Sherwood Mining Corporation

GEOTECHNICAL DESIGN
ICE-RICH OVERBURDEN DUMP
MINTO MINE, MINTO, YT

1200173

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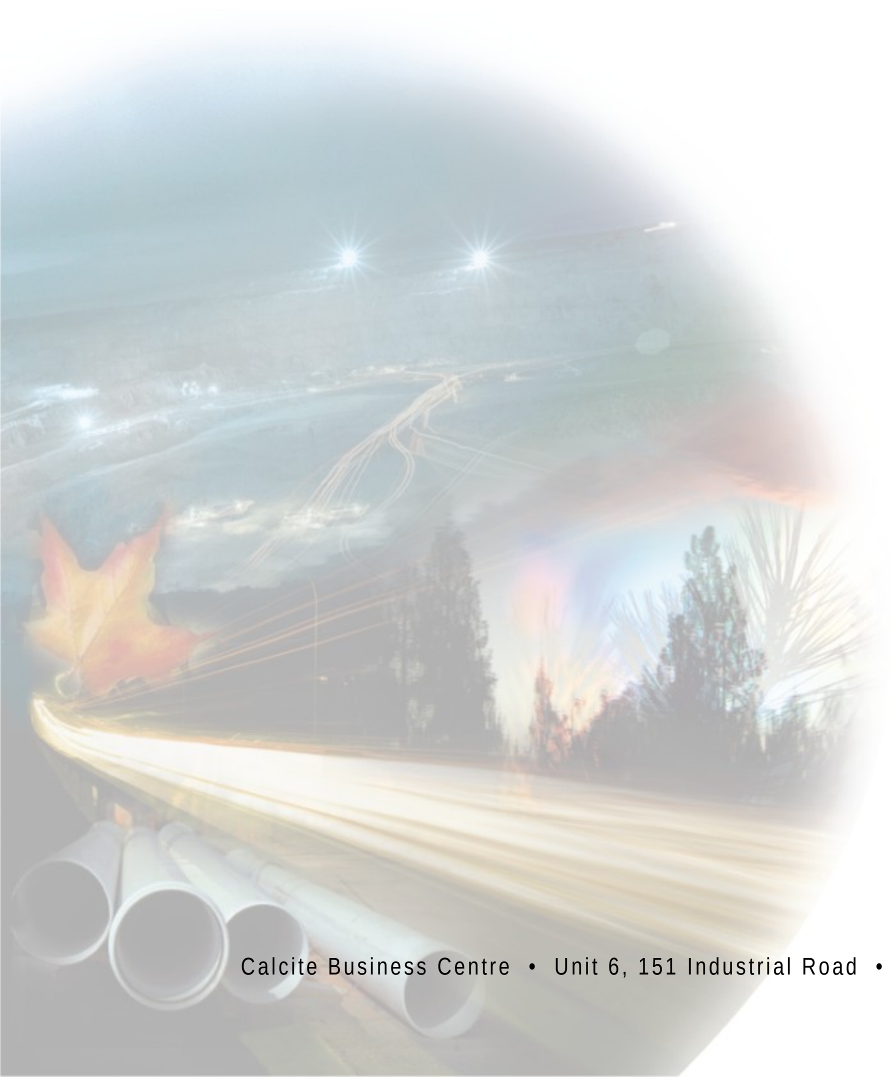

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1.0 INTRODUCTION

Sherwood Mining Corporation (SMC) is currently proposing to construct two waste dumps to the west and southwest of the proposed open pit at the Minto project site, located approximately 90 km northwest of Carmacks, Yukon. The waste dumps will be used to separately stockpile: (a) unconsolidated ice-poor and ice-rich overburden; and (b) waste rock, all excavated from the pit area. EBA Engineering Consultants Ltd. (EBA) has been retained by SMC to complete the geotechnical design of the ice-rich overburden dump. The waste rock dump design has already been prepared by EBA for the previous owner, Minto Explorations Ltd., as detailed in our April 1998 report (EBA File: 0201-95-11509).

It is understood that a volume of ice-rich overburden in the order of 200,000 yd^3 will initially be excavated from the open pit during pre-stripping operations. There is also a potential for that volume to increase later in the mine life, depending on the lateral extent of the ore body. There is a concern that once the ice-rich overburden begins to melt; it will behave as a thick viscous fluid in composition and flow for a considerable distance, if not controlled. Consequently, a containment berm is proposed to prevent uncontrolled downslope movement of thawed, ice-rich overburden. This containment berm is therefore primarily for retaining the mass of the wet overburden, but should permit the passage of water to promote drainage and gradual drying of the overburden.

At mine closure, the thawed overburden will be used for reclamation purposes over select disturbed areas on the mine property. A general site plan identifying the main features of the mine site development including the approximate footprint of the proposed ice-rich overburden dump is shown on Figure 1.

The overburden dump will be constructed throughout the mine life. It will initially be constructed to a lower elevation then increased in height as necessary during the life of the mine. The initial base will be sized and constructed to accommodate the final design height.

This report has been prepared in accordance with generally accepted geotechnical practice and engineering judgment and experience has been used in the development of recommendations. For additional information regarding the use of this report, refer to the attached General Conditions, Appendix A.

EBA received approval from SMC to proceed with the design of the overburden dump in September 2005.

2.0 DESIGN BASIS

2.1 SITING AND ALIGNMENT SELECTION

The overburden dump location was originally selected on the basis of air photo interpretation, followed by a site reconnaissance. The footprint of the overburden dump is located on terrain where bedrock is present at shallow depths. Below this elevation, the overburden is thicker and ice-rich. The dump was located on a gentle slope above two tributaries of Minto Creek, at an elevation that was considered practical for truck hauling from the open pit. Figure 2 presents a site plan of the proposed overburden dump relative to the location of the main waste rock dump and mine site.

An iterative approach was adopted to select the crest elevation required to provide sufficient storage capacity for the anticipated volume of ice-rich overburden. A containment berm crest elevation of 2,925 feet was identified to provide a storage capacity of 180,000 yd^3, if the material is placed at a horizontal angle behind the containment berm. If the ice-rich material can be stockpiled at a gentle slope (varying from 10H:1V to 16:H:1V), the volume increases to 420,000 yd^3. This provides additional capacity in the event that additional ice-rich material is encountered during the mine life.

2.2 CONTAINMENT BERM CONCEPT

It is understood that the majority of the material available for construction of the containment berm will comprise run of mine waste rock from the open pit. Depending on the gradation of the waste rock, the berm could be relatively porous and may not provide complete containment for the ice-rich overburden. Accordingly, there is concern that saturated sediments may flow through the rock berm and continue down the valley slope and be transported by surface water flow into Minto Creek.

A layer of finer grained material is required on the upstream face to retain the fine overburden particles, yet permit drainage of water. It is proposed to utilize the native residual soils as the filter on the upstream face of the confining berm. Initially, the residual soils below the confining berm will be stripped and stockpiled. Waste rock will then be used to construct the confining berm, and the residual soils will be spread on the upstream face to act as a filter. If the waste rock placed in the containment berm proves to be soil like through quality assurance, particle size, distribution testing or observation, the need for the filter layer can be revisited.

2.3 CONSEQUENCE CLASSIFICATION OF CONTAINMENT BERM

A failure of the overburden dump containment berm will result in inorganic soils and rock being deposited on the slope above Minto Creek. Failure of the overburden dump is not anticipated to result in loss of human life due to there being no haul roads proposed below the dump. Furthermore, failure will not result in any permanent or significant environmental damage, as the failed mass will be limited to the mine lease area. As this structure is considered to be an overburden dump, the requirements of the British Columbia Interim Guidelines for Investigation and Design of Mine Dumps has been adopted.

2.4 DESIGN AND CONSTRUCTION CONSIDERATIONS

The containment dump will be constructed as soon as competent rock fill is available from open pit development, and access roads to the site have been constructed. This is anticipated within a month or two of the start-up of pit development.

The containment berm will be constructed of waste rock and soil from the open pit. Sorting at the pit will be required to ensure that large boulders (greater than 3 feet diameter) are excluded from the construction material.

3.0 SITE INVESTIGATION

3.1 INTRODUCTION

The toe of the proposed containment berm was selected based on the assumption that it was founded on thaw stable material. Previous drilling has identified ice-rich material further downslope. One borehole was drilled close to the site in 1995 (BH 95-04) and five boreholes were drilled in 1997 (BH 97-G13 to –G17 inclusive). These holes were drilled as part of the general reconnaissance of the site. Prior to finalizing the design, a site investigation was undertaken in 2005, to confirm that the foundation beneath the containment berm was not ice-rich.

3.2 TESTPITTING PROGRAM

As part of the final design, site specific geotechnical information was required along the toe of the proposed containment berm. Correspondingly, ten testpits were excavated along the toe of the proposed overburden dump in the fall of 2005. All testpits were excavated with a CAT 416C rubber-tired backhoe, owned by the mine. The testpits remained exposed for several weeks until Mr. James Buyck, of EBA's Whitehorse office, was able to log and obtain samples; whereupon the testpits were then backfilled. The testpit depths range from 6 to 10 feet and were excavated at the locations shown on Figure 3.

Mr. Buyck completed the logging and sampling of the exposed testpits, utilizing the rubber-tired backhoe to further expose the testpit sidewalls and base where deemed necessary. All disturbed grab samples were collected at regular intervals from either the testpit wall or from the backhoe bucket.

All soil samples were returned to EBA's Whitehorse laboratory for natural moisture content determination and laboratory classification testing.

4.0 SITE CONDITIONS

4.1 SURFICIAL GEOLOGY

The site for the overburden dump consists of residual soils (weathered bedrock) overlying granodiorite bedrock. This area was not glaciated during the last ice age, hence the observed deep weathering in-place.

4.2 SURFACE FEATURES

The terrain in this area has two distinct landforms: valley bottom and uplands terrain. The valley bottom terrain is typically a colluvium blanket overlying residuum soil. It is poorly drained and has downslope movement due to solifluction and colluvial processes. The uplands terrain is typically well drained residuum soils with a variable thickness of overlying residuum or colluvium. The valley bottom terrain has ice-rich zones throughout, particularly on the north-facing slopes. South-facing uplands terrain typically does not contain ice-rich soil. The angle of the existing valley slope through the centreline location of the proposed dump is approximately 7H:1V.

4.3 SUBSURFACE CONDITIONS

The testpits were chosen, based on aerial photographs, to be located in an area of shallow bedrock upslope of fine-grained and potentially unstable permafrost soils. Observations in the testpits, and the results of the laboratory testing program, confirm that all testpits are within an area of residual soils (weathered bedrock) over intact bedrock. The residual soils range from 4 to 8 feet in thickness, locally overlain by a thin veneer of organics.

The results from the laboratory and the field-testing program are shown on the attached testpit logs, where applicable, and on the accompanying grain size distribution curves.

4.3.1 Groundwater

No groundwater was encountered in any of the testpits excavated at the site.

4.3.2 Permafrost

No permafrost was detected in any of the testpits excavated at the site.

4.3.3 Bedrock

Weathered granodiorite bedrock was encountered in all testpits, at depths ranging from 4 to 8 feet below existing ground surface.

5.0 BERM DESIGN

5.1 LAYOUT AND GEOMETRY

After stripping and stockpiling the residual soils overlying the bedrock, the base of the containment berm will be constructed. It will be a crescent shaped structure, following the contours of the slope, as shown on Figure 3. The confining berm will be constructed in lifts not exceeding five feet in thickness. The crest width of the ultimate berm (elevation 2,925 feet) will be 20 feet, with a correspondingly wider crest of 55 feet for the initial berm height of 2,915 feet. Figure 4 presents a section through the proposed containment berm and Figure 5 presents a profile along the centreline of the proposed berm. Approximately 300,000 yd^3 of rockfill will be required to construct the ultimate berm.

5.2 STABILITY EVALUATION

5.2.1 Analysis Methodology

Limit equilibrium analyses were conducted to determine the factor of safety against slope failure during construction and operation of the dump. All analyses were conducted using the commercially available two-dimensional, limit equilibrium software, SLOPE/W (Geo-Slope International Ltd., Version 5.17). The principles underlying the method of limit equilibrium analyses of slope stability are as follows:

- A slip mechanism is postulated;
- The shear resistance required to equilibrate the assumed slip mechanism is calculated by means of statics;
- The calculated shear resistance required for equilibrium is compared with the available shear strength in terms of factor of safety; and
- The slip mechanism with the lowest factor of safety is determined through iteration.

Factor of safety is used to account for the uncertainty and variability in the strength and pore water pressure parameters, and to limit deformations.

Earthquake loading is modeled using a pseudostatic peak horizontal ground acceleration.

Stability analyses were carried out for the deepest cross-section of the confining berm. The foundation at this location was inferred to be sand and gravel with varying percentages of silt and cobbles with occasional boulders, grading into weathered granodiorite bedrock.

5.2.2 Design Criteria

The Mined Rock and Overburden Piles Investigation and Design Manual (1991) (Waste Rock Design Manual) published by the British Columbia Mine Waste Rock Pile Research Committee presents interim guidelines regarding minimum factors of safety which should be used in mine waste pile design. EBA has conducted the design according to the factors of safety that are presented in Table 1. These guidelines have been chosen from ranges of values using experience and the site database of borehole logs, test pits and laboratory test results.

TABLE 1: DESIGN FACTORS OF SAFETY

Stability Condition	Minimum Design Factor of Safety
Long Term Deep Seated Stability	1.3
Seismic (Pseudo-static) Stability	1.0

The Waste Rock Design Manual recommends that seismic stability should be evaluated using pseudostatic horizontal accelerations that correspond to a 10% probability of exceedance in 50 years. It should be noted that the Waste Rock Design Manual considers that pseudostatic assessments based on anticipated peak ground accelerations tend to yield very conservative results. Therefore, the use of a relatively low factor of safety (1.0) is considered acceptable.

When work was originally undertaken on this project in the late 1990's, the Canadian Geological Survey Pacific Geosciences Centre provided a value for the peak horizontal acceleration for the project site of 0.15 g. An updated value for the site has been provided by the Pacific Geosciences Centre and the current peak horizontal acceleration that corresponds to a 10% probability of exceedance in 50 years is 0.055g. The reasoning for the decrease in the peak ground acceleration provided by the Pacific Geosciences Centre, is due to the fact that seismic data information has increased substantially in the Yukon in recent years. A better understanding of ground motion and improved modelling has resulted in revised predictions, which are considered to be more accurate and representative for the project area.

Testpitting conducted during the latest field program confirms that the main dump is founded on competent thaw stable uplands terrain. Accordingly, the stability analyses have been conducted using conventional soil parameters without having to incorporate the effects of ice-rich soils.

5.2.3 Material Properties

5.2.3.1 Residuum

The residuum soil found beneath the main dump is typically a silty sand with some fine gravel. Index testing and engineering judgement have been used in estimating the friction angle for this material to be 35°, which is consistent with values used in previous analyses for the tailings/water retention dam, and the main waste rock dump.

5.2.3.2 Waste Rock

Steffen, Robertson and Kirsten Ltd. (SRK) reviewed Minto rock core taken during a 1993 exploration program and produced a report of geotechnical properties of the rock mass present on site with respect to open pit design, hanging wall design and underground mining design issues. The bedrock is described as weathered to a depth of about 100 feet and it was recommended that ripping with bulldozers could be used for pit excavation (SRK, 1994). It is believed that this observation justifies that some of the waste rock excavated from the open pit could be treated as "soil like" waste rock with a friction angle of 35°. It is anticipated that the majority of the waste rock produced will be "rock like" with a friction angle of 37° to 38°. However, the initial rock excavated from the pit will probably be more "soil-like".

The material properties chosen for the embankment and foundation materials in the stability analyses are presented in Table 2. The properties for granular materials were selected based on experience with similar materials used by EBA for the waste rock design.

TABLE 2: MATERIAL PROPERTIES USED IN STABILITY ANALYSES			
Material	Angle of Internal Friction	Cohesion (psf)	Unit Weight (pcf)
Berm	35	--	124.8
Foundation	35	--	124.1
Ice-rich overburden	0	210	120.0

5.2.4 Pore Water Pressure Conditions

5.2.4.1 Natural Stratigraphy

No perched groundwater table was identified during any of the geotechnical drilling or testpitting at this site to date. However, evidence of free flowing water has been noted in other locations on slopes on the property, usually in sandy layers within the colluvium. Therefore it is possible that a shallow perched groundwater table may exist for short periods of the year. For the present stability analyses, a groundwater table at original ground surface was assumed, which is a conservative assumption.

5.2.4.2 Overburden Materials

The overburden materials within the dump will consist of both frozen and unfrozen materials. Although some ground ice was observed in the colluvium (based on observations from diamond drill and auger holes in the open pit area) the soil is not considered to be overly ice-rich. Some localized zones of ice lenses will be encountered, but the majority of the material will be stable when thawed, with minimal release of free water from melting ground ice. Any water that is released will seep through the rockfill containment berm and not build up any pore pressure. Correspondingly, for the stability analyses, the potential for a phreatic surface developing within the confining berm is considered remote. The analyses have also considered a partial phreatic surface that may develop within the berm, although this is considered unlikely.

5.2.5 Stability Analyses

5.2.5.1 Static Case - No Pore Pressures

When performing the stability analyses, the critical failure surfaces comprised very shallow near surface failures. These types of failures are not of concern as they can be easily repaired. More of a focus is on deeper seated failures that have a larger impact on the berm. Accordingly, the analyses were performed such that the depth of the failure surfaces extended at least 5 feet below the surface of the slope.

The initial stability analysis assumed the berm was constructed to the full height, with no material retained by the berm. Assuming a groundwater table at the original ground surface, the factor of safety for the downstream slope was determined to be 1.39. The mode of failure was a relatively shallow failure surface at the downstream toe of the berm, as shown on Figure 6. For the upstream slope, the minimum factor of safety was identified as 1.12.

These results indicate that the factor of safety for the downstream slope exceeds the minimum 1.3 recommended by the Waste Rock Design Manual. The relatively low factor of safety on the upstream face indicates that shallow failures should be expected. This is not a concern for the overall stability of the containment berm, as material will eventually be placed against the upstream face to prevent instability in the upstream direction. Therefore, the plan to only build the dam to an intermediate height is beneficial to minimize the risk of failures on the upstream slope face. Although this implies a concern of stability of the filter material that will be placed on the upstream face, EBA anticipates any movements can be mitigated with placement of additional residuum. Rainfall and snow melt erosion may prove to be a greater concern with respect to stability of the upstream filter, if it is required.

5.2.5.2 Static Case - Full Dump

The second series of analyses assumed the dump was full and that the retained overburden was fully saturated. The strength of the saturated overburden material was assumed to be a (very conservative) value of 210 psf (10 kPa). The critical failure surface was determined to be the same as the initial stability analyses, with a failure surface near the downstream toe. The factor of safety for a failure surface extending back into the saturated overburden material is 1.60. This failure mode is illustrated on Figure 6.

With the containment berm full, there is no possibility of slope failures on the upstream face. As a precaution, another set of analyses was conducted for the downstream face, but with a phreatic surface generated within the containment berm. As discussed above, this is considered to be a worse case scenario that will likely not develop. The phreatic surface has been idealized to commence at the upstream crest of the berm and drop steeply through the middle of the berm, as shown on Figure 7. Once again the minimum factor of safety (1.39) was identified to be at the downstream toe. Deep-seated failure surfaces extending back into the berm were calculated to have a factor of safety of 1.56.

5.2.5.3 Pseudostatic Anaysis

From the static analyses, it was apparent that the downstream toe was providing the lowest factor of safety. Assuming the current design seismic acceleration of 0.055g, the factor of safety performing a pseudostatic analysis was determined to be 1.20.

Deep-seated failure surfaces that extend back into the berm and overburden indicate a factor of safety of 1.33 for a seismic acceleration of 0.055g. This analysis assumes a phreatic surface has developed within the containment berm.

Table 3 summarizes the minimum factors of safety, discussed in the previous sections.

TABLE 3: SUMMARY OF STABILITY ANALYSES RESULTS		
	Minimum Factor of Safety	
	Downstream	Upstream
Static, dump empty, groundwater table at original grade	1.39	1.12
Static, full overburden dump, groundwater table at original grade	1.39	n/a
Static, full overburden dump, phreatic surface developed within berm	1.39	n/a
Static, full overburden dump, phreatic surface developed within berm (deep-seated)	1.56	n/a
Earthquake (0.055g), full overburden dump (shallow)	1.20	n/a
Earthquake (0.055g), full overburden dump (deep-seated)	1.33	n/a

5.2.6 Discussion

Several papers have been written addressing problems associated with the construction and operation of mine waste dumps, including cold climatic regions (Stepanek, 1986). Controlling surface runoff and groundwater is a key element in maintaining stability for most waste dump configurations. If a phreatic surface develops within the containment berm, the stability of the berm could be negatively impacted.

The critical zone for slope stability as indicated by the analyses is the outer perimeter or shell of the dump. Ensuring that pore pressures do not build-up in this area is critical to the overall stability of the dump, and it is therefore recommended that only coarse rock be placed in the outer shell of the rockfill. The critical area can be defined by extending a vertical line down from the centreline of the dump. The quality of the waste rock from the pit will be variable. In some instances the waste will be primarily rock and some zones will yield weak rock that is more soil-like. Both fine-grained soils and rock may be placed inside this line, but only coarse free draining rock should be placed in the outer shell area.

All other reasonable precautions should be undertaken to minimize the possibility of developing pore pressures within the waste material. These include the construction of interceptor berms or ditches uphill of the dump to control surface runoff from draining into the waste rock and overburden. These interceptor ditches should channel surface runoff around the edges of the dump and discharge any surplus water away from the main dump.

As indicated by the stability analyses, the critical area is the downstream slope of the dump. Consequently, the toe of the main waste dump should be checked for instability after spring thaw and following major precipitation events to monitor the performance of the dump toe area. Should there be any indications of impending instability (such as tension cracks or localized slumping), a review the site by a geotechnical engineer as well as possible installation of piezometers, slope inclinometers and survey monuments to monitor the performance of the dump should be undertaken.

6.0 CONSTRUCTION PLAN

6.1 GENERAL

Construction of the overburden dump containment berm will be conducted in accordance to the recommendations outlined in this report, and with the previously prepared CQA Manual (1997).

6.2 CONSTRUCTION REQUIREMENTS

This report presents details regarding foundation preparation, fill materials, fill placement, instrumentation, and quality assurance programs. It is anticipated that the contractor chosen to conduct the work will develop a construction plan that must satisfy the requirements presented in the CQA report.

6.3 SCHEDULE

For construction planning purposes, the following generalized schedule for confining berm construction is suggested:

- Foundation preparation, removal of organics and residual soils to expose weathered bedrock in late spring/early summer.
- Fill placement and compaction, spread residual soils along upstream face of confining berm in mid to late summer.
- Instrumentation installation (settlement pins) in the fall.

6.4 MATERIALS

The confining berm will be constructed of open pit waste rock with a nominal size of 1 foot. To facilitate proper drainage and no build-up of pore pressure, the fines (<0.080 mm) content must be less than 5% by weight. The maximum particle size allowed in the confining berm will be 3 feet.

6.5 FOUNDATION PREPARATION

The berm foundation must be grubbed to remove organic soil and residuum down to the weathered bedrock surface. The testpit logs indicate that excavation depths will range from 4 to 8 feet along the downstream toe of the berm. The bearing surface should be confirmed by a Geotechnical Engineer prior to berm fill placement. The surface should be scarified to develop a good bond between the native soil and fill.

6.6 MATERIAL PLACEMENT

The rockfill material should be placed and compacted in maximum of 3 to 5 foot lifts. The size of lifts used for fill placement will be a function of the maximum size of rock and the size of the haul trucks. Final determination of lift thicknesses will be made in the field.

Compaction of this material will be achieved by routing heavy equipment (e.g., bulldozers, haul trucks) evenly over each lift. This material must be placed in a manner that will minimize segregation or nesting of coarse particles. The effectiveness of this construction technique will be evaluated in the field by the Geotechnical Engineer and changes to the construction procedure will be made as required. Boulders greater than 3 feet should be removed from the fill as much as practically possible and pushed to the downstream slope face.

Fine-grained material should be confined to the upstream half of the berm. Coarser, clean rock should be placed on the downstream side of the berm. A filter layer of residual soils at least 6 feet thick should be placed on the upstream berm face. This filter layer should be nominally compacted (track-packed) as overcompaction will minimize permeability and reduce the effectiveness of this drainage layer. Depending on the quantity of the material being placed for the containment berm, the need for this upstream filter layer will be re-evaluated during construction.

6.7 QUALITY ASSURANCE

A construction quality assurance program must be developed to ensure that construction-sensitive features of the design are achieved. The elements of the program will include:

- Specific engineering approvals at critical times, such as foundation preparation, and fill placement;
- Monitoring and field testing of fill materials;
- Specific approval of construction procedures for moisture conditioning and placement of all berm fill materials;
- Daily photographs of the construction progress; and
- Preparation of as-built drawings.

7.0 LONG-TERM MONITORING

7.1 PURPOSE

Performance monitoring is an integral part of the design, construction, and operation of any dump. This section describes a recommended minimum monitoring program for the construction and operation phases of the project. The monitoring program serves three functions:

- Observe groundwater seepage through the confining berm;
- Monitor surface movements of the dam; and
- Satisfy regulatory requirements for dam performance.

It is recommended that settlement pins be installed at 100 foot intervals along the crest of the confining berm (at locations where they will not be destroyed by traffic). The pins can consist of pieces of steel rod placed in the rockfill. They should be initially surveyed for both horizontal and vertical alignment.

7.2 SURVEY MONITORING

The settlement pins in the crest of the ultimate confining berm should be surveyed semi-annually, once in the spring and once in the fall.

8.0 ANNUAL INSPECTION

It is recommended that an annual site inspection be conducted by the Geotechnical Engineer to document the performance of the containment berm, as required by the site water licence. The specific tasks of these visits include:

- Observation of the upstream and downstream slopes for any signs of distress;
- Observation of the crest of the dam for any signs of settlement, transverse or longitudinal cracking; and
- Observation of the toe of the confining berm for any signs of fine sediments being transported through the berm.

9.0 CONTINGENCY PLANS

The overburden dump should be monitored on a regular basis. Should downslope instability be noted, a toe-berm of granular rock fill (from either the open pit or the main waste dump) will be constructed.

10.0 CONCEPTUAL ABANDONMENT AND RESTORATION PLANS

At the conclusion of mining, the overburden dump area will be graded to create a smooth surface, and re-seeded. The design of these measures is not part of EBA's work scope for this assignment.

11.0 LIMITATIONS

It should be noted that geological conditions are innately variable and are seldom spatially uniform. At the time of this report, information on stratigraphy at the project was at identified borehole and testpit locations from past and current studies. In order to develop recommendations from this information, it is necessary to make some assumptions concerning conditions other than at the specifically tested locations. Adequate monitoring should be provided during construction to check that these assumptions are reasonable.

The recommendations prepared and presented in this report are based on the geotechnical data gathered by EBA from previous reports and the current site investigation. The provided data, in the form of geotechnical boreholes and testpits and associated laboratory index property test results, has been supplemented by EBA's direct observations of the site.

This report and the recommendations contained in it are intended for the sole use of Sherwood Mining Corporation. EBA does not accept any responsibility for the accuracy of any of the data, the analysis or the recommendations contained or referenced in the report if the information presented in this report is used or relied upon by any party other than that specified above for the proposed overburden dump. Any such unauthorized use of this report is at the sole risk of the user. Additional information regarding the use of this report is presented in the attached General Conditions, which form a part of this report.

12.0 CLOSURE

EBA trusts that this report meets with your approval. Please do not hesitate to contact the undersigned should you have any questions or comments.

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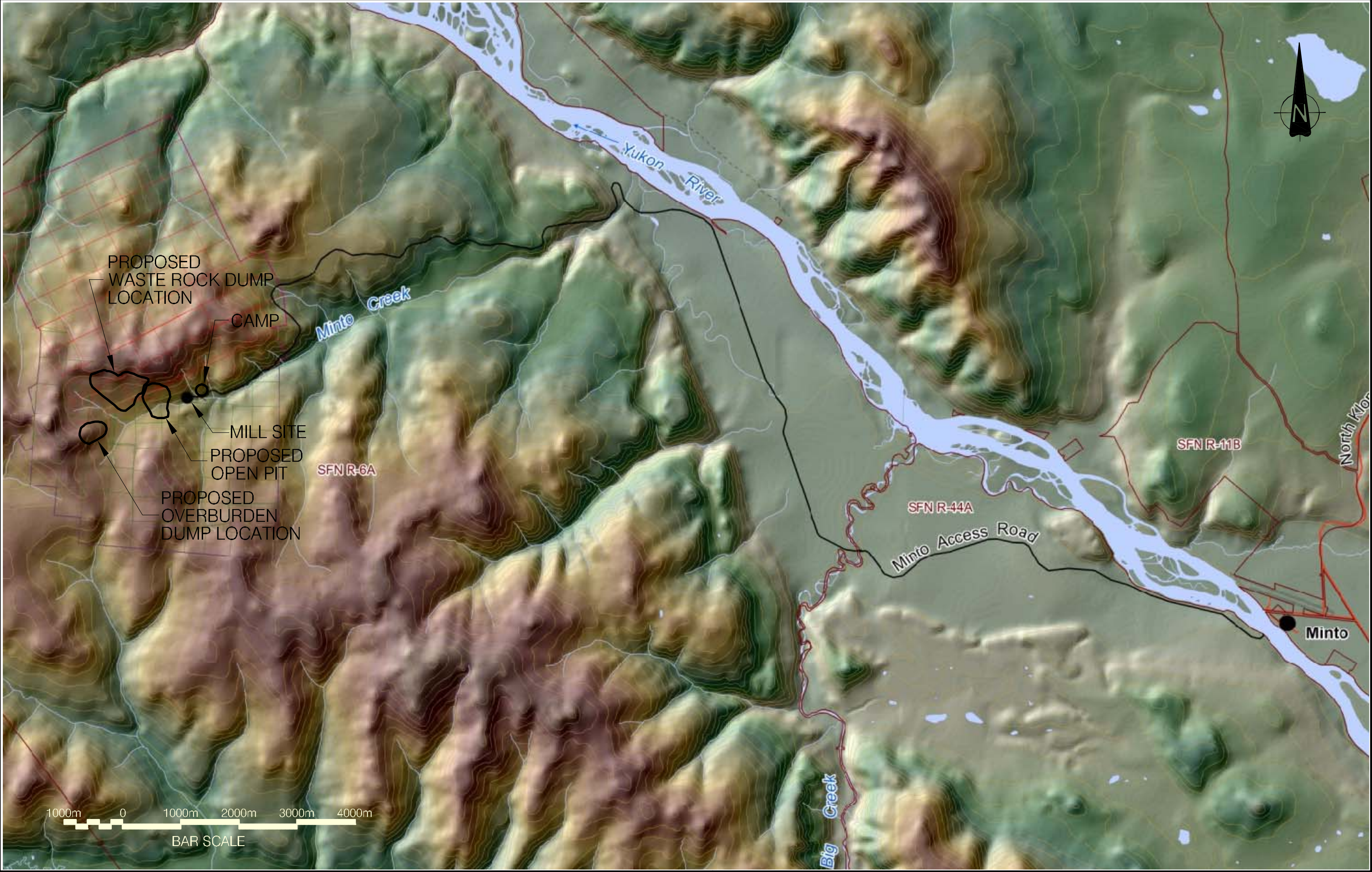
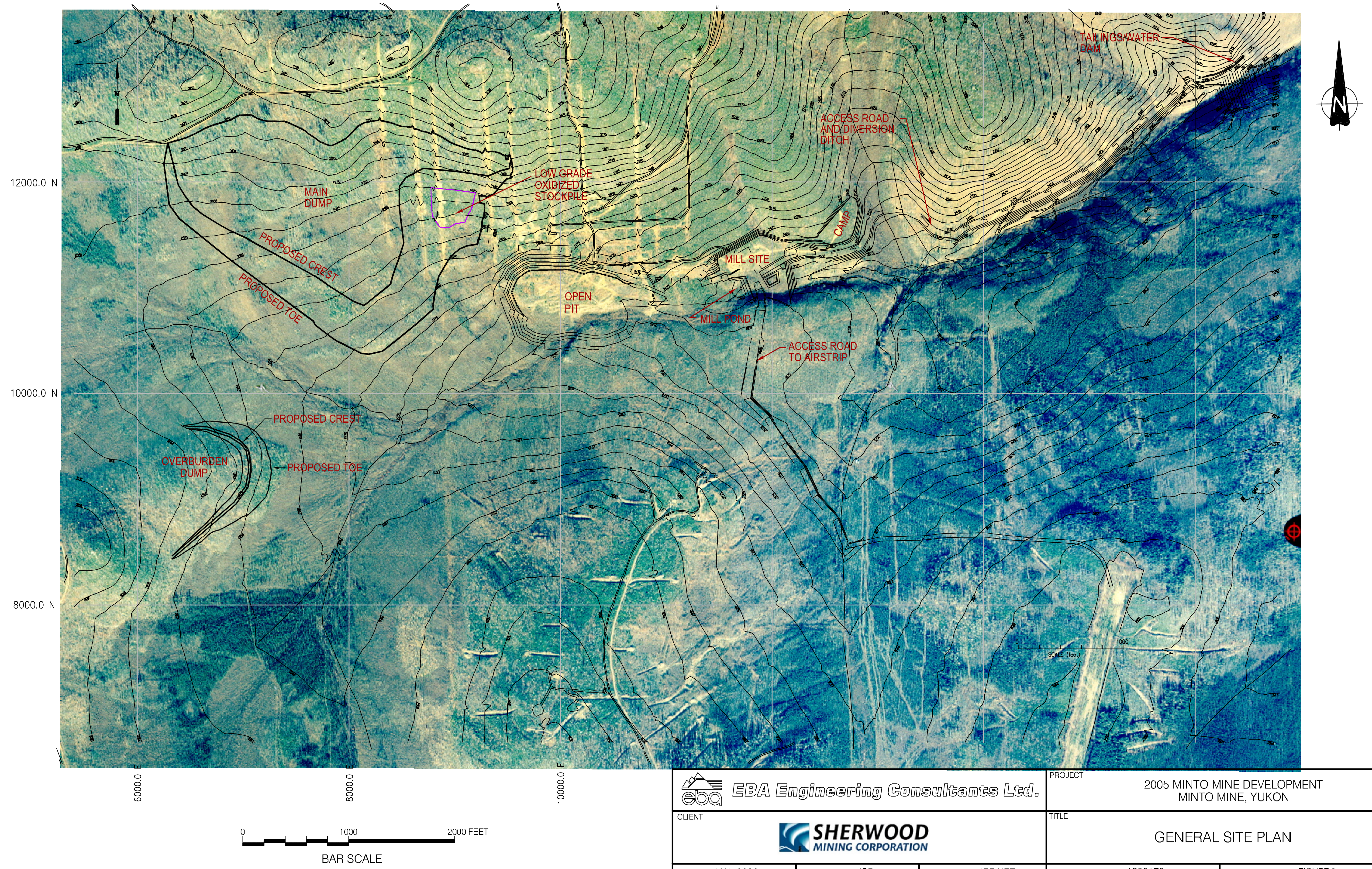
FIGURES



EBA Engineering Consultants Ltd.

PROJECT	MINTO MINE DEVELOPMENT 2005 MINTO, YUKON
CLIENT	SHERWOOD MINING CORPORATION
TITLE	LOCATION PLAN

DATE	DEC. 2005	DWN.	JSB	CHKD.	JRT	FILE NO.	1200173	DRWG.	FIGURE 1



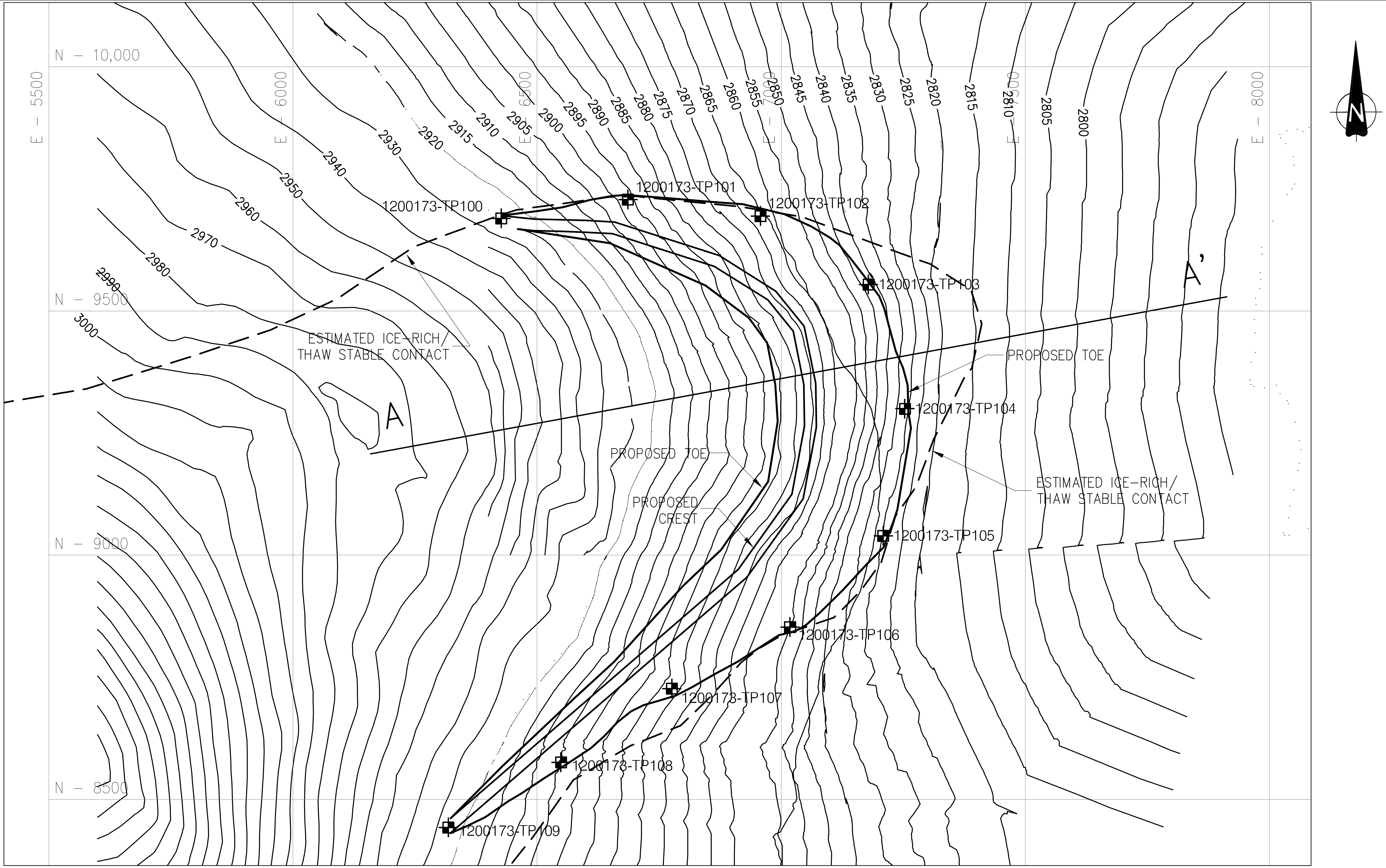
EBA Engineering Consultants Ltd.

PROJECT: 2005 MINTO MINE DEVELOPMENT
MINTO MINE, YUKON

CLIENT: SHERWOOD MINING CORPORATION

TITLE: GENERAL SITE PLAN

DATE	JAN. 2006	DWN.	JSB	CHKD.	JPB/JRT	FILE NO.	1200173	DRWG.	FIGURE 2



0 200 500 1000 feet

SCALE = 1/8" = 1'

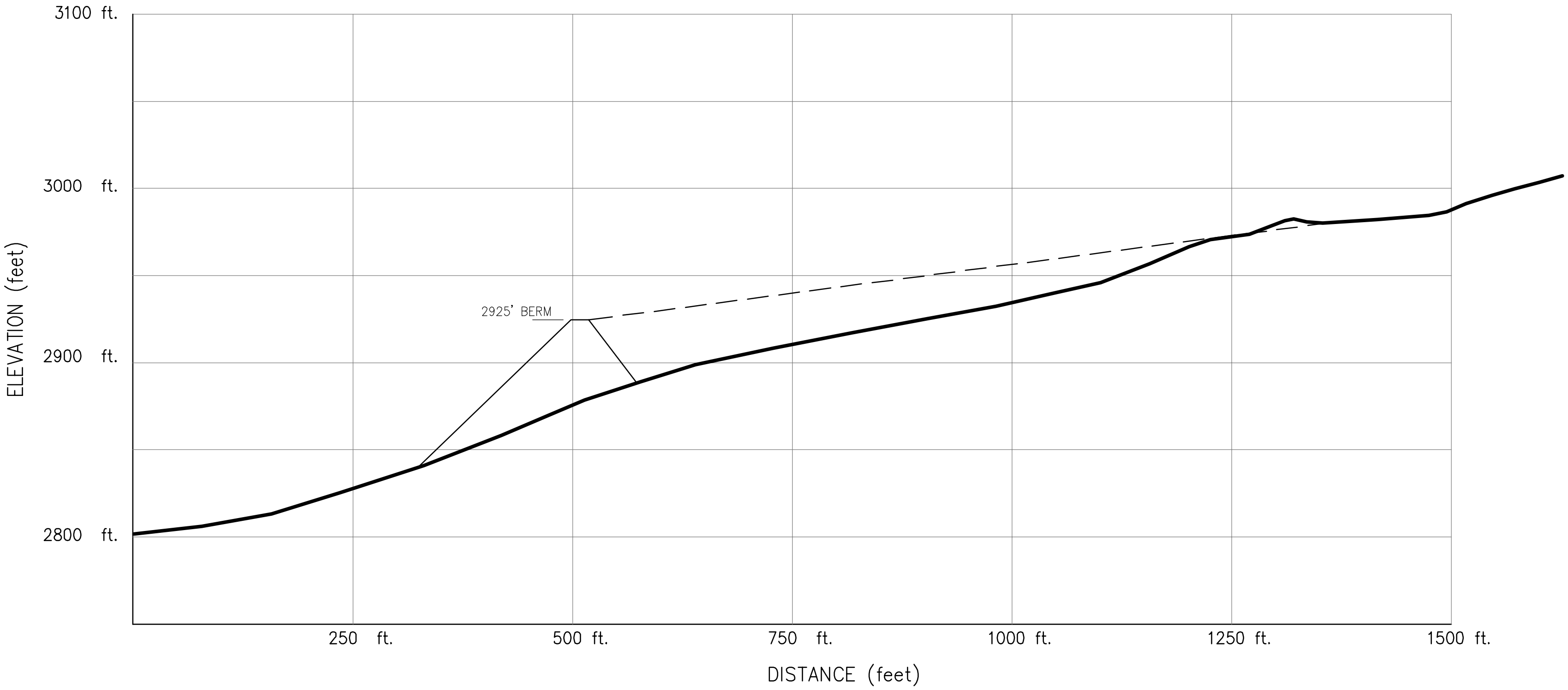
EBA Engineering Consultants Ltd.

PROJECT
2005 MINTO MINE DEVELOPMENT
MINTO MINE, YUKON

CLIENT
SHERWOOD MINING CORPORATION

TITLE
SITE PLAN SHOWING
GEOTECHNICAL TESTPITS IN PROPOSED
OVERBURDEN DUMP SITE

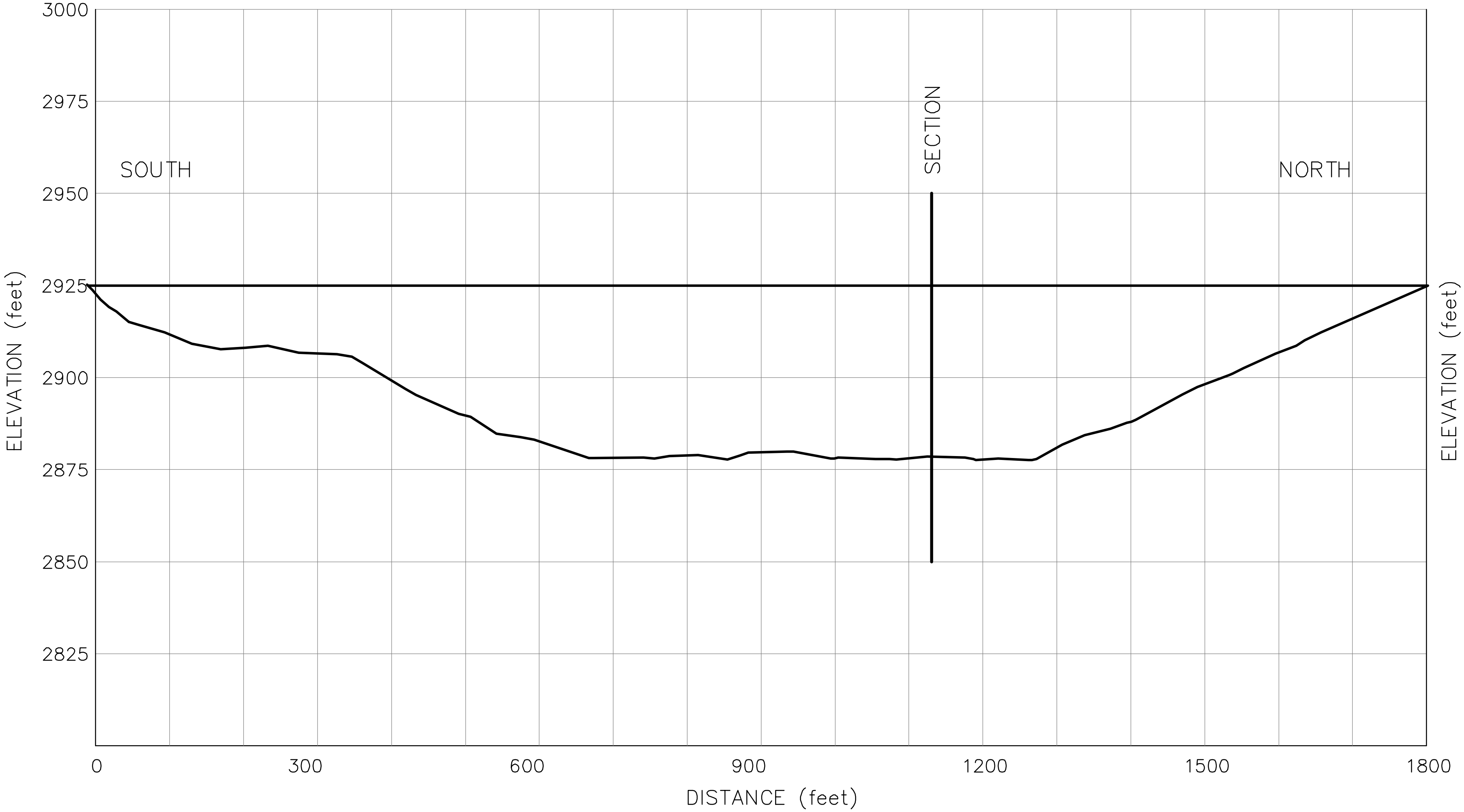
DATE	JAN. 2006	DWN.	JSB	CHKD.	JPB/JRT	FILE NO.	1200173	DRWG.	FIGURE 3



SECTION A–A'
HORIZ. 1" = 200'
VERT. 1" = 100'

EBA Engineering Consultants Ltd.	PROJECT: 2005 MINTO MINE DEVELOPMENT, MINTO MINE, YUKON
CLIENT: SHERWOOD MINING CORPORATION	TITLE: SECTION A - A'

DATE	DWN.	CHKD.	FILE NO.	DRWG.
JAN. 2006	JSB	JPB/JRT	1200173	FIGURE 4



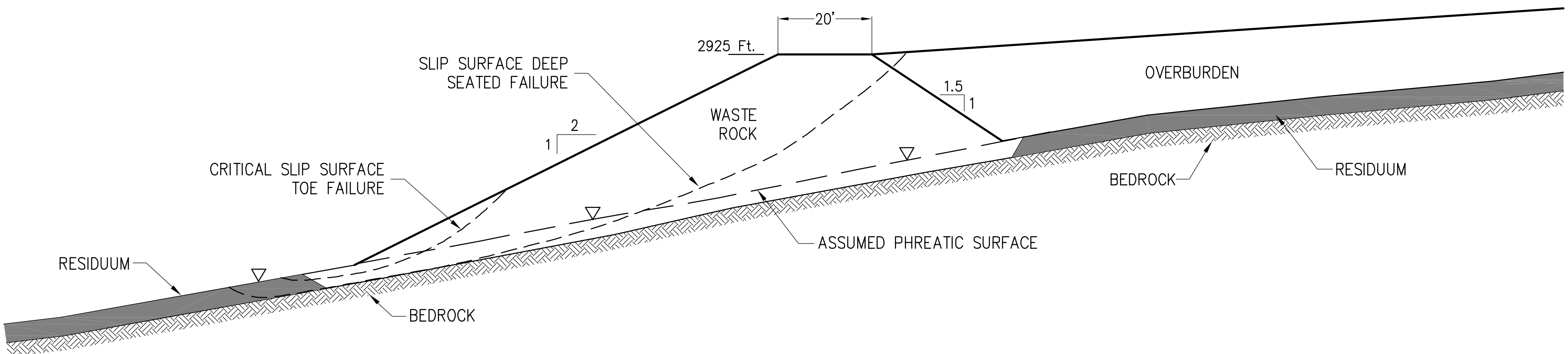
SCALE: HORIZ. – 1" = 200'
VERT. – 1" = 40'

EBA Engineering Consultants Ltd.	PROJECT: 2005 MINTO MINE DEVELOPMENT MINTO MINE, YUKON
CLIENT: SHERWOOD MINING CORPORATION	TITLE: APPROXIMATE CENTRELINE BERM PROFILE

DATE	DWN.	CHKD.	FILE NO.	DRWG.
JAN. 2006	JSB	JPB/JRT	1200173	FIGURE 5

SOIL PARAMETERS			
MATERIAL	BULK DENSITY (pcf)	FRICTION ANGLE (DEGREES)	COHESION (psf)
WASTE ROCK	124.8	35	0
RESIDUUM	124.1	35	0
OVERBURDEN	120.0	0	210

	MINIMUM FACTOR OF SAFETY
	DOWNSTREAM
STATIC, DUMP EMPTY, TOE FAILURE	1.39
STATIC, FULL OVERBURDEN DUMP, TOE FAILURE	1.39
STATIC, FULL OVERBURDEN DUMP, DEEP SEATED FAILURE	1.57
EARTHQUAKE (0.055g), FULL OVERBURDEN DUMP, TOE FAILURE	1.20
EARTHQUAKE (0.055g), FULL OVERBURDEN DUMP, DEEP SEATED	1.39



SECTION A–A'

EBA Engineering Consultants Ltd.

PROJECT: 2005 MINTO MINE DEVELOPMENT
MINTO MINE, YUKON

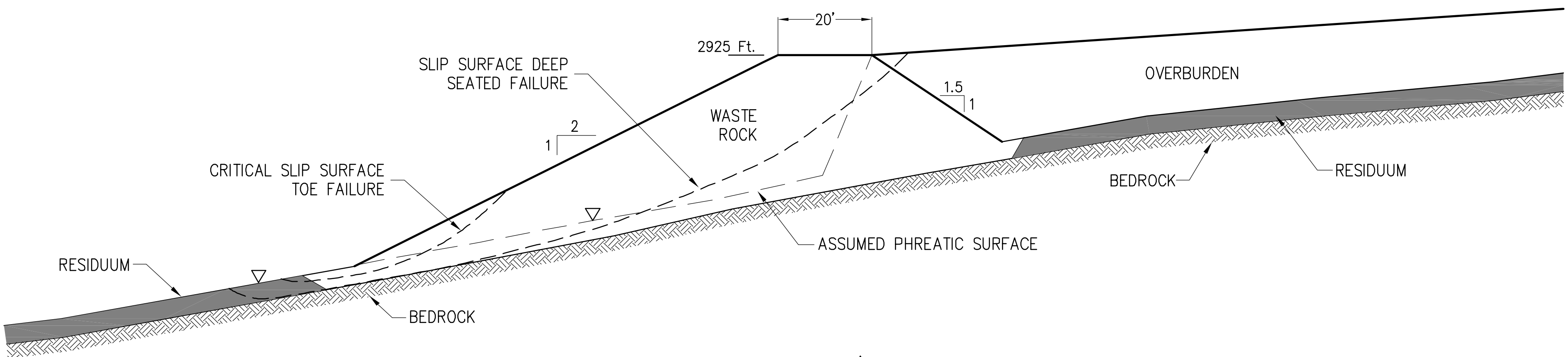
CLIENT: SHERWOOD MINING CORPORATION

TITLE: SLOPE STABILTY ANALYSIS
OVERBURDEN DUMP - PHREATIC CASE 1

DATE	JAN. 2006	DWN.	JSB	CHKD.	JPB/JRT	FILE NO.	1200173	DRWG.	FIGURE 6

SOIL PARAMETERS			
MATERIAL	BULK DENSITY (pcf)	FRICTION ANGLE (DEGREES)	COHESION (psf)
WASTE ROCK	124.8	35	0
RESIDUUM	124.1	35	0
OVERBURDEN	120.0	0	210

	MINIMUM FACTOR OF SAFETY
	DOWNSTREAM
STATIC, FULL OVERBURDEN DUMP, TOE FAILURE	1.39
STATIC, FULL OVERBURDEN DUMP, DEEP SEATED FAILURE	1.39
EARTHQUAKE (0.055g), FULL OVERBURDEN DUMP, TOE FAILURE	1.20
EARTHQUAKE (0.055g), FULL OVERBURDEN DUMP, DEEP SEATED	1.33



SECTION A–A'

EBA Engineering Consultants Ltd.

PROJECT: 2005 MINTO MINE DEVELOPMENT
MINTO MINE, YUKON

CLIENT: SHERWOOD MINING CORPORATION

TITLE: SLOPE STABILTY ANALYSIS
OVERBURDEN DUMP - PHREATIC CASE 2

DATE	JAN. 2006	DWN.	JSB	CHKD.	JPB/JRT	FILE NO.	1200173	DRWG.	FIGURE 7

APPENDIX

APPENDIX A GENERAL CONDITIONS

GEOTECHNICAL REPORT – GENERAL CONDITIONS

This report incorporates and is subject to these "General Conditions".

1.0 USE OF REPORT AND OWNERSHIP

This geotechnical report pertains to a specific site, a specific development and a specific scope of work. It is not applicable to any other sites nor should it be relied upon for types of development other than that to which it refers. Any variation from the site or development would necessitate a supplementary geotechnical assessment.

This report and the recommendations contained in it are intended for the sole use of EBA's client. EBA does not accept any responsibility for the accuracy of any of the data, the analyses or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than EBA's client unless otherwise authorized in writing by EBA. Any unauthorized use of the report is at the sole risk of the user.

This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of EBA. Additional copies of the report, if required, may be obtained upon request.

2.0 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems and methods employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system or method prevail, they are specifically mentioned.

Classification and identification of geological units are judgmental in nature as to both type and condition. EBA does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

Where subsurface conditions encountered during development are different from those described in this report, qualified geotechnical personnel should revisit the site and review recommendations in light of the actual conditions encountered.

3.0 LOGS OF TESTHOLES

The testhole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples. Soil and rock zones have been interpreted. Change from one geological zone to the other, indicated on the logs as a distinct line, can be, in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil or rock zone transition elevations may require further investigation and review.

4.0 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from logs of test holes and/or soil/rock exposures. Stratigraphy is known only at the locations of the test hole or exposure. Actual geology and stratigraphy between test holes and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historic environment. EBA does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of more precise locations of geological units is necessary, additional investigation and review may be necessary.

5.0 SURFACE WATER AND GROUNDWATER CONDITIONS

Surface and groundwater conditions mentioned in this report are those observed at the times recorded in the report. These conditions vary with geological detail between observation sites; annual, seasonal and special meteorologic conditions; and with development activity. Interpretation of water conditions from observations and records is judgmental and constitutes an evaluation of circumstances as influenced by geology, meteorology and development activity. Deviations from these observations may occur during the course of development activities.

6.0 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geological materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration. Unless otherwise specifically indicated in this report, the walls and floors of excavations must be protected from the elements, particularly moisture, desiccation, frost action and construction traffic.

7.0 SUPPORT OF ADJACENT GROUND AND STRUCTURES

Unless otherwise specifically advised, support of ground and structures adjacent to the anticipated construction and preservation of adjacent ground and structures from the adverse impact of construction activity is required.

8.0 INFLUENCE OF CONSTRUCTION ACTIVITY

There is a direct correlation between construction activity and structural performance of adjacent buildings and other installations. The influence of all anticipated construction activities should be considered by the contractor, owner, architect and prime engineer in consultation with a geotechnical engineer when the final design and construction techniques are known.

9.0 OBSERVATIONS DURING CONSTRUCTION

Because of the nature of geological deposits, the judgmental nature of geotechnical engineering, as well as the potential of adverse circumstances arising from construction activity, observations during site preparation, excavation and construction should be carried out by a geotechnical engineer. These observations may then serve as the basis for confirmation and/or alteration of geotechnical recommendations or design guidelines presented herein.

10.0 DRAINAGE SYSTEMS

Where temporary or permanent drainage systems are installed within or around a structure, the systems which will be installed must protect the structure from loss of ground due to internal erosion and must be designed so as to assure continued performance of the drains. Specific design detail of such systems should be developed or reviewed by the geotechnical engineer. Unless otherwise specified, it is a condition of this report that effective temporary and permanent drainage systems are required and that they must be considered in relation to project purpose and function.

11.0 BEARING CAPACITY

Design bearing capacities, loads and allowable stresses quoted in this report relate to a specific soil or rock type and condition. Construction activity and environmental circumstances can materially change the condition of soil or rock. The elevation at which a soil or rock type occurs is variable. It is a requirement of this report that structural elements be founded in and/or upon geological materials of the type and in the condition assumed. Sufficient observations should be made by qualified geotechnical personnel during construction to assure that the soil and/or rock conditions assumed in this report in fact exist at the site.

12.0 SAMPLES

EBA will retain all soil and rock samples for 30 days after this report is issued. Further storage or transfer of samples can be made at the client's expense upon written request, otherwise samples will be discarded.

13.0 STANDARD OF CARE

Services performed by EBA for this report have been conducted in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practising under similar conditions in the jurisdiction in which the services are provided. Engineering judgement has been applied in developing the conclusions and/or recommendations provided in this report. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of this report.

14.0 ENVIRONMENTAL AND REGULATORY ISSUES

Unless stipulated in the report, EBA has not been retained to investigate, address or consider and has not investigated, addressed or considered any environmental or regulatory issues associated with development on the subject site.

15.0 ALTERNATE REPORT FORMAT

Where EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed EBA's instruments of professional service), the Client agrees that only the signed and sealed hard copy versions shall be considered final and legally binding. The hard copy versions submitted by EBA shall be the original documents for record and working purposes, and, in the event of a dispute or discrepancies, the hard copy versions shall govern over the electronic versions. Furthermore, the Client agrees and waives all future right of dispute that the original hard copy signed version archived by EBA shall be deemed to be the overall original for the Project.

The Client agrees that both electronic file and hard copy versions of EBA's instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except EBA. The Client warrants that EBA's instruments of professional service will be used only and exactly as submitted by EBA.

The Client recognizes and agrees that electronic files submitted by EBA have been prepared and submitted using specific software and hardware systems. EBA makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

APPENDIX

APPENDIX B TESTPIT LOGS

Minto Mine Development 2005	Client: Sherwood Mining Corp.	TEST PIT NO: 1200173-TP100
Minto Copper Mine	Excavator: CAT 416 C Rubber Tire	PROJECT NO: 1200173
Proposed Overburden Dump	6944700 N, 383473.6 E, Z 8	ELEVATION: 0 m

SAMPLE TYPE ■ GRAB

Depth(m)	SOIL SYMBOL	SAMPLE TYPE	SAMPLE NO	SOIL DESCRIPTION	PLASTIC — M.C. — LIQUID (20 40 60 80)	● PERCENT CLAY ● (10 20 30 40) / ▲ PERCENT SILT ▲ (20 40 60 80) / ■ PERCENT SAND ■ (20 40 60 80) / ◆ PERCENT GRAVEL ◆ (20 40 60 80)	Depth(ft)
0.0				SAND (RESIDIUUM) – silty, trace of gravel			0.0
		GRAB		– becomes some gravel, fine to medium grained, angular 0.5 m – trace to some silt below 1.0 m	●	◆ ▲ ■	
1.0							
		GRAB			●		5.0
2.0							
				BEDROCK (GRANITE) – poor quality, friable – becomes more competent with depth			
3.0				END OF TESTPIT 3.0 m (REFUSAL)			10.0
4.0							

EBA Engineering Consultants Ltd.	LOGGED BY: JSB	COMPLETION DEPTH: 3 m
	REVIEWED BY: JRT	COMPLETE: 05/10/16
	Fig. No:	Page 1 of 1

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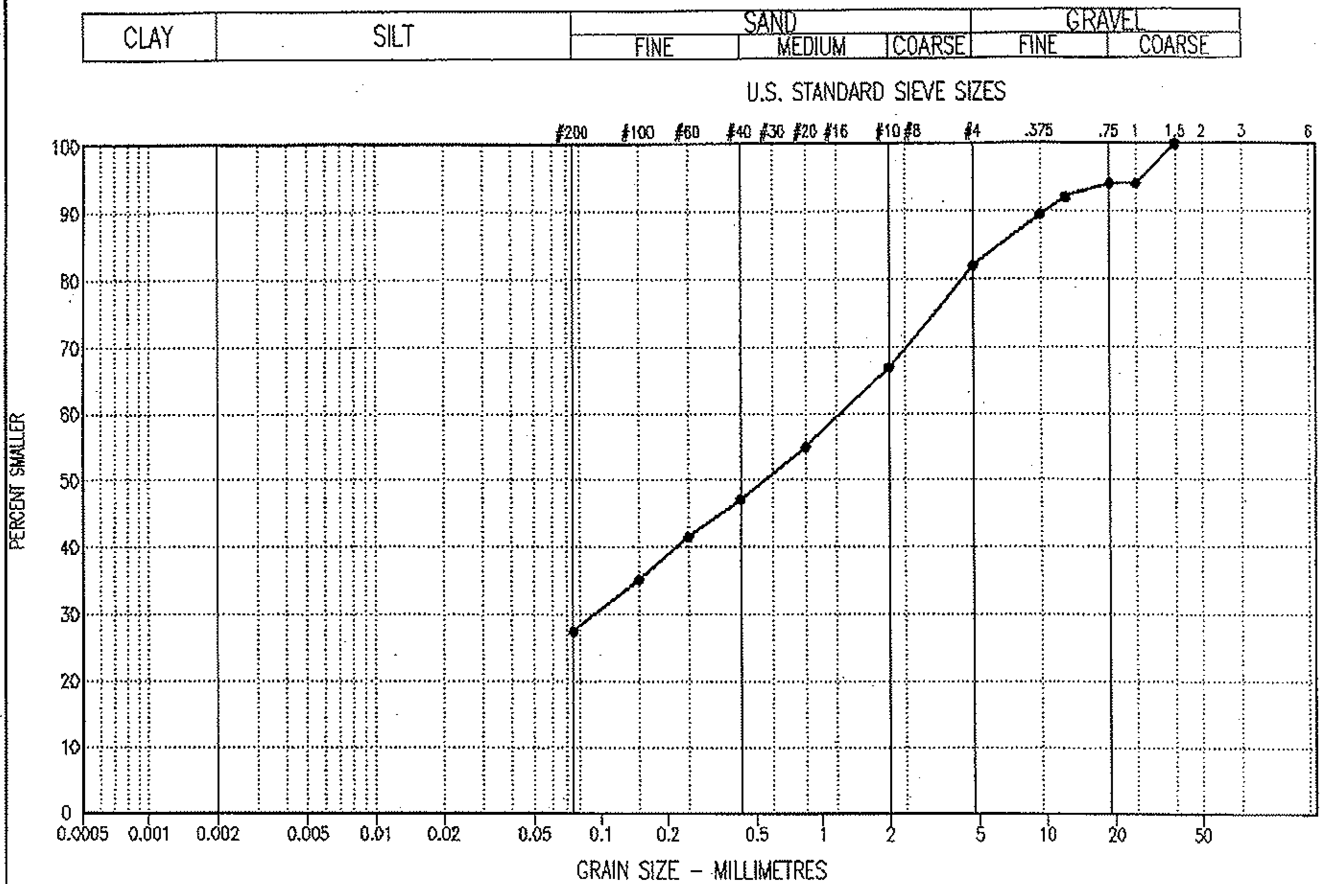
EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION CLAY %	SILT %	SAND %	GRAVEL %	Cu	Cc	U.S.C
•——•	1200173-100	0.50 - 0.70	--- 27 ---		54	19	–	–	

Project: 0201-1200173 Date Tested: 05/11/02 BY: JP

Tested in accordance with ASTM D422 unless otherwise noted.

Minto Mine Development 2005	Client: Sherwood Mining Corp.	TEST PIT NO: 1200173-TP101
Minto Copper Mine	Excavator: CAT 416C Rubber Tire	PROJECT NO: 1200173
Proposed Overburden Dump	6944709 N, 383553.1 E, Z 8	ELEVATION: 0 m

SAMPLE TYPE ■ GRAB

Depth(m)	SOIL SYMBOL	SAMPLE TYPE	SAMPLE NO	SOIL DESCRIPTION	PLASTIC — M.C. — LIQUID (20 40 60 80)	PERCENT CLAY (10 20 30 40) / PERCENT SILT (20 40 60 80) / PERCENT SAND (20 40 60 80) / PERCENT GRAVEL (20 40 60 80)	Depth(ft)
0.0				ORGANIC ROOT MAT			0.0
				SAND (RESIDIUUM) - silty, trace of gravel			
				- trace to some silt below 0.3 m			
1.0		GRAB			●		
							5.0
				- coarser gravels, some cobbles present below 1.8 m			
2.0							
				BEDROCK (GRANITE) - poor quality, friable			
				- more competent with depth			
				END OF TESTPIT 2.7 m (REFUSAL)			
3.0							10.0
4.0							

EBA Engineering Consultants Ltd.	LOGGED BY: JSB	COMPLETION DEPTH: 2.7 m
	REVIEWED BY: JRT	COMPLETE: 05/10/16
	Fig. No:	Page 1 of 1

Minto Mine Development 2005	Client: Sherwood Mining Corp.	TEST PIT NO: 1200173-TP102
Minto Copper Mine	Excavator: CAT 416C Rubber Tire	PROJECT NO: 1200173
NW of Minto, YT	6944697 N, 383635.9 E, Z 8	ELEVATION: 0 m

SAMPLE TYPE ■ GRAB

Depth(m)	SOIL SYMBOL	SAMPLE TYPE	SAMPLE NO	SOIL DESCRIPTION	PLASTIC — M.C. — LIQUID (20 40 60 80)	PERCENT CLAY (10 20 30 40) / PERCENT SILT (20 40 60 80) / PERCENT SAND (20 40 60 80) / PERCENT GRAVEL (20 40 60 80)	Depth(ft)
0.0				SAND (RESIDIUUM) – silty, trace of gravel – trace to some silt below 0.4 m – some gravel, fine to medium grained, angular to 0.4 m			0.0
1.0							
		GRAB			●		5.0
2.0							
				BEDROCK (GRANITE) – poor quality, friable			
				END OF TESTPIT 2.8 m (REFUSAL)			
3.0							10.0
4.0							

EBA Engineering Consultants Ltd.	LOGGED BY: JSB	COMPLETION DEPTH: 2.8 m
	REVIEWED BY: JRT	COMPLETE: 05/10/16
	Fig. No:	Page 1 of 1

05/11/28 02:57PM (YUK-TP4)

Minto Mine Development 2005	Client: Sherwood Mining Corp.	TEST PIT NO: 1200173-TP103
Minto Copper Mine	Excavator: CAT 416C Rubber Tire	PROJECT NO: 1200173
Proposed Overburden Dump	6944651 N, 383701.1 E, Z 8	ELEVATION: 0 m

SAMPLE TYPE ■ GRAB

Depth(m)	SOIL SYMBOL	SAMPLE TYPE	SAMPLE NO	SOIL DESCRIPTION	PLASTIC — M.C. — LIQUID (20 40 60 80)	● PERCENT CLAY ● (10 20 30 40) / ▲ PERCENT SILT ▲ (20 40 60 80) / ■ PERCENT SAND ■ (20 40 60 80) / ◆ PERCENT GRAVEL ◆ (20 40 60 80)	Depth(ft)
0.0				ORGANIC ROOT MAT			0.0
		GRAB		SAND (RESIDIUUM) - silty, trace of gravel	●		
				- trace to some silt below 0.4 m - becomes gravelly, well graded, angular below 0.4 m			
1.0		GRAB		- cobbles encountered below 1.0 m - some boulders present below 1.0 m	●		
				BEDROCK (GRANITE) - poor quality, friable around 1.6 m			5.0
2.0				END OF TESTPIT 2.0 m (REFUSAL)			
3.0							10.0
4.0							

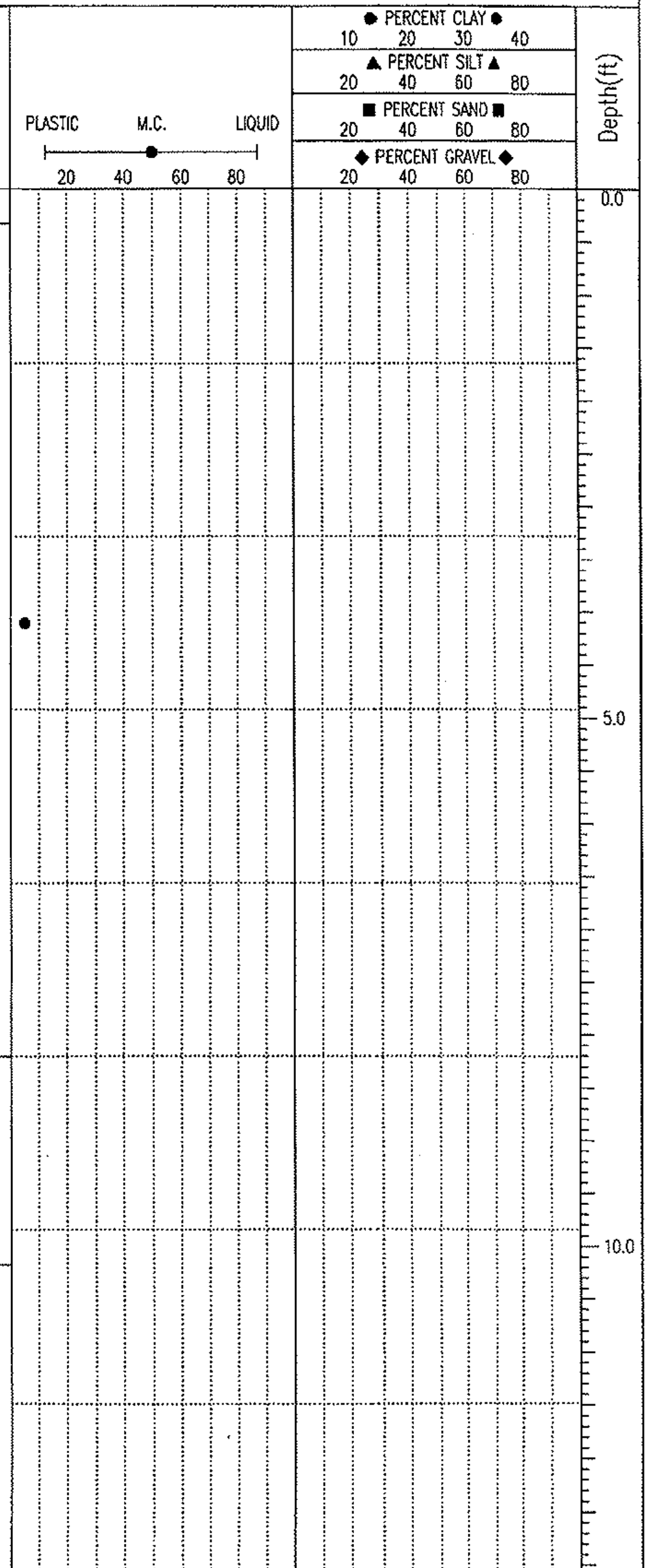
EBA Engineering Consultants Ltd.	LOGGED BY: JSB	COMPLETION DEPTH: 2 m
	REVIEWED BY: JRT	COMPLETE: 05/10/16
	Fig. No:	Page 1 of 1

05/11/28 02:57PM (YUK-1P4)

Minto Mine Development 2005	Client: Sherwood Mining Corp.	TEST PIT NO: 1200173-TP104
Minto Copper Mine	Excavator: CAT 416C Rubber Tire	PROJECT NO: 1200173
NW of Minto, YT	6944573 N, 383721.6 E, Z 8	ELEVATION: 0 m

SAMPLE TYPE ■ GRAB

Depth(m)	SOIL SYMBOL	SAMPLE TYPE	SAMPLE NO	SOIL DESCRIPTION
0.0				ORGANIC ROOT MAT
				SAND (RESIDIUUM) - silty, trace of gravel, well graded sand, fine to medium grained angular gravel, compact, damp, reddish brown - trace to some silt below 0.4 m - becomes gravelly, well graded, angular below 0.4 m - cobbles below 0.7 m
1.0				
		GRAB		
2.0				
				BEDROCK (GRANITE) - poor quality, friable - more competent with depth
3.0				
				END OF TESTPIT 3.1 m (REFUSAL)
4.0				



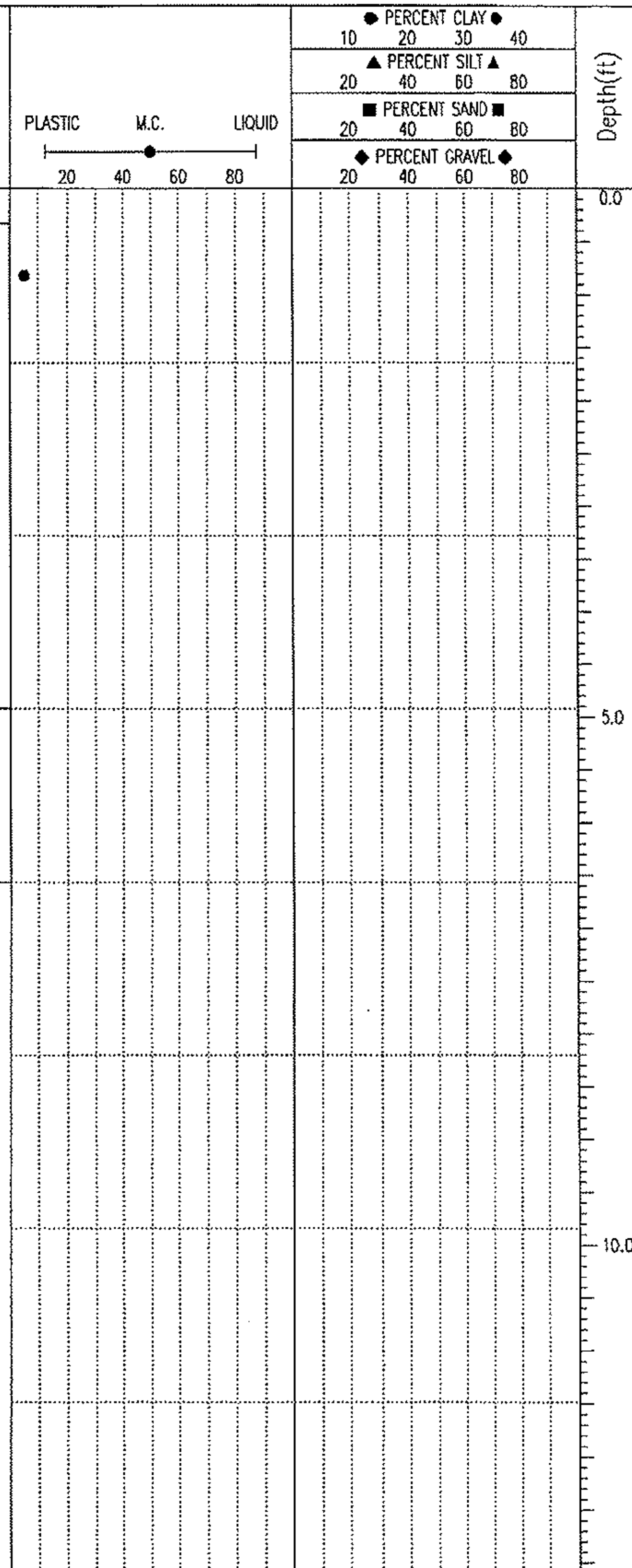
EBA Engineering Consultants Ltd.	LOGGED BY: JSB	COMPLETION DEPTH: 3.1 m
	REVIEWED BY: JRT	COMPLETE: 05/10/16
	Fig. No:	Page 1 of 1

05/11/28 02:57PM (YUK-TP4)

Minto Mine Development 2005	Client: Sherwood Mining Corp.	TEST PIT NO: 1200173-TP105
Minto Copper Mine	Excavator: CAT 416C Rubber Tire	PROJECT NO: 1200173
NW of Minto, YT	6944494 N, 383705.1 E, Z 8	ELEVATION: 0 m

SAMPLE TYPE ■ GRAB

Depth(m)	SOIL SYMBOL	SAMPLE TYPE	SAMPLE NO	SOIL DESCRIPTION
0.0				ORGANIC ROOT MAT
		■		SAND (RESIDIUUM) - trace to some gravel, well graded sand, fine angular gravel, compact, damp, medium grey - trace to some silt below 0.4 m - becomes gravelly, well graded, angular below 0.4 m - cobbles encountered below 0.6 m
				BEDROCK (GRANITE) - poor quality, friable
2.0				END OF TESTPIT 2.0 m (REFUSAL)
4.0				



EBA Engineering Consultants Ltd.

LOGGED BY: JSB	COMPLETION DEPTH: 2 m
REVIEWED BY: JRT	COMPLETE: 05/10/16
Fig. No:	Page 1 of 1

05/11/28 02:57PM (YUK-TP4)

Minto Mine Development 2005	Client: Sherwood Mining Corp.	TEST PIT NO: 1200173-TP106
Minto Copper Mine	Excavator: CAT 416C Rubber Tire	PROJECT NO: 1200173
Proposed Overburden Dump	6944439 N, 383645 E, Z 8	ELEVATION: 0 m

SAMPLE TYPE ■ GRAB

Depth(m)	SOIL SYMBOL	SAMPLE TYPE	SAMPLE NO	SOIL DESCRIPTION	PLASTIC — M.C. — LIQUID (20 40 60 80)	● PERCENT CLAY ● (10 20 30 40) / ▲ PERCENT SILT ▲ (20 40 60 80) / ■ PERCENT SAND ■ (20 40 60 80) / ◆ PERCENT GRAVEL ◆ (20 40 60 80)	Depth(ft)
0.0				ORGANIC ROOTMAT			0.0
				SAND (RESIDIUUM) – silty, trace of gravel			
				– trace to some silt below 0.5 m below 0.5 m – becomes gravelly, well graded, angular			
1.0				– gravel content increases with depth around 1.0 m			
		■		– cobble sized pieces encountered around 1.5 m	●	▲ ■ ◆	5.0
				BEDROCK (GRANITE) – poor quality, friable			
2.0							
				END OF TESTPIT 2.7 m (REFUSAL)			
3.0							10.0
4.0							

EBA Engineering Consultants Ltd.	LOGGED BY: JSB	COMPLETION DEPTH: 2.7 m
	REVIEWED BY: JRT	COMPLETE: 05/10/16
	Fig. No:	Page 1 of 1

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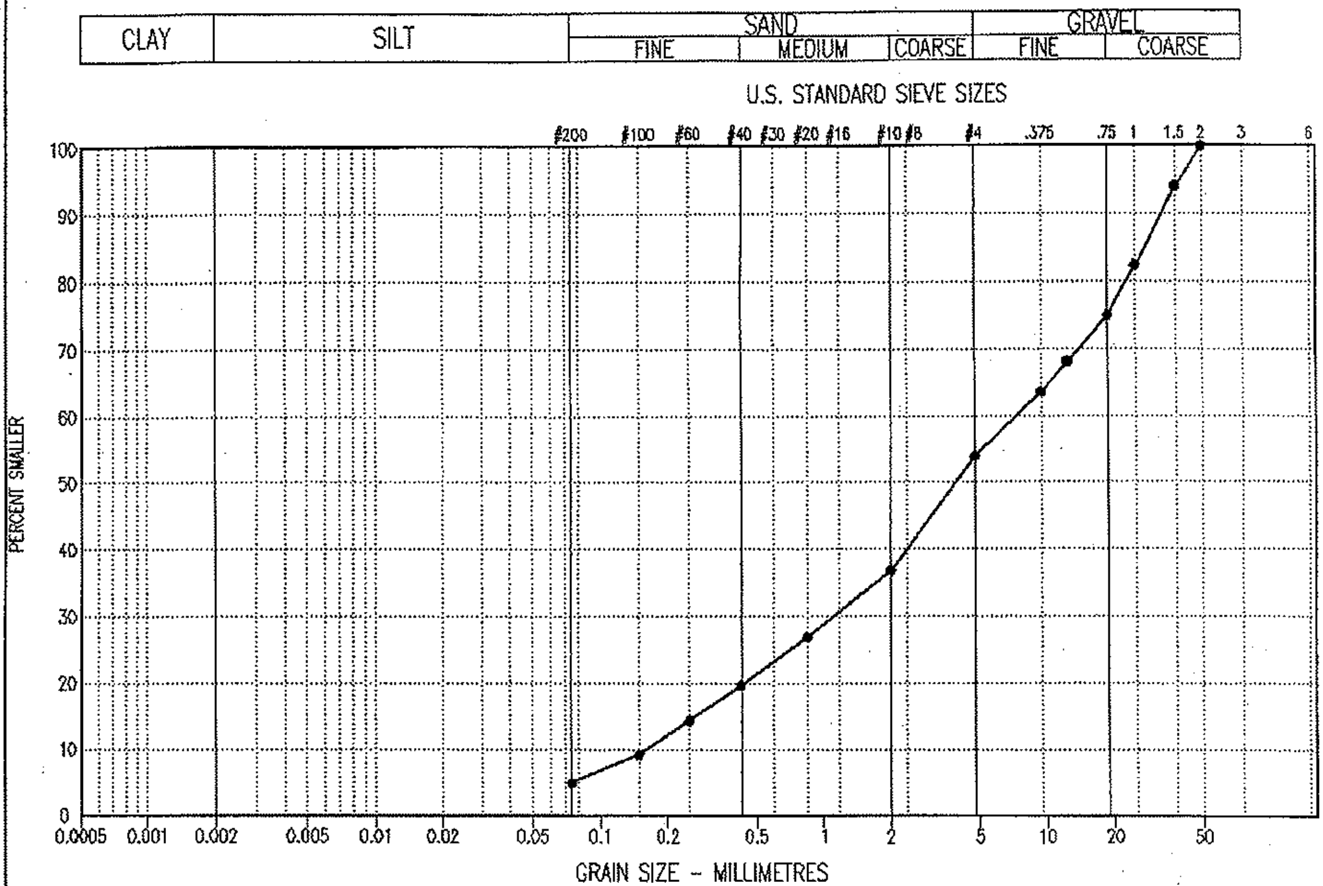
EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION CLAY %	SILT %	SAND %	GRAVEL %	Cu	Cc	U.S.C
●——●	1200173–106	1.50 – 1.70	---	5 ---	48	47	46.7	1.1	SW

Project: 0201–1200173 Date Tested: 11/02/05 BY: JP

Tested in accordance with ASTM 0422 unless otherwise noted.

Minto Mine Development 2005	Client: Sherwood Mining Corp.	TEST PIT NO: 1200173-TP107
Minto Copper Mine	Excavator: CAT 416C Rubber Tire	PROJECT NO: 1200173
Proposed Overburden Dump	6944403 N, 383570 E, Z 8	ELEVATION: 0 m

SAMPLE TYPE ■ GRAB

Depth(m)	SOIL SYMBOL	SAMPLE TYPE	SAMPLE NO	SOIL DESCRIPTION	PLASTIC — M.C. — LIQUID (20 40 60 80)	● PERCENT CLAY ● (10 20 30 40) ▲ PERCENT SILT ▲ (20 40 60 80) ■ PERCENT SAND ■ (20 40 60 80) ◆ PERCENT GRAVEL ◆ (20 40 60 80)	Depth(ft)
0.0				ORGANIC ROOTMAT			0.0
		GRAB		SAND – silty, gravelly, well graded sand, well graded angular gravels, compact, damp, reddish brown	●		
				– trace of silt around 0.5 m			
				– becomes trace to some fine to medium grained angular gravels around 0.7 m			
1.0							
		GRAB		BEDROCK (GRANITE) – poor quality, friable	●	▲ ◆ ■	
							5.0
				– becomes more competent with depth			
2.0		GRAB			●		
				END OF TESTPIT 2.5 m (REFUSAL)			
3.0							10.0
4.0							

EBA Engineering Consultants Ltd.	LOGGED BY: JSB	COMPLETION DEPTH: 2.5 m
	REVIEWED BY: JRT	COMPLETE: 05/10/16
	Fig. No:	Page 1 of 1

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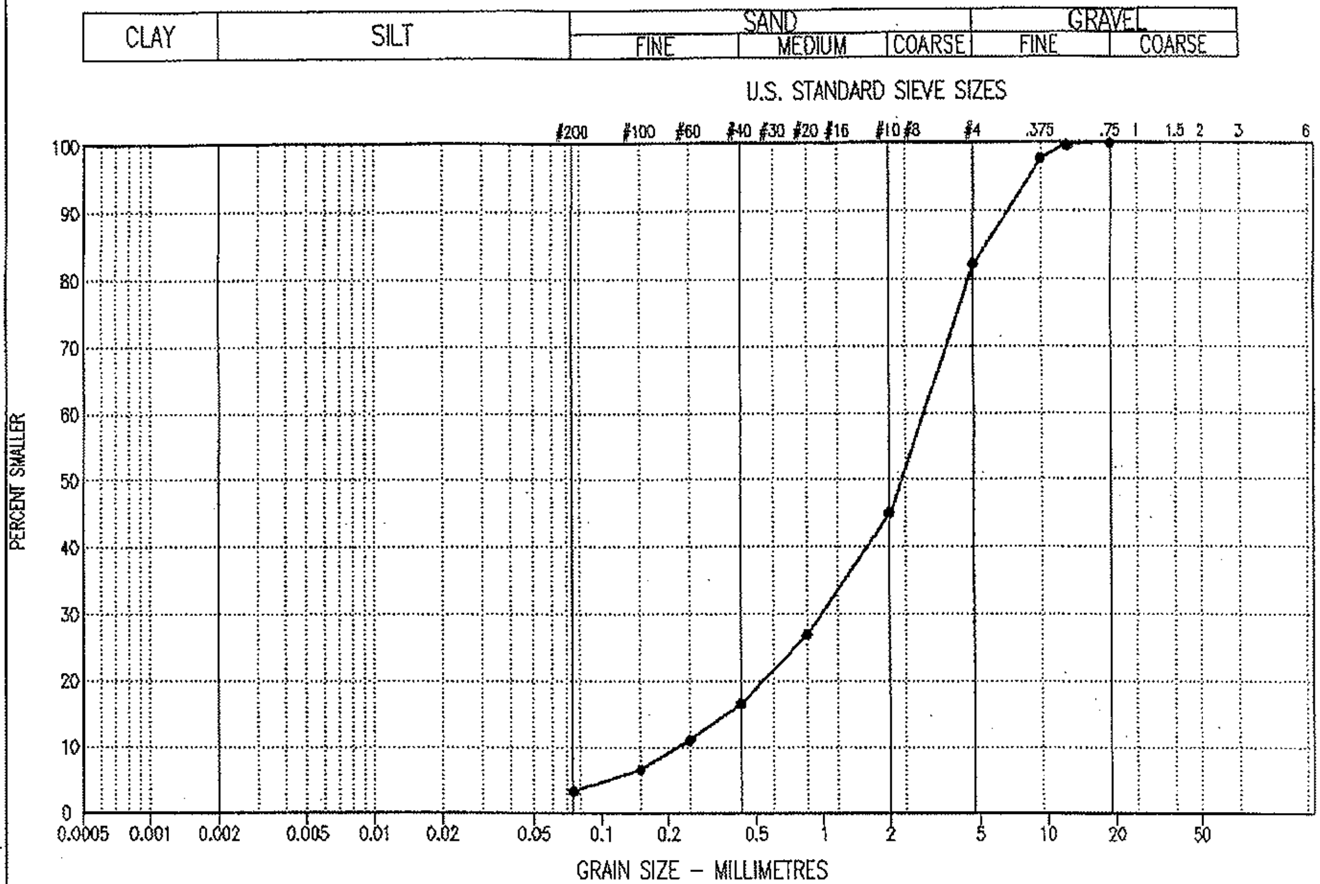
EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION CLAY %	SILT %	SAND %	GRAVEL %	Cu	Cc	U.S.C
●—●	1200173-107	1.20 – 1.50	---	3 ---	79	18	13.6	1.5	SW

Project: 0201-1200173 Date Tested: 11/02/05 BY: JP

Tested in accordance with ASTM D422 unless otherwise noted.

Minto Mine Development 2005	Client: Sherwood Mining Corp.	TEST PIT NO: 1200173-TP108
Minto Copper Mine.	Excavator: CAT 416C Rubber Tire	PROJECT NO: 1200173
Proposed Overburden Dump	6944360 N, 6944322 E, Z 8	ELEVATION: 0 m

SAMPLE TYPE ■ GRAB

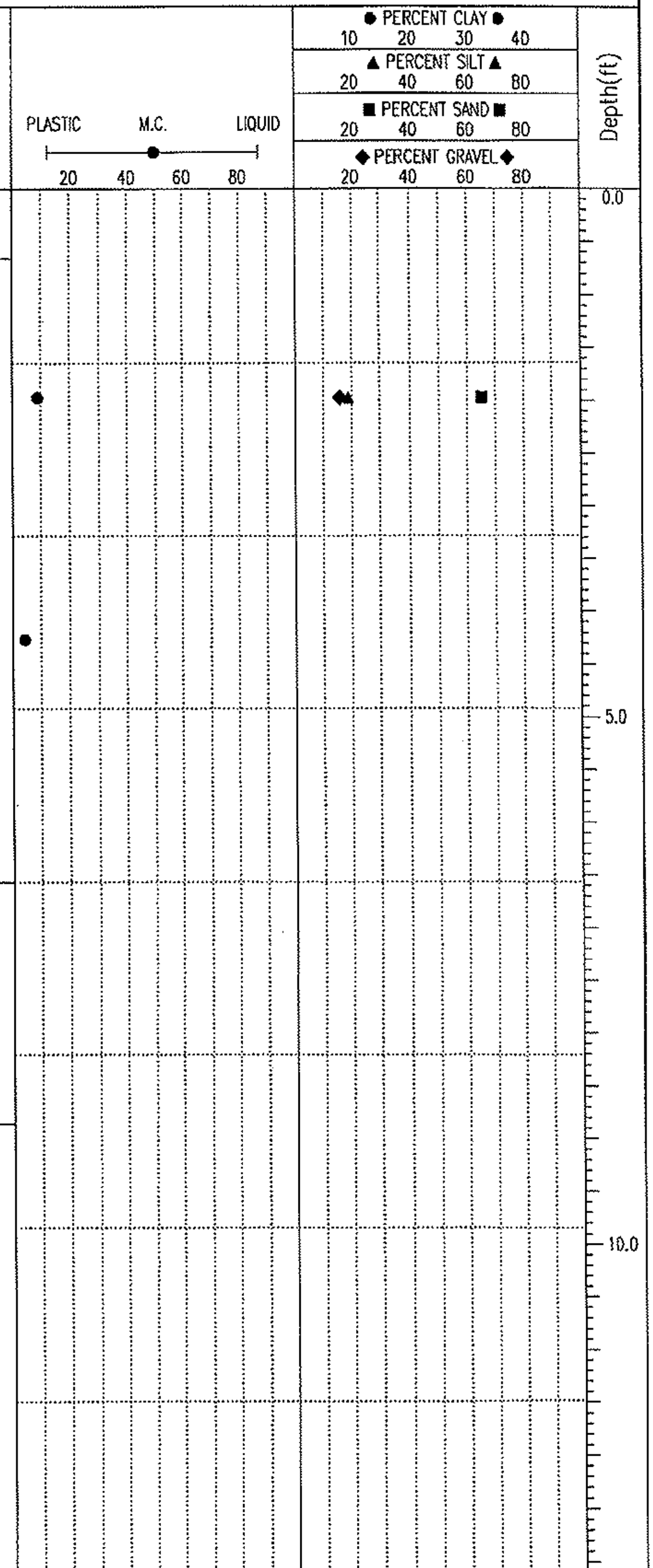
Depth(m)	SOIL SYMBOL	SAMPLE TYPE	SAMPLE NO	SOIL DESCRIPTION	PLASTIC — M.C. — LIQUID (20 40 60 80)	● PERCENT CLAY ● 10 20 30 40 / ▲ PERCENT SILT ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / ◆ PERCENT GRAVEL ◆ 20 40 60 80	Depth(ft)
0.0				ORGANIC ROOT MAT			0.0
		GRAB		SAND (RESIDIUUM) - silty, trace of gravel, well graded sand, fine to medium grained angular gravels, reddish brown - trace to some silt below 0.5 m	●		
1.0				- some gravel to gravelly around 1.0 m - 1.5 m			
							5.0
		GRAB			●		
2.0				BEDROCK (GRANITE) - poor quality, friable below 2.0 m			
				END OF TESTPIT 2.4 m (REFUSAL)			
3.0							10.0
4.0							

EBA Engineering Consultants Ltd.	LOGGED BY:	COMPLETION DEPTH: 2 m
	REVIEWED BY:	COMPLETE: 05/10/16
	Fig. No:	Page 1 of 1

Minto Mine Development 2005	Client: Sherwood Mining Corp.	TEST PIT NO: 1200173-TP109
Minto Copper Mine	Excavator: CAT 416C Rubber Tire	PROJECT NO: 1200173
Proposed Overburden Dump	6944322 N, 383427.8 E, Z 8	ELEVATION: 0 m

SAMPLE TYPE ■ GRAB

Depth(m)	SOIL SYMBOL	SAMPLE TYPE	SAMPLE NO	SOIL DESCRIPTION
0.0				ORGANIC ROOT MAT
				SAND (RESIDUUM) – silty, trace to some fine gravel, well graded sand, reddish brown
		GRAB		– less silt with depth around 0.5 m
1.0		GRAB		– becomes gravelly, coarser grained around 1.2 m
2.0				BEDROCK (GRANITE) – HIGHLY FRACTURED – cobble sized pieces, coarser with depth
				END OF TESTPIT 2.7 m (REFUSAL)
3.0				
4.0				



EBA Engineering Consultants Ltd.	LOGGED BY: JSB / COMPLETION DEPTH: 2.7 m
	REVIEWED BY: JRT / COMPLETE: 05/10/16
	Fig. No: / Page 1 of 1

05/11/28 02:58PM (YUK-TP4)

EBA Engineering

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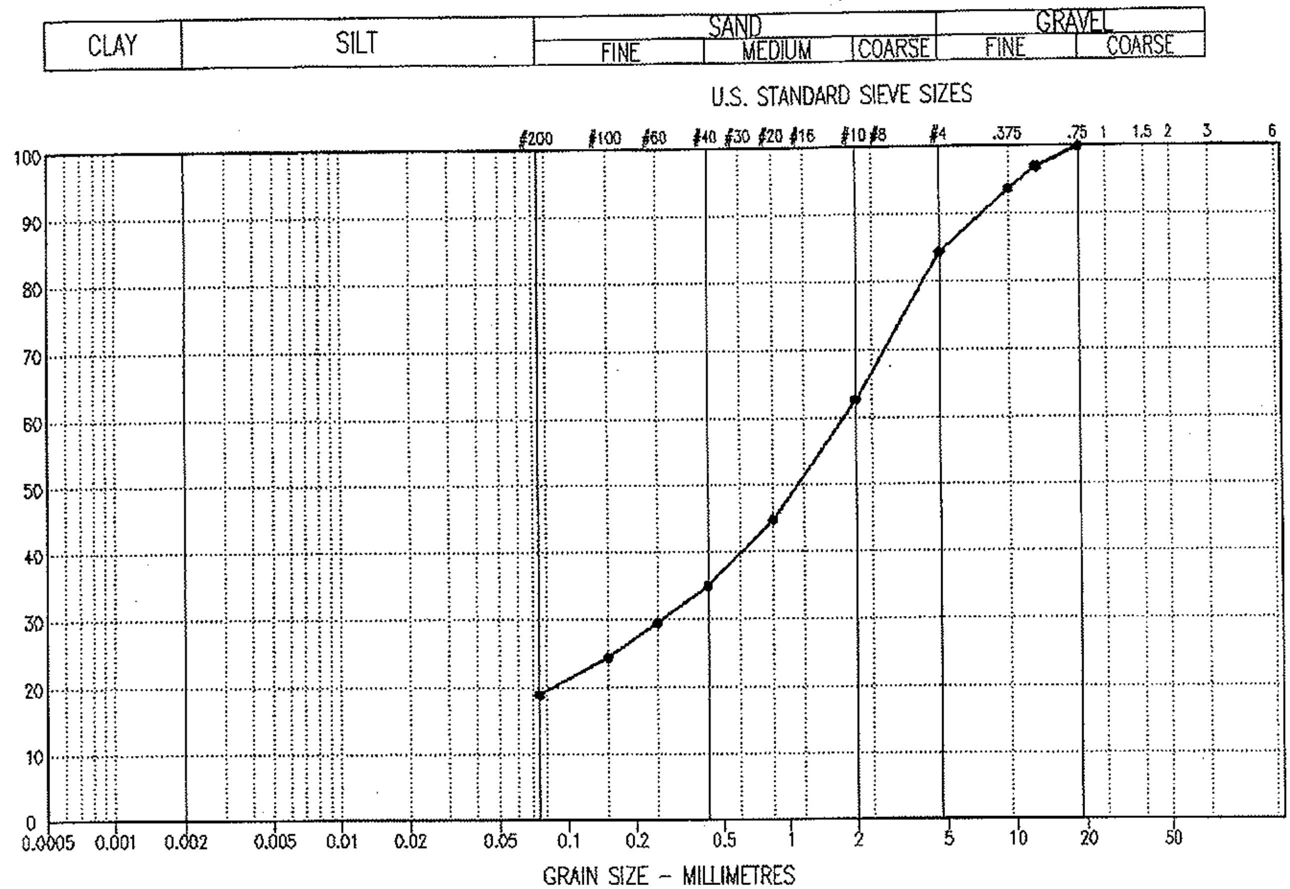

SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●——●	1200173-109	0.50 - 0.70	--- 19 ---		65	16	-	-	

Project: 0201-1200173 Date Tested: 05/11/02 BY: JP

Tested in accordance with ASTM D422 unless otherwise noted.