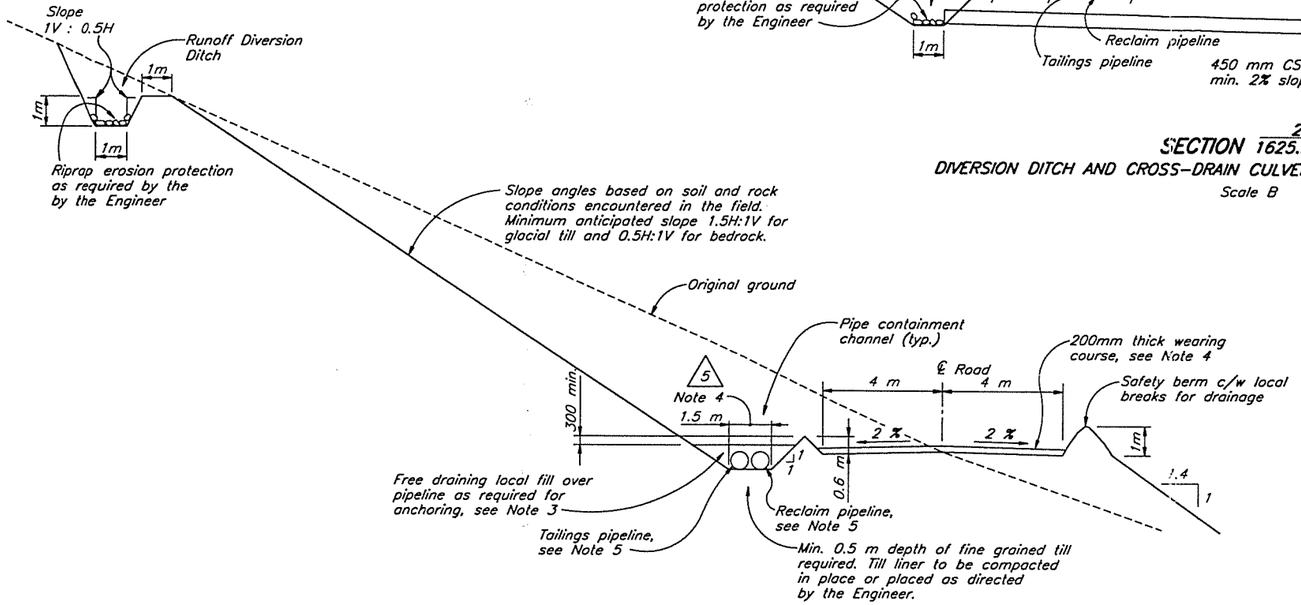
DATE JUNE 2, 1995 | SCALE AS SHOWN | DRG. NO. 1625.218 | REV. 5



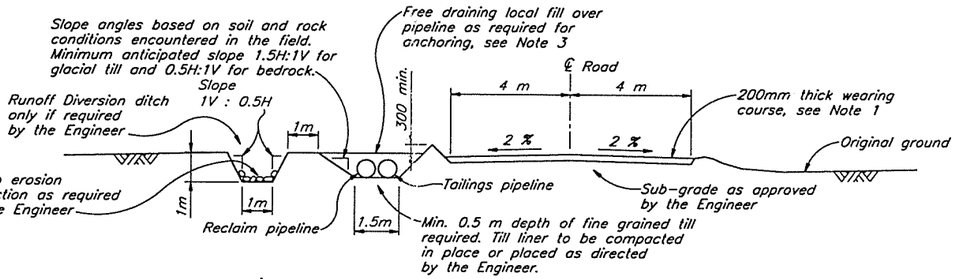
SECTION 2/1625.218 (5)
DIVERSION DITCH AND CROSS-DRAIN CULVERT FOR TAILINGS ACCESS ROAD
Scale B



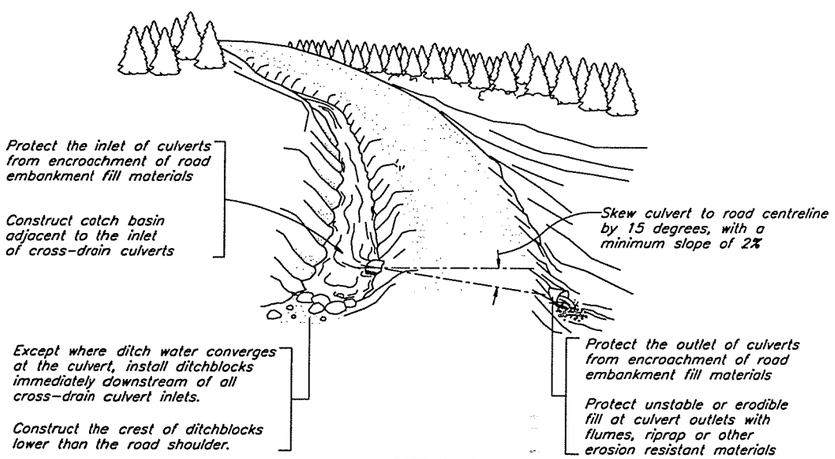
TYPICAL DETAIL FOR BURIED HDPE PIPE
NTS



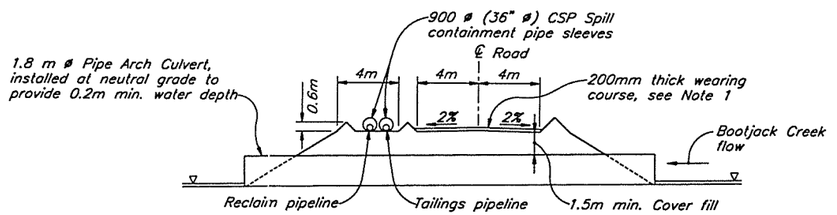
SECTION 1/1625.218 , 2/1625.232 , 1/1625.226 (5)
TAILINGS ACCESS ROAD WITH DIVERSION DITCH
Scale B



(5) **SECTION 4/1625.218 , 2/1625.226**
TAILINGS ACCESS ROAD WITH DIVERSION DITCH ON FLAT GROUND
Scale B



DETAIL B
TYPICAL CROSS-DRAIN CULVERT



SECTION 3/1625.218 (5)
TAILINGS ACCESS ROAD BOOTJACK CREEK CROSSING
Scale A

NOTES

1. Wearing course required for Tailings Access Road and Bootjack-Morehead connector relocation only.
2. For crossing under road, tailings and reclaim pipelines to be installed in individual 900 mm (min.) dia. culverts laid under road with 500 mm min. cover. Culverts laid immediately downslope of cross-drain.
3. Spacing of fill for anchoring to be determined in the field by the Engineer. Anchor posts or concrete anchor blocks can be substituted for local fill.
4. (5) Trench width may vary locally to accomodate additional pipelines or structures in the trench.
5. Tailings and reclaim pipelines reversed between Drop Box No. 1 and Drop Box No. 2.

B: 2 1 0 2 4 6 8 10 m
A: 10 5 0 10 20 m

* "SIGNATURES AND PROFESSIONAL SEAL ON REV.0 ORIGINAL"

CAD FILE\ 1625\027\027 1:200 Plot 1=0.2 July 12, 1996

REFERENCE DRAWINGS		REVISIONS				REVISIONS			
DRG. NO.	DESCRIPTION	REV.	DATE	DESCRIPTION	APPROVED	REV.	DATE	DESCRIPTION	APPROVED
1625.218	TAILINGS STORAGE FACILITY – TAILINGS DISTRIBUTION AND RECLAIM SYSTEM – PLAN					5	JULY 15/96	PIPELINES RELOCATED	KJB
						4	MAY 28/96	ISSUED FOR CONSTRUCTION	
						3	APR 26/96	REVISE DRAINAGE DITCHES	
						2	APR 19/96	SECTIONS REVISED	
						1	MAR 22/96	RE-ISSUED FOR TENDER	
						0	JUNE 2/95	ISSUED FOR TENDER	

KNIGHT PIESOLD LIMITED
CONSULTING ENGINEERS – VANCOUVER, B.C.

*

DESIGNED MBS/HPD
DRAWN VY
CHECKED *
APPROVED *

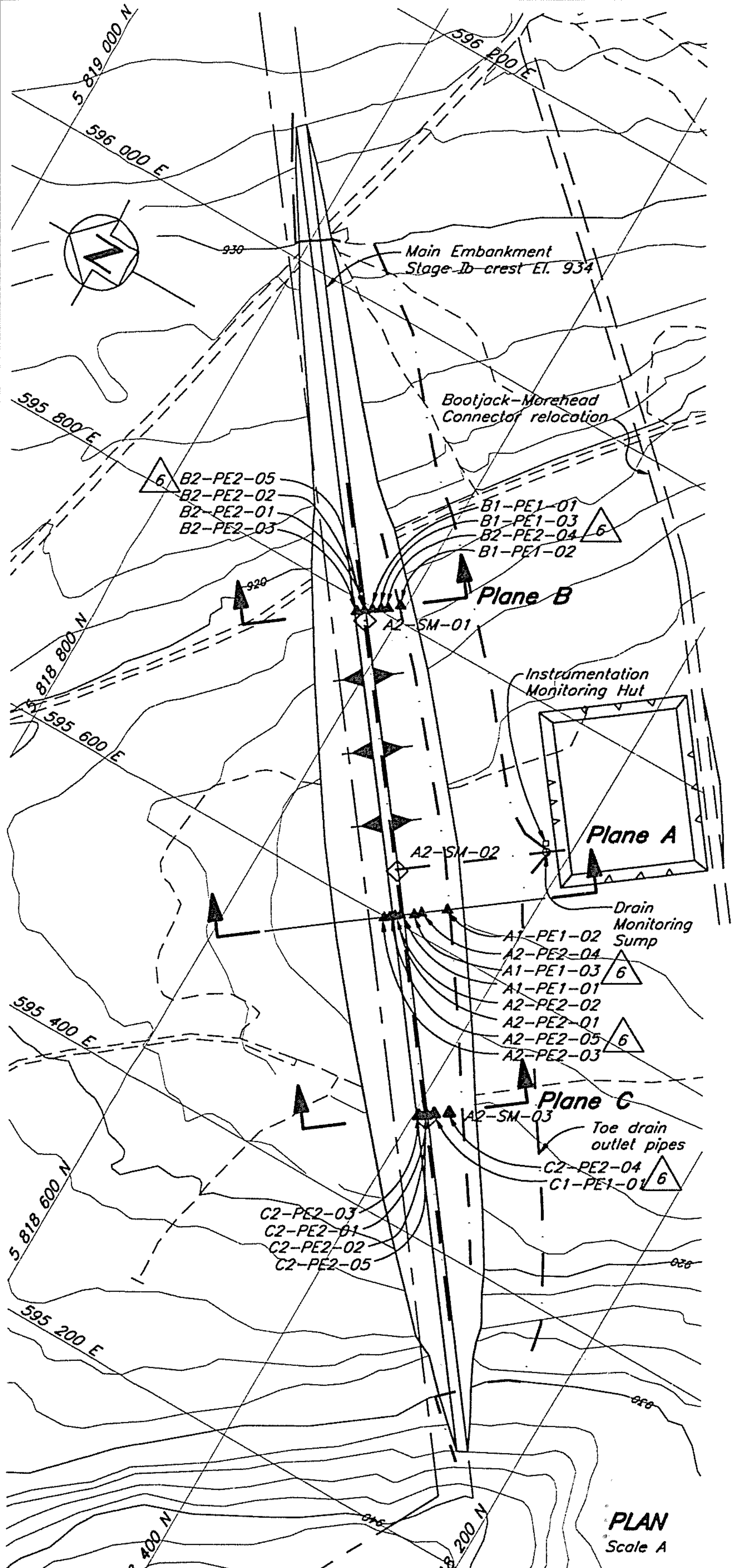
DATE JUNE 2, 1995

IMPERIAL METALS CORPORATION

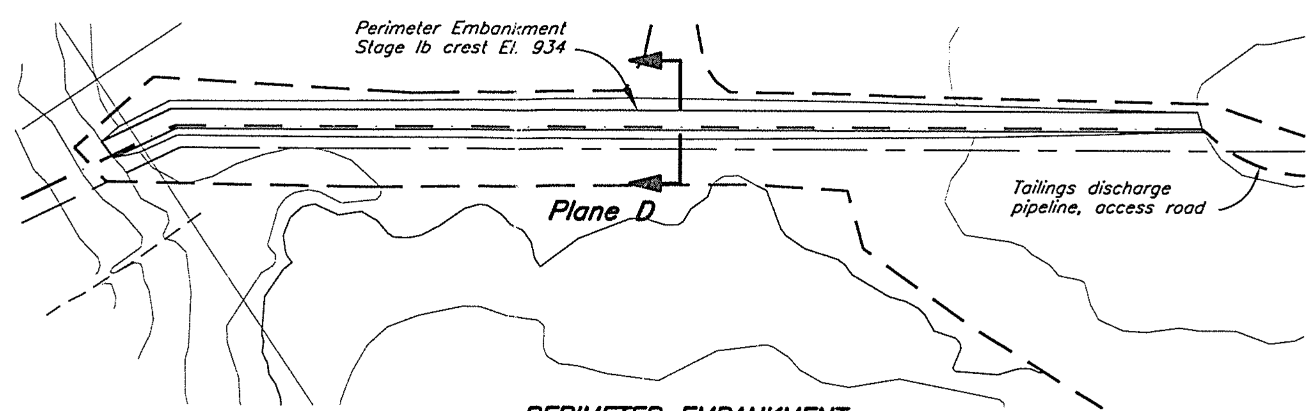
MT. POLLEY PROJECT

TAILINGS STORAGE FACILITY
TAILINGS DISTRIBUTION AND
RECLAIM SYSTEM – SECTIONS AND DETAILS

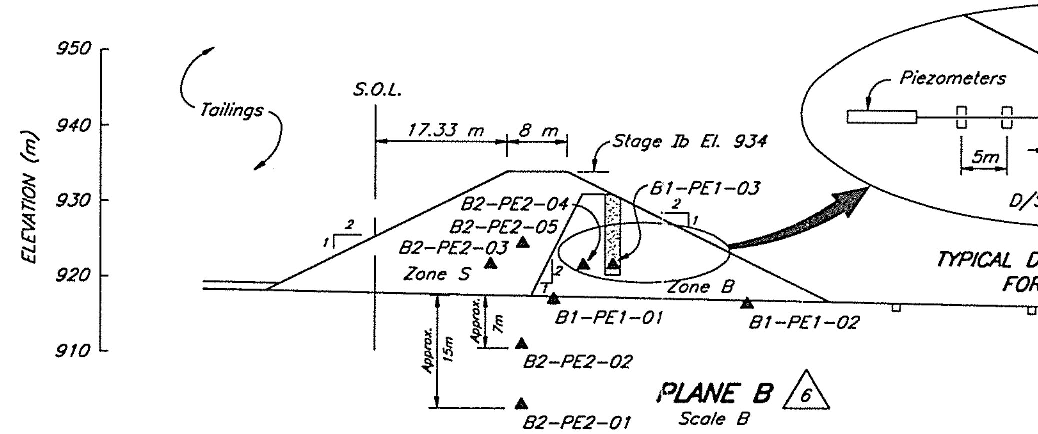
SCALE AS SHOWN | DRG. NO. 510-61-02-1625.219 | REV. 5



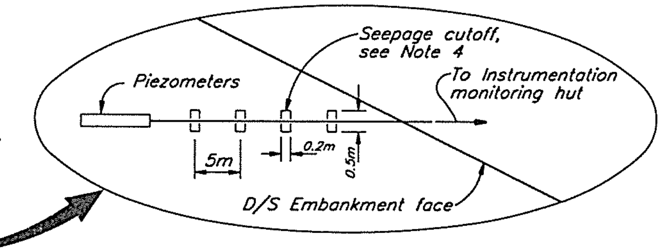
PLAN
Scale A



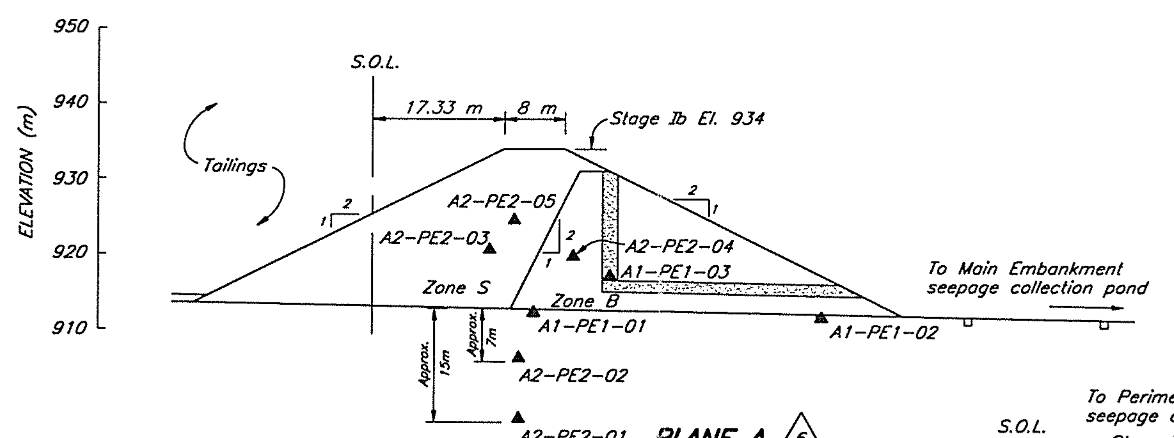
PERIMETER EMBANKMENT
Scale A



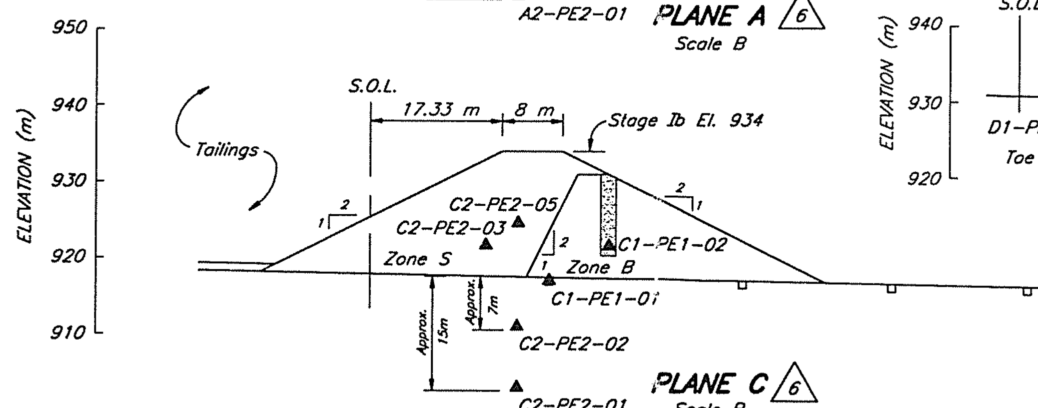
PLANE B 6
Scale B



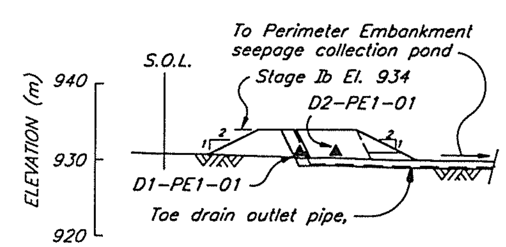
TYPICAL DETAIL OF SEEPAGE CUTOFF FOR PIEZOMETER LEADS
NTS



PLANE A 6
Scale B



PLANE C 6
Scale B



PLANE D
Scale B

SUMMARY OF PIEZOMETERS LEAD LENGTHS	
PIEZOMETER No.	LEAD LENGTH (m)
6 A1-PE1-03	200
A1-PE1-01	175
A1-PE1-02	150
A2-PE2-01	200
A2-PE2-02	200
A2-PE2-03	175
A2-PE2-04	200
A2-PE2-05 6	175
6 B1-PE1-03	305
B1-PE1-01	300
B1-PE1-02	275
B2-PE2-01	325
B2-PE2-02	325
B2-PE2-03	325
6 B2-PE2-04	330
B2-PE2-05 6	325
C1-PE1-01	325
6 C1-PE1-02	330
C2-PE2-01	350
C2-PE2-02	350
C2-PE2-03	325
C2-PE2-05 6	325
D1-PE1-01	90
D2-PE1-01	85

NOTES

1. Piezometers are vibrating type, RST model VW-2100 with a pressure rating of 100 psi or equivalent, connected to a readout panel via standard non-vented model VW-232 direct burial cable.
2. Piezometer leads are to be extended to a prefabricated monitoring hut located downstream of the final embankment toe.
3. Future survey monuments not shown. A minimum of 2 monuments will be installed for each embankment raise.
4. Seepage cutoffs placed at 5m intervals with 10% bentonite added to fine grained till backfill

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 ▲ Embankment foundation drain and toe drain piezometer

A2-PE2-01 ▲ Embankment foundation and fill piezometer

A2-SM-01 ◇ Embankment survey monument

B: 10 0 10 20 30 40 50 m

A: 100 50 0 100 200 m

CAD FILE\1625\D28\D28 1:2500 Plot 1=2.5 SEP 5, 1996

DRG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV.	DATE	DESCRIPTION	APPROVED
6	SEP 4/96	REVISED PIEZO. LOCATIONS	KJB
5	MAY 24/96	ISSUED FOR CONSTRUCTION	
4	APR 1/96	PIEZOMETER INFORMATION ADDED	
3	MAR 25/96	ROAD UPDATED	
2	JAN 18/96	REVISED SEEPAGE COLLECTION POND	
1	JUL 27/95	BASIN GROUNDWATER DRAINS REVISED	
0	JUN 2/95	ISSUED FOR TENDER	

REVISIONS

KNIGHT PIESOLD LIMITED
CONSULTING ENGINEERS - VANCOUVER, B.C.

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

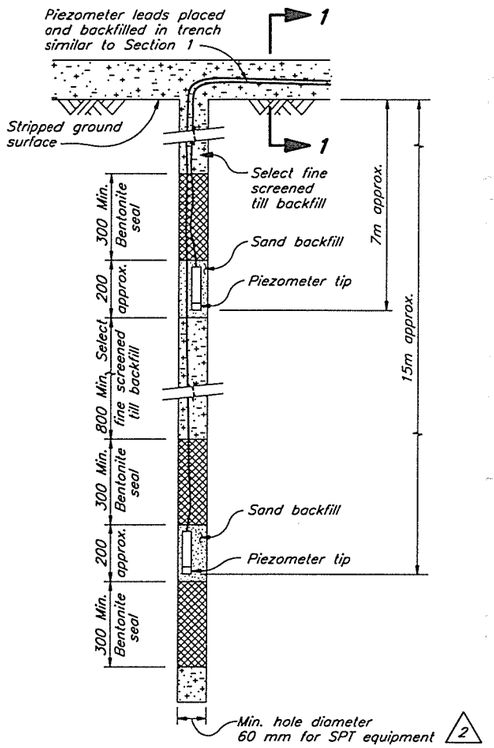
DESIGNED GRG
DRAWN RDT/VY/DHS
CHECKED KJB
APPROVED KJB

IMPERIAL METALS CORPORATION

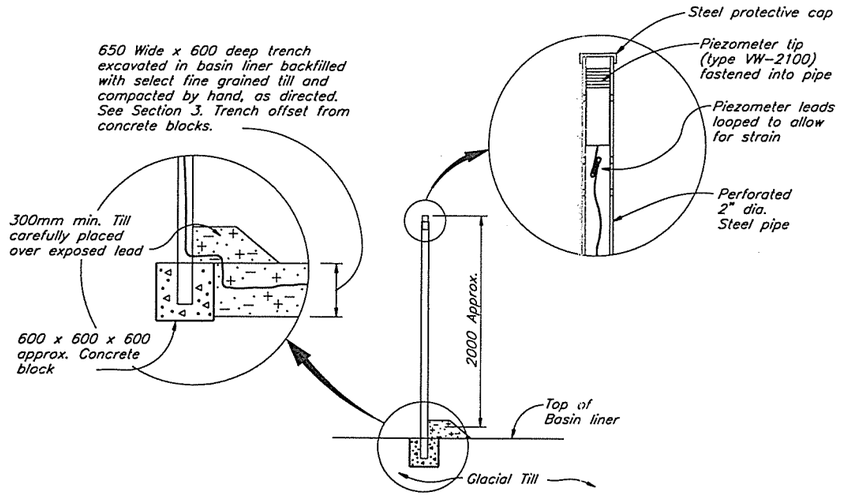
MT. POLLEY PROJECT

TAILINGS STORAGE FACILITY
INSTRUMENTATION

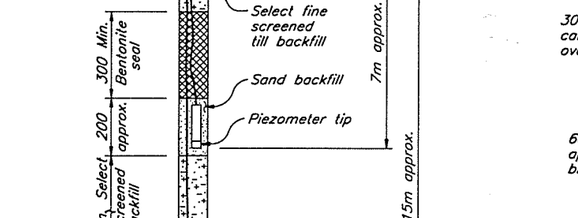
DATE JUNE 2, 1995 | SCALE AS SHOWN | DRG. NO. 510-77-01-1625.220 | REV. 6



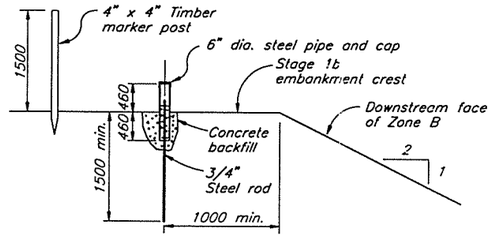
DETAIL A
INSTALLATION OF PIEZOMETERS IN BOREHOLES
N.T.S.



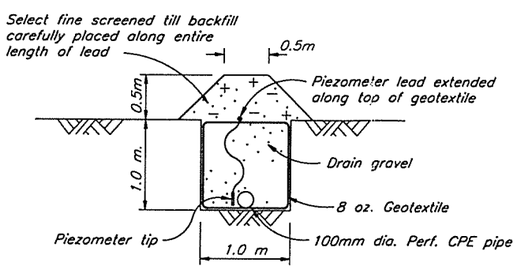
DETAIL B
VERTICAL SUPPORT FOR TAILINGS PIEZOMETERS
N.T.S.



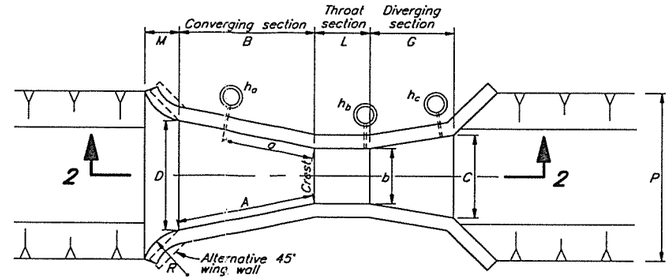
SECTION 1
TYPICAL SECTION THROUGH PIEZOMETER LEAD TRENCH IN PREPARED EMBANKMENT FOUNDATION OR IN ZONE S AND B FILL
N.T.S.



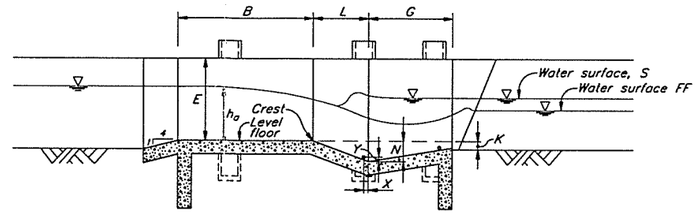
DETAIL OF
SURFACE MOVEMENT MONUMENT
N.T.S.



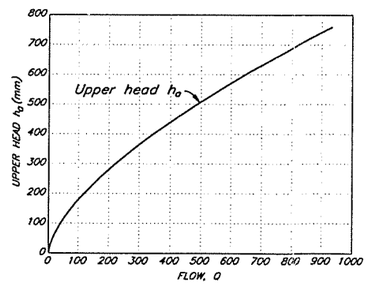
DETAIL C
TYPICAL PIEZOMETER INSTALLATION IN EMBANKMENT FOUNDATION DRAIN OR TOE DRAIN
N.T.S.



PARSHALL FLUME (2 FT. SIZE) – PLAN
DETAIL B/1625.215



SECTION 2
FLOW MEASUREMENT FOR INFLOWS TO TAILINGS STORAGE FACILITY
AREA B RUNOFF COLLECTION AND TAILINGS AREA DIVERSION DITCHES



Dimensions for Parshall flume with throat width b_c of 2 feet.	
b_c	609.6
A	1524
a	1016
B	1495
C	914
D	1206
E	914
L	610
G	914
H	–
K	76
M	381
N	229
P	1854
R	508
X	51
Y	76
Z	–

Scale 1000 500 0 1000 2000 mm

CAD FILE\1625\039.039 1:20 Plot 1=0.02 May 24, 1995

REFERENCE DRAWINGS					
DRG. NO.	DESCRIPTION				
1625.220	TAILINGS STORAGE FACILITY – INSTRUMENTATION				

REVISIONS					
REV.	DATE	DESCRIPTION	APPROVED		

REVISIONS			
REV.	DATE	DESCRIPTION	APPROVED
3	MAR 24/96	ISSUED FOR CONSTRUCTION	KJB
2	APR. 1/96	NOTE ADDED	
1	JAN. 18/96	GROUNDWATER DRAINS REMOVED	
0	JUNE 2/95	ISSUED FOR TENDER	

KNIGHT PIESOLD LIMITED
CONSULTING ENGINEERS – VANCOUVER, B.C.

PROVINCE OF BRITISH COLUMBIA PROFESSIONAL ENGINEER K. P. KEBBREE

DESIGNED	KDE/MBS
DRAWN	VY
CHECKED	KPK
APPROVED	KJB
DATE	JUNE 2, 1995

IMPERIAL METALS CORPORATION

MT. POLLEY PROJECT

TAILINGS STORAGE FACILITY
INSTRUMENTATION
SECTIONS AND DETAILS

SCALE AS SHOWN | DRG. NO. 510–77–02–1625.221 | REV. 3

Polley Lake

Creek

595 000 E

Bootjack

5 820 000 N

596 000 E

5 819 000 N

Contractor's Lay Down Area

Overburden stockpile

Tailings discharge pipeline access road

Mark 3 offtake at 4 locations between Dump Valve and Embankment, see Note 1

Perimeter Embankment seepage collection pond

Perimeter Embankment Stage Ib crest El. 934

Mark 3

M3

Main Embankment Stage Ib crest El. 934

5 818 000 N

Main Embankment seepage collection pond

Channel invert El. 917

Reclaim barge channel Access Road and Reclaim Pipeline, see Drg. No. 1625.223 (Note 4)

Embankment offtakes Note 1

Bootjack–Morehead Connector Relocation

Tailings Header Dump Valve See Mark 1/1625.224

2
1625.206

1
1625.206

Tailings Pipeline termination See Detail B/1625.224

HDPE to steel pipe connection, see Detail B/1625.223, location as required. For steel to steel connection, see DETAIL C/1625.223

Channel invert El. 935

594 000 E

Logging road crossing, Note 3

For Continuation See 1625.218

NOTES

1. For Tailings Pipework offtake locations, see Drg. No. 1625.228.
2. All bends in tailings and reclaim HDPE pipelines are made using natural flexibility of pipe unless otherwise noted. Minimum bend radius to be 25 diameter.
3. Pipelines at logging road crossings to be sleeved in 900mm ø x 2mm minimum wall CSP culvert with 500mm minimum depth of cover. Backfill to be well graded and compacted sand and gravel.
4. Reclaim pipeline is assumed to be required only to original ground elevation of 925 m. Additional line may be required if elevation of ponded water at startup is significantly lower than 925 m. See additional notes on Drg. No. 1625.206.

Scale 100 50 0 100 200 300 400 500 m

CAD FILE:\1625\DWG\042 1:5000 Plot 1=5 July 12, 1996

DRG. NO.	DESCRIPTION
1625.223	RECLAIM PIPELINE DETAILS
1625.218	TAILINGS DISTRIBUTION AND RECLAIM SYSTEM – PLAN

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	APPROVED
0	JULY 15/96	ISSUED FOR CONSTRUCTION	KJB

REVISIONS

KNIGHT PIESOLD LIMITED
CONSULTING ENGINEERS – VANCOUVER, B.C.

PROVINCE OF BRITISH COLUMBIA
H. P. DEW
ENGINEER

DESIGNED	HPD
DRAWN	AW/RDT
CHECKED	KJB
APPROVED	KJB

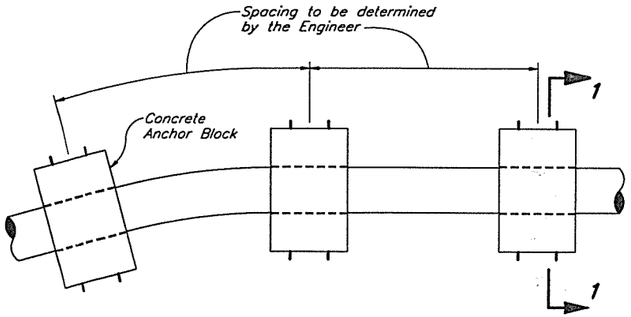
DATE JULY 15, 1996

IMPERIAL METALS CORPORATION

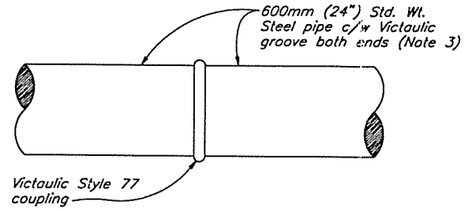
MT. POLLEY PROJECT

TAILINGS STORAGE FACILITY
TAILINGS IMPOUNDMENT
TAILINGS AND RECLAIM PIPEWORK PLAN

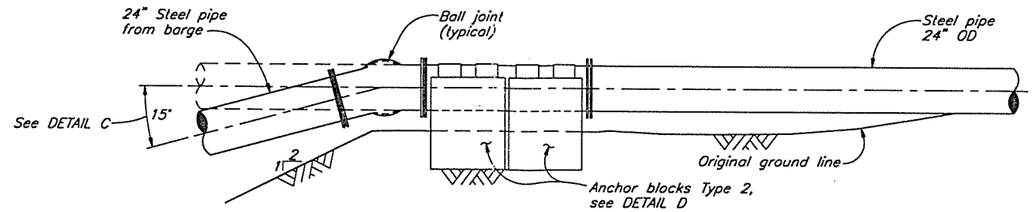
SCALE AS SHOWN | DRG. NO. 1625.222 | REV. 0



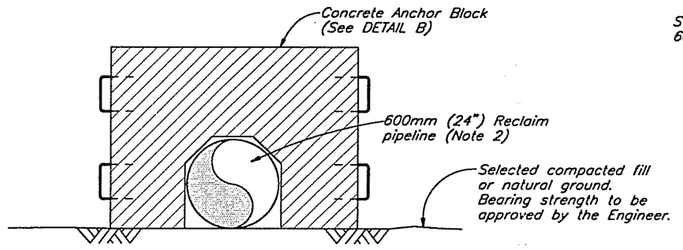
PIPELINE BEND ANCHORING
Scale B



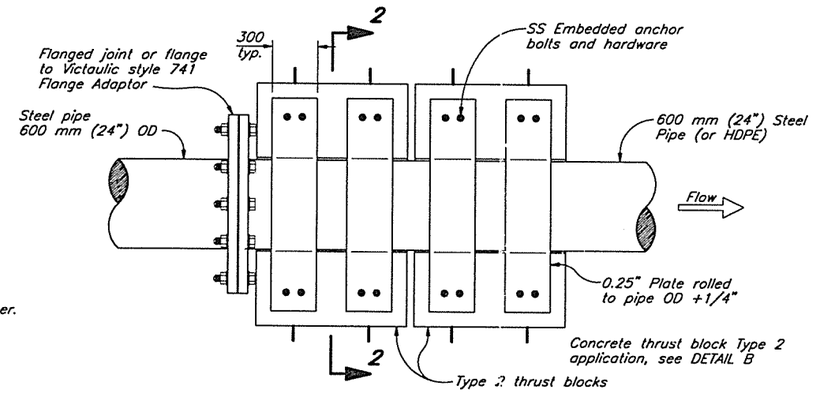
DETAIL C / 1625.222
STEEL RECLAIM PIPE CONNECTION
Scale A



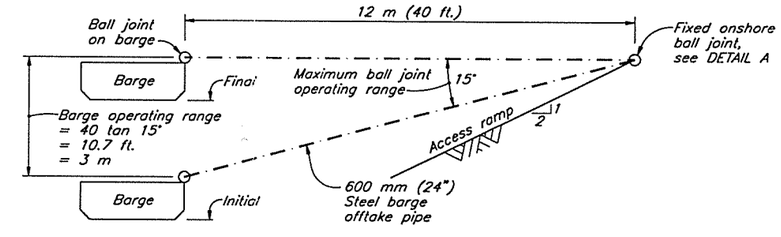
DETAIL A , A / 1625.206
ONSHORE BALL JOINT
Scale B



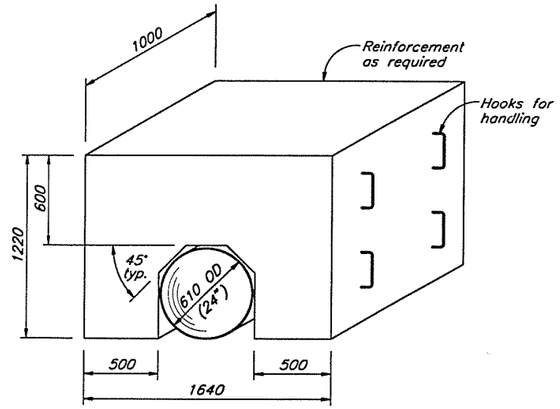
SECTION 1
CONCRETE ANCHOR BLOCK – TYPE 1 APPLICATION
Scale A



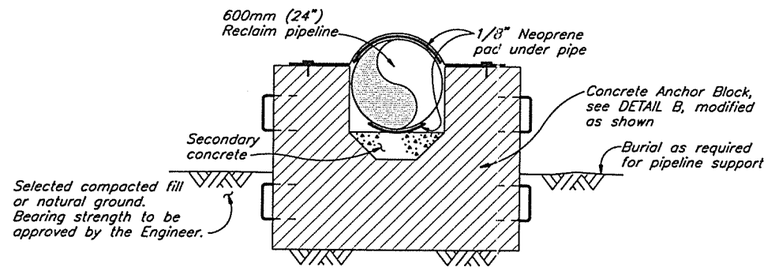
DETAIL D, B / 1625.222
CONCRETE THRUST BLOCK – TYPE 2 APPLICATION
CONNECTION BETWEEN STEEL AND HDPE PIPE
CONNECTION AT RECLAIM BOOSTER PUMPSTATION DISCHARGE
AND CONNECTION AT BARGE OFFTAKE BALL JOINT
Scale A



DETAIL C
BARGE OPERATING RANGE – SCHEMATIC



DETAIL B
TYPICAL PORTABLE CONCRETE BLOCK FOR 24" OD PIPE
(4.5 TONNE)
Scale A



SECTION 2
CONCRETE THRUST BLOCK – TYPE 2 APPLICATION
Scale A

NOTES

1. Concrete anchoring blocks to be used at barge ball joint and at locations where pipeline changes from steel to HDPE.
2. Anchor blocks may be used for reclaim or tailings pipeline as required by the Engineer. Modifications will be required for pipe diameter other than 24".
3. Victaulic grooves to be rolled if pipe wall thickness is less than 0.375".

B	2000	1000	0	2000	4000 mm
A	1000	500	0	1000	2000 mm

C:\DWG FILES\1625\DWG\040 1:20 Plot 1=0.02 STD.1 July 12, 1996

DRG. NO.	DESCRIPTION
1625.224	TAILINGS DISTRIBUTION SYSTEM – DETAILS
1625.222	TAILINGS IMPOUNDMENT – TAILINGS AND RECLAIM PIPEWORK PLAN

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	APPROVED

REVISIONS

REV.	DATE	DESCRIPTION	APPROVED
0	JULY 15/96	ISSUED FOR CONSTRUCTION	DB

REVISIONS

KNIGHT PIESOLD LIMITED
CONSULTING ENGINEERS – VANCOUVER, B.C.

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
H. P. DEW
25357

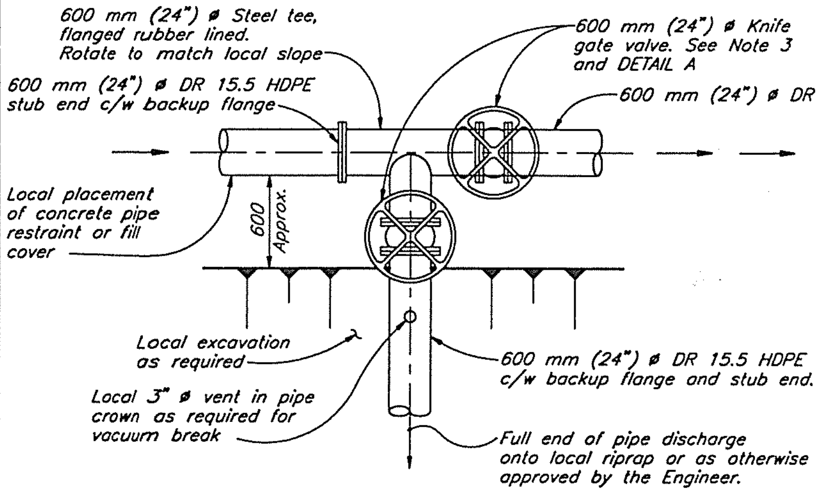
DESIGNED	HPD/NM
DRAWN	AW/RDT/NSD
CHECKED	KJB
APPROVED	KJB

DATE JULY 15, 1996 | SCALE AS SHOWN | DRG. NO. 1625.223 | REV. 0

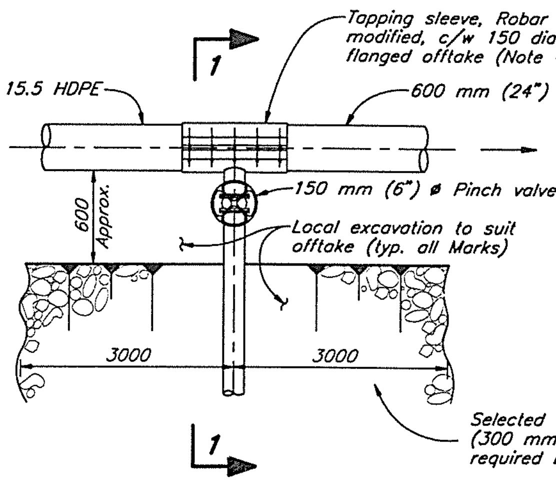
IMPERIAL METALS CORPORATION

MT. POLLEY PROJECT

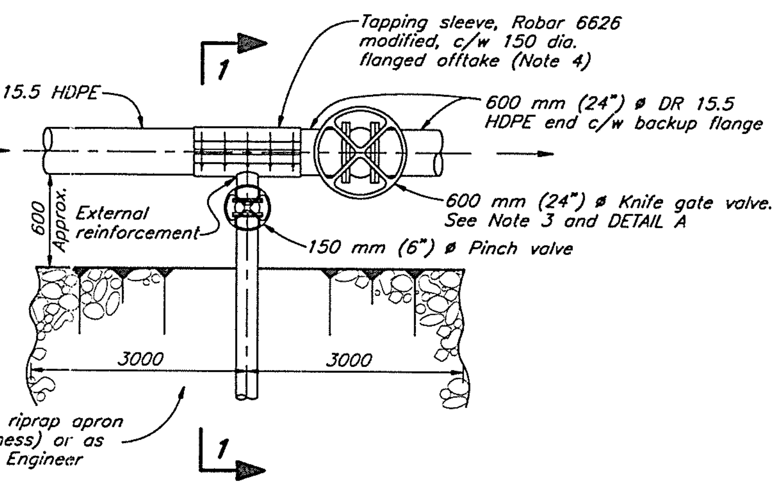
TAILINGS STORAGE FACILITY
RECLAIM PIPELINE DETAILS



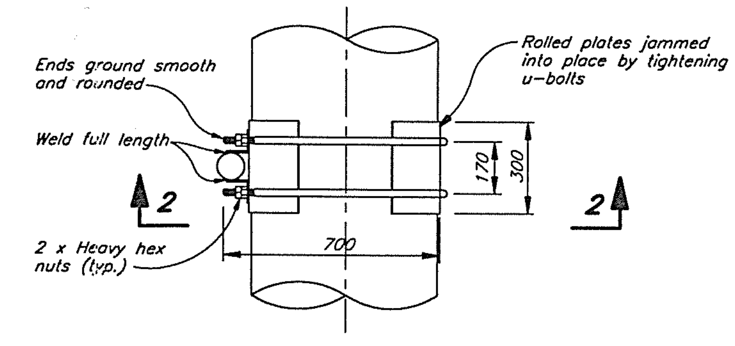
TAILINGS HEADER DUMP VALVE (1 No)
(MARK 1/1625.222)
Scale A



TAILINGS HEADER OFFTAKE (TYPICAL) (45 No)
(MARK 2)
Scale A

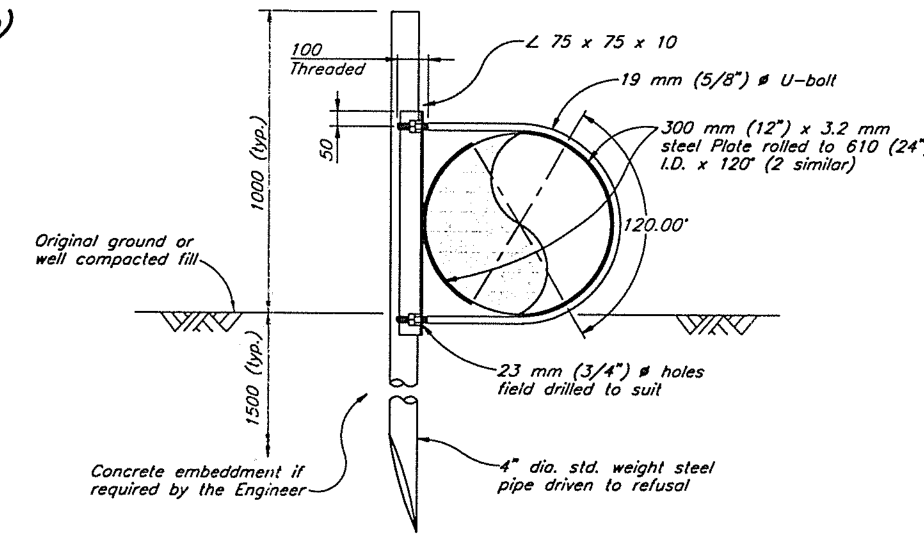


TAILINGS HEADER OFFTAKE
WITH HEADER VALVE (TYPICAL) (MARK 3) (10 No)
Scale A

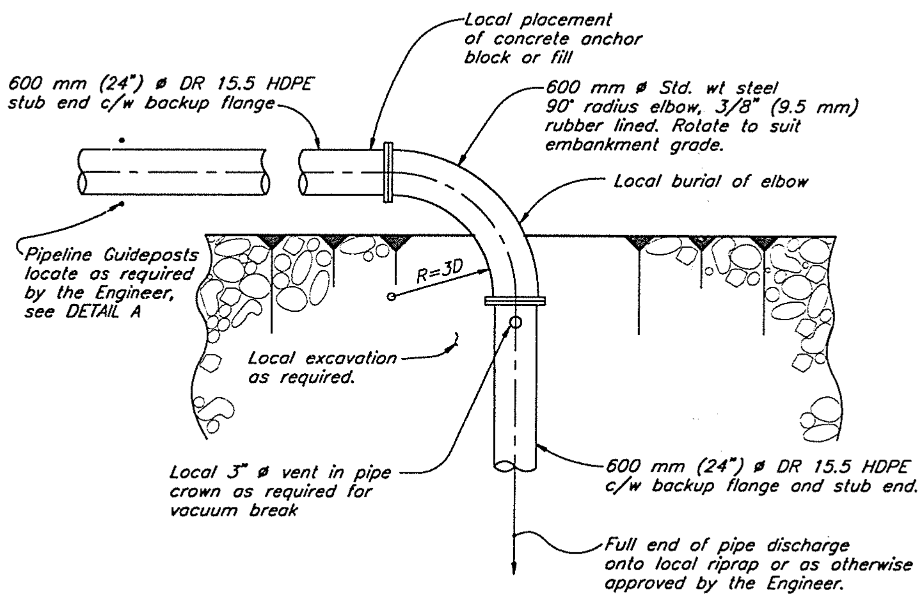


PIPE RESTRAINT FOR 24" HDPE
NTS

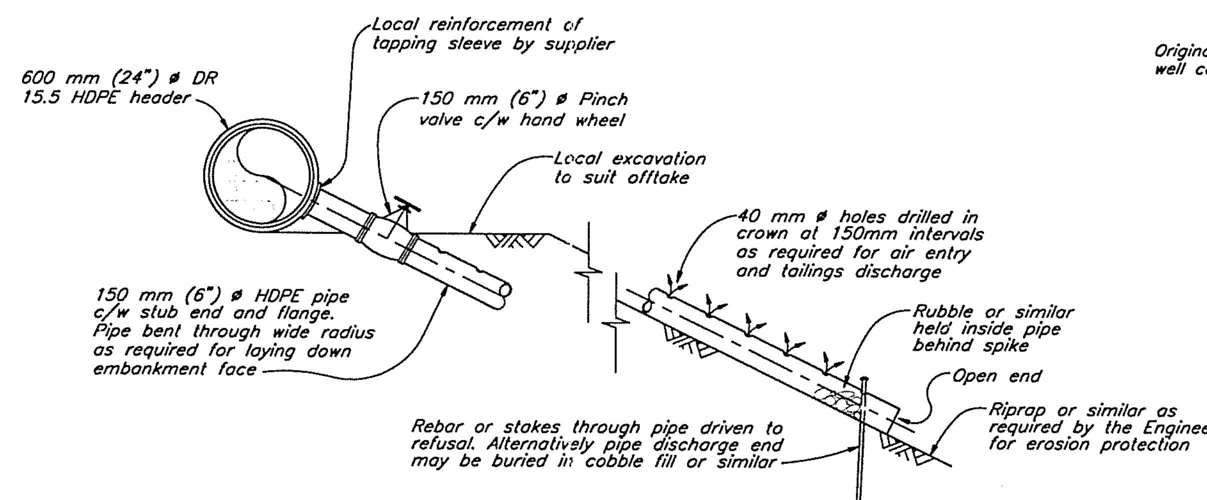
(Locate as required by the Engineer)



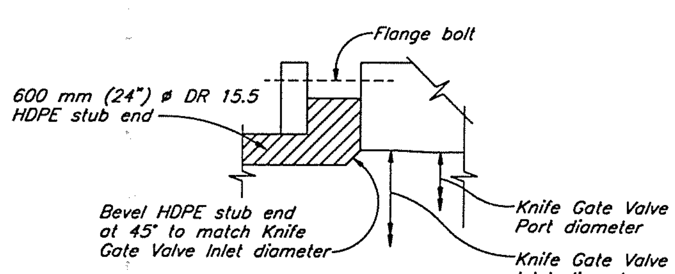
SECTION 2
NTS



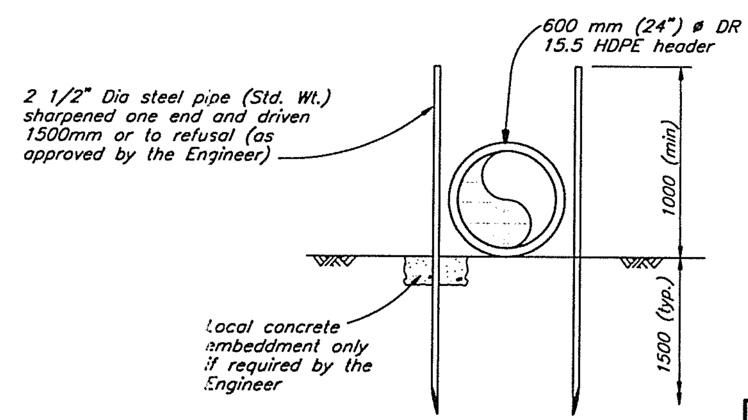
DETAIL B/1625.222
TAILINGS HEADER PIPELINE TERMINATION (1 No)
(MARK 4)
Scale A



SECTION 1 (TYPICAL MARKS 2 &3)
Scale B



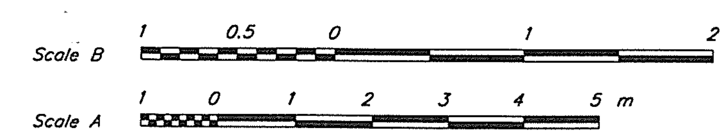
DETAIL A
KNIFE GATE INLET
(Note 5)
NTS



DETAIL B
GUIDEPOST
Scale B

NOTES

1. Rubber lining to be Linatex PGR or approved equivalent.
2. Pipe restraint by local burial of pipeline or as otherwise required by the Engineer to control movement due to thermal and hydraulic forces.
3. 24" Knife Gate Valve c/w hydraulic operator. One portable hydraulic power pack to be supplied for valve operation.
4. Robar 6626 c/w 1/4" rubber lining of offtake and external reinforcement of offtake to sleeve joint.
5. HDPE Pipe ID exceeds that of knife gate valve and is to be field bevelled to match.
6. HDPE pipelines to be connected under cool conditions with snaking allowance made for additional thermal contraction of empty pipeline.



CAD FILE:\1625\D39\D39 1:50 Plot 1=0.05 July 12, 1996

DRG. NO.	DESCRIPTION
1625.222	TAILINGS STORAGE FACILITY – TAILINGS AND RECLAIM PIPEWORK PLAN
1625.228	TAILINGS STORAGE FACILITY – TAILINGS AND RECLAIM PIPEWORK PROFILES

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	APPROVED

REVISIONS

REV.	DATE	DESCRIPTION	APPROVED
0	JULY 15/96	ISSUED FOR CONSTRUCTION	KJB

REVISIONS

KNIGHT PIESOLD LIMITED
CONSULTING ENGINEERS – VANCOUVER, B.C.

PROFESSIONAL ENGINEER – PROVINCE OF BRITISH COLUMBIA – H. P. DEW

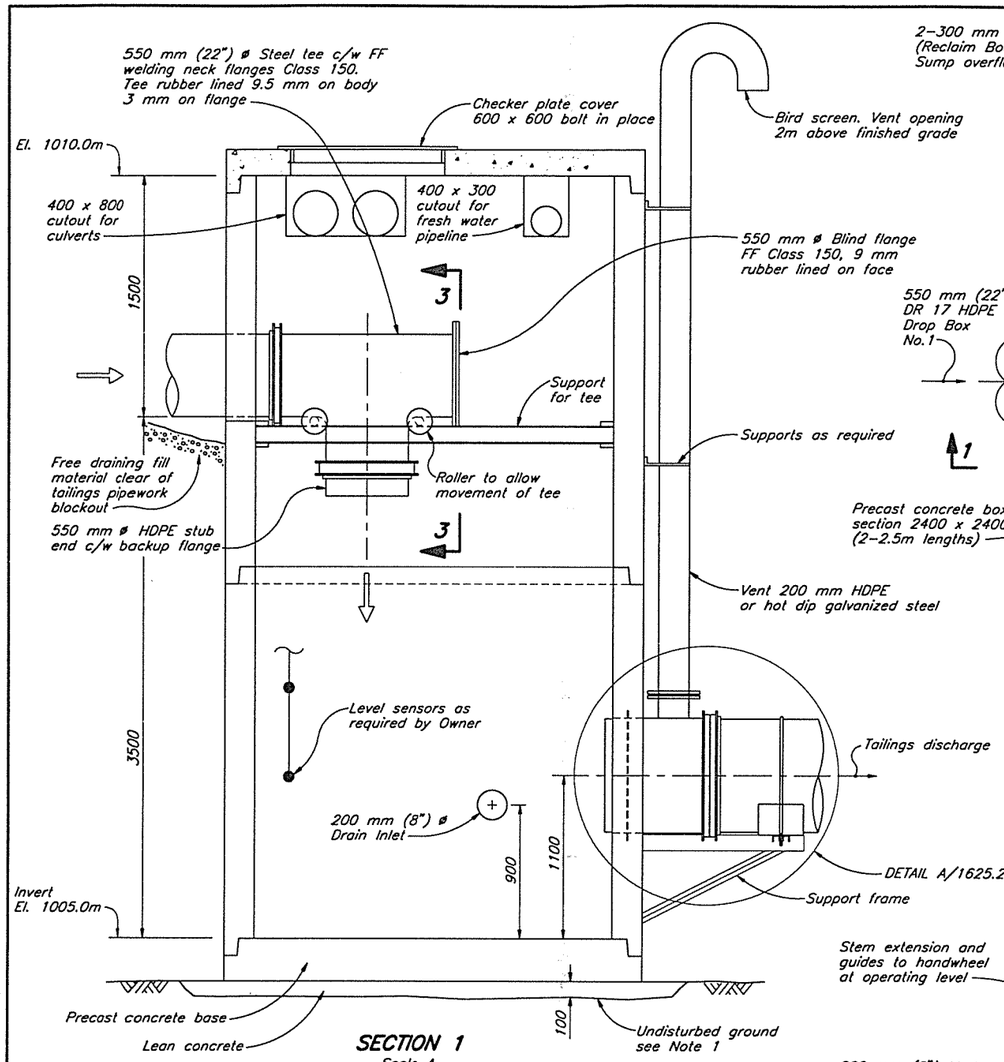
DESIGNED	HPD
DRAWN	AW/RDT
CHECKED	KJB
APPROVED	KJB

IMPERIAL METALS CORPORATION

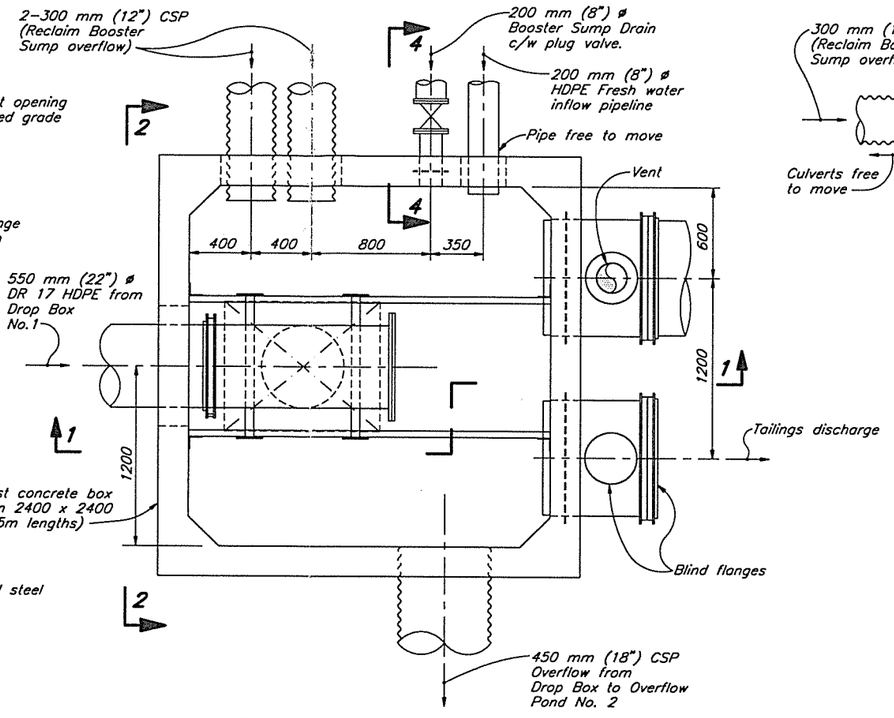
MT. POLLEY PROJECT

TAILINGS STORAGE FACILITY
TAILINGS DISTRIBUTION SYSTEM
DETAILS

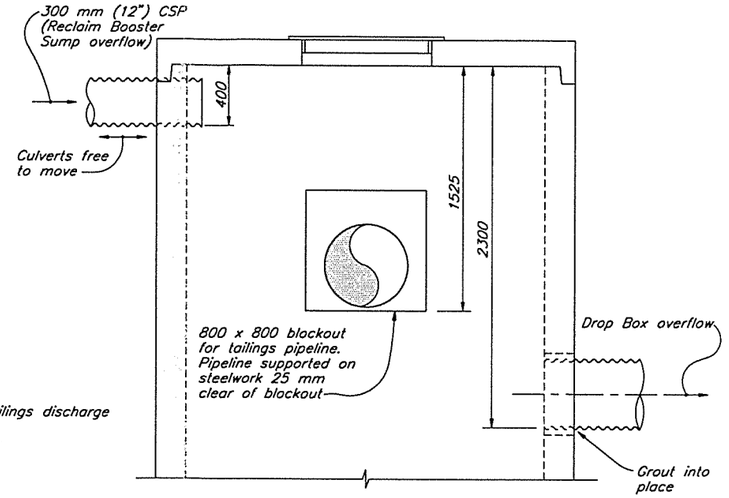
DATE JULY 15, 1996 | SCALE AS SHOWN | DRG. NO. 1625.224 | REV. 0



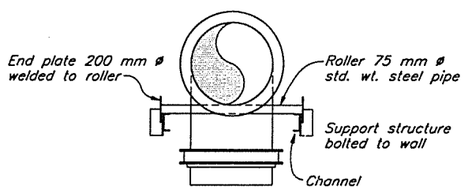
SECTION 1
Scale A



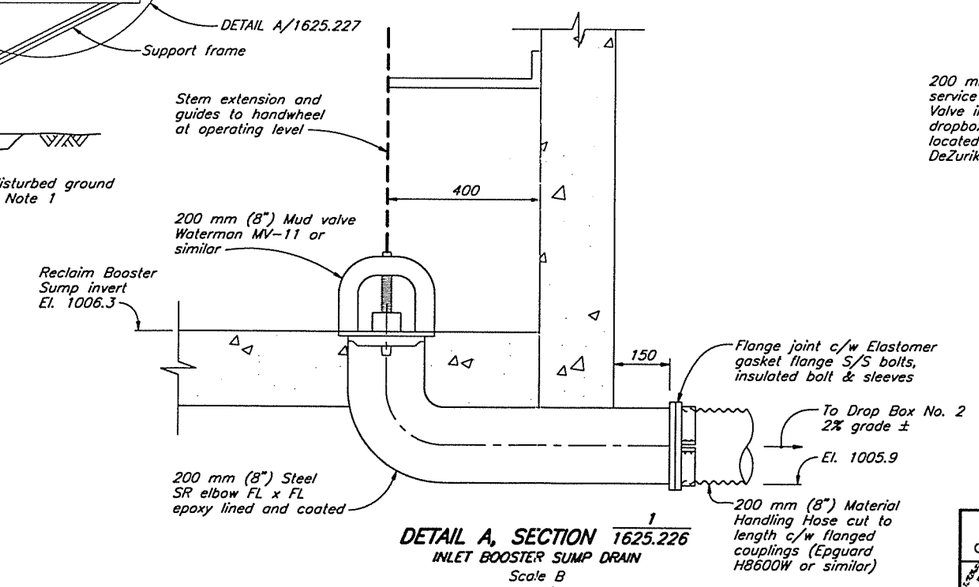
TAILINGS DROP BOX No. 2
Scale A



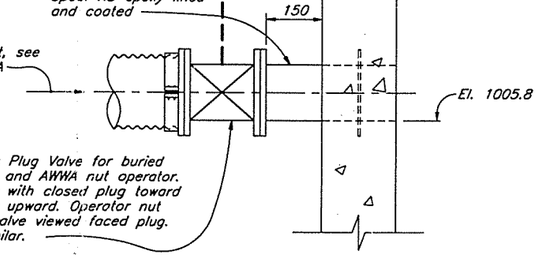
SECTION 2
Scale A



SECTION 3
Scale A



DETAIL A, SECTION 1/1625.226
INLET BOOSTER SUMP DRAIN
Scale B



SECTION 4
Scale B

NOTES

1. Soil bearing capacity as verified by the Engineer shall be 100 kPa or better.
2. Structural steel bolting to be stainless steel.

B	400	200	0		400	800	mm
A	1000	500	0		1000	2000	mm

CAD FILE\ 1625\041\041 1:20 Plot 1=0.02 STD.1 July 12, 1996

DRG. NO.	DESCRIPTION
1625.228	TAILINGS STORAGE FACILITY – TAILINGS AND RECLAIM PIPEWORK PROFILES
1625.227	TAILINGS PIPEWORK DETAILS – DROP BOX NO. 1
1625.226	TAILINGS STORAGE FACILITY – RECLAIM BOOSTER PUMP STATION, AREA 'A' G.A.

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	APPROVED

REVISIONS

REV.	DATE	DESCRIPTION	APPROVED
0	JULY 15/96	ISSUED FOR CONSTRUCTION	KJB

REVISIONS

KNIGHT PIESOLD LIMITED
CONSULTING ENGINEERS – VANCOUVER, B.C.

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA H. P. DEW

DESIGNED	HPD
DRAWN	TAM/NSD
CHECKED	KJB
APPROVED	KJB

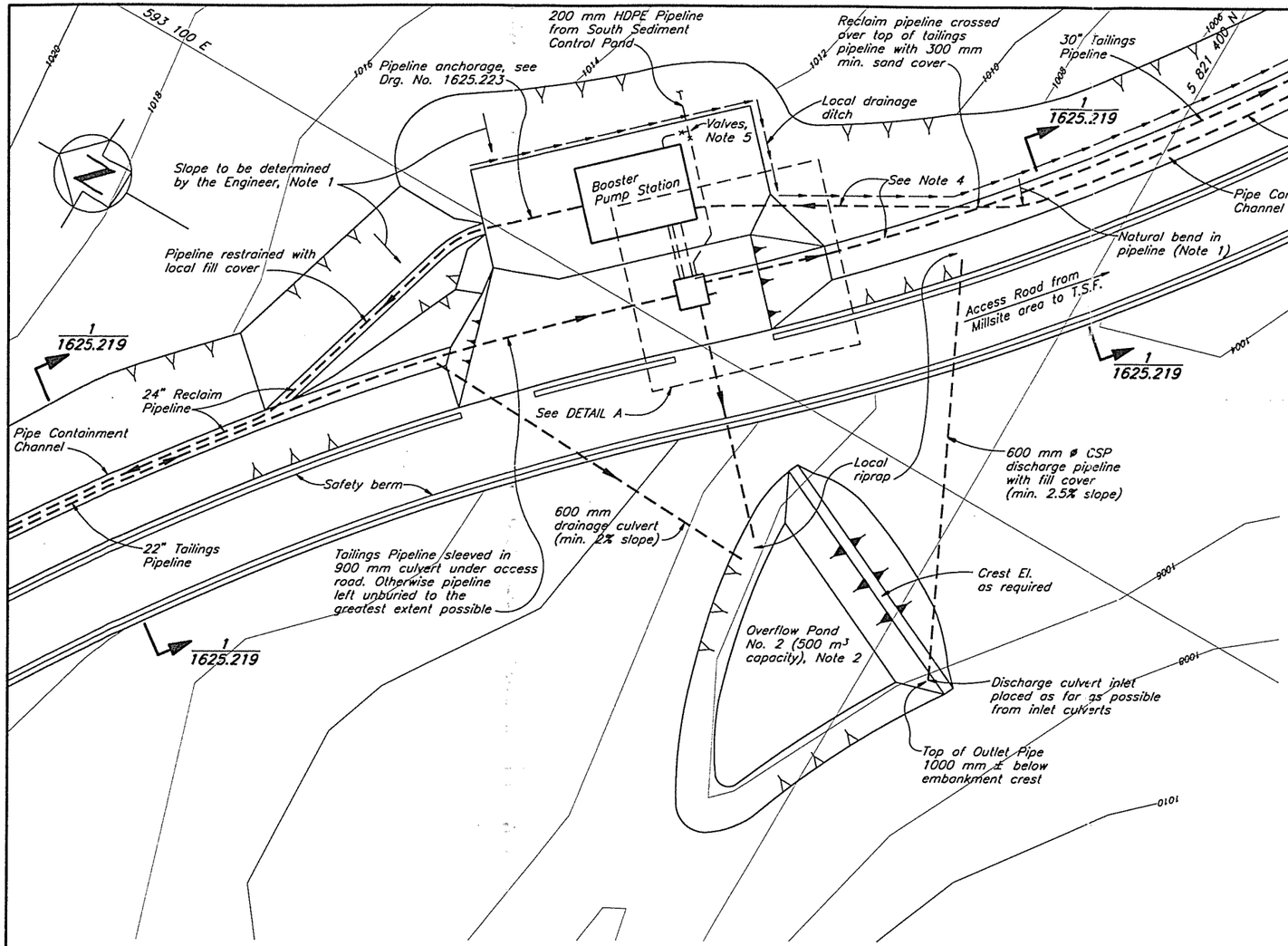
DATE JULY 15, 1996

IMPERIAL METALS CORPORATION

MT. POLLEY PROJECT

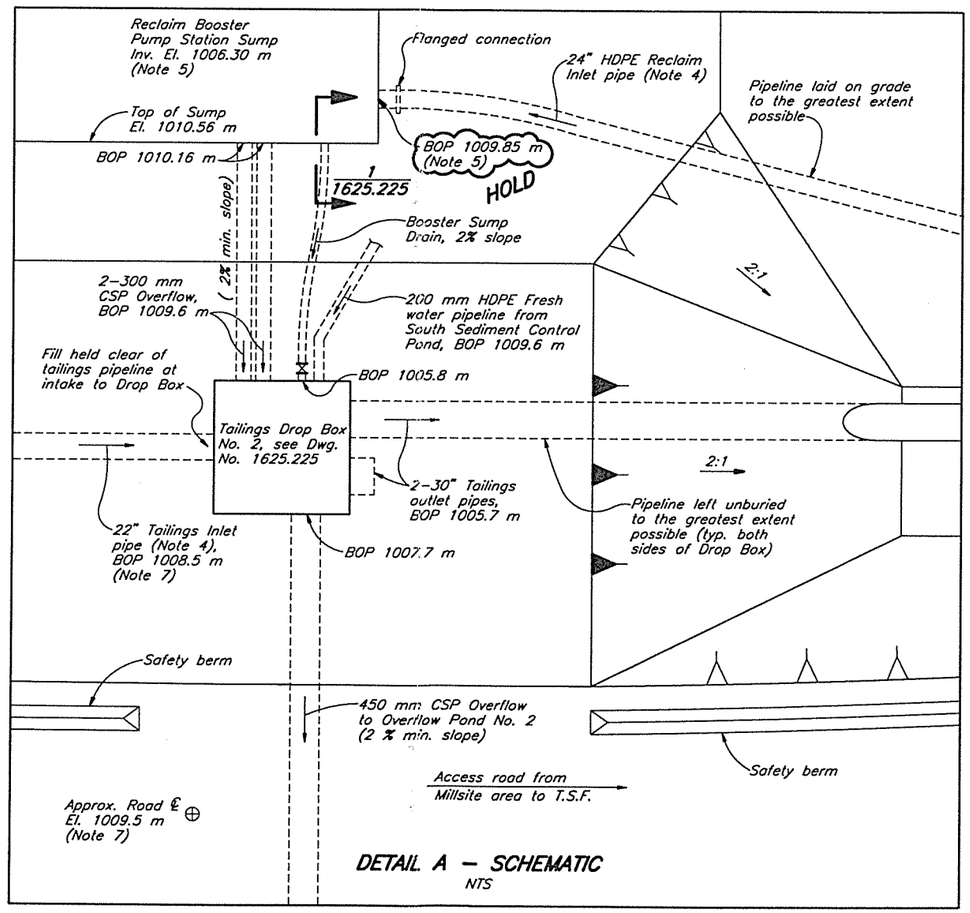
TAILINGS STORAGE FACILITY
TAILINGS PIPEWORK DETAILS
DROP BOX No. 2

SCALE AS SHOWN | DRG. NO. 1625.225 | REV. 0



DETAIL A/1625.218 – SCHEMATIC

RECLAIM BOOSTER PUMP STATION, DROP BOX No. 2 AND OVERFLOW POND No. 2



DETAIL A – SCHEMATIC

NTS

NOTES:

1. Layout including cut and fill details to be approved by the Engineer in the field to ensure basic BOP elevations and grades are achieved.
2. The 500 m³ capacity of Overflow Pond No. 2, below the invert of the discharge pipeline is sufficient to contain the contents of the upstream tailings pipeline. Pond located and shaped to take best advantage of topography and to minimize culvert requirements.
3. Radius of natural bends in HDPE pipelines not to be less than 25 pipe diameters.
4. Tailings and Reclaim pipelines uniformly graded between pipe containment channel and structures without high or low points.
5. Details of pipelines into Reclaim Booster sump to be determined in conjunction with CSFM.
6. Sump depth assumed to be 14' (4.26m).
7. Invert of pipe containment channel is assumed to be 1 m below local road elevation.

LEGEND

BOP Bottom of Pipe

Scale 10 5 0 10 20 Metres

REFERENCE DRAWINGS			REVISIONS				REVISIONS			
DRG. NO.	DESCRIPTION	REV.	DATE	DESCRIPTION	APPROVED	REV.	DATE	DESCRIPTION	APPROVED
1625.219	TSF – TAILINGS DISTRIBUTION AND RECLAIM SYSTEM – SECTIONS AND DETAILS					0	JULY 15/96	ISSUED FOR CONSTRUCTION	KJB
1625.225	TSF – TAILINGS PIPEWORK DETAILS – DROP BOX No. 2								

KNIGHT PIESOLD LIMITED
CONSULTING ENGINEERS – VANCOUVER, B.C.

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA H. P. DEW

DESIGNED	HPD/NM
DRAWN	TAM
CHECKED	KJB
APPROVED	KJB

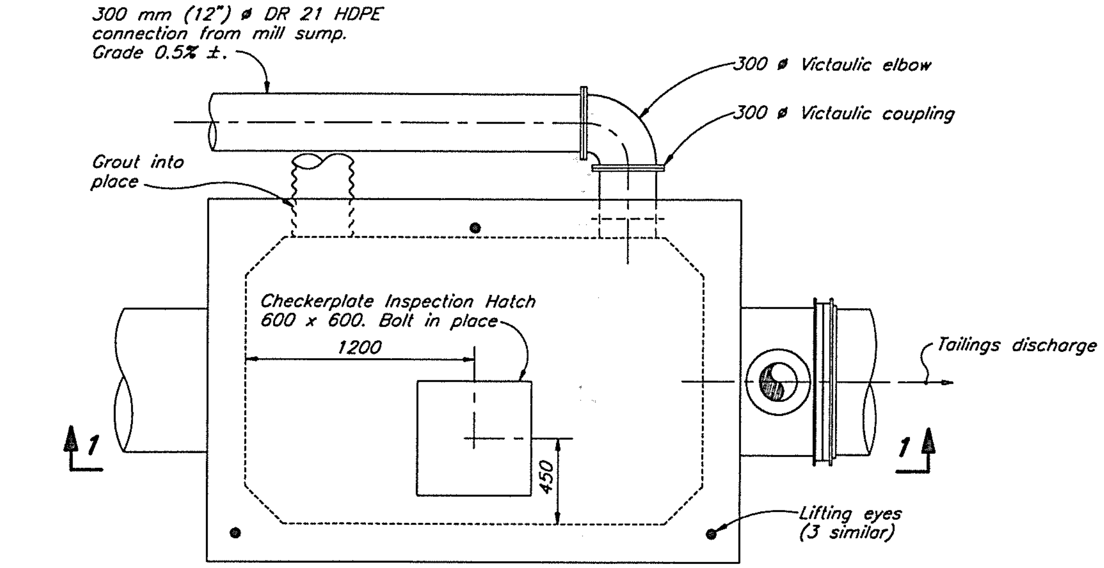
IMPERIAL METALS CORPORATION

MT. POLLEY PROJECT

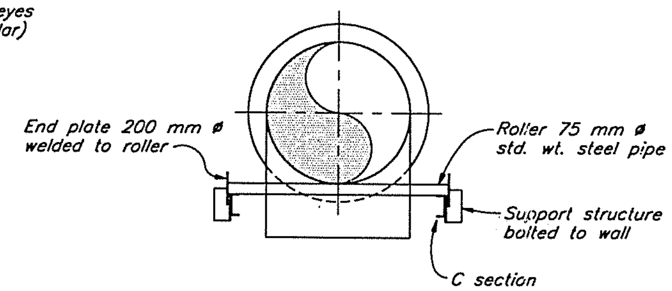
TAILINGS STORAGE FACILITY
RECLAIM BOOSTER PUMP STATION AREA
GENERAL ARRANGEMENT

DATE JULY 15, 1996 | SCALE AS SHOWN | DRG. NO. 1625.226 | REV. 0

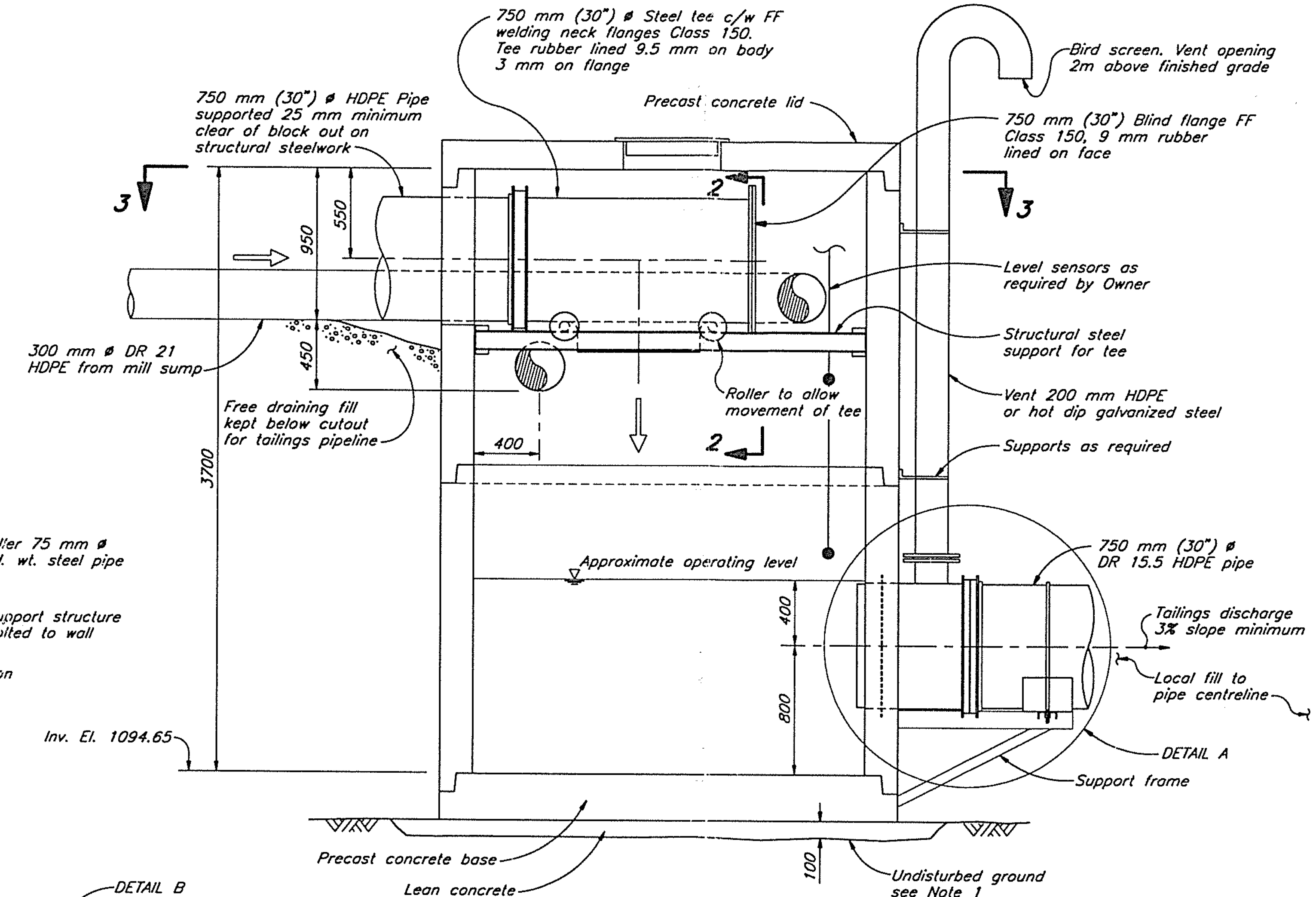
CAD FILE\1625\052\052-1250 Plot 1=0.25 STD.1 July 12, 1996



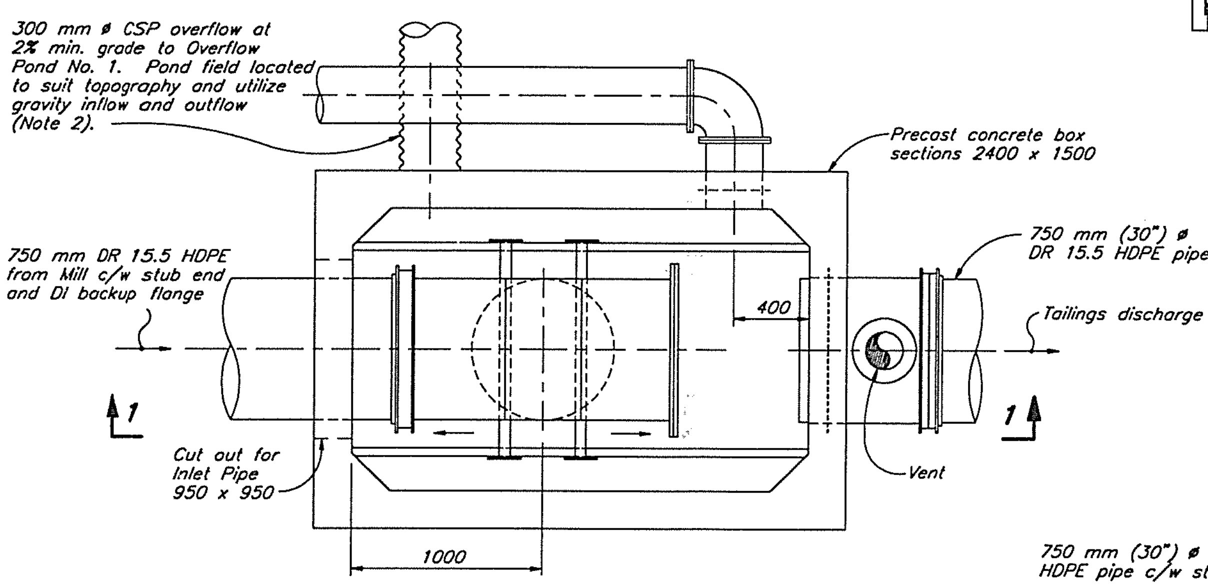
PLAN, DETAIL $\frac{A}{1625.232}$
TAILINGS DROP BOX NO. 1 (Note 1)
Scale A



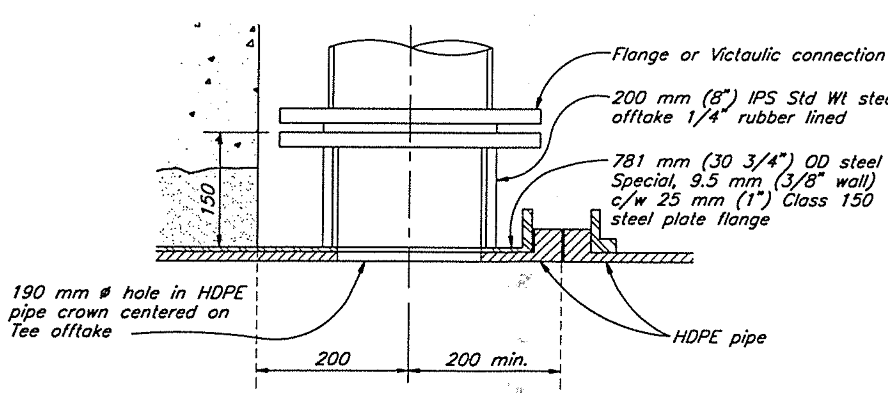
SECTION 2
Scale A



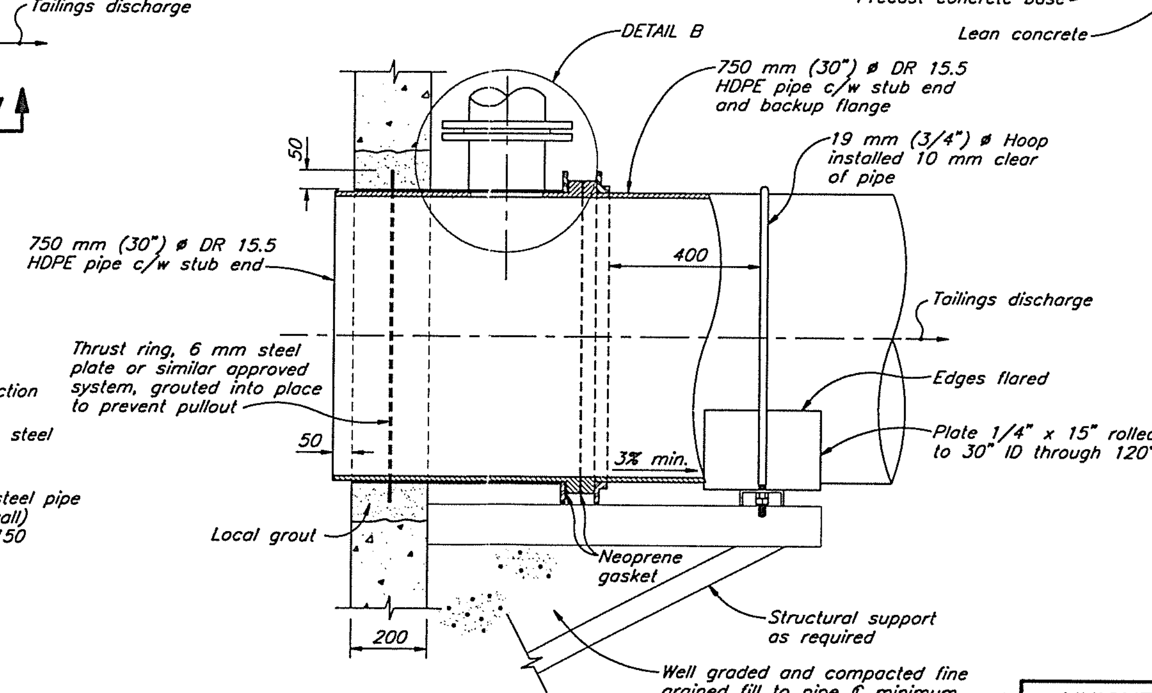
SECTION 1
Scale A



SECTION 3
Scale A



DETAIL B
VENT CONNECTION
Scale C



DETAIL A , $\frac{A}{1625.225}$
DISCHARGE PIPELINE
Scale B

NOTES

1. Soil bearing capacity as verified by the Engineer shall be 100kPa or better.
2. An Overflow Pond capacity of 150 m^3 below the invert of the pond outlet pipe is required to contain a volume equal to that of the upstream tailings pipeline.

C	250	125	0	250	500	mm
B	500	250	0	500	1000	mm
A	1000	500	0	1000	2000	mm

CAD FILE:\1625\050\050 1:20 Plot 1=0.02 STD.1 July 12, 1996

DRG. NO.	DESCRIPTION
1625.228	TAILINGS STORAGE FACILITY – TAILINGS AND RECLAIM PIPEWORK PROFILES
1625.225	TAILINGS PIPEWORK DETAILS – DROP BOX No. 2

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	APPROVED

REVISIONS

REV.	DATE	DESCRIPTION	APPROVED
0	JULY 15/96	ISSUED FOR CONSTRUCTION	KJB

REVISIONS

KNIGHT PIESOLD LIMITED
CONSULTING ENGINEERS – VANCOUVER, B.C.

PROVINCE OF BRITISH COLUMBIA — H. P. DEW — PROFESSIONAL ENGINEER

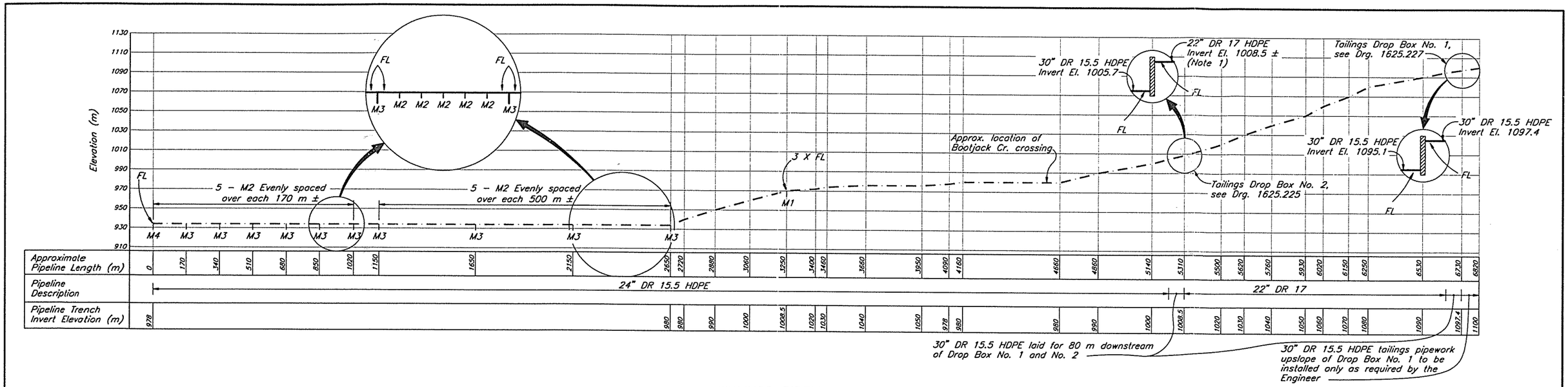
DESIGNED	HPD
DRAWN	TAM/NSD
CHECKED	KJB
APPROVED	KJB

IMPERIAL METALS CORPORATION

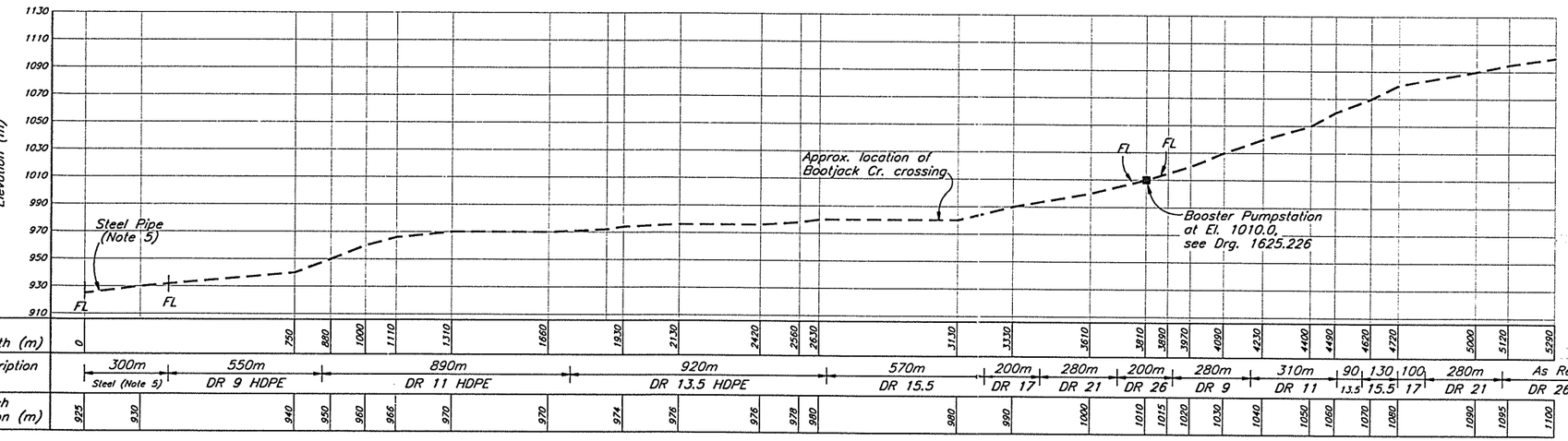
MT. POLLEY PROJECT

TAILINGS STORAGE FACILITY
TAILINGS PIPEWORK DETAILS
DROP BOX No. 1

DATE JULY 15, 1996	SCALE AS SHOWN	DRG. NO. 1625.227	REV. 0



TAILINGS PIPELINE PROFILE



RECLAIM PIPELINE PROFILE

NOTES

1. Profiles, invert elevations and pipeline lengths shown are subject to variations resulting from As Built access road alignment, local construction requirements and correction of survey errors.
2. Flange and offtake locations may be adjusted in the field by the Engineer.
3. Flanges in pipelines must be supported off the ground if pipelines are dragged into position.
4. Any section of HDPE pipeline damaged during installation by a local reduction in wall thickness of 10% or more is to be cut out and replaced.
5. Reclaim profile assumes a pond water level of 925 m at mill startup. If water level is significantly lower, additional steel or DR 9 pipeline and additional barge channel excavation may be required as recommended by the Engineer. See also Note 2 on Drg. No. 1625.206.
6. With each barge relocation, all steel and DR 9 pipeline also requires to be relocated.
7. Butt fusion joining of lower DR pipe to higher DR pipe requires end of lower DR pipe to be bevelled to same inside diameter as higher DR pipe.

LEGEND

FL – Flange Joints (Minimum)

M1 – Mark 1 offtake (1 Required) Drg. 1625.224

M2 – Mark 2 offtake (45 Required) Drg. 1625.224

M3 – Mark 3 offtake (10 Required) Drg. 1625.224

M4 – Mark 4 offtake (1 Required) Drg. 1625.224

DR 9 – HDPE Pipe Dimensional Ratio (typical)

Scale 200 100 0 200 400 600 800 1000 Metres

DRG. NO.	DESCRIPTION
1625.227	– TSF Tailings Pipework Details – Drop Box No. 1
1625.226	– TSF Booster Pump Station – Location Details
1625.225	– TSF Tailings Pipework Details – Drop Box No. 2
1625.224	– TSF Tailings Distribution System Details

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	APPROVED

REVISIONS

REV.	DATE	DESCRIPTION	APPROVED
0	JULY 15/96	ISSUED FOR CONSTRUCTION	KJB

REVISIONS

KNIGHT PIESOLD LIMITED
CONSULTING ENGINEERS – VANCOUVER, B.C.

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA H. P. DEW

DESIGNED	HPD
DRAWN	NSD
CHECKED	KJB
APPROVED	KJB
DATE	JULY 15, 1996

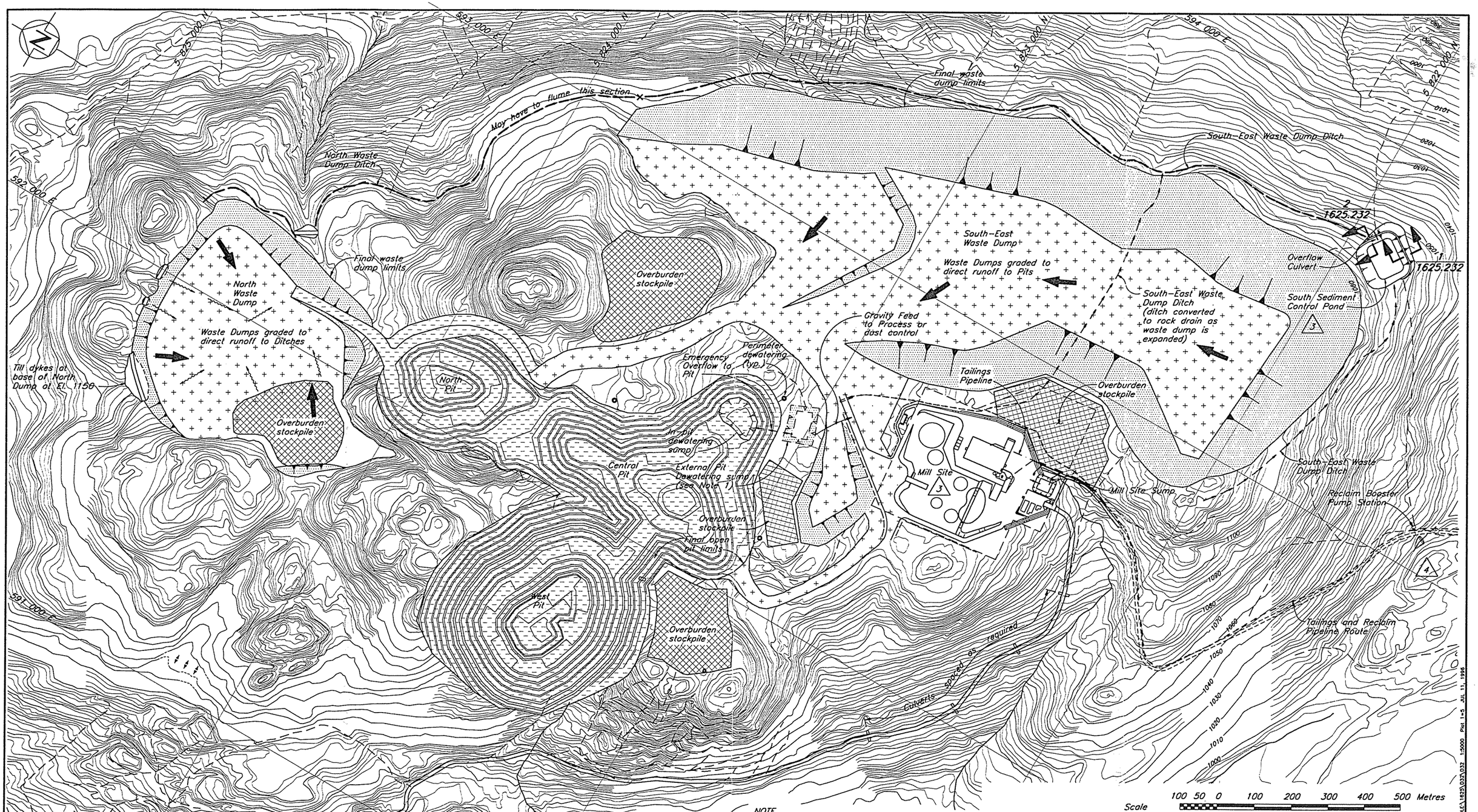
IMPERIAL METALS COMPANY

MT. POLLEY PROJECT

TAILINGS STORAGE FACILITY
TAILINGS AND RECLAIM
PIPEWORK PROFILES

SCALE AS SHOWN | DRG. NO. 1625.228 | REV. 0

CAD FILE: \1625\045\045-10000 Plot: 1=10 July 12, 1996



Scale 100 50 0 100 200 300 400 500 Metres

NOTE

1. External Pit Dewatering Sump to be installed when required.
2. Open pit and waste dump layouts digitized from information supplied by Imperial Metals.

REFERENCE DRAWINGS	
DRG. NO.	DESCRIPTION
1625.232	DRAINAGE PLAN – SECTIONS AND DETAILS

REVISIONS			
REV.	DATE	DESCRIPTION	APPROVED
4	JULY 15/96	RELOCATE BOOSTER PUMP STATION	DB
3	APRIL 1/96	MILLSITE AND CONTROL POND REVISED	

REVISIONS			
REV.	DATE	DESCRIPTION	APPROVED
2	MAR 20/96	UPDATE DRAINAGE, MILLSITE & SOUTH SEDIMENT CONTROL POND	
1	MAR 14/96	UPDATED OPEN PITS,WASTEDUMPS,SITE DRAINAGE	
0	AUG 24/95	ISSUED FOR CONSTRUCTION	

* "SIGNATURES AND PROFESSIONAL SEAL ON REV.0 ORIGINAL"

KNIGHT PIESOLD LIMITED
CONSULTING ENGINEERS – VANCOUVER, B.C.

IMPERIAL METALS CORPORATION

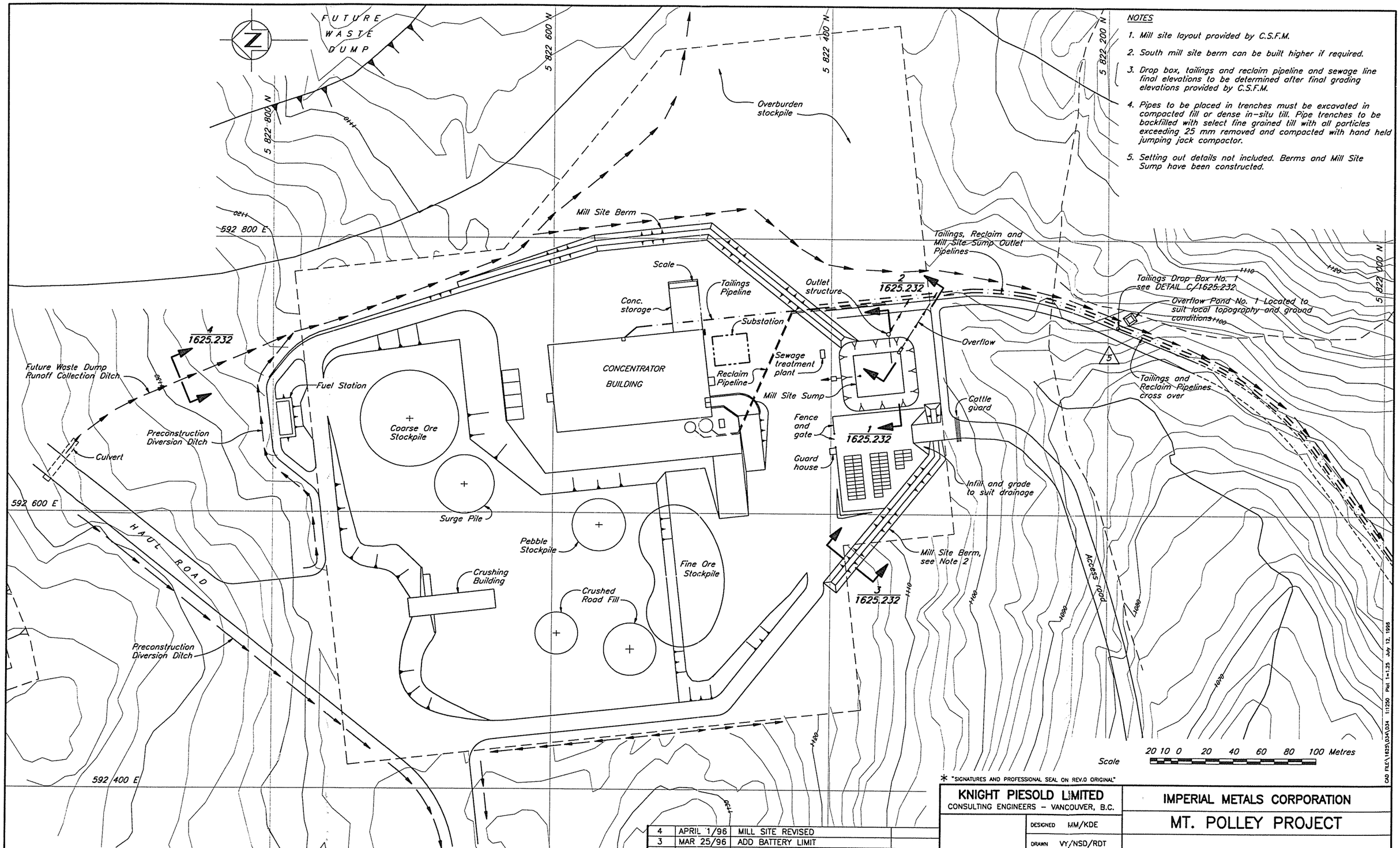
MT. POLLEY PROJECT

DRAINAGE PLAN
MINE SITE

DESIGNED	KDE/MM
DRAWN	RDT/VY/NSD
CHECKED	*
APPROVED	*

DATE AUGUST 24, 1995 | SCALE AS SHOWN | DRG. NO. 1625.230 | REV. 4

CAD FILE\ 1625\025\032 1:5000 Plot 1=5 JUL 11, 1996



NOTES

1. Mill site layout provided by C.S.F.M.
2. South mill site berm can be built higher if required.
3. Drop box, tailings and reclaim pipeline and sewage line final elevations to be determined after final grading elevations provided by C.S.F.M.
4. Pipes to be placed in trenches must be excavated in compacted fill or dense in-situ till. Pipe trenches to be backfilled with select fine grained till with all particles exceeding 25 mm removed and compacted with hand held jumping jack compactor.
5. Setting out details not included. Berms and Mill Site Sump have been constructed.

* "SIGNATURES AND PROFESSIONAL SEAL ON REV.0 ORIGINAL"

REFERENCE DRAWINGS			
DRG. NO.	DESCRIPTION		
1625.232	DRAINAGE PLAN – SECTIONS AND DETAILS		

REVISIONS				
REV.	DATE	DESCRIPTION		APPROVED
5	JULY 15/96	OVERFLOW POND NO. 1 ADDED		WB
4	APRIL 1/96	MILL SITE REVISED		
3	MAR 25/96	ADD BATTERY LIMIT		
2	MAR 20/96	UPDATE DRAINAGE AND MILLSITE		
1	MAR 14/96	RELOCATED OPEN PIT SUMP		
0	AUG 24/95	ISSUED FOR CONSTRUCTION		

KNIGHT PIESOLD LIMITED
CONSULTING ENGINEERS – VANCOUVER, B.C.

IMPERIAL METALS CORPORATION

MT. POLLEY PROJECT

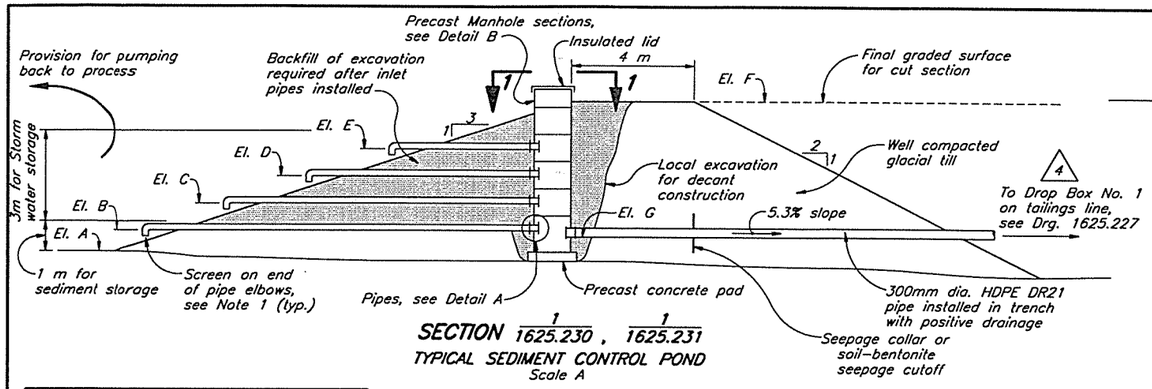
DRAINAGE PLAN
MILL SITE

DESIGNED	MM/KDE
DRAWN	VY/NSD/RDT
CHECKED	*
APPROVED	*

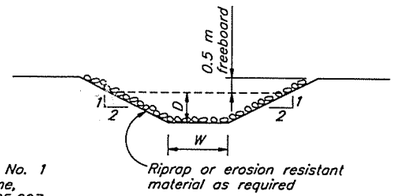
*

DATE AUGUST 24, 1995 | SCALE AS SHOWN | DRG. NO. 1625.231 | REV. 5

CAD FILE\1625\034\034 1:1250 Plot 1=1.25 July 12, 1996



SECTION 1/1625.230 , 1/1625.231
TYPICAL SEDIMENT CONTROL POND
Scale A



SECTION 4/1625.231
TYPICAL DITCH SECTION
Scale A

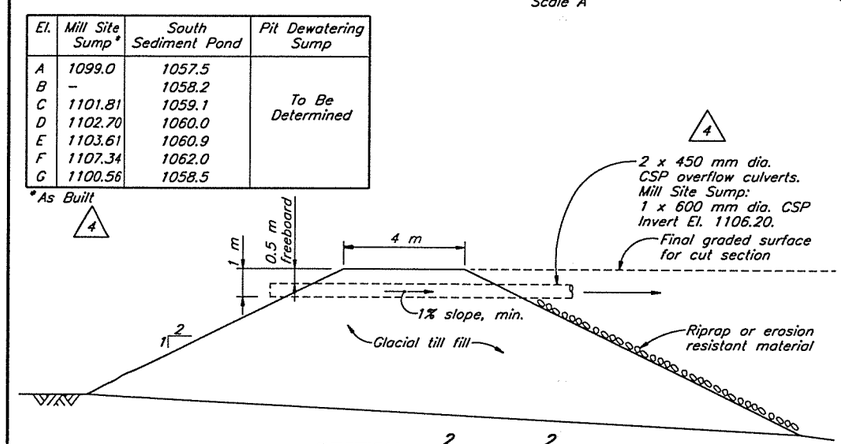
DITCH DIMENSIONS		
Ditch	W(m)	D(m)
All Mill Site Diversion Ditches	1.0	0.35
All Waste Dump Ditches	1.0	0.6

NOTES

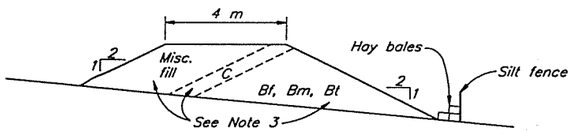
1. Pipe elbows provided for oil skimming.
2. Sediment control berm to be constructed using suitable glacial till materials from local excavations.
3. Mill site berm to be constructed with material excavated during site preparation. All soil types can be placed in the berm, but they must be separated.
4. Mill site berm to be constructed in max. 0.5 m lifts, with compaction provided by trackwalking the surface prior to placement of the next lift.
5. Silt fence and hay bales provided for sediment control.
6. Rockfill to comprise clean coarse gravel and cobbles.
7. All pond excavations and fill sections to be completed in low permeability glacial till materials.
8. Local pipe containment channel width will vary to accomodate additional pipework and structures in channel.

El.	Mill Site Sump*	South Sediment Pond	Pit Dewatering Sump
A	1099.0	1057.5	To Be Determined
B	–	1058.2	
C	1101.81	1059.1	
D	1102.70	1060.0	
E	1103.61	1060.9	
F	1107.34	1062.0	
G	1100.56	1058.5	

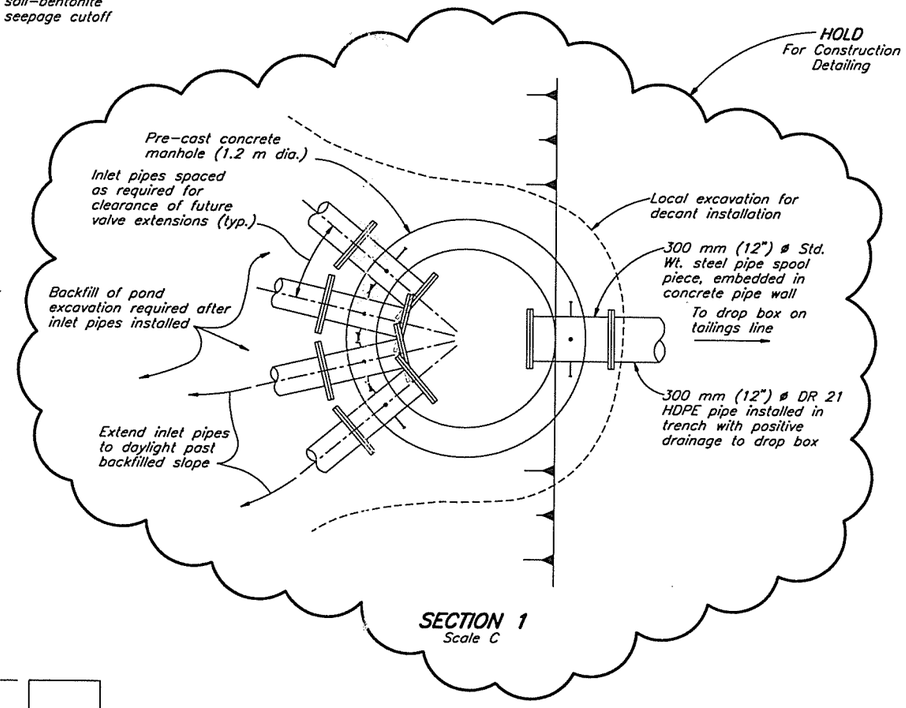
*As Built



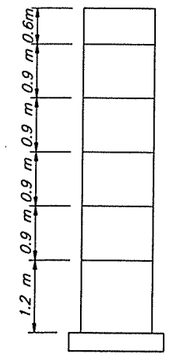
SECTION 2/1625.230, 2/1625.231
TYPICAL SEDIMENT CONTROL POND OVERFLOW CULVERTS
Scale A



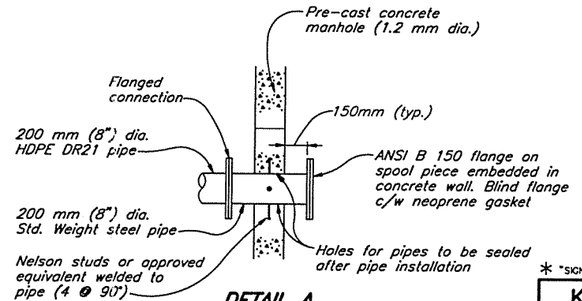
SECTION 3/1625.231
MILL SITE BERM SECTION
Scale A



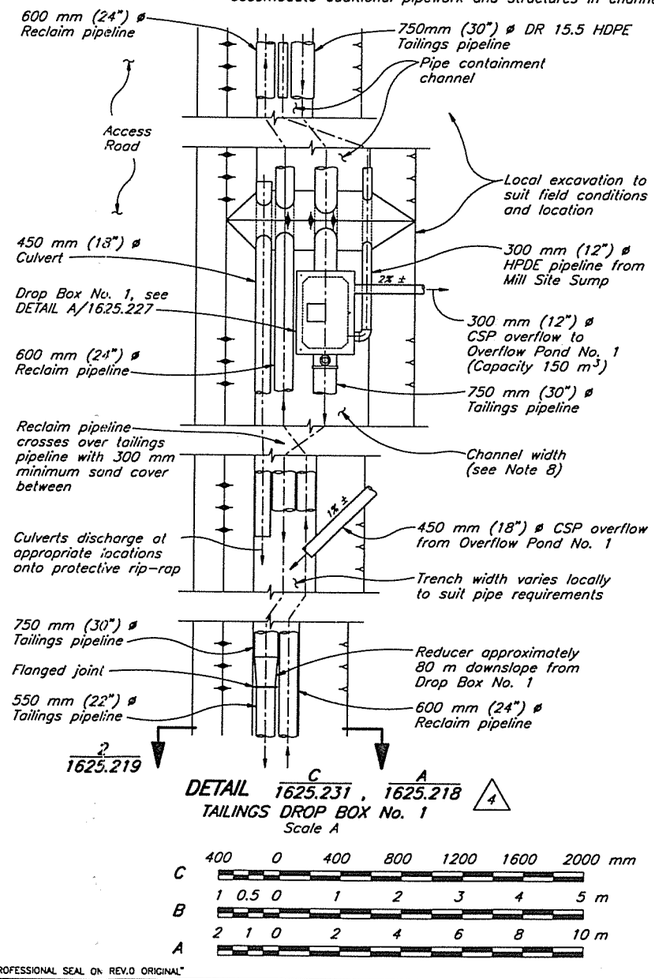
SECTION 1
Scale C



DETAIL B
TYPICAL MANHOLE SECTIONS FOR 5 m DEEP POND
NTS



DETAIL A
Scale C



DETAIL C/1625.231 , A/1625.218
TAILINGS DROP BOX No. 1
Scale A

POND	STORAGE VOLUMES (m^3)		CRITERIA
	Live Storage	Dead Storage	
South Sediment Pond	46,000	5,000	10yr 24 hour precipitation event at start-up of operations
Pit Dewatering Sump – Initial	Not required	Not required	1.5 x 10yr 24 hour precipitation event at start-up of operations
Pit Dewatering Sump – Final	24,400	6,700	
Mill Site Sump	6,000	1,000	1.5 x 10yr 24 hour precipitation event

NOTES:

1. Initial Pit Dewatering Sump approx. 50% of final volume. Sump size to be increased in conjuction with waste dump expansion.
2. Final Pit Dewatering Sump includes 10% of Open Pit inflows.
3. Typical Sediment Control Pond and Typical Sediment Control Pond Overflow Culverts cross-sections will change in fill construction and will be appropriately adjusted in the field as determined by the Engineer.

DRG. NO.	DESCRIPTION
1625.230	DRAINAGE PLAN – MINE SITE
1625.231	DRAINAGE PLAN – MILL SITE

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	APPROVED

REVISIONS

REV.	DATE	DESCRIPTION	APPROVED
4	JULY 15/96	DETAIL AND ELEVATIONS MODIFIED	KJB
3	APR 1/96	UPDATE SEDIMENT CONTROL POND	
2	MAR 20/96	UPDATE SEDIMENT CONTROL POND	
1	MAR 14/96	UPDATE DITCHES AND NOTE 3 ADDED	
0	AUG 24/95	ISSUED FOR CONSTRUCTION	

REVISIONS

* "SIGNATURES AND PROFESSIONAL SEAL ON REV.0 ORIGINAL"

KNIGHT PIESOLD LIMITED
CONSULTING ENGINEERS – VANCOUVER, B.C.

*

DESIGNED	KDE/MM
DRAWN	RDT/NSD
CHECKED	*
APPROVED	*

IMPERIAL METALS CORPORATION

MT. POLLEY PROJECT

DRAINAGE PLAN
SECTIONS AND DETAILS

DATE AUGUST 24, 1995 | SCALE AS SHOWN | DRG. NO. 1625.232 | REV. 4

CAD FILE\ 1625\035\033 1:100 Plot 1=0.1 STD.1 July 12, 1996

APPENDIX B

INSPECTION CHECKLIST
(TO BE INCLUDED IN FINAL ISSUE OF STAGE 1B MANUAL)

APPENDIX C

COMMUNICATIONS DIRECTORY

APPENDIX C

COMMUNICATIONS DIRECTORY

(to be determined)

NAME	ADDRESS	TELEPHONE

SITE PERSONNEL:

Dam Co-ordinator
Dam Operator
General Foreman
Sub-Foreman
Technician

TECHNICAL ADVISORS:

Knight Piésold Ltd.		Suite 1400	Office (604)685 - 0543
(a)	Ken Brouwer	750 West Pender St.	Home
(b)	Bruce Brown,	Vancouver, B.C.	Home
(c)	Jeremy Haile,	V6C 2T8	Home

OTHER AGENCIES (to be confirmed):

R.C.M.P. Williams Lake, B.C.
Comptroller of Water Rights, Victoria, B.C.
Director of Provincial Emergency Program, Victoria, B.C.
B.C. Water Management, Regional Manager (Williams Lake)
MELP, Water Management Branch (Dam Safety Engineer), Victoria, B.C.
MEI, Geotechnical Branch, Victoria, B.C.