Construction Report
Cyprus Anvil Mining Corporation
1980 Raising
of the
Tailings Dam
Faro, Yukon Territory

Volume 1 of 3

Golder Associates
CONSULTING GEOTECHNICAL AND MINING ENGINEERS

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Volume 1 of 3

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Golder Associates
CONSULTING GEOTECHNICAL AND MINING ENGINEERS

July 17, 1981
File No.: 802-2024

Cyprus Anvil Mining Corporation
P.O. Box 1000
Faro, Yukon Territory

Attn: Mr. N.G. Cornish, P. Eng.
Manager of Environment Control

Dear Sir:

Re: 1980 Tailings Containment Raising

We are pleased to provide this letter together with each of four (4) copies of Volumes 1, 2 and 3 of our report and related drawings concerning the captioned earthworks contract.

Our report contains a copy of the tender documents, the contract drawings, "As-Built" sections, and results of the piezometric observations of performance of the different sections used for this project.

Golder Associates is indeed grateful to Cyprus Anvil for the support provided during our supervision of the construction project, and concerning maintenance of a good relationship with the contractor.

Yours very truly,
GOLDER ASSOCIATES

H. G. Gilchrist, P. Eng.

PROFESSIONAL ENGINEER
H.G. GILCHRIST
YUKON TERRITORIES

HGG/kk
Encl.

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(Bound into Volumes 1, 2 and 3)

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INTRODUCTION

Due to the ongoing demand for tailings containment capacity at the Cyprus Anvil Mine, which is located near Faro in the Yukon Territory as shown in Figure 1, the existing dam was raised during the months of June, July and August, 1980. Golder Associates prepared the tender documents, assisted Cyprus Anvil in tendering the work and evaluating the bids and then made recommendations concerning award of the work. The Tenderer's Information package contained herein as Appendix I was provided with the Tender Documents package and drawings presented in Appendix II.

Cyprus Anvil Mining Corporation retained the services of Golder Associates to provide contract management and quality control engineering for the work done by the General Enterprises, the successful tenderer for the work. Golder Associates had previously designed and supervised construction of earlier lifts, and had undertaken the initial design and construction supervision of the first phase of the containment.

This report provides a brief summary and description of the work and on-site engineering services provided. Volume 2 contains Appendix 4 which presents the "As-Built" cross sections of the dam as measured during and after construction. Discussion is also provided concerning installation of piezometers pertaining to section and foundation performance monitoring.

Included at the end of the text of this report as Table 1 is a final payment statement as determined by the Engineer's on-site representative during and after construction.

LAYOUT

The preconstruction and post construction surveys were made by Underhill Engineering of Whitehorse. Because the survey could not be initiated until the site was free of snow, and because a survey was not available which described the existing dam and surrounding topography, all of the

layout for the work was finalized on-site. Using surveyed baselines, preliminary offsets were determined for the new centerline. After trial layouts were done in the field and appropriate adjustments made, a final centerline location was chosen with respect to the surveyed baseline and information was provided to the Contractor for his construction staking. These offsets are supplied in tabular format on Table 2 at the end of this report. The baseline survey detail is presented in Figure 2.

Significant changes made to the tender drawings as a consequence of incorporating the preconstruction survey information were:

- the shortening of both the east and west dam
- the location of a roadway "raising" from east of the east dam mine road junction to the dam north of the C.I.L. explosives plant
- the realignment of the east dam on the mine road west of the East Dam - mine road junction.

The dam lengths were reduced because the preconstruction survey showed that design elevations at the abutments would be achieved before the anticipated chainages were reached.

The mine roadway "raising" was required to overcome an approximate 7 foot difference in elevation between the existing road and the proposed top elevation of the dam at the location of the intersection.

The initial design of the dam for the section along the existing mine road was to place it north of the road. However, the local topography was suggestive of the presence of ice-rich permafrost over part of the design area and this was confirmed later while preparing the outer edge of foundation area for the revised location. The revised location shifted the dam centerline toward the tailings deposit and a front-end loader was used to test the foundation adequacy of the tailings pond area inward from the mine road. The indications were that adequate dam and road support could

be provided by locating the raised dam along the existing mine road centerline and allowing the upstream toe of the embankment to encroach on the tailings deposit. The adequacy of the tailing pond material was confirmed by the passage of approximately 4,000 scraper loads of tailings sand over it with little or no damage to the temporary haul road surface.

MATERIAL

The embankment raising utilized tailings, terrace source sand and gravel alluvium, and filter and drainage zone materials in a zoned section configuration of varying design depending on location, height, and foundation conditions. The tender documents detail the section usage and indicate the relationship between the existing section centreline and the anticipated 1980 construction centreline.

The principal borrow areas used for material supply are outlined on the drawings contained in Appendix II. The terrace area containing Borrow Area A west of the dam proved easily accessible and adequate for supply of the non-tailings material of general gravel classification. In contrast Borrow Area B which was situated east of the dam did not yield the expected borrow quantity because of excessive boulder content and associated excvation problems. As a result, most of the gravel used in the dam raising was obtained from the Borrow Area A in spite of the longer haul.

Screening for the drainage zone (Class III) material was done in Borrow Area B. Because of the variety in the pitrun gradation, including a significant amount of over and undersize, a large volume of screen feed was needed to provide the quantity of specified drainage zone material required. The result was a delay in the start of construction for the highest part of the west dam due to inadequate supply of this drainage zone material.

Tailings sand was obtained from several accessible cone deposits in both the original pond and the lower pond areas and, apparantly due to

mineralogy and degree of oxidation, the sand unit weights varied substantially across each of the borrow areas used. Most of the sand placed was obtained from Borrow Area D. Only a limited amount was available from the east part of Borrow Area C and very little was used from this supply. It was not easily obtained and testing indicated a comparatively low unit weight and a comparatively low compacted density. The Contractor was very cooperative when asked by the on-site Engineer to avoid this less desirable source unless other supplies were exhausted. A large volume of tailing sand was obtained from an area located west of Borrow Area D. These areas are indicated on the drawing of Appendix II.

Table 3 contains results obtained from a preconstruction program of tailings sand sampling and testing concerning measured moisture content, Standard Proctor maximum dry density, and optimum water content. These results indicate that an upward moisture correction of at least 2 percent was required for test results provided by the Troxler nuclear densometer. Also indicated was a much higher than practical optimum moisture content for the compaction required to obtain the specified 100 percent of Standard Proctor maximum dry density. Although an optimum moisture content of between 9 and 12 percent was indicated, a moisture content of over 8 percent in the material on the grade usually resulted in soft wet sand which could not be properly worked by the compaction equipment. In fact, a field moisture content of approximately 5 percent was generally most satisfactory, and, as a result of the testing it was decided that an in situ dry density of 160 lb/cu.ft. or greater would be acceptable for dam construction.

EQUIPMENT

Although a larger than tendered number of machines were on-site for most of the time dam construction was in progress, the average of equipment actually working was approximately that stated in the Tender Document equipment forecast by the Contractor. An equipment availability analysis for the month of July indicated an average of 5.14 scrapers

working per shift from a total of 8 Cat model 631 C's and D's on-site. Of the 3 compactors on-site, usually at least 2 were operating.

The machine operators were generally of limited experience but good super vision was available and satisfactory workmanship was achieved.

INSPECTION AND TESTING

Because of the large volumes of various materials being placed and the types of materials used, most of the work was evaluated on the basis of visual and "reaction test" inspection that was guided during initial construction stages by the results of the nuclear densometer testing.

Use of standard Proctor parameters and a nuclear densometer for the control and testing of the Class I and Class III Material, was concluded to be inappropriate because

(a) A huge "rock correction" would have been required, making any test results highly suspect.

(b) Driving a nuclear densometer testing pin into these compacted granular materials greatly disturbs the soil and tends to negate the test result.

Therefore, utilizing past experience, the soil compaction for Class I and Class III materials was evaluated on the basis of reaction to loading by hauling and compacting equipment.

Class II Material was easily placed and compacted because of the good gradation and quality. Visual observation easily provided good quality control and therefore only limited testing was necessary; typical test results are presented on Table 4.

Class IV Material (mine road surfacing) conisted of a mixture of Class I sand and gravel and clayey glacial till. As the mix proportions were the product of the placing and grading procedures, it was not practical to determine a representative standard Proctor maximum dry density and a corresponding optimum moisture content for each test location. Therefore, visual inspection was also used for this material placement. Further work and compaction for the Class IV Material placed on the new mine road surface from station 4+00S to 59+65E was included as one of the requirements for the confirmation of an Acceptance Certificate covering the completed work.

Class V material was easily placed and the compaction quality was generally obvious. Table 5 presents results of Nuclear Densometer testing on the Class V tailings sand fill. Although more than 130 tests were made, most of the evaluation was done visually and/or with the use of a probe rod. Moisture content was critical for efficient compaction of this material and soil reaction readily indicated deviation from best content. The test results tend to show a consistency of dry density over a day which normally reflected use of the same source area. Variation between days was consistent with the preconstruction experimental test results.

MEASUREMENT

All of Golder Associates' on-site staff had survey experience and were able to make the necessary interim measurements necessary for construction control and measurement of pay quantities where contact faces would be covered by subsequent placement during construction. The measurements made were used to provide the internal material boundary lines as shown on the "As-Built" sections. Quantity summaries are provided on Table 1. Sufficient measurements were taken to adequately determine the location and quantity of Class II and III Material and to locate the Class I to Class IV and Class V Material interfaces throughout the work. Final sections were obtained by Underhill Engineering using the horizontal control system which was established when the preconstruction survey was made.

Monitoring of the standpipes located on the east dam prior to construction, indicated a lower than adjacent pond surface level for the local groundwater elevations consistent with the previous foundations and adjacent channel water level elevation. Although monitoring of the pneumatic piezometers previously installed on and near the west dam suggested a marked increase in peizometric pressures elevation during the period of construction, the reaction was not typical of the materials being loaded and, because the leads were suspect, the readings were not seriously regarded.

Recorded observations of the pond surface water level near station 23+00W indicated an average elevation of 3571.61 from August 17 to August 30th inclusive. This average includes a maximum of 3571.67 and a minimum of 3571.58.

EXTRA WORK

Four projects were included as "Extra Work" within the terms of the Contract. Only part of one, Construction of Decant Facilities, was introduced in the Contract Documents.

Project One was the raising of the Seepage Pond No.7 containment dyke situated just west of the high portion of the West Dam. This work was done on instructions from the Owner's on-site representative to improve tailings decant water management capability. Prior to the start of this work, Golder Associates recommended that substantial work be undertaken to prepare the base area for acceptance of the toe area fill. This work consisted of reinforcing the downstream toe area and downstream slope with gravel and the placement was not included in the accounting for Project One as it was done by another Contractor.

Project Two was the construction of a soil pad suitable for locating an Exploration Department drill rig. This work was done at the request of a Geologist from the Cyprus Anvil Mine Exploration Department.

Project Three involved construction of a new decant channel. It also included:

- construction of a soil pad for chemical storage and dispensing at the end of the new decant channel;
- construction of a short berm into the tailings pond near Station 20+00 of the West Dam
- clearing and grading right-of-way along the north side of the tailings pond for a tailings discharge pipe line;
- removal of organic material and gravel fill from across the west end of the base area for the new construction.
- construction of 58 feet of embankment section using clayey silt till for a north end abutment for the raised embankment;
- construction of a breakwater in front of the syphon pipe at the West Dam abutment;
- construction of a bridge across the new decant channel;
- construction of a roadway from the Pond No. 7 dam to the old roadway at the west end of Borrow Area A.

The extra work in Project Three was concluded with placement of the decant channel gravel filter pad preparatory to placement of riprap. Riprapping was to be done later by the Owner's forces using selected mine waste rock.

Project Four was the construction of a causeway northward from Station 14+00E across the lower tailings pond area as instructed by Cyprus Anvil. Installation of the required culvert system was not included in the work undertaken by the Contractor.

GENERAL

Prior to leaving the site, Golder Associates documented deficiencies requiring attention prior to issuance of the "Acceptance Certificate" for the work. This information was presented in Memorandum No. 25 dated

August 30, 1980, which was delivered to both the Owner and Contractor. A copy of this memorandum precedes Table 1 following the text of this report.

The surveyed cross-sections of the dam show a top elevation deficiency at most stations of up to one foot. These elevations were not checked by the Engineer's representative prior to leaving the site under instructions from the Owner. The final quantity survey sections also show a general dam over-width on the cross-sections. The general alignment of the top is as required by the provided baseline offsets. The extra width at Stations 37+00E and 38+00E was due to a mislocated toe stake. The workmanship, except for the minor discrepancies included in Memorandum No. 25, was very good. Surveyed sections indicate that, in most places, the section limits were closely satisfied. Although the pleasing appearance of the outward face of the dam along the east, south and west sides attests to the workmanship of the Contractor, the Contractor did not complete the work by August 15, 1980, as required by Item 5.3 of the General Clauses in the Contract Documents. The delay was related to waiting for Class III Material and because of the requirement to undertake the "Extra Work" items previously described.

INSTRUMENTATION

Performance evaluation of the tailings containment dykes previously raised by work similar to that described in the preceeding sections of this report traditionally has been accompanied by ongoing piezometric observations at selected sections. Repeated construction activities have destroyed the original instrumentation, and some subsequent installations. Therefore, and in view of the anticipation that the completed work represents the final phase of dyke raising, some carefully installed piezometers were put in place in late April, 1980 when drill mobilization

cost savings were possible because of the drilling contractor's involvement with a Cyprus Anvil exploration program.

The purpose of the piezometers installed at locations as tabulated in Table 6, is to provide information on dam section and foundation piezometric levels and pressures, and thereby to ascertain whether or not the constructed section is performing within design expectations.

Procedure

The piezometers were installed at locations selected according to design arguments previously provided to Cyprus Anvil and presented herein as a preamble to Appendix III which contains the Record of Borehole sheets describing the installations. Locations with reference to the horizonral control are given on Figure 3-1 of Appendix III. The installations were made during the period April 24 to April 26, 1981 using an air flush Schram rotory drill owned and operated by Midnight Sun Drilling of Whitehorse, Yukon Territory. The work was supervised full time by a Golder Associates' technician who also prepared a record of the installations. The piezometer materials were supplied through the drilling contractor and Cyprus Anvil.

Results and Conclusions

The water level readings that have been obtained since the installations were made are given in Table 7.

The general conclusion that can be made with reference to the piezometric levels tabulated in Figure 6 is that the embankment sections are performing very well. Indeed, the piezometric levels are somewhat lower than expected and therefore the piezometric levels give no cause for concern about overall stability. There appears to be no flow over the top of the glacial till core placed in the West Dam as an element of initial construction, and there appears to be no higher level seepage either. As

expected, there is slight artesian flow from the area immediately downstream of the high section of the West Dam as evidenced by piezometer installation P81-03, but it is not of concern when the tip installed at about core base elevation from the crest of the dam shows only about 15 ft. of hydrostatic head above the natural valley bottom at that location. It is concluded therefore that the tailings sand deposit has been effective in maintaining a low phreatic surface within the embankment section.

The piezometers which have been installed in the East Dam show similarly low piezometric levels with reference to the height of section in spite of the fact of no low permeability core section being included in the construction. The low levels are considered due to the decrease in permeability that results from compacting the tailings sand utilized for construction, the fact of general underdrainage by the alluvial terrace materials with a drainage level not higher than the adjacent Rose Creek Diversion channel, the influence of the beach in keeping free water away from the face of the embankment, and the low permeability of the consolidated slimes skin that is believed present on the face of the embankment where the beach is absent along portions of the East Dam.

In spite of the observed piezometric levels in the tailings containment embankment, Cyprus Anvil is cautioned against desregarding the importance of maintaining proper freeboard, and of not maintaining the beach as an element of the dyke section. The results indicate that there is no immediate need to place downstream face filter protection over any of the toe sections of the tailings containment embankment.

It is considered necessary to continue to read the piezometers, and to undertake some planning related to commissioning of the Down Valley Tailings scheme in respect of planning to buttress the downstream face of the high section of the West Dam with spigotted tailings of historical gradation. Placement technique will have to be carefully developed to prevent undercutting of the backslope of the dam which could lead to sloughing, and potential for crest damage.

MEMORANDUM No. 25

TO: General Enterprises
(Copy to Cyprus Anvil)

DATE: August 20, 1980

FROM: John Vieaux

JOB NO.: 802-2024

Re: 1980 Embankment Dam Raising
Acceptance Certificate

The following is resultant from a site examination made on August 30, 1980:

- The area at and near where the Golder Associates office trailer was parked should be cleaned up and all debris removed.

- A grader should be used to improve and level the dam surface after the survey work now in progress is completed.

- The trench areas along the south side of the dam and east of 0+00 should be filled with gravel.

- The outside and top dam surface at the ramp located between 23+00E and 24+00E should be repaired.

- A ramp from the new mine road surface at 59+00E to the old water line road should be constructed.

- The roadway which runs along the dam from 20+00W to 45+00E should be cleaned of surface debris and regraded where a poor surface exists.

- The haul road over the old creek bed which extends from near the dam to meet the pumphouse at approximately 37+00E should be removed. Leave the stream in the course it is now running and Cyprus Anvil Mine will arrange to return it to the other bed as is required.

- The access roads to the pumphouse should be cleaned of surface debris and regraded where a poor surface exists.

- Existing ramps to the dam should not be removed as these provide additional reinforcement and strength.

- The service area on the west side of the dam near station 22+00W should be cleaned up and all equipment and debris removed.

.....2

- The new mine road surface from 4+00S to 59+65E should be repaired. The surface mixture of gravel and glacial till containing fine grained soil has not been properly mixed and recompacted. The top six inches should be graded outward from the road centerline and the resultant furrows worked across the road using a grader. The regraded surface should then be well compacted using the padfoot compactor and sufficient included soil moisture to achieve good soil density. The surface should then be regraded for levelling and recompacted with the drum roller. It may be necessary to add some till to achieve an adequate soil binder for the gravel patches.

Satisfactory completion of the work required for the above listed should be the final requirement for this memo to be considered as an Acceptance Certificate as detailed in Article 26 on Page E-15 of the General Conditions included in the Contract documents.

If so requested by the Owner, the Engineer will arrange an inspection, after advice is received from the Contractor that the above listed work has been completed, to insure the work has been done in a satisfactory manner.

TABLE 1
CONSTRUCTION QUANTITY AND COST SUMMARY
1980 EMBANKMENT DAM RAISING

Final Payment

Part I - Itemized Account

Item	Description	Unit	Contract Estimate	Completed Quantity	Unit Price	Amount
1(a)	Clear & Grub	Area	1.5	0.2	$2,400.00	$ 480.00
1(b)	Stripping	Cu.Yd.	3,000	3,375	1.80	6,075.00
2(a)	Decant Channel - See Extra Work Project Three & Bridge Material Cost					
	Class I	Cu. Yd.	200,000	174,989	2.15	376,226.35
2(c)	Class II	Cu. Yd.	21,800	25,190	2.53	63,730.70
2(d)	Class III	Cu. Yd.	7,120	5,323	2.38	12,668.74
2(e)	Class IV	Cu. Yd.	2,100	2,117	2.38	5,038.46
2(f)	Class V	Cu. Yd.	278,000	237,568	2.15	510,771.20
	Bond	L.S.	4,500.00			4,500.00
1(A)	Mobilization	L.S.	26,000			26,000.00
Extra Work Project One (Pond No. 7 dyke raising)						20,533.24
Extra Work Project Two (Exploration drill rig pad)						1,465.88
Extra Work Project Three (Decant channel construction)						47,378.18
Extra Work Project Four (Causeway Construction, 14+00E)						14,515.40
Bridge Material Cost (See Details Below)						4,747.21
					TOTAL	$1,094,130.36

Note: Particulars for Extra Work Projects One to Four inclusive were provided to Cyprus Anvil in support of Progress Claims #2 and #3.

Bridge Material (As Built)

9 - 2 x 12 x 20' @ $25.84 each = 9 x $25.84	=	$ 232.56
2 - 8 x 8 x 20' @ $81.60 each = 2 x $81.60	=	$ 163.20
8 - 6 x 6 x 20' @ $38.38 each = 8 x $38.38	=	$ 307.04
29 - 4 x 10 x 16' @ $20.80 each = 29 x $20.80	=	$ 603.20
67 - 8 x 8 x 16' @ $31.57 each = 67 x $31.57	=	$2,115.19
1 Box 12" spikes @ $36.00	=	$ 36.00
1 Box 6" nails @ $31.50	=	$ 31.50
1 Box 5" nails @ $31.50	=	$ 31.50
Material Total		$3,520.19
Plus 10% Handling		$ 352.02
Plus 250 miles cartage @ $3.50/mile	=	$ 875.00
TOTAL COST		$4,747.21

(Cont'd)

TABLE 1 (Cont'd)

Part II - Progress Payments

Progress Estimate	For	Total Claimed (100%)	Progress Payment (85%)	Hold Back (15%)
No. 1	June, 1980	$152,098.00	$129,283.30	$22,814.70
	Bond	$ 4,500.00	$ 3,825.00	$ 675.00
No. 2	July, 1980	$569,909.06	$484,422.70	$85,486.36
No. 3	August, 1980	$388,150.46	$329,927.89	$58,222.57
	TOTALS	$1,114,657.52	$947,458.89	$167,198.63

Part III - Summary

Account Total - Part I	$1,094,130.36
Specified Payment - Part II	$ 947,458.89
Hold Back Due Contractor - Part II	$ 146,671.47
15% Hold Back - Part II	$ 167,198.63
Balance Hold Back - Credit to Owner	$ 20,527.16 (See Note 1 below)

Part IV - Comparative Analysis

Tendered Contract Price		$1,145,157.60
Extra Work Project One		$ 20,533.24
Extra Work Project Two		$ 1,465.88
Extra Work Project Three		$ 47,378.18
Extra Work Project Four		$ 14,515.40
Bridge Material Cost		$ 4,747.21
	TOTAL	$1,233,797.51
Account Total - Part I		$1,094,130.36
	Difference	$ 139,667.15 (See Note 2 below)

Note 1: A balance become due to the Owner because the required field surveys necessary to accurately compute progress payment No. 3 were not authorized.

Note 2: The cost of the originally contracted work was #1, 145, 157.60 whereas the value of contracted items was $1,005,490.45; a reduction of $139,667.15 due to reduced material quantities related to inward relocation of the design centreline subsequent to analysis of preconstruction survey information.

TABLE 2

1980 EMBANKMENT DAM RAISING

Design Centreline and Top Width - 1980 Embankment Dam Raising

Station	Top Elevation	Baseline Direction Station From & To	Top Width	Offset (Ft)
27+28W	(3586.0)	10° 20' 10" 19+39.9W to 28+87.6W	(top 20' wide)	25.1 inward
27+00W	"	"	"	22.0 inward
26+00W	"	"	"	13.2 inward
25+00W	"	"	"	6.6 inward
24+00W	"	"	"	2.2 inward
23+00W	"	"	"	zero
22+00W	"	"	"	zero
21+00W	"	"	"	zero
20+00W	"	"	"	6.1 inward
19+00W	(3586.0)	356° 36' 35" 16+26.3W to 19+38.9W	(top 20' wide)	8.8 inward
18+00W	"	"	"	3.1 inward
17+00W	"	"	"	3.6 inward
16+00W	"	164° 55' 0" 16+26.3W to 13+46.2W	"	6.3 inward
15+00W	"	"	"	1.8 inward
14+00W	"	"	"	5.0 inward
13+00W	"	150° 32' 50" 13+46.2W to 8+93.3W	"	4.2 inward
12+00W	"	"	"	4.4 outward
11+00W	"	"	"	6.3 outward
10+00W	"	"	"	2.2 outward
9+00W	(3586.0)	150° 32' 50" 13+46.2W to 8+93.3W	(top 20' wide)	5.5 inward
8+00W	(3586.0)	135° 11' 15" 8+93.3W to 1+54.8W	(top 20' wide)	0.6 outward
7+00W	"	"	"	1.3 outward
6+00W	"	"	"	2.1 outward
5+00W	"	"	"	2.8 outward
4+00W	"	"	"	3.6 outward
3+00W	"	"	"	4.3 outward
2+00W	"	"	"	3.5 inward
1+00W	"	110° 17' 25" 1+54.8W to 7+28.4E	"	2.1 outward
0+00	"	"	"	20.0 outward
1+00E	"	"	"	20.0 outward
2+00E	"	"	"	20.0 outward
3+00E	"	"	"	20.0 outward
4+00E	"	"	"	20.0 outward
5+00E	"	"	"	20.0 outward
6+00E	"	"	"	26.1 outward
7+00E	"	"	"	32.2 outward
8+00E	"	121° 45' 25" 7+28.4E to 34+48.6E	"	30.0 outward
To & Including		"	"	"

(Cont'd)

TABLE 2 (Cont'd)

Station	Top Elevation	Baseline Direction Station From & To	Top Width	Offset (Ft)
20+00E	"	121° 45' 25" 7+28.4E to 34+48.6E	"	30.0 outward
21+00E	(3586.4)	"	"	30.0 outward
22+00E	(3586.8)	"	"	30.0 outward
23+00E	(3587.2)	"	"	30.0 outward
24+00E	(3587.6)	"	"	30.0 outward
25+00E	(3588.0)	121° 45' 25" 7+28.4E to 34+48.6E	(top 20' wide)	30.0 outward
26+00E	(3588.4)	"	"	30.0 outward
27+00E	(3588.8)	"	"	30.0 outward
28+00E	(3589.2)	"	"	30.0 outward
29+00E	(3589.6)	"	"	30.0 outward
30+00E	(3590.0)	"	"	30.0 outward
31+00E	(3590.7)	"	"	30.0 outward
32+00E	(3591.3)	"	"	30.0 outward
33+00E	(3592.0)	"	"	30.0 outward
34+00E	(3592.7)	"	"	30.0 outward
35+00E	(3593.4)	Curve R = 261.63 34+48.6E to 38+59.6E	(top 20' wide)	35 outward on radial. 30.0 outward off extension of base line 8+00E to 34+00E (121° 45' 25"to 7+28.4E to 34+48.6E)
36+00E	(3594.0)	"	"	37.0 outward
37+00E	(3594.7)	"	(top width 37')	46.5 outward
38+00E	(3595.4)	"	(top width 23')	41.5 outward
39+00E	(3596.0)	31° 45' 25" 38+59.6E to 42+20.4E	(top 20' wide)	35.0 outward
40+00E	(3596.7)	"	"	30.0 outward
41+00E	(3597.4)	"	"	25.0 outward
42+00E	(3598.0)	"	"	45.0 outward
43+00E	(3598.7)	51° 3' 55" 42+20.4E to 46+50.0E	"	55.0 outward
44+00E	(3599.4)	"	"	55.0 outward
45+00E	(3600.0)	"	"	35.0 outward
46+00E	(3601.3)	"	"	6.0 outward
47+00E	(3602.7)	5° 28' 10" 46+50.0E to 51+4.2E	"	10.0 outward
48+00E	(3604.0)	"	"	52.0 outward
49+00E	(3605.3)	"	"	68.0 outward
49+60E CL East Dam Joins With Existing Mine Road CL				
50+00E	(3606.6)	5° 28' 10" 46+50.0E to 51+4.2E	(road 50' wide)	37.0 outward

(Cont'd)

TABLE 2 (Cont'd)

Station	Top Elevation	Baseline Direction Station From & To	Top Width	Offset (Ft)
51+00E	(3608.0)	"	(road 49' wide)	18.0 inward
52+00E	(3609.3)	152° 6' 45" 63+29.8E to 51+4.2E	(road 48' wide)	15.8 inward
53+00E	(3610.6)	152° 6' 45" 51+4.2E to 63+29.8E	(road 47' wide)	13.6 inward

Centreline new New Decant Channel - As Built

Station	Recommended 13' Wide. Finished Base Elevation	Baseline Direction Station From & To	Line (Dam)	Offset (Ft)
0+00	(3581.0)	10° 20' 10" 19+38.9W to 28+87.6 W	26+83.0	166 inward
0+25	"	"	26+97.5	150 inward
0+50	"	"	27+13.5	131 inward
0+75	"	"	27+29.0	112 inward
0+90	Center of Bridge			
1+00	(3581.0)	10° 20' 10" 19+38.9W to 28+87.6W	27+43.5	91 inward
1+25	(3580.7)	"	27+55.0	69 inward
1+50	(3580.5)	"	27+66.0	46 inward
1+75	(3580.2)	"	27+69.5	22 inward
2+00	(3577.3)	"	27+67.5	3 outward
2+25	(3574.4)	"	27+55.0	25 outward
2+50	(3571.5)	"	27+37.5	43 outward
2+75	(3568.6)	"	27+19.5	59 outward
3+00	(3565.6)	"	27+2.0	73 outward
3+25	(3562.7)	"	26+81.0	90 outward
3+50	(3559.8)	"	26+64.0	102 outward
3+75	(3556.9)	"	26+43.5	116 outward
4+00	(3553.9)	"	26+23.0	129 outward
4+25	(3551.0)	"	26+2.5	143 outward
4+50	(3548.1)	"	25+84.0	160 outward

TABLE 3

1980 EMBANKMENT DAM RAISING

Preconstruction Experimental Test Results

Sample No.	Standard Oven Dried Moisture Content (%)	Quick Oven Dried Moisture Content (%)	In Situ Densometer Indicated Moisture Content (%)	In Situ Densometer Indicated Dry Density (pcf)	Standard Proctor Maximum Dry Density (pcf)	Standard Proctor Optinum Moisture Content (%)
D1	4.3	4.1	1.1	158.2	159.3	12.5
D2	4.3	3.8	1.7	159.8	162.6	12.2
D3	2.9	2.5	1.3	167.5	159.8(8pt)	9.7
D4	4.0	3.7	1.0	153.3	154.3	12.6
D5	3.0	3.7	1.9	172.9	168.3	10.5
D6					168.7	9.2
D7					161.0	9.0

TABLE 4

1980 EMBANKMENT DAM RAISING

Summary - Compaction Test Results
Class II Material - Select Filter

Date	Test Location on Centreline	Dry Density (pcf)	Moisture Content (%)	Remarks
7/16/80	Stn 31+00E	116.6	9.1	
7/16/80	Stn 38+00E	129.5	8.2	
7/16/80	Stn 41+00E	125.2	9.4	
8/02/80	Stn 25+00W	126.3	8.4	
8/02/80	Stn 8+00W	123.5	7.8	

TABLE 5

1980 EMBANKMENT DAM RAISING

Summary - Compaction Test Results
Class V Material - Tailings Sand

Date	Test Location	Dry Density (pcf)	Moisture Content (%)	Remarks
6/22/80	CL Stn 42+00E	176.6	8.7	proof rolled
6/22/80	CL Stn 39+00E	173.9	9.0	proof rolled
6/22/80	Toe Stn 42+00E	165.0	6.6	first lift
6/23/80	Toe Stn 38+00E	168.0	13.1	second lift
6/23/80	CL Stn 37+00E	175.4	4.4	first lift
6/23/80	CL Stn 27+00E	173.5	5.5	first lift
6/23/80	10' inside toe Stn 36+00E	158.3	8.5	second lift scraper packed
6/23/80	Stn 12+00E	155.4	4.6	first lift
6/23/80	Stn 40+00E	169.1	13.0	scraper packed
6/23/80	Stn 10+00E	170.1	6.3	
6/24/80	Toe Stn 4+00E	167.9	7.6	
6/24/80	CL Stn 10+00E	175.0	8.1	
6/24/80	Stn 37+00E	177.5	7.2	
6/25/80	Stn 32+00E	175.4	7.5	
6/25/80	Stn 9+50E	174.0	6.1	
6/25/80	Stn 37+00E	176.9	6.6	
6/25/80	Toe Stn 6+00E	173.3	5.7	
6/25/80	CL Stn 2+00E	179.5	6.4	
6/25/80	Toe Stn 37+00E	175.3	6.3	first lift
6/26/80	Stn 33+00E	168.7	5.2	
6/26/80	Stn 4+00E	171.5	6.1	
6/26/80	Toe Stn 37+00E	169.4	4.4	
6/26/80	CL Stn 38+00E	170.5	5.9	
6/26/80	Shoulder Stn 11+00E	172.6	8.5	
6/26/80	Shoulder Stn 31+00E	170.8	6.5	
6/27/80	Shoulder Stn 32+00E	169.8	8.7	
6/27/80	Shoulder Stn 38+00E	169.3	6.7	
6/27/80	Shoulder Stn 17+00E	173.1	6.1	
6/27/80	CL Stn 11+00E	173.1	6.6	
6/27/80	CL Stn 21+00E	171.2	7.1	
6/28/80	Stn 36+00E	164.2	7.3	
6/28/80	Stn 9+75E	168.8	9.4	
6/28/80	CL Stn 29+00E	170.1	7.2	
6/28/80	Shoulder Stn 36+00E	169.5	5.1	
6/28/80	CL Stn 8+00E	170.7	8.2	
6/28/80	Shoulder Stn 17+00E	168.0	5.2	
7/01/80	Stn 23+50E	170.3	7.5	
7/01/80	Stn 31+00E	171.6	5.7	
7/01/80	Stn 13+00E	169.0	7.3	
7/01/80	Stn 1+00E	159.5	6.3	appeared soft
7/01/80	Stn 10+00E	158.3	7.3	appeared soft

(Cont'd)

TABLE 5 (Cont'd)

Date	Test Location	Dry Density (pcf)	Moisture Content (%)	Remarks
7/03/80	Shoulder Stn 5+00E	150.3	4.3	
7/03/80	CL Stn 22+00E	169.0	5.8	
7/07/80	Not Specified	125.4	4.5	from West End borrow Area C
7/07/80	Not Specified	109.4	4.7	from West End borrow Area C
7/22/80	Stn 17+00E	174.7	5.8	
7/22/80	Stn 6+50E	146.1	10.1	very wet
7/29/80	CL Stn 27+00E	169.7	10.0	
7/29/80	CL Stn 10+00E	169.8	10.3	
7/29/80	CL Stn 37+00E	167.1	8.5	
7/30/80	CL Stn 42+00E	178.3	6.6	
7/30/80	CL Stn 29+00E	177.4	7.3	
7/30/80	CL Stn 16+00E	173.9	9.4	
7/30/80	CL Stn 5+00E	163.5	7.9	
8/01/80	Stn 3+00E	166.6	4.9	
8/01/80	CL Stn 16+00W	174.6	9.0	
8/01/80	Shoulder Stn 20+00W	163.9	7.0	
8/01/80	Shoulder Stn 6+00W	152.0	6.0	
8/01/80	CL Stn 12+00W	163.7	8.1	
8/01/80	CL Stn 12+00E	169.0	7.6	
8/01/80	Shoulder Stn 7+00E	164.0	8.4	
8/04/80	CL Stn 5+00E	180.9	5.2	
8/04/80	CL Stn 1+00W	176.0	6.4	
8/04/80	CL Stn 13+00W	175.4	5.4	
8/04/80	CL Stn 23+00W	176.5	6.3	
8/05/80	CL Stn 13+00E	181.2	4.9	
8/05/80	Shoulder Stn 7+00E	176.2	4.9	
8/05/80	CL Stn 0+00	176.8	4.2	
8/05/80	Shoulder Stn 5+00W	179.0	4.4	
8/05/80	CL Stn 12+00W	179.3	6.0	
8/05/80	Shoulder Stn 19+00W	177.0	4.5	
8/05/80	Shoulder Stn 24+00W	174.4	5.7	
8/06/80	Shoulder Stn 45+00E	177.4	4.4	
8/06/80	Shoulder Stn 38+00E	176.9	3.8	
8/06/80	CL Stn 35+00E	171.4	4.4	
8/06/80	Shoulder Stn 17+00E	170.8	4.2	
8/06/80	CL Stn 41+00E	177.9	4.1	
8/06/80	Shoulder Stn 43+00E	161.6	5.8	partially compacted
8/07/80	CL Stn 25+00W	180.8	5.3	
8/07/80	Shoulder Stn 3+00W	178.6	5.9	
8/07/80	Shoulder Stn 13+00W	180.6	5.4	
8/07/80	CL Stn 5+00E	178.7	4.9	
8/07/80	Shoulder Stn 17+00W	176.2	4.3	
8/08/80	CL Stn 20+00W	176.8	4.2	
8/08/80	Shoulder Stn 10+00W	180.5	4.8	
8/08/80	Shoulder Stn 4+00E	174.7	4.6	
8/08/80	CL Stn 41+00E	174.4	4.3	
8/08/80	Shoulder Stn 33+00E	168.2	6.7	
8/08/80	CL Stn 1+00W	180.7	4.5	
8/08/80	Shoulder Stn 15+00W	179.1	4.2	

(Continued)

TABLE 5 (Cont'd)

Date	Test Location	Dry Density (pcf)	Moisture Content (%)	Remarks
8/08/80	CL Stn 6+00E	179.2	4.2	
8/08/80	Shoulder Stn 2+00W	180.7	4.3	
8/08/80	CL Stn 20+00W	170.7	4.5	
8/09/80	CL Stn 2+00W	179.7	4.6	
8/09/80	CL Stn 11+00W	179.1	4.5	
8/09/80	CL Stn 25+00W	181.9	4.4	
8/09/80	CL Stn 7+00E	178.5	4.0	
8/09/80	CL Stn 21+00W	175.7	6.7	
8/09/80	CL Stn 10+00E	179.2	3.6	
8/09/80	CL Stn 16+00W	178.5	4.8	
8/09/80	CL Stn 14+00E	185.7	7.5	
8/09/80	CL Stn 7+00W	177.9	4.6	
8/09/80	CL Stn 1+00E	179.2	5.2	
8/11/80	CL Stn 24+00W	181.6	4.1	
8/11/80	CL Stn 17+00W	181.2	5.0	
8/11/80	CL Stn 2+00W	180.4	4.8	
8/11/80	CL Stn 7+00E	172.3	7.0	
8/11/80	CL Stn 0+00	172.9	6.8	
8/11/80	CL Stn 8+00W	177.1	4.4	
8/11/80	CL Stn 30+00E	165.0	6.2	
8/12/80	CL Stn 24+00W	178.9	4.7	
8/12/80	CL Stn 6+00W	171.4	5.6	
8/12/80	CL Stn 16+00W	176.3	5.5	
8/12/80	CL Stn 8+00E	171.9	4.5	
8/12/80	CL Stn 35+00E	163.2	10.4	
8/12/80	CL Stn 24+00E	151.0	5.8	new lift
8/13/80	CL Stn 42+00E	162.3	5.9	
8/13/80	CL Stn 37+00E	162.2	5.4	
8/13/80	CL Stn 34+00E	168.6	5.8	
8/13/80	CL Stn 21+00E	160.5	7.2	
8/13/80	CL Stn 12+00E	175.3	5.8	
8/13/80	CL Stn 4+00W	175.8	5.1	
8/13/80	CL Stn 23+00W	175.7	5.2	
8/14/80	CL Stn 42+00E	162.4	8.3	
8/14/80	CL Stn 30+00E	164.7	7.8	
8/14/80	CL Stn 24+00E	169.3	6.3	
8/14/80	CL Stn 16+00E	169.6	5.2	
8/14/80	CL Stn 23+00W	189.2	5.2	
8/14/80	Shoulder Stn 6+00W	157.9	4.6	
8/14/80	CL Stn 18+00W	177.6	7.2	
8/15/80	CL Stn 42+00E	163.2	4.5	
8/15/80	CL Stn 36+00E	166.4	6.8	
8/15/80	CL Stn 30+00E	169.1	5.3	
8/15/80	CL Stn 24+00E	166.8	5.7	
8/15/80	CL Stn 13+00E	156.1	3.0	

TABLE 6

PIEZOMETER INSTALLATION DETAILS

Borehole Number	Control Chainage	Collar Location	Approximate Tip Depth(s)
P81-01	19+00 West	Outside edge of crest	20' & 35'
P81-02	15+00 West	Outside edge of crest	36' & 90'
P81-03	11+00 West	30' beyond toe	30'
P81-04	11+00 West	Outside edge of crest	36' & 90'
P81-05	5+00 West	Outside edge of crest	40'
P81-06	17+50 East	Outside edge of crest	20'
P81-07	34+00 East	Outside edge of crest	20'
P81-08	38+00 East	Outside edge of crest	24'

NOTE:

1. Depths are with reference to ground surface
2. Water level readings subsequent to installation are given in Table 7
3. Boring and installation details are given in the Record of Borehole Sheets, AppendixIII. Arguments related to piezometer installation details are provided as a preface to the Record of Borehole Sheets.

TABLE 7

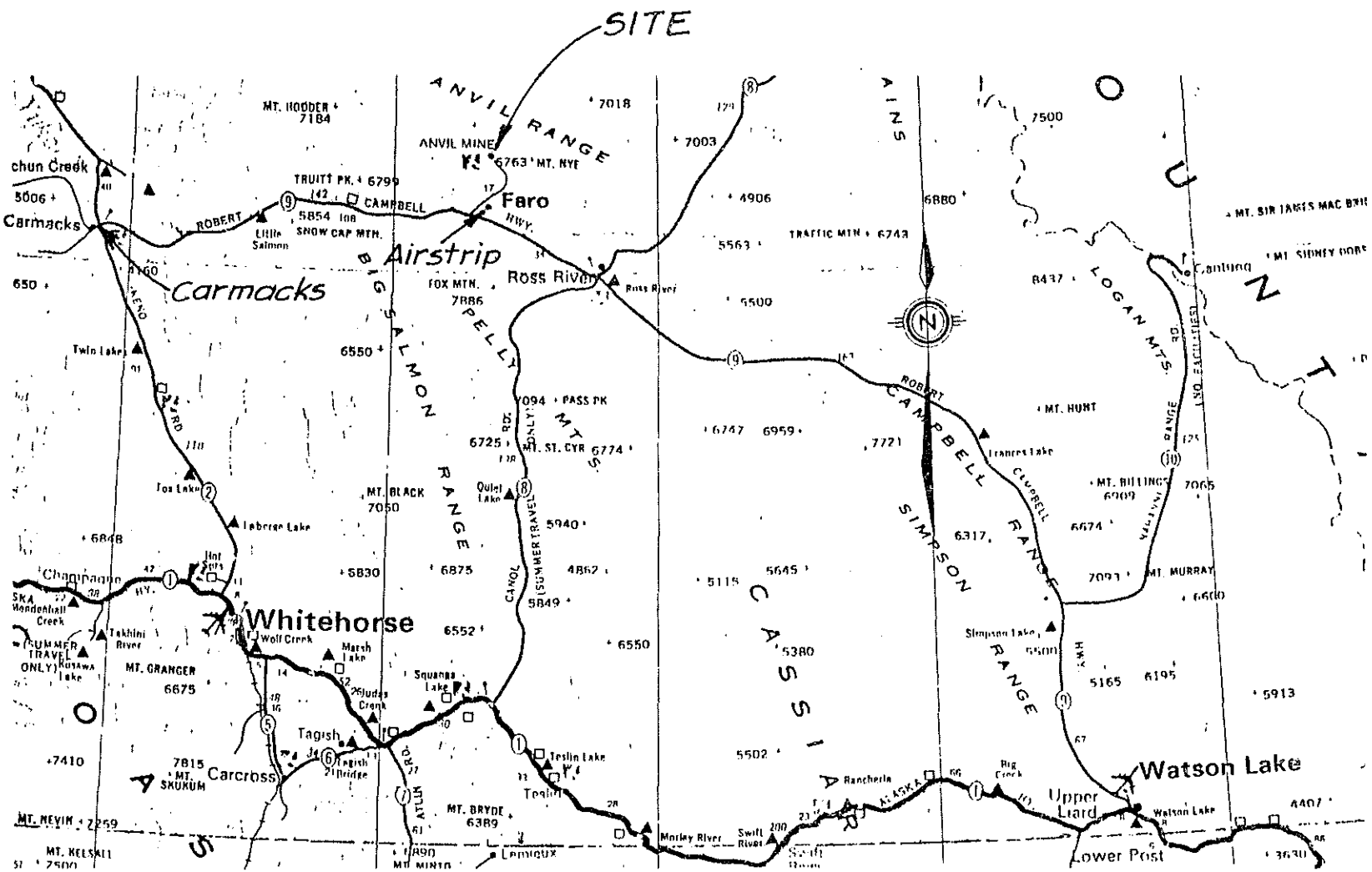
RESULTS OF PIEZOMETER READINGS

Piezometer	Location	Tip at	Depth To Water (ft)						
			April			May			June
			28	29	30	1	9	14	17
P81-01	19+00 West	20'	dry	dry	dry	dry	-	-	dry
	15+00 West	35'	dry	dry	dry	dry			27.3
P81-02	15+00 West	36'	both piezometers broken and plugged						
		90'	at 19 ft due to casing recovery problems						
P81-03	11+00 West	30'	Continuous artesian flow of less than 5 gal/hr.						
P81-04	11+00 West	36'	dry	dry	dry	dry	-	-	dry
		90'	76.0	76.6	77.7	76.5	75.1	-	74.9
P81-05	5+00 West	40'	dry	dry	dry	dry	-	-	dry
P81-06	17+50 East	20'	dry	dry	dry	dry	-	-	dry
P81-07	34+00 East	20'	17.0	17.3	17.3	17.2	16.8	16.7	19.7
P81-08	38+00 East	24'	20.3	20.3	20.1	19.9	19.7	19.6	22.3

NOTES:

1. All water levels are measured from ground surface
2. See Appendix III for installation details.

Project No. 792-2025 Drawn RK Reviewed [illegible] Date 18 Sep 79



SCALE: 1 in. to 40 mi.

LOCATION PLAN

Figure 1

Golder Associates

APPENDIX I

1980 Construction Photos
Followed By

Tenderer's Information Package
That Accompanied Tender Package
Presented in Appendix II

List of Photos

GENERAL ENTERPRISES CONSTRUCTION FLEET

Figure 1

Project No. 802-2024 Drawn G.P.B. Reviewed [illegible] Date Feb '82

EAST DAM DOWNSTREAM FROM CANAL INLET

Figure 2

Sand Dyke prior to commencement of dyke raising

Post construction view of gravel-topped dyke

Project No 802-2024 Drawn G.P.R. Reviewed JS Date Feb '82

EAST DAM - VICINITY OF STATION 35+00

Figure 3

Prior to Dyke Construction - note the tailings sand fill between the sand dyke and the diversion canal dyke

Construction complete - The sand dyke was constructed using the downstream design method and it was capped with gravel

Project No. 802.2029 Drawn G.L.B. Reviewed 4 Date Feb. 82

EAST DAM - FILTER ZONE DETAILS

Figure 4

Filter zone materials (class II)
(see appendix II Contract Drawings, sheet 5 of 5)

Zoning of the East Dam near the CIL buildings

Project No. 802-2024 Drawn G.P.S. Reviewed [illegible] Date Feb '82

EAST DAM - VICINITY OF STATION 43+00

Figure 5

Intermediate stage of construction

Construction complete and gravel capped

Project No. 802-2029 Drawn G.P.B. Reviewed [illegible] Date Feb '82

TAILINGS SAND BORROW AREAS

Figure 6

Borrow area "D" (see Contract Document Drawings, sheet 1 of 5)

Borrow area "D" access, looking northwest

Project No. 802-2024 Drawn G.P.B. Reviewed [illegible] Date Feb '82

WEST DAM - DRAINAGE ZONE DETAILS

Figure 7

Dumped drainage zone material, prior to spreading and compaction

View of drainage zone materials characteristics

Project No. 802.2024 Drawn G.P.S. Reviewed JS Date Feb '82

WEST DAM - GENERAL VIEWS

Figure 8

Condition prior to beginning of raising

Partially completed zone, viewed from downstream of the high section of the West Dam

Project No. 892-2029 Drawn G.P.G. Reviewed JS Date Feb '83

DECANT CONSTRUCTION - SITE ARRANGEMENT

Figure 9

View showing decant prior to start of 1980 construction
(West Dam in background)

Dyke construction complete - decant shaping is progressing

Project No. 802-2024 Drawn G.R.S. Reviewed S Date Feb 1/82

DECANT CONSTRUCTION - CHANNEL DETAILS

Figure 10

Lining of the decant channel with filter bedding for later riprap placement by Cyprus Anvil (looking upstream)

The completed bridge structure spanning the decant channel (looking downstream)

Project No. 802-2025 Drawn G.R.B. Reviewed [illegible] Date Feb '82

EXTRA WORK

Figure 11

Item 1 - Seepage Pond #7 - Dyke strengthening and raising

Item 4 - Causeway Construction
(Vicinity of station 15+00, East Dam)

Project No. 802-2229 Drawn G.P.R. Reviewed [illegible] Date Feb'92

Golder Associates
CONSULTING GEOTECHNICAL ENGINEERS

PRELIMINARY MATERIALS DATA PACKAGE
For
TENDERER'S INFORMATION
CYPRUS ANVIL MINING CORPORATION
1980 Embankment Dam Raising
Faro Yukon Territory

NOTE: The information provided herein is to assist the Tenderer in his assessment of field conditions and, while Golder Associates believes the information to be true and representative of conditions at the site, Golder Associates shall not be held liable for the interpretations placed upon or the uses made of the data and other information provided herein.

April, 1980

792-2041

TABLE OF CONTENTS

INTRODUCTION

Cyprus Anvil Mining Corporation is presently exploiting lead-zinc ore deposits located near Faro, Yukon Territory (see Figure 1). It is planned to expand their existing tailings containment facility capacity to provide additional storage for tailings disposal. The proposed construction (1980 Embankment Dam Raising) will raise the existing east and west embankment dams an additional 15 ft. Project scheduling for this construction proposes commencement on or before June 15, 1980 with a target completion date of August 15, 1980.

BACKGROUND

Recent construction at the site has included:

1. Stage 1 - The original construction of the East and West Embankment Dams was begun in 1974 and completed in 1975.
2. Stage 2 - The East and West Embankment Dams were raised about 15 ft. in 1978.
3. In 1978 there was a 5 ft. supplementary raising of both the East and West Embankment Dams.

Construction materials for these projects have included sand and gravel for shell material, filter and drainage zone materials, tailings sand, and glacial till core materials.

Present construction calls for the raising of the existing East and West Dams an additional 15 ft. Proposed construction materials will include:

1. Sands and gravels for embankment shell material (designated Class I material)
2. Filter zone material from selective borrowing (designed Class II material)
3. Drainage zone material provided by others through screening (designated Class III material)

4. Screening by-product material (designated Class IV material)

5. Tailings sand general fill material (designted Class V material)

It is anticipated that the four borrow areas designated 'A', 'B', 'C' and 'D', will provide the above classes of material in the quantities required. The limits of these borrow areas are shown on the Site Plan, Figure 2.

PURPOSE

The purpose of this preliminary information package is to provide the Tenderer with preliminary materials data related to the different classes of material used for the proposed construction, as well as information concerning the proposed borrow areas.

DISCUSSION

Borrow Area A -

The location of Borrow Area A as shown on Figure 2 down the Rose Creek Valley from the West Dam and adjacent to a previous borrow pit now used as water storage pond No. 5 that is to be drained by Cyprus Anvil Mining Corporation prior to development of Borrow Pit 'A'. The primary purpose of this borrow area is to obtain Class I sand and gravel shell material and Class II select filter zone material for embankment construction. Previous construction at the site has used the adjacent and other local borrow areas which are generally referred to as the airport borrow pits because of the pits' proximity to an abandoned airport runway. Materials data obtained for previous construction involving use of airport gravels is shown on Figure 3. In the upper portion of Figure 3 the typical gradation envelope for previous airport gravel borrow pits is shown. The material generally ranged from 6 in. size down to approximately 5 percent passing the No. 200 sieve.

The lower portion of Figure 3 provides insight into the standard Proctor maximum dry density values for the airport gravels. Plates 1 and 2 showing general sand and gravel materials in the area of the old airport show the physical characteristics of the material. The presence of cobbles and boulders larger than 6 in. diameter is clearly apparent. The tendency has been for these pits to grade from a coarse material at the top of the pit down to a finer material at depth with a distinct decrease in cobble content occurring at a depth of about 5 ft. Pond No. 5 is located to the south of Borrow Area 'A' and Plate No. 1 shows the south bank of this pond. The grey cut slope mantling is fine tailings material sedimented out from use of the pond for tailings water clarification purposes.

The in situ moisture content of the materials in Borrow Area 'A' will be substantially below the optimum moisture content, ranging from about 2.5 to 5 percent. Therefore wetting of the Borrow Area sands and gravels would facilitate efficient compaction.

Previous construction at the site has utilized the borrow areas south of Borrow Area 'A' as the source material for producing drainage zone and filter zone materials by screening. The typical drainage zone materials, used in previous construction, are shown on Plates 3 and 4.

Borrow Area B -

The location of Borrow Area 'B' is to the east of the tailings containment facility as shown on Figure No. 2. It is proposed to obtain material Classes I, II, III and IV from this borrow area for 1980 construction. Class I would be borrowed as general shell material. Class II will be selectively borrowed where available and as required for select filter material under the direction of the supervising geotechnical engineer. Class II material is relatively fine material as indicated on Figure 4 and because significant quantities may be difficult to obtain from Borrow Area 'B' due to its coarse gradation, as shown on Figure 5, Borrow Area 'A' will be the primary Class II material source.

On February 25, 2 test pits were excavated by dozing at locations shown on Figure 2. The logs of these test pits are shown on the Record of Test Pits accompanying this report. One grain size distribution analysis of a sample of material from Test Pit 80-26 provided the information given in Figure 5.

The results of the test pits in Borrow Area 'B' indicate that the Borrow Area 'B' deposit is typically layered with some layers containing cobble and boulder sizes as shown on Plate 5. No seepage was encountered in either test pit during excavation.

It is also proposed to use Borrow Area 'B' as source material supply for production of Class III and Class IV material by screening. This work will be done by others and the resulting drainage zone and reject materials will be stockpiled in this area.

Borrow Areas 'C' and 'D'

The locations of borrow Areas 'C' and 'D' are shown on Figure 2. These areas are located on tailings cones spigotted during 1979 and earlier and the materials typically consist of fine to medium sand. The gradation of the tailings sand material tested during previous construction at the site is shown on the upper portion of Figure 6. The lower portion of Figure 6 shows the results of standard Proctor density tests conducted during previous years' construction. The standard Proctor maximum dry density ranged from 180.2 to 175.5 lbs/ft.^{3} with optimum moisture contents of 7.8 to 8.6 percent respectively. It is important to note that tailings sands at Cyprus Anvil appear to vary in mineralogy and hence in specific gravity; the observed variation in grain specific gravity lies between 4.0 and 4.7 although most tests have indicated values of about 4.4. Specific gravity directly affects observed densities since higher grain weights will result in higher bulk density for the same porosity or void ratio. The in situ moisture content of the tailings sands in the lower pond (Borrow Area 'C') has generally been about 5.0

percent (based on dry weight). Previous years; construction has shown that it is advantageous for compaction to provide additional moisture during the compaction process. It is expected that the in situ moisture content of the tailings sand in the upper pond (Borrow Area 'D') may be less than that in the lower pond.

A compacted tailings sand embankment section is shown in Plates 6, 7, and 8. Plate 6 and Plate 7 show the north abutment area of the West Dam and Plate 8 shows the roughed-in decant and the tailings sand embankment.

Plate 9 shows the backslope of the West Dam just south of the north abutment and it illustrates both the Class I and Class V materials.

GENERAL COMMENTS

This materials data package is for Tenderer's information only. It is not meant to supplant any requirements in the tender documents which require the Contractor or Tenderer through site inspection and investigation, from study and inspection of available samples and records and from such other investigation as he desires to make, to form his own opinions of materials and foundation conditions, to assess the character of the materials to be excavated, disposed of or used in the work.

Any questions related to this information package or concerning what further information should be available should be directed in writing to the undersigned at 5915 - 3 Street S.E., Calgary, Alberta T2H 1K3, Telephone (403) 252-5525, Telex No. 03-822539.

Yours very truly,

GOLDER GEOTECHNICAL CONSULTANTS LTD.

J.P. Murphy, P.Eng.

H.G. Gilchrist, P.Eng.

JPM:HGG:kk

Encl.

LIST OF ABBREVIATIONS

The abbreviations commonly employed on each "Record of Borehole," on the figures and in the text of the report, are as follows:

I. SAMPLE TYPES

AS auger sample
CS chunk sample
DO drive open
DS Denison type sample
FS foil sample
RC rock core
ST slotted tube
TO thin-walled, open
TP thin-walled, piston
WS wash sample

II. PENETRATION RESISTANCES

Dynamic Penetration Resistance: The number of blows by a 140-pound hammer dropped 30 inches required to drive a 2-inch diameter, 60 degree cone one foot, where the cone is attached to 'A' size drill rods and casing is not used.

Standard Penetration Resistance, *N*: The number of blows by a 140-pound hammer dropped 30 inches required to drive a 2-inch drive open sampler one foot.

WH sampler advanced by static weight—weight, hammer

PH sampler advanced by pressure—pressure, hydraulic

PM sampler advanced by pressure—pressure, manual

III. SOIL DESCRIPTION

(a) *Cohesionless Soils*

Relative Density	*N, blows/ft.*
Very loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very dense	over 50

(b) *Cohesive Soils*

Consistency	c_u, *lb./sq. ft.*
Very soft	Less than 250
Soft	250 to 500
Firm	500 to 1,000
Stiff	1,000 to 2,000
Very stiff	2,000 to 4,000
Hard	over 4,000

IV. SOIL TESTS

C consolidation test
H hydrometer analysis
M sieve analysis
MH combined analysis, sieve and hydrometer[1]
Q undrained triaxial[2]
R consolidated undrained triaxial[2]
S drained triaxial
U unconfined compression
V field vane test

NOTES:

[1]Combined analyses when 5 to 95 per cent of the material passes the No. 200 sieve.

[2]Undrained triaxial tests in which pore pressures are measured are shown as $\bar{Q}$ or $\bar{R}$.

LIST OF SYMBOLS

I. GENERAL

$\pi = 3.1416$

e = base of natural logarithms 2.7183

$\log_e a$ or $\ln a$, natural logarithm of a

$\log_{10} a$ or $\log a$, logarithm of a to base 10

t	time
g	acceleration due to gravity
V	volume
W	weight
M	moment
F	factor of safety

II. STRESS AND STRAIN

u	pore pressure
σ	normal stress
σ'	normal effective stress ($\bar{\sigma}$ is also used)
τ	shear stress
ϵ	linear strain
ϵ_{xy}	shear strain
ν	Poisson's ratio (μ is also used)
E	modulus of linear deformation (Young's modulus)
G	modulus of shear deformation
K	modulus of compressibility
η	coefficient of viscosity

III. SOIL PROPERTIES

(a) *Unit weight*

γ	unit weight of soil (bulk density)
γ_s	unit weight of solid particles
γ_w	unit weight of water
γ_d	unit dry weight of soil (dry density)
γ'	unit weight of submerged soil
G_s	specific gravity of solid particles $G_s = \gamma_s/\gamma_w$
e	void ratio
n	porosity
w	water content
S_r	degree of saturation

(b) *Consistency*

w_L	liquid limit
w_P	plastic limit
I_P	plasticity index
w_S	shrinkage limit
I_L	liquidity index $= (w - w_P)/I_P$
I_C	consistency index $= (w_L - w)/I_P$
e_{max}	void ratio in loosest state
e_{min}	void ratio in densest state
D_r	relative density $= (e_{max} - e)/(e_{max} - e_{min})$

(c) *Permeability*

h	hydraulic head or potential
q	rate of discharge
v	velocity of flow
i	hydraulic gradient
k	coefficient of permeability
j	seepage force per unit volume

(d) *Consolidation (one-dimensional)*

m_v	coefficient of volume change $= -\Delta e/(1+e)\Delta\sigma'$
C_c	compression index $= -\Delta e/\Delta \log_{10} \sigma'$
c_v	coefficient of consolidation
T_v	time factor $= c_v t/d^2$ (d, drainage path)
U	degree of consolidation

(e) *Shear strength*

τ_f	shear strength	
c'	effective cohesion intercept	in terms of effective stress $\tau_f = c' + \sigma' \tan \phi'$
ϕ'	effective angle of shearing resistance, or friction	
c_u	apparent cohesion*	in terms of total stress $\tau_f = c_u + \sigma \tan \phi_u$
ϕ_u	apparent angle of shearing resistance, or friction	
μ	coefficient of friction	
S_t	sensitivity	

*For the case of a saturated cohesive soil, $\phi_u = 0$ and the undrained shear strength $\tau_f = c_u$ is taken as half the undrained compressive strength.

RECORD OF TEST PIT T.P. 80-26

Project No. 782 2041

795 N. 11211 S.
LOCATION (See Figure) DATE Feb. 25, 1980 DATUM Ground surface

METHOD OF EXCAVATION D-8 Cat & Ripper PROJECT 1980 Dyke Raising

SOIL PROFILE ELEV N. / DEPTH (ft.)	DESCRIPTION	STRATIGRAPHY PLOT	SAMPLE NUMBER	SAMPLE TYPE	ELEVATION SCALE	WATER CONTENT, PERCENT W_P W W_L	ADDITIONAL LAB. TESTING	GROUNDWATER CONDITIONS
1095.3	Ground surface							
0.0 1094.3	Organic debris and volcanic ash							
1.0 1092.8	Frozen red-brown sandy and silty GRAVEL							
2.5 1090.8	Brown medium to coarse SAND							
4.5 1086.3	GRAVEL with little sand (maximum size ~ 1 ft.)							No seepage during excavation
9.0 1084.3	GRAVEL and medium to coarse SAND		-1-	CS.			-M	
11.0	End of Test Pit Note: Layers are dipping toward south fork of Rose Creek.							

VERTICAL SCALE
1 inch to 2 feet

Golder Associates T.P. 80-26

DRAWN RW
CHECKED RM

U.B.C.

RECORD OF TEST PIT T.P. 80-27

Project No. 122 2041

927 N 11770 E
LOCATION (See Figure)

DATE Feb. 25, 1980

DATUM Ground surface

METHOD OF EXCAVATION D-8 Cat & Ripper

PROJECT 1980 Dyke Raising

SOIL PROFILE			SAMPLE NUMBER	SAMPLE TYPE	ELEVATION SCALE	WATER CONTENT, PERCENT W_P W W_L	ADDITIONAL LAB. TESTING	GROUNDWATER CONDITIONS
ELEV N. / DEPTH (ft.)	DESCRIPTION	STRATIGRAPHY PLOT						
1099.02	Ground surface							
0.0 / 1098.02	Organic debris & volcanic ash							
1.0 / 1097.02	Red brown frozen silty GRAVEL							
2.0 / 1095.02	Red brown SAND and GRAVEL							No Seepage during excavation
4.0 / 1091.02	COBBLES and BOULDERS, some gravel and sand							
8.0	End of Test Pit							

VERTICAL SCALE
1 inch to 2 feet

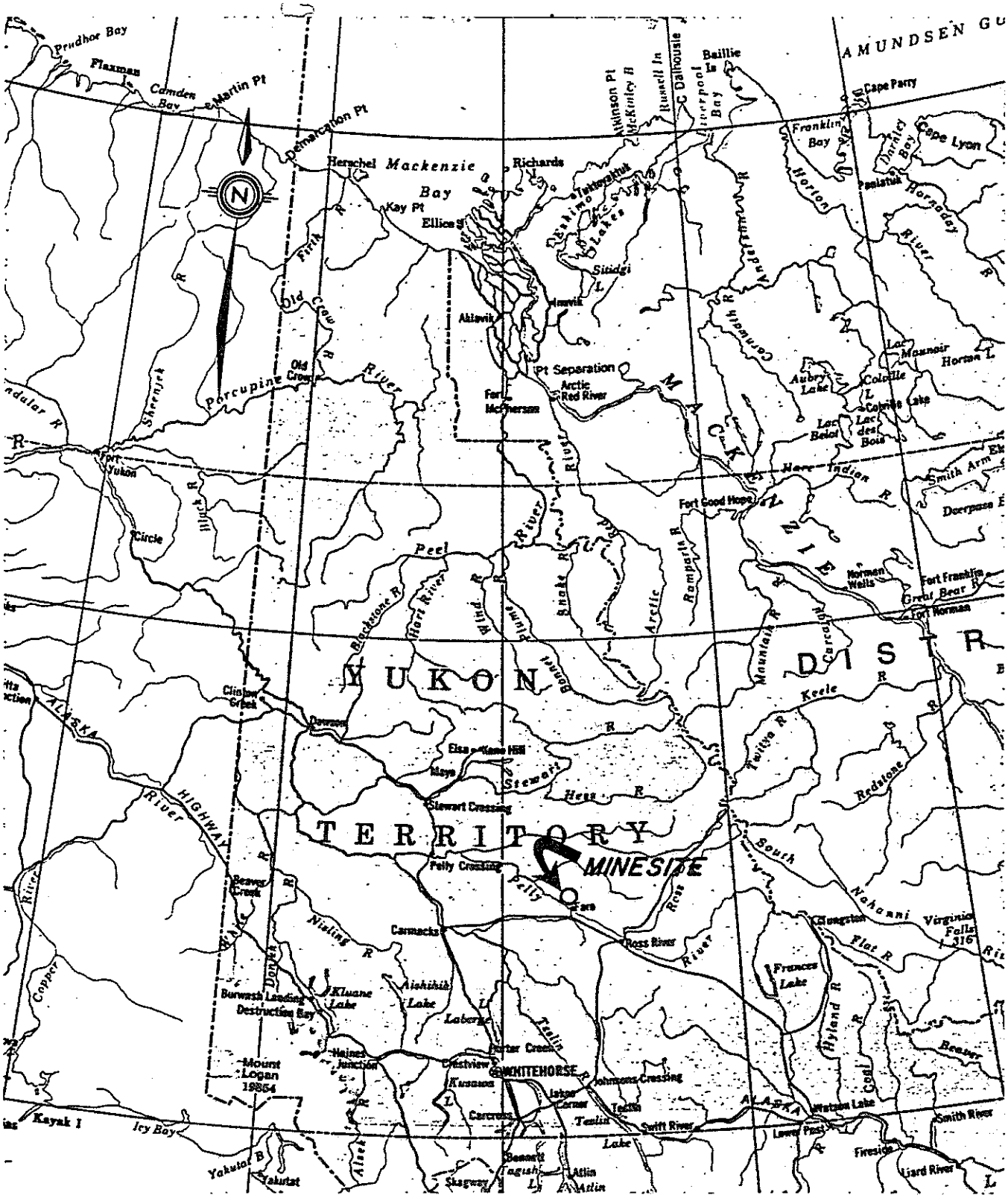
Golder Associates T.P. 80-27

DRAWN R.W.

CHECKED JBM

KEY PLAN

Figure 1



SCALE: 1 in. to 100 mi.

Project No. 792-2041 Drawn RWL Reviewed [illegible] Date 24 April/80

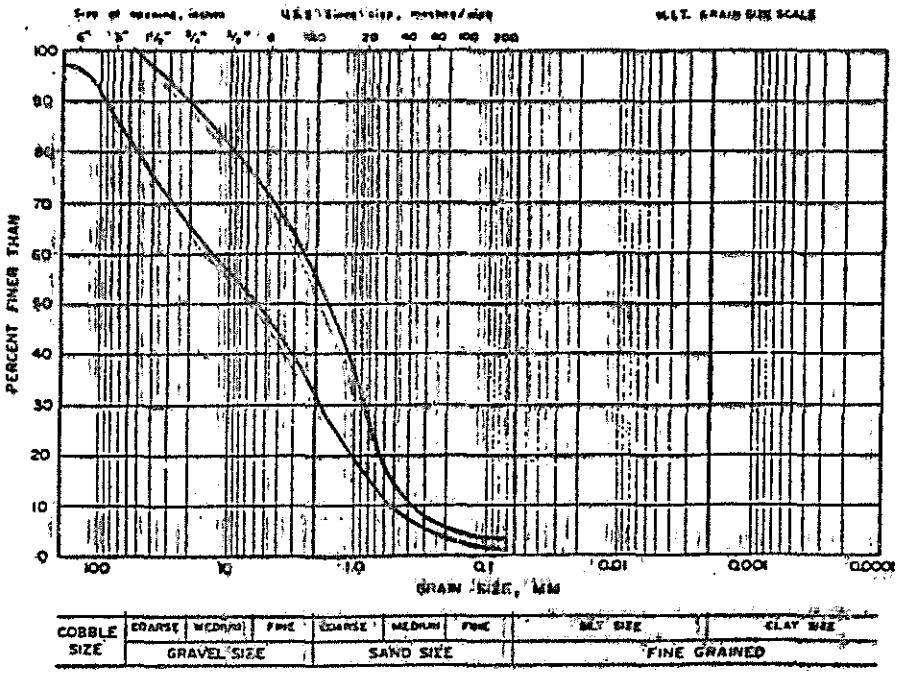
PREVIOUS LABORATORY TEST RESULTS
CLASS I BORROW MATERIAL

Figure 3

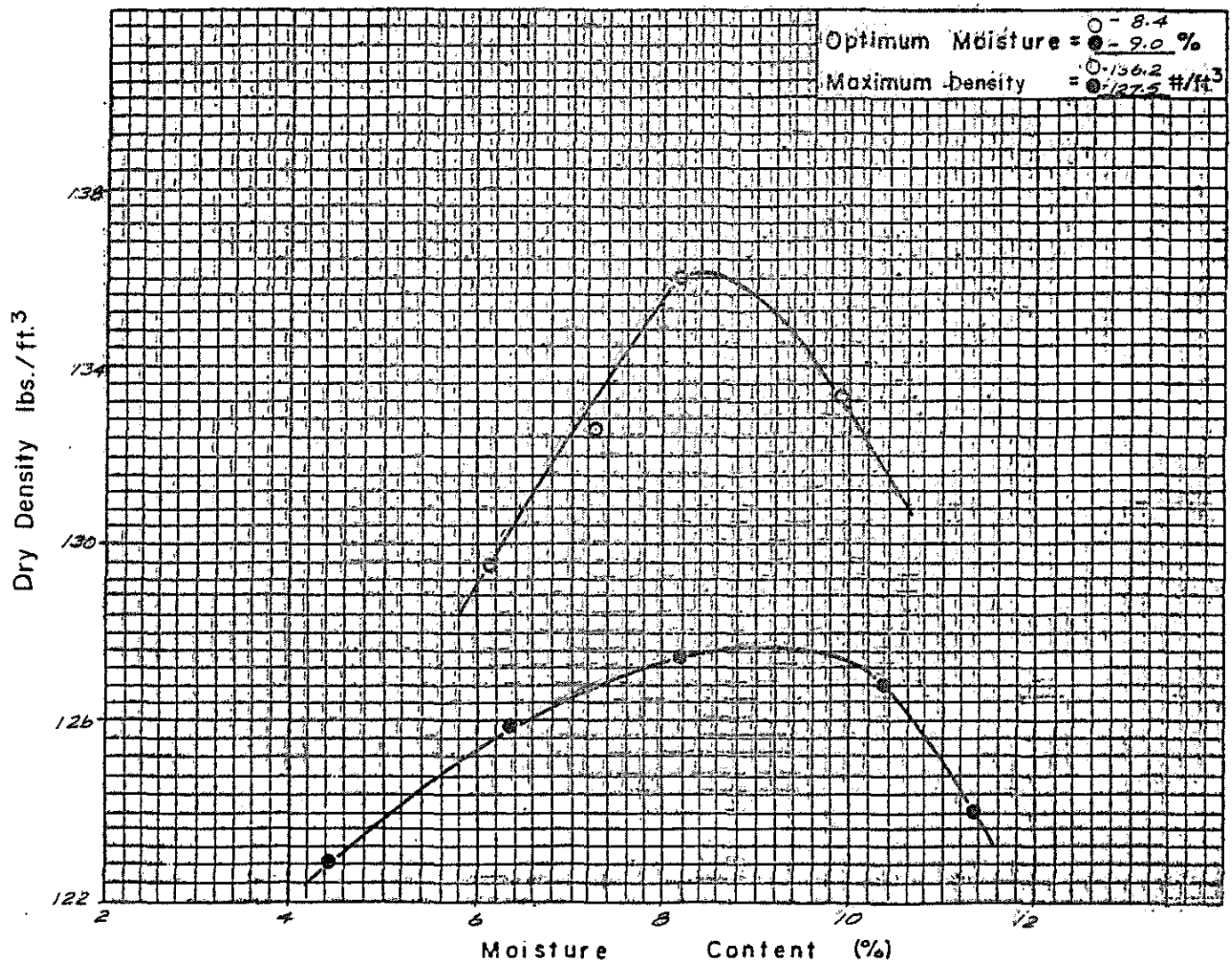
GRAIN SIZE DISTRIBUTION

Typical gradation envelope for previous Airport Gravel Borrow Pits CLASS I MATERIAL

Note: This figure is to be read in conjunction with accompanying report.



MOISTURE-DENSITY RELATIONSHIP



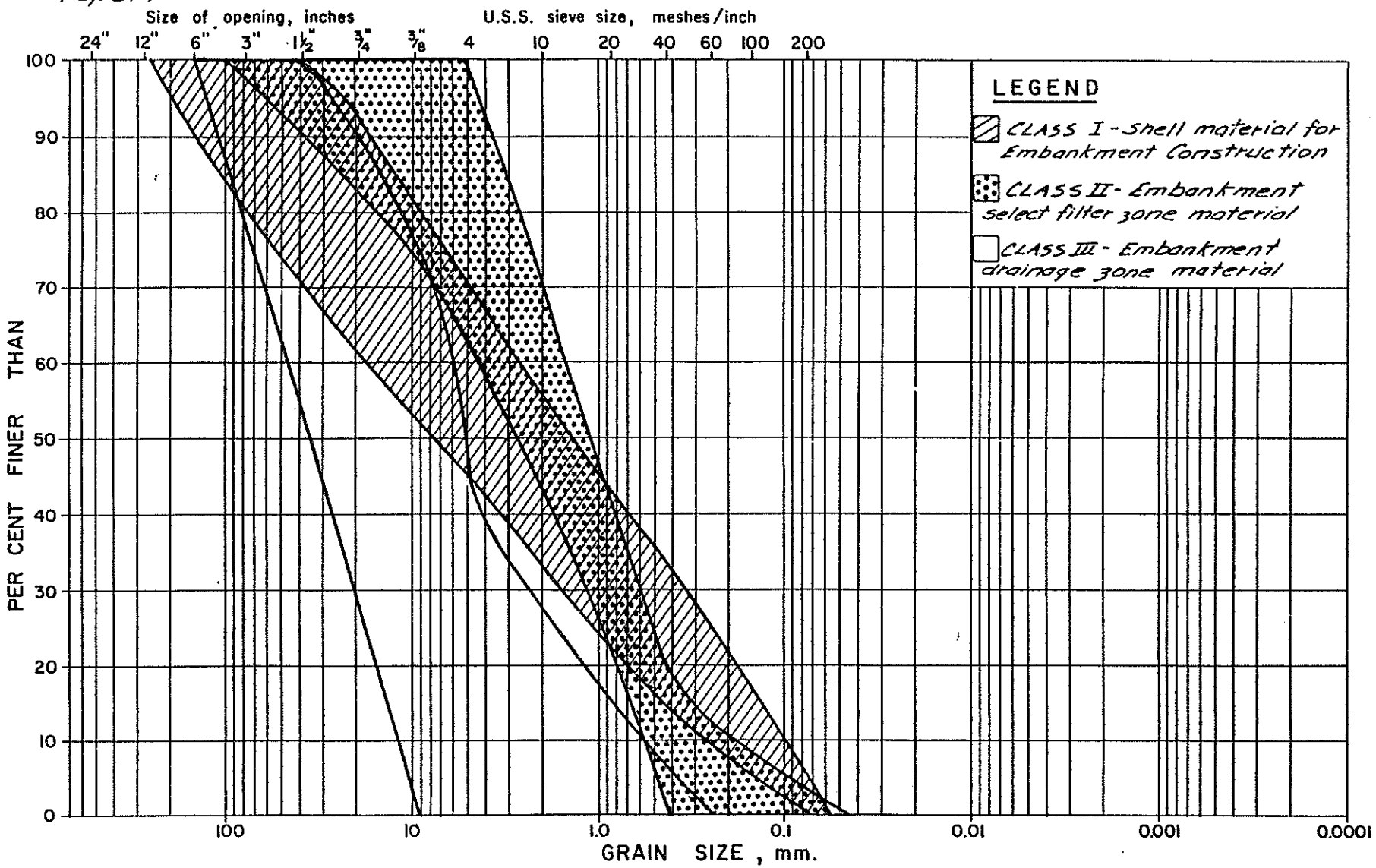
Project No. 792 2041 Drawn RW Revised RW Date 24 APR 80

Golder Associates

Project No. 792.2.041 Drawn RW. Reviewed [illegible] Date 24 Apr. 80

Note: This figure is to be read in conjunction with accompanying report.

M.I.T. GRAIN SIZE SCALE



BOULDER SIZE	COBBLE SIZE	GRAVEL SIZE			SAND SIZE			SILT SIZE	CLAY SIZE
		coarse	medium	fine	coarse	medium	fine	fine grained	

GRAIN SIZE DISTRIBUTION

PROJECT EMBANKMENT MATERIALS

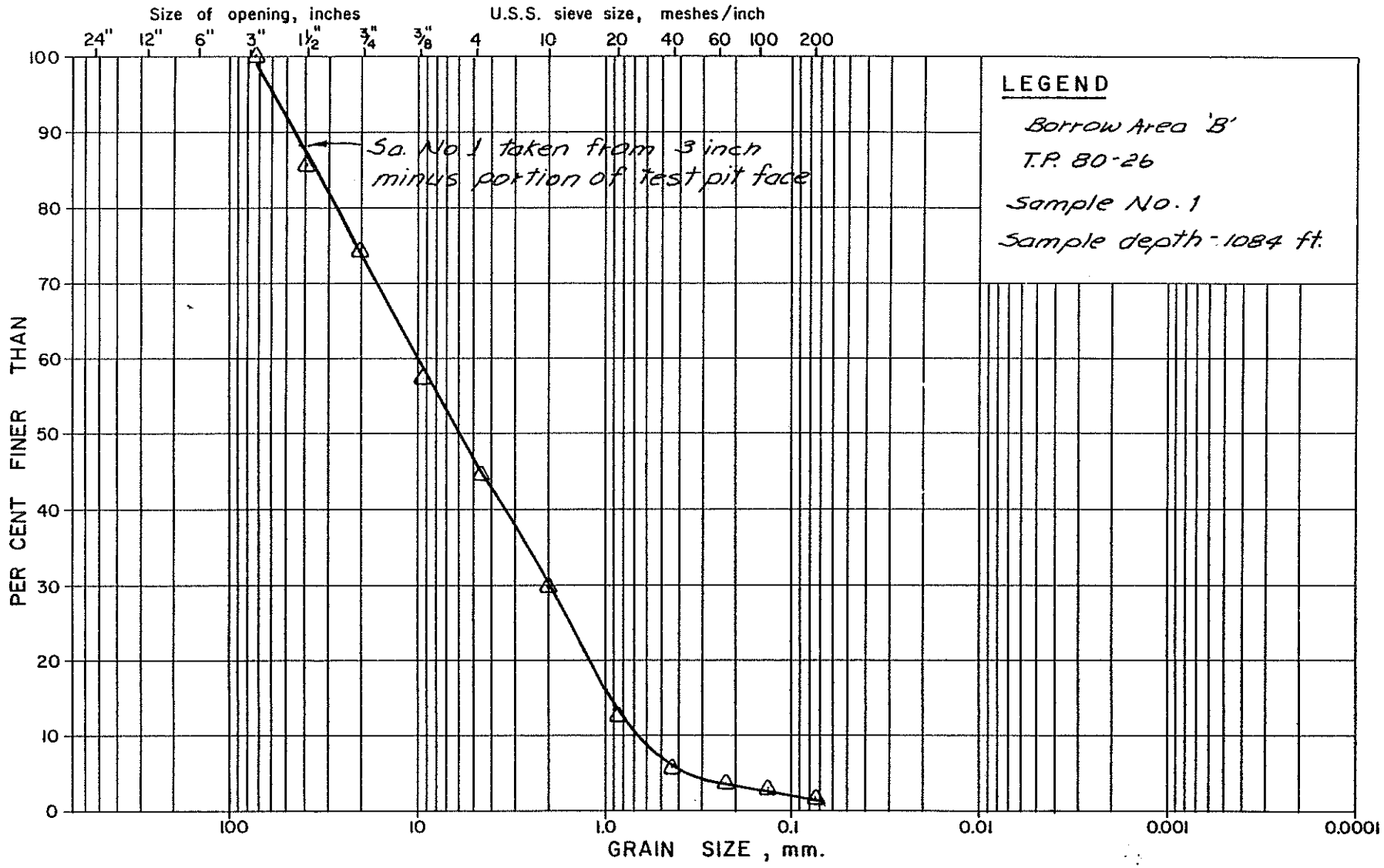
Figure 4

Golder Associates

Project No. 792.2041 Drawn RW Reviewed [illegible] Date 24 April/80

Note: This figure is to be read in conjunction with accompanying report.

M.I.T. GRAIN SIZE SCALE



BOULDER SIZE	COBBLE SIZE	GRAVEL SIZE: coarse	GRAVEL SIZE: medium	GRAVEL SIZE: fine	SAND SIZE: coarse	SAND SIZE: medium	SAND SIZE: fine	SILT SIZE: fine grained	CLAY SIZE

GRAIN SIZE DISTRIBUTION
SAND AND GRAVEL

Figure 5

Golder Associates

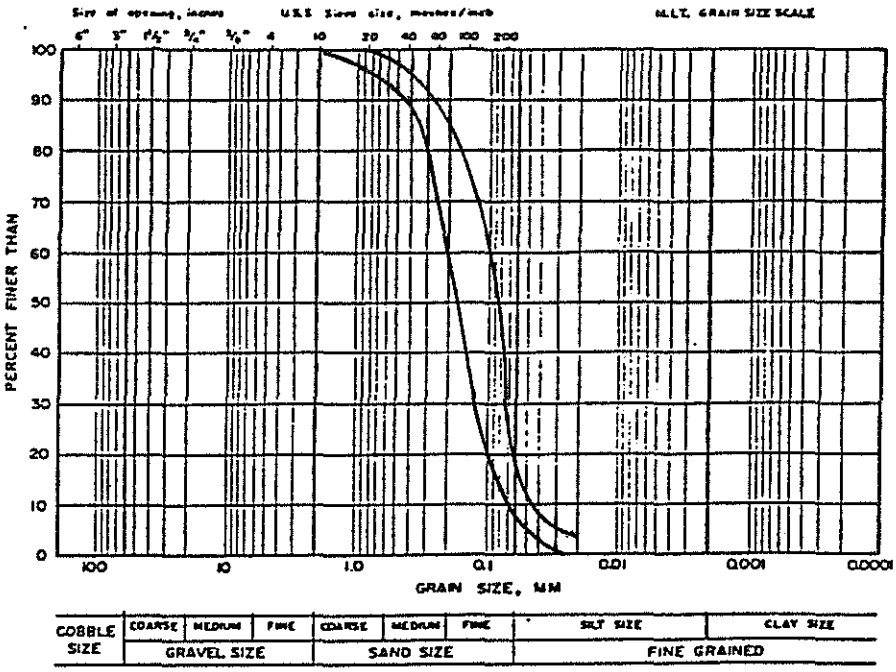
PREVIOUS LABORATORY TEST RESULTS
CLASS IV BORROW MATERIAL

Figure 6

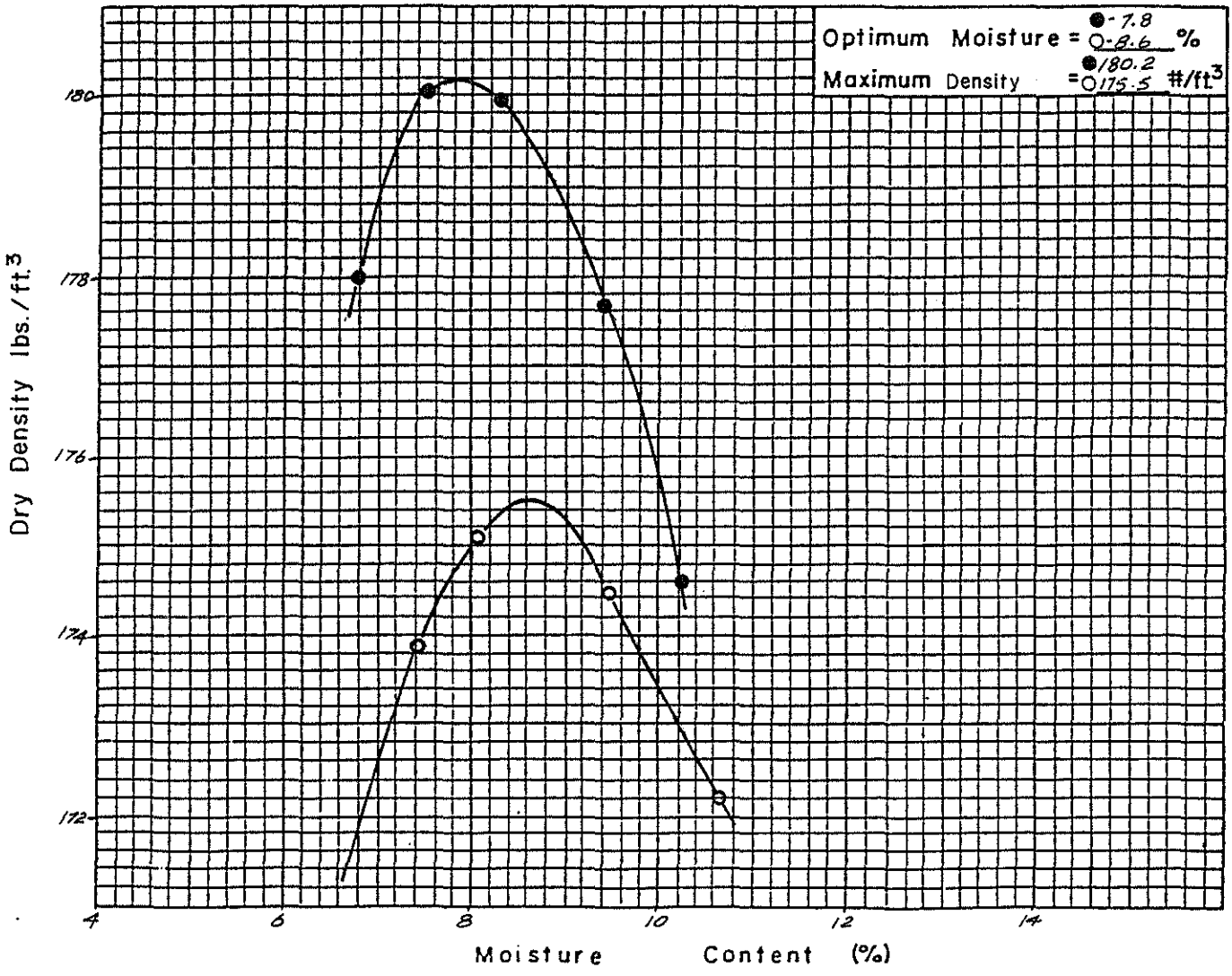
GRAIN SIZE DISTRIBUTION

Typical gradation envelope for previous Tailing Sands (CLASS IV MATERIAL)

Note: This figure is to be read in conjuction with accompanying report.



MOISTURE-DENSITY RELATIONSHIP



Golder Associates

Project No. 792-2041. Drawn K.W. Reviewed [illegible] Date 29 April/80

PLATE 1

South bank of Pond 5 showing Class I
Borrow Area (September, 1979)

PLATE 2

Excavation at west end of Borrow Area "A"
showing second level of excavation. (March, 1978)

PLATE 3

Class III Drainage Zone Material
Summer 1978 Construction.

PLATE 4

Placement of Class III Drainage Zone Material
Summer 1978 Construction.

PLATE 5

Test Pit 80-26 showing potential
material in Borrow Area "B"
(February, 1980)

PLATE 6

West Dam and upper reach of Decant Channel
June, 1979

PLATE 7

Lower reach of Decant Area
September, 1979

PLATE 8

Decant Area - looking west from entrance to pond.
September, 1979

PLATE 9

West Dam looking east
June, 1979

APPENDIX II

Tenderer Documents Consisting of:

- Parts A to G as per the contained index
- Title sheet and sheets 1 to 5 of drawings (reduced for the convenience of binding in this Appendix)
- Baseline Survey Plan by Underhill Engineering Ltd., Whitehorse, Y.T.

CYPRUS ANVIL

Mining Corporation

Tailings Containment Construction

TENDER DOCUMENTS

CYPRUS ANVIL MINING CORPORATION

TAILINGS CONTAINMENT CONSTRUCTION

1980 EMBANKMENT DAM RAISING

Faro, Yukon Territory

Golder Associates

consulting geotechnical engineers

CYPRUS ANVIL MINING CORPORATION

TAILINGS CONTAINMENT CONSTRUCTION

1980 EMBANKMENT DAM RAISING

Faro Yukon Territory

SPECIFICATIONS
CONTAINING

A. INVITATION FOR TENDERS AND INSTRUCTIONS TO TENDERERS
B. FORM OF TENDER
C. SCHEDULES
D. FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR
E. GENERAL CONDITIONS
F. GENERAL CLAUSES
G. DETAILED SPECIFICATIONS

Golder Geotechnical Consultants Ltd.
Consulting Geotechnical Engineers

April 29, 1980
Calgary, Alberta

Cyprus Anvil Mining Corporation
Tailings Containment Construction
Faro, Yukon Territory

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CYPRUS ANVIL MINING CORPORATION

TAILINGS CONTAINMENT CONSTRUCTION
1980 EMBANKMENT DAM RAISING
Faro Yukon Territory

A. INVITATION FOR TENDERS AND INSTRUCTIONS TO TENDERERS

Golder Geotechnical Consultants Ltd.
Consulting Geotechnical Engineers

April 29, 1980
Calgary, Alberta

CYPRUS ANVIL MINING CORPORATION

TAILINGS CONTAINMENT CONSTRUCTION

1980 Embankment and Dam Raising

Faro Yukon Territory

INVITATION FOR TENDERS

Tenders are invited for the construction of an additional lift on the existing East and West tailings embankment dams associated with the mine and mill complex located near Faro, Y.T.

Work under this contract is scheduled to commence June 15, 1980, and to be completed by August 15, 1980.

Tender Documents

The Tender Documents for this contract may be inspected at the offices of the Cyprus Anvil Mining Corporation at the minesite office at Faro, Yukon Territory, at the corporate office at 355 Burrard Street, Vancouver, B.C. at Golder Associates offices at 5915 - 3rd Street S.E., Calgary, Alberta, and at 9854 - 41st Avenue, Edmonton, Alberta on and after Tuesday, April 29, 1980.

Copies may be obtained from either office upon prepayment of $25.00 for the first copy and $10.00 for each additional copy. All amounts paid will be refunded upon return of the tender documents complete and in good condition within fourteen (14) days after the Tender closing date.

Conditions of Tendering

Tenders must be for the entire work included in the Contract. Cyprus Anvil Mining Corporation reserves the right to reject any or all tenders, and to accept any tender considered advantageous to it.

Cyprus Anvil Mining Corporation will not be responsible for any costs incurred by the Tenderer in preparing his tender.

Qualifications of Tenderers

Tenders will be considered only from Tenderers whose financial resources, technical ability and experience are commensurate with the work to be performed, and who have successfully completed comparable work on other projects.

Tender Closing

Sealed tenders will be received until 12:00 noon Pacific Standard Time on Wednesday, May 14, 1980 at:

Cyprus Anvil Mining Corporation,
Box 1000,
Faro, Yukon Territory
Y0B 1K0

CYPRUS ANVIL MINING CORPORATION

TAILINGS CONTAINMENT CONSTRUCTION

1980 Embankment and Dam Raising

Faro Yukon Territory

INSTRUCTIONS TO TENDERERS

1. Submission of Tenders

1.1 Sealed Tenders for the construction of the 1980 Embankment Dam Raising facilities at Anvil Mine near Faro, Yukon Territory, as generally specified herein, will be received by Cyprus Anvil Mining Corporation until 12:00 Pacific Standard Time, Wednesday, May 14, 1980 at:

Cyprus Anvil Mining Corporation
Box 1000,
Faro, Yukon Territory
Y0B 1K0

1.2 Two blank copies of the complete Tender Documents and two blank copies of the Form of Tender and Schedules are annexed hereto, and Tenders shall be upon these forms. One copy of each shall be enclosed in a sealed envelope, clearly marked "Tender for Cyprus Anvil Tailings Containment Construction, 1980 Embankment Dam Raising, Faro, Yukon Territory" and addressed to:

Cyprus Anvil Mining Corporation,
Box 1000,
Faro, Yukon Territory
Y0B 1K0

1.3 Tenders shall be in duplicate and any documents submitted by the Tenderer which are intended to explain or qualify his Tender shall be submitted in duplicate.

2. Conditions of Tendering

2.1 Tenders shall be in Canadian Dollars and shall include duties, taxes both direct and indirect, insurance premiums, costs of performance and related bonds, Workmen's Compensation assessments, Unemployment Insurance assessments, and other statutory assessments, and all the Tenderer's contributions to normal provisions commonly called "Fringe Benefits" as set out in

collective labour agreements in the area of jurisdiction.

2.2 All payments by the Owner will be made in Canadian Currency only, at any branch of such chartered bank as the Owner may designate.

2.3 The Owner reserves the right to reject any or all tenders, and the lowest tender will not necessarily be accepted. The Owner will not be responsible for any costs incurred by Tenderers in making their tender.

2.4 The Tenderer shall furnish evidence satisfactory to the Owner, to demonstrate conclusively that he has the ability and experience to perform the various classes of work involved, and that he has sufficient capital and plant to enable him to prosecute the same successfully and to complete and deliver it as provided in his tender.

2.5 Tenders should not be incomplete, conditional or obscure, and should not contain additions not called for, erasures, alterations or irregularities of any kind.

3. Data From Field Investigations

Investigations have been carried out for previous construction at the site. One purpose of these investigations was to ascertain the suitability of local materials general earthwork construction.

Where applicable the boring and exploratory test pit information, and all acquired geological data, and example soils and rock samples taken during the previous investigations are available, during normal business hours, for examination at the Office of Golder Geotechnical Consultants Ltd., at 5915 - 3rd Street S.E., Calgary, Alberta.

4. Jobsite Conditions

4.1 It shall be understood that the Tenderer, in preparing his tender, has satisfied himself with conditions at the Site, with the Specifications and Drawings, with board and lodging standards, and has independently investigated and is satis-

fied with the conditions to be encountered, qualities and quantities of work to be performed and materials to be furnished, including the conditions imposed by reason of standing collective labour agreements, labour conditions, and labour rates. The Tenderer shall not claim at any time after the submission of his tender or subsequent execution of a contract that there was any misunderstanding in regard to the conditions imposed by the Contract Documents.

4.2 The Tenderer shall form his own opinions of materials and foundation conditions, the character of the materials to be excavated, disposed of, or used in the work and of any other conditions affecting the work from inspection of the Site, from study and inspection of available samples and records and from such other investigations as he desires to make. He shall place his own interpretation upon soundings or borings made on behalf of the Owner.

4.3 The Tenderer shall arrange at his own cost for any access to and on the Site which he may require during the period for preparation of tenders.

5. Clarification of Tender Documents

5.1 If any Tenderer finds an inconsistency, error or omission in the Tender Documents, or requires clarification of any provision contained therein, he shall submit his query in writing concurrently to Cyprus Anvil Mining Corporation, Box 1000, Faro, Yukon Territory, Y0B 1K0 and to Golder Geotechnical Consultants Ltd., 5915 - 3rd Street S.E., Calgary, Alberta T2H 1K3.

5.2 Any revisions to the Tender Documents will be issued as written "Addenda", which will be distributed to all parties registered as having purchased copies of the Tender Documents.

6. Inclusion of Addenda with Tender Documents

Any Addenda to the Tender Documents which may be issued to Tenderers during the time for preparation of tenders shall be covered by the tenders, and shall become part of the Tender Documents. If any Addenda are issued, each Tenderer shall acknowledge, in the space

provided therefor in the Form of Tender, that he has received them and that his tender has been prepared in accordance therewith.

7. Acceptance of Successful Tender

7.1 Tenders shall remain valid and be irrevocably open for acceptance by the Owner for thirty (30) calendar days after the closing time for submission of tenders.

7.2 The successful Tenderer will be notified in writing by the Owner of the acceptance of his Tender. The successful Tenderer shall then execute a contract with the Owner within seven (7) calendar days of notification of acceptance of his Tender in the Form of Agreement between Owner and Contractor, forming a part of the Contract Documents. The Contract shall consist of the Contract Documents as defined by Article 1 of the General Conditions.

8. Bonding

Within fourteen (14) days following receipt by the successful Tenderer of notice in writing from the Owner of acceptance of this tender he shall furnish the Owner with the bonds required to be effected by the Contractor in accordance with the requirements of Article 20A of the General Conditions hereof.

9. Construction Schedule

The successful Tenderer shall carry out the Work in such a way that the various stages of the Work are completed not later than the times stated in the "Construction Schedule", and as covered under Clause 6 of the General Clauses.

10. Board and Lodging

The Tenderer shall note that board and lodging are to be be supplied to the Contractor's labour force in accordance with Clause 14 of the General Clauses.

11. Schedule A - Schedule of Quantities and Prices

11.1 The work will be paid for on the basis of tendered prices for the items included in Schedule A, the Schedule of Quantities and Prices contained in the Form of Tender. Any work not included in the said Schedule of Quantities and Prices and not susceptible to classification as an item so included and not of such a nature as is ruled by the Engineer to be part of the Contractor's normal costs will be paid for in accordance with the terms of Article 24 of the General Conditions hereof, "Changes and Extra Work".

11.2 The parts of the Work for which Tenderers are to submit prices have been divided into items in order to enable Tenderers to tender for different portions of the Work in accordance with their estimate of their cost so that in the event of an increase or decrease in the quantity of any particular item of work, the actual quantities executed may be paid for at the rate stated for that particular item of work, subject to the basis of payment laid down for each item in the Specifications. It is to be clearly understood that no work will be paid for under more than one item or more than once under any item.

11.3 The quantities in Schedule A - the Schedule of Quantities and Prices contained in the Form of Tender hereof have been listed for the purpose of comparing Tenders on a uniform basis. It must be distinctly understood that any quantities shown in the Schedule of Quantities and Prices are approximate only and that the Owner expressly or by implication does not represent that the actual quantities will even approximately correspond therewith. No variation whatever therefrom in the quantities actually handled shall give rise to any claim against the Owner except as permitted under Article A-3(b), Form of Agreement between Owner and Contractor.

11.4 Each item as detailed in Schedule A, the Schedule of Quantities and Prices contained in the Form of Tender hereof shall be reasonably priced for such item. Under no circumstances will a manifestly unbalanced tender be considered by the Owner. When called upon to do so by the Owner the Tenderer must submit details of how each Lump sum and Unit Price item in the Schedule of Quantities and Prices has been determined

12. Tender Schedules

Tenderers shall provide with the Form of Tender annexed hereto, and on the sheets provided with the Form of Tender for that purpose, the following:

12.1 Contract Schedule A - Schedule of Quantities and Prices

12.2 Contract Schedule B - Statement of Work in Progress

12.3 Contract Schedule C - Preliminary Construction Schedule. The Work shall be performed in accordance with Contract Schedule C until approval of the Contract Construction Schedule as provided in General Clause 6.

12.4 Contract Schedule D - List of Subcontractors

12.5 Contract Schedule E - Proposed Supervisory Personnel

12.6 Contract Schedule F - Proposed Equipment List

12.7 Contract Schedule G - Manpower Forecast

12.8 Contract Schedule H - Proposed Hourly Labour Rates

12.9 Contract Schedule J - Proposed Equipment Rental Rate Schedule

CYPRUS ANVIL MINING CORPORATION

TAILINGS CONTAINMENT CONSTRUCTION
1980 EMBANKMENT DAM RAISING
Faro Yukon Territory

B. FORM OF TENDER

Golder Geotechnical Consultants Ltd.
Consulting Geotechnical Engineers

April 29, 1980
Calgary, Alberta

FORM OF TENDER

To: Cyprus Anvil Mining Corporation,
P.O. Box 1000,
Faro, Yukon Territory
Y0B 1K0

Tender by _____

_____

a company duly incorporated under the laws of Canada, whose place of business is: _____

_____

OR Tender by: Whose place of business is:

_____ _____

and _____ _____

and _____ _____

and _____ _____

comprising the joint venture of _____

_____

_____

and having its Head Office at _____

and hereinafter called the "Tenderer".

FORM OF TENDER

1. The Tenderer has been carrying on business as

_____

for_____years.

2. The Tenderer has carefully examined all the documents listed in Article 1 of the General Conditions hereof, and the Tenderer hereby agrees that should the Owner award a Contract to the Tenderer, the said documents shall be included in the Contract Documents.

3. The Tenderer agrees that the acceptance of this tender by notice in writing given to the Tenderer by the Owner shall commit the Tenderer to the performance of the Work in accordance with the Contract. The Contact shall be and be deemed to have been dated and made as of the date of said notice in writing of acceptance of this tender.

4. The Tenderer agrees that this Tender is to continue open to acceptance and irrevocable for thirty (30) days, and that the Owner may, at any time within thirty (30) days of closing date give notice to the Tenderer in writing of acceptance of this Tender, and whether any other Tender has previously been accepted or not, and whether notice of acceptance of another Tender has been given or not.

5. The Tenderer agrees that, if his Tender is accepted, he shall furnish contract bonds in conformity with the requirements of Article 20A of the General Conditions hereof.

6. The Tenderer hereby tenders and offers to enter into a Contract, in the form herein set forth, to supply and do all or any part of that which is set out or called for in the Specifications in accordance with the Specifications for the Contract Price stated in Schedule A, the Schedule of Quantities and Prices, and the Tenderer agrees that if this Tender is accepted by the Owner the Tenderer will carry out the Work specified herein.

7. The Tenderer agrees that, if this Tender is accepted by the Owner the Tenderer will execute any additional volume or quantity of work that may be required, over and above the quantities set forth in Schedule A, the Schedule of Quantities and Prices at the unit prices and lump sum prices tendered herein except as permitted under Article A-3(b), Form of Agreement Between Owner and Contractor and in accordance in all respects with the requirements of the Detailed Specifications.

8. The Tenderer agrees that under no circumstances shall any such alterations, additions and deductions affect the validity of the terms of the Contract or give grounds for any claim.

9. The Tenderer certifies that he will commence the Work and will complete the Work in accordance with the dates specified in Clause 5 of the General Clauses.

10. The Tenderer certifies that from his personal inspection of the site, he has satisfied himself with conditions at the Site, with the Specifications and Drawings and the conditions imposed by reason of standing collective labour agreements, board and lodging standards, and that no variation whatever in the character or quantities of the materials actually handled or other conditions affecting the Work shall give rise to any claim against the Owner.

11. The Tenderer's Bankers are_____

_____

and their full address is_____

_____

12. The Tenderer certifies that he has received the following addenda to the Specifications:

Addendum No.

_____

_____

_____

_____

DATED AT_____this_____

day of _____.

For _____

By _____

_____ For _____
Witness

By _____

For _____

By _____

NOTE: If the tender is submitted by a Corporation, it must be properly executed and the seal of the Corporation affixed in the presence of proper officers.

The Corporation Seal of _____

as hereto affixed in the presence of:

_____
(Signature and Official Capacity)

_____
(Signature and Official Capacity)

CYPRUS ANVIL MINING CORPORATION

TAILINGS CONTAINMENT CONSTRUCTION
1980 EMBANKMENT DAM RAISING
Faro Yukon Territory

C. SCHEDULES

Golder Geotechnical Consultants Ltd.
Consulting Geotechnical Engineers

April 29, 1980
Calgary, Alberta

CONTRACT SCHEDULE A

SCHEDULE OF QUANTITIES AND PRICES

CONTRACTOR_____

Payment Item No.	Description	Unit	Approx. Quantity	Unit Price	Amount
1(A)	ITEM A - MOBILIZATION	L.S.	-	-	_____
	ITEM 1 - Clearing, Grubbing and Stripping				
1(a)	Clearing & Grubbing	acre	1.5	_____	_____
1(b)	Stripping and removal of topsoil	cu.yd.	3,000	_____	_____
	ITEM 2 - Excavation and Earthworks				
2(a)	Excavation and disposal of riprap, filter gravel, abutment soils and debris relating to removal and reconstruction of the decant facilities		Item 2(a) to be paid in accordance with Article 24 of the General Conditions N/A	N/A	N/A
2(b)	Excavation, hauling, placement and compaction of Class I material	cu.yd.	200,000	_____	_____
2(c)	Excavation, hauling, placement and compaction of Class II filter zone material	cu.yd.	21,800	_____	_____
2(d)	Loading, hauling, placement and compaction of Class III drainage zone material	cu.yd.	7,600	_____	_____
2(e)	Loading, hauling, placement and compaction of Class IV screened filter zone material	cu.yd.	7,800	_____	_____
2(f)	Excavation, hauling, placement and compaction of Class V embankment tailing sands material	cu.yd.	278,400	_____	_____

CONTRACT SCHEDULE A

SCHEDULE OF QUANTITIES AND PRICES

CONTRACTOR _____

Payment Item No.	Description	Approx. Unit	Unit Quantity	Price	Amount
	ITEM 3 - Premium Cost of Bond: The following will be paid by Owner in accordance with Clause 20 A of the General Conditions	N/A	N/A	N/A	_____
					$
	TOTAL CONTRACT PRICE				═══

CONTRACT SCHEDULE B

STATEMENT OF WORK IN PROGRESS AND STATEMENT OF RECENTLY COMPLETED CONTRACTS

CONTRACTOR: _____

A Statement of present commitments and enumeration of contracts completed over the last 5 year period:

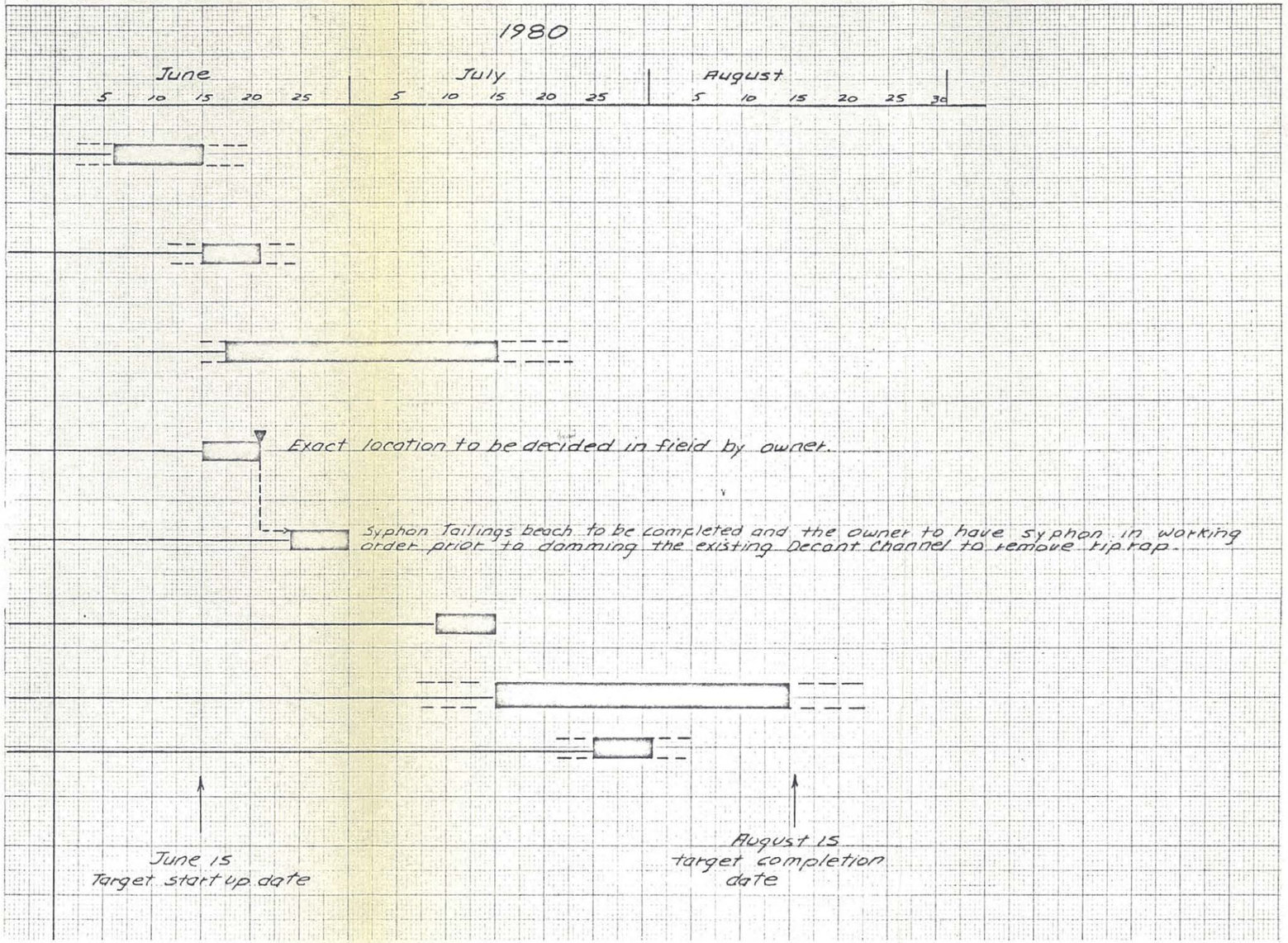
PRESENT COMMITMENTS:

Project	Owner	Joint Venture		Joint Venture Sponsor		Scheduled Completion	Percent Complete	Contract Amount ($000)
		Yes	No	Yes	No			

CONTRACT SCHEDULE 'C'

Tailings Containment Construction 1980 Embankment Dam Raising

1. Mobilization
2. Clean, grub and strip
3. Construct West Dam Sta. 0+00 to Sta. 26+00
4. Construct tailings beach at syphon location
5. Dam existing decant above West Dam and remove riprap
6. Construct new Decant Channel
7. Construct East Dam Sta. 0+00 to Sta. 49+00
8. Construct East Dam sta. 49+00 to sta. 61+23



CONTRACT SCHEDULE D

PROPOSED SUBCONTRACTORS

CONTRACTOR: _____

NAME	ADDRESS	ITEMS OR PORTION OF WORK SUBCONTRACTED

CONTRACT SCHEDULE E

PROPOSED SUPERVISORY PERSONNEL

CONTRACTOR: _____

NAME AND PROPOSED POSITION	EXPERIENCE AND QUALIFICATIONS	NAME OF REFERENCE CONTACT

CONTRACT SCHEDULE F

EQUIPMENT FORECAST

CONTRACTOR: _____

NO. OF UNITS	DESCRIPTION	SIZE OR CAPACITY	YEAR OF MANUFACTURE	PRESENT LOCATION

CONTRACT SCHEDULE G
MANPOWER FORECAST

CONTRACTOR: _____

PERSONNEL CLASSIFICATION	1980 JUNE 15 - 22	JUNE 23 - 30	JULY 1 - 7	JULY 8 - 15	JULY 16 - 23	JULY 24 - 31	1980 AUGUST 1 - 7	AUGUST 8 - 15
Manpower Shift 1								
Manpower Shift 2								
Manpower Shift 3								
Total Manpower								

CONTRACT SCHEDULE H

PROPOSED HOURLY LABOUR RATES

CONTRACTOR: _____

TRADE	LEVEL CLASS	HOURLY RATES

CONTRACT SCHEDULE J

PROPOSED EQUIPMENT RENTAL RATE SCHEDULE

CONTRACTOR: _____

UNIT	DESCRIPTION	SIZE CAPACITY	RENTAL RATE					
			HOURLY		WEEKLY		MONTHLY	
			First Shift	Second Shift	First Shift	Second Shift	First Shift	Second Shift

CYPRUS ANVIL MINING CORPORATION

TAILINGS CONTAINMENT CONSTRUCTION
1980 EMBANKMENT DAM RAISING
Faro Yukon Territory

D. FORM OF AGREEMENT BETWEEN OWNER AND CONTRATOR

Golder Geotechnical Consultants Ltd.
Consulting Geotechnical Engineers

April 29, 1980
Calgary, Alberta

CYPRUS ANVIL MINING CORPORATION

TAILINGS CONTAINMENT CONSTRUCTION

1980 Embankment and Dam Raising

Faro Yukon Territory

AGREEMENT BETWEEN OWNER AND CONTRACTOR

THIS AGREEMENT made in duplicate the _____ day of _____

in the year Nineteen hundred and _____ by _____

and between

CYPRUS ANVIL MINING CORPORATION

herein (and in the General Conditions) called the "Owner",
and

_____

herein (and in the General Conditions) called the "Contractor",

WITNESSETH: That the Owner and the Contractor undertake and agree as follows:

ARTICLE A-1 The Contractor shall:

(a) provide all the materials and perform all the work shown on the Drawings and described in the Specifications titled

Cyprus Anvil Mining Corporation
Tailings Containment Construction
1980 Embankment Dam Raising
Faro, Yukon Territory

which have been signed in duplicate by both the parties, and which have been prepared by

Golder Geotechnical Consultants Ltd.,
Consulting Geotechnical Engineers

acting as, and herein (and in the General Conditions) titled, the "Engineer", and

(b) do and fulfill everything indicated by this Agreement, and

(c) complete substantially as certified by the Engineer, all the work by August 15, 1980.

Article A-2

The list of Specifications and Drawings referred to in Article A-1 is as covered by Article 1 of the General Conditions hereof.

Article A-3

(a) The Owner shall pay to the Contractor in lawful money of Canada for the performance of the Contract, the amounts determined for each of the items of work completed at the unit prices stated in Schedule A, the Schedule of Quantities and Prices, subject to the adjustments provided herein and in the General Conditions of the Contract. The quantities contained in this schedule are approximate only, and the final payment shall be made for the actual quantities that are incorporated in or made necessary by the work covered by the Contract.

(b) Should the quantities of completed Work of any individual item of the above Schedule vary thirty percent (30%) or more from quantities stated in such Schedule, either the Owner or the Contractor may request a revision of the unit price for the items so affected, and both parties agree that under such conditions an equitable revision of the price shall be made. If the parties fail to agree upon the revision to be made, the dispute may be determined by arbitration as provided for in Article 42 of the General Conditions of the Contract.

(c) If the Engineer orders in writing the performance of any work not covered by the Drawings or included in the Specifications that cannot be classified as coming under any of the contract units and for which no unit price, lump sum, or other basis can be agreed upon, then such Extra Work shall be performed on a Substantiated Expenditure basis as provided for in Article 24 of the General Conditions hereof.

(d) Notwithstanding the provisions contained in sub-section (a) above if on account of climatic or other conditions reasonably beyond the Contractor's control there are items of work that cannot readily be completed, the payment in full for the work which has been completed shall not be delayed on account thereof, but the Owner may withhold a sufficient and reasonable sum, as determined by the Engineer, until the uncompleted work is finished and such sum as will adequately protect the Owner against liens.

ARTICLE A-4

The "General Conditions of the Contract" hereto annexed and the aforesaid Specifications and Drawings, are all to be read into and form part of this Agreement and the whole shall constitute the Contract between the parties and it shall enure to the benefit of and be binding upon them and their successors, executors, administrators and, subject to Article 39 of the General Conditions of the Contract, their assigns.

ARTICLE A-5

All communications in writing between the parties or between them and the Engineer shall be deemed to have been received by the addressee if delivered to the individual or to a member of the firm or to an officer of the Corporation for whom they are intended or if sent by post or by telegram addressed as follows:-

The Owner at Box 1000 (street and number) Faro, Y.T. Y0B 1K0 (post office)

The Contractor at _____ (street and number) (post office)

The Engineer at 5915 - 3 Street S.E. (street and number) Calgary, Alberta T2H 1K3 (post office)

IN WITNESS WHEREOF the parties hereto have executed this Agreement the day and year first above written.

SIGNED, SEALED AND DELIVERED
in the presence of

(SEAL)

(SEAL)

CYPRUS ANVIL MINING CORPORATION

TAILINGS CONTAINMENT CONSTRUCTION
1980 EMBANKMENT DAM RAISING
Faro Yukon Territory

E. GENERAL CONDITIONS

Golder Geotechnical Consultants Ltd.
Consulting Geotechnical Engineers

April 29, 1980
Calgary, Alberta

CYPRUS ANVIL MINING CORPORATION

TAILINGS CONTAINMENT CONSTRUCTION

1980 Embankment and Dam Raising

Faro Yukon Territory

GENERAL CONDITIONS

ARTICLE 1. Definitions

(a) The "Contract Documents" shall include and consist of the following:

1. Invitation for Tenders and Instructions to Tenderers
2. Form of Tender
3. Schedules
4. Form of Agreement between Owner and Contractor
5. General Conditions
6. General Clauses
7. Detailed Specifications
8. Drawings listed in the Detailed Specifications
9. Addenda to the Specifications
10. Completed Form of Tender submitted by Tenderer
11. Executed Form of Contract
12. Contractor's Bonds
13. Specifications and Drawings issued after the Award or Execution of the Contract.
14. Contractor's Specifications and Drawings provided these have been approved in writing by the Engineer.

(b) The word "Specifications" and the words "Tender Documents" shall mean such of the first nine items listed in the immediately proceeding definition of the "Contract Documents" as are sent to the prospective Tenderers.

(c) The word "Drawings" shall mean all drawings, plans, sketches and maps issued with the specifications or subsequently as provided for in the Contract, and shall include any drawings submitted by the Contractor if signed and approved by the Engineer.

(d) The Owner, the Contractor and the Engineer are those named as such in the Agreement.

(e) The word "Tenderer" shall mean, as the context requires, any party or parties tendering on the work covered by these Specifications, or the successful Tenderer who later becomes the Contractor for such Work.

(f) The term "Subcontractor" includes only a person, firm or corporation having a contract for the execution of a part or parts of the work included in the Contract, and a person, firm or corpor-

ation furnishing material called for in the Contract and worked to a special design according to the Drawings or Specifications, but does not include one who merely furnishes material not so worked.

(g) The term "Work" includes all labour, materials and services required, as shown or described in the Contract Documents, supplied and installed or erected complete at the place of building.

(h) The words "Extra Work" shall mean work performed by the Contractor pursuant to a written order of the Engineer issued with respect to the work performed under Article 24 of the General Conditions hereof.

(i) The term "Other Contractor" means any person or firm or corporation employed by or having a contract directly or indirectly with the Owner otherwise than through the Contractor.

(j) The place of building is the designated site or location of the completed Work.

(k) The law of the place of building shall govern the Work.

ARTICLE 2. Contract Documents

The Contract Documents shall be signed in duplicate by the Owner and Contractor. The Contract Documents are complementary, and what is called for by any one shall be as binding as if called for by all. The intention of the Contract Documents is to include all labour and materials reasonably necessary for the proper execution of the work. It is not intended, however, that materials or work not covered by or properly inferable from any heading, section or trade in the Specifications shall be supplied unless shown on the Drawings. Descriptions of materials or work in words which so applied have well known technical or trade meanings shall be held to refer to such recognized standards. Should the Specifications conflict with the Drawings, the Specifications shall govern. In the case of discrepancies between Drawings, those of larger scale, or if the scales are the same, those of later date shall govern. All Drawings and Specifications shall be interpreted in conformity with the Agreement and these General Conditions which shall govern.

ARTICLE 3. Detail Drawings & Instructions.

The Engineer shall furnish, as necessary for the execution of the work, additional instructions, by means of drawings or otherwise. All such additional instructions shall be consistent with the Contract Documents. The Work shall be executed in conformity therewith and the Contractor shall do no work without such additional instructions.

If either the Contractor or the Engineer so requests, they shall jointly prepare a schedule, subject to change from time to time in accordance with the progress of the Work, fixing the dates at which the various detail drawings will be required, and the Engineer shall furnish them in accordance with this schedule; and on like request, a schedule shall be prepared, fixing the dates for the submission of shop drawings, for the beginning of manufacture and installation of materials and for the completion of the various parts of the Work.

ARTICLE 4. Copies Furnished

The Engineer shall furnish to the Contractor, without charge, as many copies of all Drawings and Specifications as are reasonably necessary for the proper execution of the Work.

ARTICLE 5. Drawings and Specifications on the Work

The Contractor shall keep one copy of all Drawings and Specifications on the work, in good order, available to the Engineer and to his representatives.

All Drawings used for construction of the Work shall be marked "Approved for Construction" and signed by the authorized representative designated by the Engineer.

ARTICLE 6. Ownership of Drawings

All Drawings, Specifications and copies thereof furnished by the Engineer are his property. They are not to be used on other work, and, with the exception of the signed contract set of Drawings and Specifications, are to be returned to him on request on the completion of the Work.

ARTICLE 7. Samples

The Contractor shall furnish to the Engineer such samples of construction materials as he may reasonable require.

ARTICLE 8. Engineer and Contractor

The Engineer is in the first instance the interpreter of the Contract and the judge of its performance; he shall use his powers under the Contract to enforce its faithful performance by both parties hereto. The Contractor shall, however, have complete control, subject to Article 10, of his organization. In case of the termination of the employment of the Engineer, the Owner shall appoint an Engineer whose status under the Contract shall be that of the former Engineer.

ARTICLE 9. The Engineer's Decisions

The Engineer shall decide on questions arising under the Contract Documents, whether as to the performance of the Work or the interpretation of the Specifications and Drawings; but should the Contractor hold such decisions to be at variance with the Contract Documents or to involve changes in Work already built, fixed, ordered or in hand in excess of the Contract, or to be given in error, he shall notify the Engineer in writing and wait a reasonable period for a response before proceeding to carry them out. In the event of the Engineer and the Contractor failing to agree as to such excess or error and the Engineer deciding to carry out such disputed work, the Contractor shall act according to such decision. Any questions of excess of cost due to the aforesaid cause may be decided in the manner hereinafter provided in Article 42.

ARTICLE 10. Superintendence

The Contractor shall keep on the Work, during its progress, a competent project manager or superintendent and any necessary assistants, all satisfactory to the Engineer. The project manager or superintendent shall not be changed except with the consent of the Engineer, unless the project manager or superintendent proves to be unsatisfactory to the Contractor or ceases to be in his employ. The project manager or superintendent shall represent the Contractor in his absence and directions on minor matters given to him shall be held to be given to the Contractor. Important directions shall be given in writing to the Contractor. The Contractor shall give efficient supervision to the work using his best skill and attention.

ARTICLE 10A. Employees

Notwithstanding Article 10, any person employed upon the Work, who shall be deemed by the Engineer to be uncooperative, incompetent or disorderly, or one who has been discharged on such grounds by another contractor on the Site shall, upon representation by the Engineer to the Contractor, be by the latter removed from the Work, and shall not at any time thereafter be employed upon the same.

The Contractor shall not permit the use of alcoholic liquors upon or about the Work.

ARTICLE 11. Layout and Measurement

The Engineer will establish on the ground at the Site a survey control base line and one master bench mark together with such other survey marks and bench marks as he may choose to provide to enable the Work to be set out.

The Contractor shall be responsible for the true and proper layout of the Work in relation to original points, lines and levels of references set out by the Engineer and confirmed in writing (or by Drawings) and for correctness of the positions, levels, dimensions and alignment of all

parts of the Work and for the provision of all necessary instruments, appliances and labour in connection therewith.

From the said bench mark and reference points the Contractor shall establish and reference further control points and complete the layout of the Work to the satisfaction of the Engineer. He shall be responsible for all measurements that may be required for the execution of the Work to the exact positions and elevations as shown on the Drawings, or as the same may be modified at the direction of the Engineer to meet changed conditions or as a result of modifications to the Work.

The Contractor shall furnish at his own expense, all the equipment, materials, tools and labour that may be required to lay out the Work from the survey reference points and bench mark established by the Engineer. The Engineer may require that construction work be suspended at any time when location and limit marks established by the Contractor are not reasonably adequate to permit checking completed work or work in progress.

If at any time during the progress of the Work any error shall become evident or arise in the position, levels, dimensions or alignment of any part of the Work, the Contractor, if and when required to do so by the Engineer, shall at his own expense rectify such error to the satisfaction of the Engineer. Provided that if such error is based on incorrect data supplied in writing by the Engineer, the Contractor shall be reimbursed for rectifying the same in accordance with Article 24 "Changes and Extra Work".

The checking of any layout or of any line or level by the Engineer shall not in any way relieve the Contractor of his responsibility for the correctness thereof and the Contractor shall carefully protect and preserve all bench marks, batter boards, pegs and other measures used in the layout of the Work.

The Contractor shall afford all reasonable facilities and assistance to the Engineer for checking the setting-out and lines and grades established by the Contractor. The checking of any setting-out or of any line and grade by the Engineer shall not in any way relieve the Contractor of responsibility for the correctness thereof.

No payment will be made for any expense incurred by the Contractor as a result of any work performed in the establishment of control points or in the checking of these and the taking of any other measurements by the Engineer and no extension of time will be allowed for any delay occasioned thereby.

Before any work on the site is commenced, the Engineer will carry out surveys to enable the surface of the ground to be accurately recorded. During the progress of the Work, the Engineer will take further surveys to record the extent of any excavation and fill. The Engineer will give notice to the Contractor when the Engineer requires any survey to be taken and the Contractor shall forthwith send a qualified representative to attend and assist the Engineer in taking such surveys.

Should the Contractor neglect or omit to send a qualified representative, then the surveys taken by the Engineer or approved by him shall be taken to be correct.

The Engineer shall determine by measurement the quantities of Work performed on a unit price basis.

ARTICLE 12. Labour, Materials, and Equipment

Unless otherwise stipulated, the Contractor shall provide and pay for all labour, materials, and equipment, and including tools, water, light, power and all other consumable items necessary for the execution of the Work. Unless otherwise specified, all materials shall be new. The Contractor shall not employ on the Work any unfit person or anyone not skilled in the work assigned to him.

ARTICLE 13. Inspection of Work

The Owner or the Engineer on his behalf and their representative shall at all times have access to the Work wherever it is in preparation or progress and the Contractor shall provide proper facilities for such access and for inspection. If the Specifications, the Engineer's instructions, the laws, or the ordinances of any public authority require any work to be specially tested or approved, the Contractor shall give the Engineer timely notice of its readiness for inspection, and if the inspection is by an authority other than the Engineer, of the date and time fixed for such inspection. Inspections by the Engineer shall be promptly made. If any such work should be covered up without approval or consent of the Engineer it must, if required by the Engineer, be uncovered for examination and made good at the Contractor's expense.

Re-examination of questioned work may be ordered by the Engineer with the consent of the Owner. If such work be found in accordance with the Contract, the Owner shall pay the cost of re-examination and replacement. If such work be found not in accordance with the Contract, through the fault of the Contractor, the Contractor shall pay such cost.

ARTICLE 14. Rejected Work

The Contractor shall promptly remove from the premises or replace any defective work, which has been condemned by the Engineer as failing to conform to the Contract Documents, whether incorporated in the Work or not.

ARTICLE 15. Deductions for Uncorrected Work

If in the opinion of the Engineer it is not expedient to correct defective work or work not done in accordance with the Contract Documents, the Owner may deduct from the contract price the difference in value

between the work as done and that called for by the Contract, the amount of which shall be determined in the first instance by the Engineer.

ARTICLE 16. Correction After Completion

Subject to any special provisions in the Contract Documents, the Contractor shall remedy any defects due to faulty materials or workmanship appearing within a period of one year from the date of Substantial Completion of the Work and shall pay for any damage to other work resulting therefrom which appears within such period and neither the acceptance certificate nor final payment thereunder shall relieve the Contractor from responsibility hereunder. The Owner shall give notice of observed defects promptly. Questions arising under this Article may be decided as provided in Article 42. This Article shall not be deemed to restrict any liability of the Contractor arising out of any law in force in the place of building.

ARTICLE 17. Emergencies

The Engineer has authority in an emergency to stop the progress of the work whenever in his opinion such stoppage may be necessary to ensure the safety of life, or of the Work, or of neighboring property. This includes authority to make such changes and to order, assess and award the cost of such work extra to the Contract or otherwise as may in his opinion be necessary.

ARTICLE 18. Protection of Work and Property

The Contractor shall maintain continuously adequate protection of all his work from damage and shall take all reasonable precautions to protect the Owner's property from all injury arising in connection with this Contract. He shall make good any damage or injury to his work and shall make good any damage or injury to the property of the Owner resulting from the lack of reasonable protective precautions. He shall not be responsible, however, for any damage or injury to his work and to the property of the Owner which may be directly due to errors in the Contract Documents or caused by the Owner, his agents or employees, provided the Contractor has taken reasonable protective precautions. He shall adequately protect adjacent property as required by law and the Contract Documents.

ARTICLE 19. Contractor's Liability Insurance

(a) The Contractor shall protect himself and indemnify and save the Owner and Engineer harmless from any and all claims which may arise from the Contractor's operations under the Contract where bodily injury, death, or property damage is caused and for this purpose, shall without restricting the generality of the foregoing, maintain insurance as set forth in Clause (c) below.

(b) The Contractor shall furnish evidence of compliance with all requirements of the applicable workmen's compensation Act or Ordinance of the Territory of the Yukon including payments due thereunder.

(c) The Contractor shall maintain Comprehensive general liability insurance covering premises and operations liability, completed operations liability, Contractors Contractual liability, Automobile and Machinery liability insurance (covering licensed and unlicensed units) and covering owned, non-owned, or hired units. The foregoing shall include as specified perils (but without restricting the generality of the foregoing) insurance covering personal injuries (including death) and damage to or destruction of the property of others (including but without limitation standing timber both mature and immature and whether situate on or off the construction site, electric power transmission towers and lines, whether situate on or off the Construction site) by fire, subsidence or explosion, with extended coverage for fire fighting, legal liability expense (whether incurred by the Owner, Contractor or others, including the owners or occupiers of neighbouring lands and the Crown) in a minimum amount of $5,000,000 (five million dollars) with a Company acceptable to the Owner and showing the Owner as Co-insured and payable to the Owner and the Contractor as their respective interest may appear and protecting each in such terms as will preclude subrogation claims by the insurer against anyone insured thereunder.

The Contractor shall hold the Owner and Engineer harmless with regard to any loss or damages resulting from equipment owned or leased by the Contractor.

(d) Subcontractors shall have similar insurance coverage to that required to be in force by the Contractor or shall be covered by the Contractor's insurance.

(e) All insurance policies which the Contractor is required to obtain or to require any Subcontractor to obtain under this Article 19 and Article 20 shall provide that the insurance shall not be cancelled, reduced, restricted or changed in any way without the Insurer giving at least thirty days' notice in writing to the Owner.

(f) If the Contractor fails to do all or anything which is required of him with regard to insurance, the Owner may do all that is necessary to effect and maintain such insurance, and any monies expended by the Owner shall be repayble by and recovered from the Contractor.

(g) Neither the providing of insurance by the Owner nor the insolvency, bankruptcy, nor failure of any insurance company carrying insurance of the Contractor and/or the Owner and/or Sub-contractors, nor the failure of any insurance company to pay any claim accuring shall be held to waive any of the provisions of this Contract with respect to the liability of the Contractor or otherwise.

(h) All liability insurance policies shall be written in such terms as will fully protect the Contractor notwithstanding his assumption of liability and his indemnity covenants under the Contract.

(i) Prior to the commencement of any work hereunder, the Contractor shall file with the Owner a copy of each insurance policy and certificate required. All such insurance shall be maintained until final completion of the work including the making good of faulty work or materials pursuant to Article 16; except that coverage of completed liability shall in any event be maintained for Twelve (12) months from date of substantial completion as certified by the Engineer.

ARTICLE 20. Fire Insurance

The Contractor shall maintain Fire Insurance acceptable to the Owner, with standard Extended Coverage Endorsement, in the joint names of the Owner and Contractor, payable to the Owner and Contractor as their respective interest may appear, and protecting each in such terms as will preclude subrogation claims by the Insurer against anyone insured thereunder.

In the event of a loss, the Contractor shall act on behalf of the Owner and himself for the purpose of adjusting the amount of such loss with the Insurer. On completion of such adjustment the Contractor shall repair the damage and complete the Work, and shall be entitled to receive from the Owner (in addition to any sum due under the Contract) the amount at which the Owner's interest has been appraised in the adjustment, to be paid as the work of restoration proceeds and in accordance with the Engineer's certificates. Damage shall not affect the rights and obligations of either party under the Contract except as aforesaid, and except that the Contractor shall be entitled to such reasonable extension of time for completion of the work as the Engineer may decide.

In the event that the Owner utilizes the Work or any part thereof prior to the date of substantial completion as certified by the Engineer, any increase in cost of insurance arising out of such occupancy shall be at the Owner's expense.

Prior to commencement of any work hereunder, the Contractor shall file with the Owner a copy of the insurance policy. All such insurance shall be maintained continuously until a date ten (10) days after issue by the Engineer of the Acceptance Certificate, after which date the Owner shall assume responsibility for insuring the whole Work.

ARTICLE 20A. Performance Bonds

The Contractor shall provide and maintain in good standing until the expiration of the one year period referred to in Article 16 a Performance Bond in the amount of one hundred percent (100%) of the Contract price guaranteeing the due performance of this Contract by the Contractor and a Labour and Material Payment Bond binding the surety for the payment for all labour and material used in the performance of this Contract and providing that the notice stipulated thereunder may be given within Two Hundred (200) days after the last of the labour was performed and the last of the materials was furnished. The Contractor shall also cause each Subcontractor to provide and maintain a similar Labour and Material Payment Bond (with the Subcontractor as Principal and the Contractor and the Owner as Joint Obligee) and a similar Performance Bond if the same must be issued simultaneously in order to obtain the Labour and Material Payment Bond.

Such bonds shall be obtained with a duly incorporated surety company acceptable to the Owner and authorized by law to transact business in the Yukon Territory. Except as otherwise provided herein, the bonds shall be in the standard forms approved by the Canadian Construction Association. The costs attributable to providing the bonds shall be borne by the Contractor and/or Subcontractors and shall therefore be included in the Tender price.

The Contractor shall report to and obtain the written consent of the surety for all amendments to and increases in the Contract where the increase in value of the Contract is greater thant ten (10) percent as soon as such an increase is indicated. The Contractor shall provide the owner with a copy of the surety's consent, and shall ensure continued bonding of the Contract.

The Contractor shall obtain from the surety who issues a bond an assurance satisfactory to the Owner that the bond will not be terminated or varied unless the Owner first consents in writing.

ARTICLE 21. Fire Fighting Equipment

The Contractor shall at all times during his presence on the site provide fire fighting equipment. The minimum requirements shall be as follows:

(a) All vehicles shall be equipped in conformity with all applicable laws, statutes, ordinances and regulations.

(b) The Contractor shall supply a minimum of three (3) fire fighting pumps of a size and type acceptable to the Engineer plus 500 m of hose per pump, subject to the Engineer's approval. These pumps shall be kept in good operating condition and working order. The disposition of the pumps around the site will be as approved by the Engineer.

ARTICLE 22. Pollution of Adjacent Water Courses

The Contractor shall restrict his work in order that he initiates no pollution of creeks or adjacent water courses. He shall carry insurance sufficient to cover any monetary liability under the Territorial Pollution Control Legislation and consequent legal costs and showing the Owner and Engineer as a Co-insured and without limitation, the Contractor further agrees to indemnify and save harmless the Owner and Engineer from any and all liability claims, damages and costs arising out of any pollution of Creeks or adjacent Water Courses.

ARTICLE 23. Subsurface Conditions

In the event that during the execution of the work subsurface conditions at the site are found to differ materially from those indicated on the Contract Documents and soils data provided, or otherwise represented by Owner or Engineer to the Contractor then the Contractor shall promptly notify the Engineer in writing of such conditions. The Engineer shall promptly investigate such conditions and if he finds that they differ materially and will result in an increase or decrease in the cost of, or time required, for performance of this Contract an equitable adjustment shall be made between the parties and the Contract modified in writing accordingly in accordance with Article 24. If the parties fail to agree upon the adjustment to be made the dispute may be determined as provided for in Article 42.

ARTICLE 24. Changes and Extra Work

(a) Definition of "Changes"
The term "Changes", as used herein, means a substitution for, an addition to, or a deletion of, any work or other requirement, the performance of or compliance with which is contemplated by the Contract.

(b) Definition of "Extra Work"
The term "Extra Work", as used herein, means any work or other requirement, the performance of or compliance with which is not contemplated by the Contract.

Extra Work does not include the following:

i. Work necessitated by the failure of the Contractor to perform satisfactory work or to maintain a satisfactory work schedule; and

ii. Changes in quantities of work as detailed in the Schedule of Quantities and Prices.

(c) Performance of Extra Work
The Engineer may, at any time, without invalidating the Contract or any Performance Bond given thereunder, and without notice to the sureties, make Changes in the Work, and may require the Contractor to perform Extra Work.

(d) Notification of Change

Where a Change, in the opinion of the Engineer, will result in an increase or decrease in:

i. The cost of performing the Work for which no corresponding increase or decrease in the Contract Price is provided for under the Contract, or

ii. The time required to complete the Work, or any part of the Work for which a completion date is set forth in the Contract,

The Engineer will issue the Contractor a written Notification of Change. The Contractor shall promptly perform the Work in accordance with the Notification of Change. When the increase or decrease in the Contract Price, as provided in Article 24[f], or in the time to perform the Work as provided in Article 33, has been established, the Engineer will issue a written Change Order to the Contract setting out the details of such increase or decrease.

(e) Authorization of Extra Work

In general, formal Extra Work orders will be issued in writing by the Engineer whenever Extra Work is required, and formal Change Orders will be issued whenever Changes result in Extra Work.

(f) Payment for Extra Work

Extra Work for which there are, in the opinion of the Engineer, applicable unit prices in the Schedule shall be paid for at such unit prices.

Where there are no such unit prices, Extra Work may be paid for on a lump sum and/or unit price basis as may be agreed upon.

Where, in the opinion of the Engineer, there are no applicable Items in the Schedule of Quantities and Prices for the Extra Work, and the Engineer and the Contractor are unable to agree upon a lump sum or unit prices basis, Extra Work shall be paid for on a Substantiated Expenditure basis.

When payment is to be made on a Substantiated Expenditure basis, Substantiated Expenditure shall mean actual and necessary net cost as approved by the Engineer, plus percentage fees all as hereinafter described:

i. Direct Labour

The direct wages paid to direct labour employed by the Contractor and Subcontractors on the Extra Work in accordance with Contract Schedule H, the Schedule of Hourly Labour Rates.

The Contractor shall submit a schedule of hourly rates for all trades and foremen he proposes to have on his payroll on Contract Schedule H, at the time of Tender.

These hourly rates shall include the direct wages paid to direct labour employed on the Extra Work including the proper proportion of the foremen directly supervising the Extra Work, and including payroll costs such as fringe benefits and statutory assessments paid on the direct wages to labour, and including a fee on the foregoing actual direct labour charges to cover overheads and profit.

The fringe benefits and statutory assessments herein stated shall include assessments under the Workmen's Compensation Act, the Unemployment Insurance Act, Statutes providing for vacations with pay, government hospitalization or any similar statutes of Canada, or payments on account of usual vacations made by the Contractor to his employees engaged on the work at the site, to the extent to which such assessments or payments for vacations with pay relate to the Work covered by this Contract, and all sales taxes or other taxes where applicable.

The fee herein stated shall include all charges for all job overhead charges such as, but not limited to, timekeeping, first aid, clerks, safety men, superintendence, wages and salaries of supervisory personnel, engineers, survey personnel, draftsmen, storekeepers, board and camp costs.

All general overhead such as, but not limited to office salaries and expenses, furnishings, stationery supplies, general supervision, and head office cost.

Contractor's profit.

ii. Materials

The actual net cost to the Contractor or to an approved Subcontractor, whichever is the less, of materials supplied by the Contractor or such approved Subcontractor which are necessary for the performance of the Extra Work, subject to a discount to the Owner to be determined by the Engineer in respect of any re-used materials and in respect of the salvage of any materials not completely consumed.

iii. Equipment

The rental charges for equipment other than small tools, necessary for performance of the Extra Work by the Contractor and Subcontractors for the time directly used in the performance of the Extra Work. Equipment rental charges shall be determined in accordance with Schedule J, the Equipment Rental Rate Schedule. The Contractor shall submit a schedule of hourly, weekly and monthly rates for all equipment listed in Schedule F. These rates shall include

all costs of owning and operating the equipment including lubrication and maintenance, fuel, operators wages (including fringe benefits, statutory assessments, and other payroll costs), depreciation, obsolescence, major repairs, general overhead, and all related taxes. The rates shall also include all costs of transporting the equipment to and from the jobsite, and on and off loading the equipment from any carrier vehicle. "Small Tools" shall include all hand tools such as picks, shovels, wheelbarrows, hoses and other single items each of a new market value of $500.00 or less.

iv. Expendables and Small Tools
The cost of all expendable materials, supplies and small tools (other than tools customarily provided by tradesmen) less the salvage value thereof at the completion of the work.

v. Sub-Contracts
The amount of all Subcontract costs for Subcontractors directly engaged on the Extra Work, provided prior authorization for the employment of Subcontractors on the Extra Work is obtained from the Engineer.

vi. Other
Such other expenditures in connection with the Work as may be approved by the Engineer, provided always that except with the consent of the Engineer, the above items of cost shall be at rates comparable with those prevailing in the locality of the Work.

vii. Fee
A fee of ten percent (10%) on the material costs in Item (ii.) above and on the Sub-Contract costs covered in Item (v) above to cover all overheads and profit.

No percentage fee shall be paid in respect of the rental charges for equipment, and of the costs of expendables and small tools, or labour other than that stated by item (i) above.

(g) Daily Field Reports

The Contractor shall submit to the Engineer a daily report on all Extra Work in progress. The report shall be of a form in the number of copies required by the Engineer and shall be submitted daily on the first working day following each day on which any Extra Work is executed. For all Extra Work performed on a cost basis the report shall iclude the following information:

i. The names, occupations, union rates and time engaged on such Extra Work of all labour including the proper proportion of the time of foremen directly supervising such Extra Work.

ii. The description and quantity of all materials actually incorporated into such Extra Work.

iii. The description and time operated of all equipment necessarily used in the performance of such Extra Work.

iv. The daily cost of all expendable materials and supplies consumed in the performance of Extra Work.

v. The daily costs for Sub-Contractors engaged on Extra Work.

Copies of each daily field report shall be approved by the Engineer when agreed upon and returned to the Contractor who shall attach one copy of the approved report with invoices and other necessary documents to his monthly statements.

(h) Revocation and Audit

The Engineer shall supply the Owner with a copy of all Extra Work Orders and Change Orders, together with cost estimates relating thereto, prior to the commencement of the relevant work and the Owner shall be entitled to revoke the same at any time prior to the commencement of the work.

The Owner shall also have the right to audit all invoices and documents relevant to claims for payment under Extra Work Orders and Change Orders.

ARTICLE 25. Additions and Deductions.

The Engineer shall have the right to make such alterations, deductions and additions as he may require in the line, grade, form, location, dimensions, quantities, or material of the Work herein contemplated or any part thereof, either before or after the commencement of construction.

Under no circumstances shall such alterations, deductions or additions affect the validity of the terms of the Contract. If, however, such alterations, deductions or additions shall make useless any work already done or material already supplied, the Engineer shall make reasonable allowance thereof.

ARTICLE 26. Acceptance Certificate.

When the entire Work has completely fulfilled the requirements of the Contract, in the opinion of the Engineer, the Engineer shall so certify in writing by means of an Acceptance Certificate to the Owner and to the Contractor, and it shall then be deemed that the Owner has taken over the Work.

ARTICLE 27. Progress Estimates and Payments

On or about the end of each month, a progress estimate, on a form approved by the Engineer shall be prepared by the Contractor showing the estimated amount of each class of work including Extra Work performed during the month, and the values thereof will be computed in accordance with the unit or lump sum prices set out in the Contract, provided that such estimate shall not include and no payment shall be made on account of the value of materials delivered to the Site which have not been incorporated in the permanent work.

The progress estimate shall be accompanied by such satisfactory evidence as the Engineer may require to establish that the costs have been properly incurred and by an appropriate certification to the effect that all wages and currently due workmen's compensation and unemployment insurance have been paid for the period covered by the said progress estimate.

The progress estimate will be submitted to the Engineer for checking and certification. When the Engineer is satisfied that the estimate is correctly made out in accordance with the provisions of the Contract, he will certify the estimate and forward it to the Owner.

The Engineer shall within ten (10) days of the receipt of the progress estimate, certify the amount for payment, or advise the Contractor promptly in writing why the account is amended or disapproved.

Eighty-five percent (85%) of the amount of each progress estimate thus prepared will be paid to the Contractor within ten (10) days after receipt of the progress estimate in the Owner's Site Operations Office at the Faro minesite duly certified by the Engineer.

ARTICLE 27A. Final Payment

Within thirty (30) days of signing the Acceptance Certificate (as described in Article 26 hereof) for the whole Work, the Engineer will prepare a final statement of the total quantities of the various classes of work performed, based on field measurement. The statement will show the total amount due to the Contractor for all Work, including Extra Work, performed under the Contract.

Except as hereinafter provided, the amount due to the Contractor, after deducting from the total so shown the amounts of all previous monthly progress payments and the amounts of any monies due or claimed to be due to the Owner from the Contractor, will be paid by the Owner to the Contractor within thirty (30) days after the signing by the Engineer of the final statement.

Provided, however, that before payment is made, the Contractor shall execute a release to the Engineer and the Owner from all claims or demands whatsoever arising out of or in connection with performance of the Work, and shall furnish satisfactory evidence to the Engineer and the Owner that all claims or demands against the Contractor arising out of or in connection with the performance of the Work have been satisfied.

Provided, further, that notwithstanding anything herein contained, the Owner shall be entitled to retain as a holdback under the Mechanics' Lien Ordinance, ten percent (10%) of all payments due to the Contractor under this Contract until the expiration of thirty (30) days following the date of the Acceptance Certificate (or such other percentage for such other period as may from time to time be prescribed by the Mechanics' Lien Ordinance or a successor ordinance thereto).

ARTICLE 28. Taxes

Unless otherwise provided herein, the Contractor shall pay all government sales or excise taxes in force during the continuance of this Contract.

ARTICLE 29. Permits, Notices, Laws and Rules

The Contractor shall apply and pay for all necessary permits or licences required for the execution of all the Work (but this shall not include the obtaining of permanent easements or rights of servitude). The Contractor shall give all necessary notices and pay all fees required by law and comply with all laws, ordinances, rules and regulations relating to the Work and to the preservation of the public health.

If the Contract Documents are at variance therewith, any resulting additional expense incurred by the Contractor shall constitute an addition to the Contract Price.

ARTICLE 29A. Safety

The Contractor shall be responsible for the safety of all workmen and equipment on the project in accordance with all applicable safety legislation passed by federal, territorial and local authorities governing construction safety.

The Contractor shall at all times exercise all necessary precautions for the safety of his employees and shall comply with all statutory requirements and any instructions of the Engineer or of the Safety Inspectors employed by said authorities. Safety precautions as applicable shall include but shall not be limited to adequate life protection and life-saving equipment, fire fighting tools, adequate illumination for all operations, instructions in accident prevention for all employees including, where necessary, care in the use of explosives, adequate traffic control, and such machinery guards, walkways, scaffolds, ladders, bridges and other safety devices as are necessary to prevent accidents or injuries.

The Contractor, in addition to any other reports which may be required, shall promptly report to the Engineer all accidents involving death of or serious injury to any person.

ARTICLE 30. Patent Fees

The Contractor shall pay all royalties and licence fees and shall save the Owner and Engineer harmless from loss on account of suits or claims for infringement of patents in the doing of the Work.

ARTICLE 31. Use of Premises

The Contractor shall confine his equipment, the storage of materials and the operations of his workmen to limits indicated by laws, ordinances, permits or by direction of the Engineer and shall not unreasonably encumber the premises with his materials. The Contractor shall not load or permit to be loaded any part of the work with a weight that will endanger its safety. The Contractor shall enforce the Engineer's instructions regarding signs, advertisements, fires and smoking.

ARTICLE 32. Cleaning Up

The Contractor shall at all times keep the site free from accumulations of waste material or rubbish caused by his employees or work, and at the completion of the Work he shall remove all his rubbish and all tools, equipment and surplus materials from and about the Work and shall leave the Work in an orderly condition. In case of dispute the Owner may remove the rubbish and charge the cost as the Engineer shall determine to be just.

ARTICLE 33. Delays and Extension of Time

If the Contractor is delayed in the completion of the Work by any act or neglect of the Owner, Engineer or any Other Contractor or any employee of any one of them or by changes ordered in the Work, then the time of completion may be extended for such reasonable time as the Engineer may decide. If the Contractor is delayed in completion of the Work by labour disputes, strikes, lock-outs (including lock-outs decreed or recommended by a recognized contractors' association for its members of which the Contractor is a member), fire, unusual delay by common carriers or unavoidable casualties or, without limit to any of the foregoing, by any cause of any kind whatsoever beyond the Contractor's control, then the time of completion shall be extended for a period of time equal to the time loss due to such delays. In addition and without limit to the foregoing the time of completion shall be extended because of any cause whatsoever within the Contractor's control which the Engineer shall decide as justifying a delay for such reasonable time as the Engineer may decide.

No such extension shall be made for delay unless written notice of claim is given to the Engineer within seven (7) days of its commencement, provided, however, that in the case of a continuing cause of delay only one claim shall be necessary.

Notwithstanding anything herein contained, if the Contractor is delayed in completion of the Work or if there are one or more suspensions of the Work by reason of labour disputes, strikes or lock-outs involving employees of the Owner, the Engineer or any other employer, the time of

completion shall be extended for a period of time equal to the time loss due to such delays or suspensions but the Contractor shall have no claim against the Owner or the Engineer in respect of the delays or suspensions and the Contractor shall be obliged to complete the Work following the delays or suspensions without being entitled to receive any compensation or reimbursement for loss or extra costs and charges resulting from the delays or suspensions.

If no schedule is made under Article 3, no claim for delay shall be allowed on account of failure to furnish drawings until two weeks after demand for such drawings and not then unless such claim be reasonable.

The Engineer shall not, except by written notice to the Contractor, or as provided in Article 17, stop or delay any part of the Work pending decisions or proposed changes either by himself or by the Owner.

ARTICLE 34. Owner's Right to do Work

If the Contractor should neglect to prosecute the Work properly or fail to perform any provision of this Contract, the Owner, after five (5) days' written notice to the Contractor may, without prejudice to any other right or remedy he may have, make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due to the Contractor; provided however, that the Engineer shall approve both such action and the amount charged to the Contractor.

ARTICLE 35 Owner's Right to Perform Work or Stop the Work or Terminate Contract

If the Contractor should be adjudged as bankrupt, or makes a general assignment for the benefit of creditors under the Bankruptcy Act (Canada) or if a receiver or receiver manager is appointed in respect of any of his property, the Owner may, without prejudice to any other right or remedy he may have, by giving the Contractor or receiver or receiver-manager or trustee in bankrupty written notice, terminate the Contract.

If the Contractor should neglect to prosecute the Work properly or otherwise fails to comply with the requirements of the Contract to a substantial degree and if the Engineer has given a written statement to the Owner and the Contractor that sufficient cause exists, the Owner may notify the Contractor in writing that he is in default of his contractual obligations and instruct him to correct the default in the five (5) working days immediatley following the receipt of such notice.

If the correction of the default cannot be completed in the five (5) working days specified, the Contractor shall be in compliance with the Owner's instructions if he:

(a) commences the correction of the default within the specified time, and,

(b) provides the Owner with an acceptable schedule for such correction and,

(c) completes the correction in accordance with such schedule.

If the Contractor fails to correct the default in the time specified or subsequently agreed upon, the Owner, without prejudice to any other right or remedy he may have, may:

(a) correct such default and deduct the cost thereof from any payment then or thereafter due the Contractor provided the Engineer has certified such cost to the Owner and the Contractor, or,

(b) terminate the Contractor's right to continue with the Work in whole or in part or terminate the Contract.

If the Owner terminates the Contractor's right to continue with the Work under the conditions set out in this General Condition, he shall:

(a) be entitled to take possession of the Work and utilize the construction machinery and equipment subject to the rights of third parties, and finish the Work by whatever method he may consider expedient but without undue delay or expense, and

(b) withhold further payments to the Contractor until the Work is finished, and

(c) upon Total Performance of the Work, charge the Contractor the amount by which the full cost of finishing the Work as certified by the Engineer, including compensation to the Engineer for his additional services and a reasonable allowance as determined by the Engineer to cover the cost of corrections to work performed by the Contractor that may be required under Article 16 exceeds the unpaid balance of the Contract Price; however, if such cost of finishing the Work is less than the unpaid balance of the Contract Price, he shall pay the Contractor the difference, and

(d) on expiry of the warranty period, charge the Contractor the amount by which the cost of corrections to his work under Article 16 exceeds the allowance provided for such corrections, or if the cost of such corrections is less than the allowance, pay the Contractor the difference.

The provisions of this General Condition shall be exercised in accordance with the conditions of the performance bond.

The Contractor's obligation under the Contract as to quality, correction and warranty of the work performed by him up to the time of termination shall continue in force after such termination.

ARTICLE 36. Contractor's Right to Suspend Work or Terminate Contract

If the Work should be stopped under an order of any court, or other public authority through no act or fault of the Contractor or of anyone employed by him (but excluding a stoppage related to a labour dispute strike or lock-out) or if the Engineer fails to issue a certificate in accordance with Article 27, or if the Owner should fail to pay the Contractor within ten (10) days of its maturing and presentation, any sum certified by the Engineer or awarded by arbitrators, then the Contractor may upon five (5) days written notice to the Owner and the Engineer stop work and/or terminate this Contract without prejudice to any other right or remedy he may have, and recover from the Owner payment for all work executed and any loss sustained upon the plant or material with reasonable profit and damages.

ARTICLE 37. Damages and Mutual Responsibility

If either party to this Contract should suffer damage in any manner because of any wrongful act or omission of the other party or anyone employed by him (but excluding an act or omission of an employee related to a labour dispute strike or lock-out) then he shall be reimbursed by the other party for such damage. Claims under this paragraph shall be made in writing to the party liable within a reasonable time after the first observance of such damage and not later than the time of acceptance certificate, except as expressly stipulated otherwise in the case of faulty work or materials, and may be adjusted by agreement or in the manner set out in Article 42, and the party reimbursing the other party as aforesaid shall thereupon be subrogated to the rights of the other party in respect of such wrongful act or neglect if it be that of a third party. Should the Contractor cause damage to any Other Contractor on the work, the Contractor agrees upon due notice to settle with such Other Contractor by agreement or arbitration, if he will so settle. If such Other Contractor sues the Owner on account of any damage alleged to have been so sustained the Owner shall notify the Contractor who shall defend such proceedings at the Owner's expense and if any final order or judgment against the Owner then the Contractor shall have the right, upon undertaking to indemnify the Owner against any and all liability for costs, to appear in the name of the Owner such final order or judgments to any and all court of competent jurisdiction.

ARTICLE 38. Separate Contracts with Other Contractors

The Owner reserves the right to let separate contracts in connection with the undertaking of which the Work is a part and the Contractor shall connect properly and coordinate his work with that of Other Contractors. If any part of the Contractor's work depends for its proper execution or result upon the work of any Other Contactor, the Contractor shall in writing report promptly to the Engineer any defects in the work of such Other Contractor as may interfere with the proper execution of the Contractor's work. Should the Contractor fail so to inspect and report he shall have no claim against the Owner by reason of the defective or unfinished work of any Other Contractor except as to latent defects not reasonably noticeable at the time of the commencement of the Contractor's

The Contractor shall not be obliged to employ as a Subcontractor or supplier any person or firm to whom he may reasonably object.

ARTICLE 41. Relations of Contractor and Subcontractor

The Contractor agrees to bind every Subcontractor by the terms of the Contract Documents, as far as applicable to his work.

ARTICLE 42. Arbitration

In the case of any dispute arising between the Owner (or the Engineer acting on his behalf) and the Contractor as to their respective rights and obligations under the Contract, either party hereto shall be entitled to give to the other notice of such dispute and to request binding arbitration thereof; and the parties may, with respect to the particular matters then in dispute, agree to submit the same to binding arbitration in accordance with the applicable law of the Yukon Territory.

Arbitration proceedings shall not take place until after the completion or alleged completion of the Work except (a) on a question of certificate for payment, or (b) in a case where either party can show that the matter in dispute is of such nature as to require immediate consideration while evidence is available.

work. In letting separate contracts the Owner shall be responsible for the coordination of fire and other insurance coverage and shall take all precautions reasonably possible to avoid possible occurrence of a labour dispute or disputes on the Work.

ARTICLE 39. Assignment

Neither party to the Contract shall assign the Contract without the written consent of the other.

ARTICLE 40. Subcontractors.

The Contractor agrees to preserve and protect the rights of the parties under the Contract with respect to work to be performed under sub-contract and to:

(a) enter into contracts or written agreements with his Subcontractors to require them to perform their work in accordance with and subject to the terms and conditions of the Contract Documents, and

(b) be as fully responsible to the Owner for acts and omissions of his Subcontractors and of persons directly or indirectly employed by them as for acts and omissions of persons directly employed by him.

The Contractor therefore agrees that he will incorporate the terms and conditions of the Contract Documents into all Subcontract Agreements he enters into with his Subcontractors.

The Contractor agrees to employ those Subcontractors proposed by him in writing and accepted by the Owner at the signing of the Contract.

The Owner may, for reasonable cause, object to the use of a proposed Subcontractor and require the Contractor to employ one of the other subcontract bidders. In the event that the Owner requires a change from a proposed Subcontractor the Contract Price shall be adjusted by the difference in cost and mark-up occasioned by such required change.

The Engineer may, upon reasonable request and at his discretion, provide to a Sub-Contractor information as to the percentage or quantity of the Sub-Contractor's work which has been certified for payment.

Nothing contained in the Contract Documents shall create a contractual relationship between a Sub-Contractor and the Owner.

The Engineer shall, on request, furnish to any Sub-Contractor, wherever practicable, evidence of the amounts certified to on his account.

CYPRUS ANVIL MINING CORPORATION

TAILINGS CONTAINMENT CONSTRUCTION
1980 EMBANKMENT DAM RAISING
Faro Yukon Territory

F. GENERAL CLAUSES

Golder Geotechnical Consultants Ltd.
Consulting Geotechnical Engineers

April 29, 1980
Calgary, Alberta

CYPRUS ANVIL MINING CORPORATION

TAILINGS CONTAINMENT CONSTRUCTION

1980 Embankment and Dam Raising

Faro Yukon Territory

GENERAL DESCRIPTION OF THE PROJECT

1. LOCATION

The site of the Work is located in the valley of Rose Creek, downstream of the North Fork of Rose Creek at the Anvil Mine Property near Faro, Yukon Territory. The project elevation of the site is as shown on the contract drawings. The construction site is within the property limits of Cyprus Anvil Mining Corporation.

2. PURPOSE

The purpose of the proposed construction is to increase the storage capacity of the existing tailings disposal area currently being utilized for storage of tailings being produced by Cyprus Anvil Mine. The work involves the Embankment Dam raising of the crest elevation of the existing East and West embankment dams approximately fifteen (15) ft. to the elevations shown on the construction drawings

3. SCOPE OF WORK

The work includes but shall not necessarily be limited to the following:

(a) Clearing, grubbing of natural ground surface and stripping of topsoil as required for embankment dam foundation construction.

(b) Excavation and disposal of materials present in the base areas of the proposed new decant channel.

(c) Excavation, hauling and compaction of natural granular materials from the designated borrow areas for construction of the specified zones of the embankment dams.

(d) Excavating, hauling and compaction of tailings sand material from designated borrow areas for construction of specified zones of the embankment dams.

It is the intent that the Contractor shall supply all labour, materials, equipment and tools to carry out the required Work and that the equipment available shall be adequate to produce a balanced plant.

4. DIRECTION OF WORK

The Contractor shall supply all equipment and suitable experienced personnel to operate the equipment such that best usage of the equipment will be achieved. The Contractor will be responsible for providing all maintenance and repair of equipment. All work will be directed and controlled by the Owner or by the "Engineer".

5. COMMENCEMENT, PROSECUTION AND COMPLETION OF THE WORK

5.1 Commencement

The Contractor shall commence work at the jobsite as soon as possible after being notified in writing by the Owner of acceptance of his Tender, and in any case no later than June 15, 1980, or fourteen (14) days after being so notified by the Owner, whichever comes later.

5.2 Prosecution

The sequence and progress of the Work shall be carried out in accordance with the Contract Construction Schedule covered by General Clause 6.

5.3 Completion

The work shall be completed without obstruction or risk of damage to the Work, in accordance with the following provisions:

(a) Substantial Completion of the tailings containment dam shall be not later than August 15, 1980 such that on that date the construction has been completed according to the Contract specifications and drawings and can begin to be utilized without restriction by the Owner, and to the satisfaction of the Engineer.

The Contractor shall have all of the Work completed, including final clean-up, and shall have all of his equipment removed from the jobsite (unless formal approval is received from the Owner otherwise) not later than August 15,1980

6. CONSTRUCTION SCHEDULE

6.1 Preliminary Schedule

Until the Contract Construction Schedule is approved as provided by Section 6.2 below, the Work shall be performed in accordance with Contract Schedule C, Preliminary Construction Schedule.

6.2 Submission And Approval

The Contractor shall within fourteen (14) days after being notified in writing by the Owner of acceptance of his tender submit to the Engineer a reproducible copy (transparency) of his proposed construction schedule covering all Contract activities. Such schedule shall include a Bar Chart Schedule and/or a Network Diagram, a list of activities and a written explanation of the proposed plan and schedule of construction of the Work, all as hereinafter set forth. The Contractor shall adequately demonstrate on his proposed construction schedule the impact of significant variables on the start and finish dates of all major activities.

The Contractor's proposed construction schedule shall be subject to approval by the Engineer to ensure that it respresents a practical and achievable plan for completion of the Work in accordance with all Contract requirements. Following approval by the Engineer, the Contractor's proposed construction schedule shall become the Contract Construction Schedule and shall take precedence over the Preliminary Construction Schedule shown as Contract Schedule C.

The Contractor shall prosecute the Work in accordance with the Contract Construction Schedule. The Contractor will be permitted reasonable variance from the sequence of activities indicated by the Contract Construction Schedule, provided such variance does not jeopardize timely completion of the Work, in accordance with all provisions of the Contract, and provided that no interference is caused to operations of others. The Contractor shall at all times keep the Engineer informed of his proposed courses of action, and his day to day schedule of operations.

If, in the opinion of the Engineer, delay to an activity or a series of activities jeopardizes timely completion of the Work or a portion thereof in accordance with requirements of the Contract, the Contractor shall take such action as necesary to improve his progress including, but not necessarily limited to, increasing any or all of his forces, construction equipment, shifts and/or hours of work. The Contractor shall submit a detailed plan showing his proposed method of acceleration of production to provide compliance with the Contract Construction Schedule and upon approval by the Engineer of an adequate plan shall immediately and effectively implement such program.

6.3 Progress Reports and Site Meetings

During the course of the Work, the Contractor shall submit to the Engineer periodic progress reports on the actual progress of the Work. Such reports shall be furnished as the Engineer may request, but will not be required more often than weekly nor less often than once monthly, and shall contain the following:

i) The list of activities scheduled to be in progress or actually in progress during the report period, together with the Contractor's estimate of progress made to the cutoff date and actual or forecast start and/or completion date for each of these activities.

ii) A list of activities scheduled to be started within the next two reporting periods with forecast start dates.

iii) A brief narrative report presenting a general resume of Contract progress and an explanation of any actual or anticipated delays or problems affecting progress of the Work. Such progress reports shall be presented during regular site meetings to be held on dates as agreed upon by the Engineer and Contractor.

7. TRANSPORTATION

The Contractor shall make his own arrangements and shall be responsible for transporting all necessary material, equipment and labour to the site and also for the removal of his unused materials and his equipment and labour upon completion of the Work.

8. CONSTRUCTION POWER

The Contractor shall at his own expense arrange for the generation of all electrical power necessary for performing the Work covered by this Contract.

9. CONSTRUCTION ROADS AND ACCESS FACILITIES

The Contractor shall, at his expense, construct and maintain throughout the duration of the Contract such haul roads and access facilities as may be necessary for the supply and placement of all earthwork materials and other items required for the construction. He shall also provide at his expense, all lighting, signs, barricades, distinctive markings, traffic control facilities, dust control, snow removal, sanding and personnel necessary for the safe movement of his own traffic as well as other traffic which may be affected by his operations.

The Contractor shall, at his expense, keep and maintain Owner's roads used by him in a condition equivalent to or better than their original condition when he commences to use them at the start of the Contract and at least equivalent to that required for normal usage by the Owners of such private roads.

The location, grades, widths and dimensions of all haul roads and other access facilities to be constructed by the Contractor shall be subject to the approval of the Engineer and details of these access roads and facilities shall be submitted to the Engineer in due time prior to their construction.

Access and haul roads and all other associated facilities shall be constructed so as not to interfere with natural or directed drainage courses and shall be graded and drained properly so as not to create a hazard to property or to the Work. The quality of materials used in construction shall be such that the roads and facilities will remain in a stable and safe condition throughout the period of their use.

The Contractor shall comply with any ruling regarding traffic movement on the existing access roads which may be made by the Engineer.

10. FIRE PROTECTION

A fire break shall be provided around the periphery of the works and all brush shall be stockpiled inwards from the periphery of clearing, if directed by the Engineer.

11. ACCESS TO PRIVATE PROPERTY

The Engineer will obtain the necessary permission to enter on or use private property. The Contractor shall not enter or use or permit any of his employees to enter or use any property other than that designated as being within the project property area without the specific permission of the Engineer. If the Contractor wishes to enter or use any property for which he has not received permission, he shall make application to the Engineer. The Engineer will seek to obtain the necessary permission as rapidly as he is able, but neither the Owner nor the Engineer will be liable for any delay in obtaining the necessary permission.

12. PROTECTION OF PRIVATE PROPERTY

The Contractor shall be wholly responsible for any damage to private property resulting from his operations and it shall be his responsibility that all workmen and persons employed by him or his agents or under his control shall use due care that no person or property is injured or damaged and that no rights are infringed in the prosection of the Work.

13. PERMITS AND NOTICES

The Contractor will be responsible for obtaining all notices and permits required for completion of the Work.

14. ROOM AND BOARD

The Owner will provide room and board in his mine site camp for up to thirty-five employees of the prime contractor and his sub-contractors. Where room and board are provided by the Owner the prime contractor shall be charged a fixed rate equalling $30.00 for each employee for each day for his employees as well as his sub-contractor's employees. Additional meals for visitors will be charged for at a fixed rate of $8.00 for each extra meal. Camp rules must be adhered to in all respects.

15. OFFICE FOR THE ENGINEER

The Contractor shall provide all necessary electical power for the Engineer's site trailer (to be supplied by Owner). The Contractor shall, in addition to this, supply to the Engineer's site trailer, all necessary heating fuel and potable water as directed by the Engineer.

The Contractor shall be responsible for the labour and cost of making minor modifications to the office to permit its use as a construction control laboratory.

16. SECURITY

The Contractor shall assume full responsibility for the security of the Work.

In addition, the Contractor shall provide suitable "no trespassing" signs on the access roads to the site to prohibit entry of the public.

17. SPECIAL PRECAUTIONS

(a) Explosives

The Contractor shall comply with all laws and regulations applicable to the use, handling and storage of explosives.

(b) Fuel Storage

Supplies of gasoline, fuel oils, other liquified petroleum or gas products shall be stored and transported in accordance with the applicable laws of the Territory of the Yukon.

18. MEASUREMENT AND COMPUTATION OF QUANTITIES

Measurement of payment of Contract items will be as described in the Detailed Specifications. The Engineer will make all measurements and computations for quantities in accordance with good engineering practice. Field surveys and measurements will be performed by an independent registered land survey company.

19. DIARY

The Engineer shall maintain in detail, a Diary to record the progress of the Work, the number of personnel of all categories at the site, and all such other items which he deems necessary to record. The Diary shall be kept in the Engineer's Site Office and the Contractor shall be required to read and sign this document daily. If the Contractor disputes any fact set out in the Diary he shall, within seven (7) days give notice in writing to the Engineer expounding any difference or differences of opinion.

20. SANITATION

The Contractor shall provide and maintain, so long as any of his men are employed on the Work, adequate sanitary conveniences for their use, and their provision, maintenance and removal shall accord in every way with the requirements of the local Medical Officer of Health. The Contractor shall also provide and be responsible for the servicing of similar facilities which he shall install at the site office of the Engineer.

21. FAIR WAGES

The Contractor shall pay all tradesmen employed on the Work not less than the fair rate of wages for work of a similar nature prevailing in the vicinity of the Work.

22. DRAWINGS

The Drawings listed in the following schedule are included in and form part of this Specification. Revision of these Drawings may be made and furnished to the Contractor during the construction of the Work, and all revised Drawings shall take precedence over previous issues of such Drawings. The Contractor shall act only on written instructions or revised Drawings and not on oral instructions.

The following drawings form a part of these specifications:

DRAWING NO.	DESCRIPTION
7922041-1	Site Plan
7922041-2	West Dam Sta. 0+00 to Sta.26+00 East Dam Sta. 0+00 to Sta.20+00
7922041-3	Typical West Dam Sections Sta. 0+00 to Sta. 26+00
7922041-4	East Dam - Sta. 5+00 to Main Access Road Abutment
7922041-5	Typical East Dam Sections
7922041-6	Decant Channel and North Abutment Details

CYPRUS ANVIL MINING CORPORATION

TAILINGS CONTAINMENT CONSTRUCTION
1980 EMBANKMENT DAM RAISING
Faro Yukon Territory

G. DETAILED SPECIFICATIONS

Golder Geotechnical Consultants Ltd.
Consulting Geotechnical Engineers

April 29, 1980
Calgary, Alberta

CYPRUS ANVIL MINING CORPORATION

TAILINGS CONTAINMENT CONSTRUCTION

1980 Embankment and Dam Raising

Faro Yukon Territory

DETAILED SPECIFICATIONS

ITEM 1A

MOBILIZATION

1A.01 DESCRIPTION

Mobilization shall mean the complete mobilization of all equipment and manpower from place of origin to the site of the project along with any support facilities required in accordance with proposed Contract Schedules E, F and G of the Contract Schedules detailed herein and to the approval of the Engineer. Expenses of demobilization shall be covered within unit prices bid by the Contractor on the project work.

1A.02 METHOD OF MEASUREMENT

Mobilization shall be measured as a percentage of the Contractors forecast for mobilization as detailed by Contract Schedules E, F and G and as agreed jointly by the Contractor and the Engineer.

1A.03 BASIS OF PAYMENT

Mobilization will be paid as a percentage of the Lump Sum price bid under Item 1A of the Schedule of Quantities and Prices.

ITEM 1

CLEARING, GRUBBING, STRIPPING OF TOPSOIL AND REMOVAL OF WASTE MATERIAL

1.01 SCOPE

The work included in this item consists of furnishing all labour, plant and small tools and performing all work to clear and grub and remove waste materials from areas to be excavated for embankment dams, at the site as required by the Engineer and clearing only of waste disposal areas, also removal of topsoil from within embankment foundation areas and disposal of same. No payment will be made for clearing and grubbing required for haul roads and other contractor's facilities except as directed by the Engineer to be cleared. No payment will be made for areas already cleared.

1.02 DISPOSAL OF WASTE MATERIAL

All slash, stumps, roots and other debris resulting from clearing, grubbing and danger tree removal shall be buried as directed by the Engineer.

1.03 PAYMENT ITEM 1(a) - CLEARING AND GRUBBING

1.03.01 - Description

Clearing shall mean the complete removal and disposal of all trees, shrubs, logs, loose stumps, debris and other objectionable material from areas required by the Engineer to be cleared, and as generally shown on Drawing Number 7922041-4.

Grubbing shall mean the entire removal and disposal of all stumps, roots, embedded logs and other buried debris from areas of cuts where stumps, roots and other debris would spoil the use of excavated materials as fill or the suitability of the cleared surface for receiving fill. Grubbing shall be performed as required by the Engineer in areas cleared for construction of dykes, borrow pits, storage areas, or any other areas stipulated by the Engineer.

All trees shall be felled within the cleared areas and in the event of any trees falling outside the boundaries of the cleared areas, such trees shall be brought back within the cleared areas and burned if required by the Engineer.

1.03.02 - Method of Measurement

The quantity of clearing and grubbing to be paid for will be determined by measuring the area cleared as required by the Engineer. Existing cleared land will not be paid for. Measurement for clearing isolated trees will be taken over the area directly under the foliage of such trees. The area determined for payment will be made on the basis of horizontal measure.

1.03.03 - Basis of Payment

Payment for clearing and grubbing will be made at the unit price bid per acre under Item 1(a) of the Schedule of Quantities and Prices. This price shall include the cost of all labour, plant and small tools required to clear areas as directed by the Engineer, to dispose of waste material, and to construct an initial fire break prior to clearing. No payment will be made for clearing haul roads or other areas cleared by the Contractor outside the area required to be cleared by the Engineer.

1.04 PAYMENT ITEM 1(b) - STRIPPING AND REMOVAL OF TOPSOIL

1.04.01 - Description

All topsoil within the embankment foundations will be stripped and removed from the area to suitable disposal dumps designated by the Engineer or to sites subject to the Engineer's approval.

1.04.02 - Method of Measurement

The quantity of materials to be paid for will be determined by computing the stripping volume based on surveys of the ground surface before and after topsoil stripping.

1.04.03 - Basis of Payment

Payment for topsoil stripping and removing will be made at the unit price bid per cu. yd. under item 1(b) of the Schedule of Quantities and Prices. This price shall include the cost of all labour, plant and small tools required to strip areas as directed by the Engineer. No payment will be made for clearing haul roads or other areas cleared by the Contractor outside the areas required to be stripped by the Engineer.

ITEM 2

EXCAVATION AND EARTHWORKS

2.01 SCOPE

The work included in this item consists of furnishing all materials, labour, plant and small tools and performing all work required to excavate and construct the earthwork.

2.01.01

The principal features of the excavation and earthworks include but shall not be limited to the following:

(a) The excavation hauling and disposal of materials to the lines shown on the drawings, along the alignment of the decant channel.

(b) The excavation, hauling, placement and compaction of the various classes of borrow material for the construction of the Work as well as the damming of the existing decant channel such that work can be carried out in the dry.

2.01.02

The principal feature of the earthworks includes but is not limited to the construction of raising the crest elevations of the existing East and West tailings containment embankment dam structures by approximately fifteen (15) feet.

2.02 MATERIALS

All materials placed in the earthworks shall conform to the specifications for the various materials, as set out herein. The description of materials Class I, Class II, Class III and Class IV are given to allow the contractor to determine suitable excavation, hauling, placing and compaction procedure and equipment. Class I fill may be excavated separately from Borrow Areas 'A' and 'B' and used as general fill. Class II materials may be selectively excavated from Borrow Areas 'A' and 'B' and be used as filter zone fill. Class III and IV materials may be obtained from Borrow Areas 'A' and 'B' and will have been screened by others to achieve the desired gradation.

Class V fill may be excavated from Borrow Area 'C' and 'D' and used as tailing sand fill.

The location of borrow areas 'A', 'B','C' and 'D' are shown on Construction Drawing No. 7922041-1.

All materials placed in the earthworks shall be placed and compacted in accordance with the specifications herein.

The following gradation limits apply for the fill types to be included in the construction.

Class I - Shell Material for Embankment Construction

U.S. Standard Sieve Size	Minimum Percent by Weight Passing	Maximum Percent by Weight Passing
6 in.	90	100
1 1/2 in.	70	100
No. 4	45	70
No. 40	15	35
No. 200	0	5

Maximum particle size not to exceed 10 in.

Class II - Embankment Select Filter Zone Material

U.S. Standard Sieve Size	Minimum Percent by Weight Passing	Maximum Percent by Weight Passing
1 1/2 in.	90	100
3/8 in.	75	100
No. 4	60	100
No. 40	0	20
No. 200	0	5

Materials not meeting these gradation limits may be used in designated locations as directed by the Engineer.

Class III - Embankment Drainage Zone Material

It is intended that this material will be obtained from the Borrow Areas 'A' and 'B' through advance coarse screening by others. It will be designated as Class III material and used as drainage zone material in the embankment.

U.S. Standard Sieve Size	Minimum Percent by Weight Passing	Maximum Percent by Weight Passing
6 in.	100	100
1 1/2 in.	55	100
3/8 in.	0	75
No. 4	0	45
No. 40	0	5

Particle sizes up to 8" may be acceptable but may only be used in designated locations as directed by the Engineer.

Class IV - Embankment Screened Reject Material

It is intended that this material will be obtained from the reject product from the screening of Embankment Drainage Zone Material to be done by others. The gradation of this material will be similar to the gradation of the Class II select Filter Zone Material.

Class V - Emankment Tailings Sand Material

It is intended that these materials will be obtained from Borrow Area 'C' and 'D' and will be classified as Class V material and used as embankment tailing sand zone fill. The gradation of the material will generally be a well-graded fine to medium sand.

Gradation tests will be performed by the Engineer. The Contractor will be required to develop the borrow areas as required by the Engineer to ensure reasonable soil uniformity. It may be necessary to adjust the depth of cut in various areas of the borrow pit to combine appropriate amounts of fine and coarse grained soils as required to produce an acceptable fill material.

2.03 BORROW AREAS

The borrow areas shown on Drawing No. 7922041-1 are approved as sources of borrow materials required for the earthworks. Sources other than those specified will be permitted subject to approval by the Engineer.

Class I, II, III and IV Material can be obtained from Borrow Areas 'A' and 'B'. Class V Material can be obtained from Borrow Area 'C' and 'D'.

2.04 DESCRIPTION OF WORK

2.04.01 - Excavation of Material Relating to Removal and Reconstruction of the Decant Channel

The alignment and grade of the new decant channel will require the excavation, hauling and disposal of deleterious material as shown on Drawing No. 7922041-6.

2.04.02 - Embankment Dam Construction with Designated Classes of Fill

The embankments will be constructed of Class I, Class II, Class III, Class IV and Class V fill, compacted subject to the Engineer's approval and as shown on Drawing Nos. 7922041-3 and 7922041-5.

2.04.03 - Development of Sand and Gravel Filter Beneath the Proposed Embankment

A 2 ft. thick blanket of Class II fill will be placed next to the excavation surface in the designated areas of embankment foundation as indicated by the Engineer. General layout of this foundation filter zone is shown on Drawing No. 7922041-3.

2.04.04 - Placement of Drainage Zone Material

A 3 ft. thick zone of free draining Class III material will be placed above the sand and gravel filter zone described in Section 2.04.02 above. This material will be derived from stockpiles provided.

2.04.05 - Development of Sand and Gravel Class II Filter Material Between the Shell and The Class V Tailings Sand Zone of the Proposed and Existing Embankment Sections

Filter zones of Class II material as detailed on the drawings will be placed and compacted adjacent to selected zones of the proposed embankment sections as shown on Drawing No. 7922041-3.

2.05 PLACEMENT AND COMPACTION

The fill shall be placed in continuous horizontal lifts and shall be placed and compacted to the lines and grades as shown on the drawings. A 0.5 ft. tolerance will be permitted, to that shown on the drawings.

All Class I, Class II, Class III, Class IV and Class V fill will be compacted to 100 percent of the standard Proctor maximum dry density as measured according to the procedure outlined in ASTM D698, corrected for oversize if appropriate. The Contractor will be required to place the fill in loose lifts having a thickness of not greater than 12 inches. The moisture content of the fill shall be controlled such that the above compaction standard may be achieved with suitable equipment.

It is proposed that sections of fill will be tested to determine the number of passes of the compaction equipment, supplied by the Contractor, required to achieve the desired density. This data will be used to establish a procedural control of the compaction together with periodic in situ density tests.

No allowance will be made for settlement occurring within the foundation or fill soils.

All new fill must be blended with ground contours at the embankment abutments and adequately compacted subject to the Engineer's approval.

2.06 GENERAL PROVISIONS

2.06.01 - General

The Contractor shall submit, for the approval of the Engineer, details of his proposed methods of placing materials and the sequence of operations to be followed. The Contractor will be required to arrange his construction so as to make efficient use of the borrow materials.

2.06.02 - Construction

a) Frozen material shall not be placed as fill.

b) Fill shall not be placed on a frozen surface unless specifically approved by the Engineer.

c) Fill materials shall not be placed at temperatures which, in the opinion of the Engineer, will cause freezing of the material before it is adequately compacted.

d) Frozen crust of any accumulated snow and ice layers on the surface of fills shall be removed by the Contractor or allowed to melt completely and dry as directed by the Engineer prior to placement of additional lifts.

2.07 PAYMENT 2(a) - EXCAVATION, HAULING AND DISPOSAL OF MATERIAL FOR THE CONSTRUCTION OF THE NEW DECANT CHANNEL

2.07.01 - Basis of Payment

Payments for excavations, hauling and disposal of material along the alignment of the decant channel will be made in accordance with Article 24 of the General Conditions, "Extra Work". Payment for this work shall include all materials, labour, plant and small tools required to excavate, haul and dispose of the material along the alignment of the new decant channel.

2.08 PAYMENT ITEM 2(b) - EXCAVATION, HAULING, PLACING AND COMPACTION OF CLASS I MATERIAL FOR EMBANKMENT CONSTRUCTION

2.08.01 - Method of Measurement

The quantity of materials to be paid for will be determined by computing the volume of in-place compacted embankment fill based on original ground surface as determined by survey and to the neat lines of fill placement required as shown by the drawings.

2.08.02 - Basis of Payment

Payment for excavation, hauling, placing and compaction of Class I fill developed from Borrow Areas 'A' and 'B' designated above will be made at the unit price bid per cubic yard in place under Item 2 (b) of the Schedule of Quantities and Prices. This price shall include the cost of all materials, labour, plant and small tools required to excavate, level, place and compact the material. No payment will be made for overhaul.

2.09 PAYMENT ITEM 2(c) - EXCAVATION FROM DESIGNATED BORROW AREAS, HAULING, PLACEMENT AND COMPACTION OF CLASS II SELECT FILTER ZONE MATERIAL FOR EMBANKMENT CONSTRUCTION.

2.09.01 - Method of Measurement

The quantity of materials to be paid for will be determined by computing the volume of in-place compacted embankment fill based on original ground surface as determined by survey and to the neat lines of fill placement as shown by the drawings.

2.09.02 - Basis of Payment

Payment for excavation, hauling placing and compaction of Class II fill developed from Borrow Areas 'A' and 'B' designated above will be made at the unit price bid per cubic yard in place under Item 2(c) of the Schedule of Quantities and Prices. This price shall include the cost of all materials, labour, plant and small tools required to excavated, level, place and compact the material. No payment will be made for overhaul.

2.10 PAYMENT ITEM 2(d) LOADING, FROM DESIGNATED STOCKPILE SOURCE, HAULING, PLACEMENT AND COMPACTION OF CLASS III EMBANKMENT DRAINAGE ZONE MATERIAL FOR EMBANKMENT CONSTRUCTION.

2.10.01 - Method of Measurement

The quantity of materials to be paid for will be determined by computing the volume of in-place compacted embankment fill based on original ground surface as determined by survey and to the neat lines of fill placement as shown by the drawings.

2.10.02 - Basis of Payment

Payment for loading, hauling, placing and compaction of Class III material derived from stockpiles provided will be made at the unit price bid per cubic yard in place under Item 2(d) of the Schedule of Quantities and Prices. This price shall include the cost of all materials, labour, plant and small tools required to excavate, haul, place, level and compact the material. No payment will be made for overhaul.

2.11 PAYMENT ITEM 2(e) - LOADING, HAULING, PLACEMENT AND COMPACTION OF CLASS IV SCREENED FILTER ZONE MATERIAL FOR EMBANKMENT CONSTRUCTION

2.11.01 - Method of Measurement

The quantity of material to be paid for will be determined by computing the volume of in-place compacted fill based on surveys of the ground surface before and after fill placement.

2.11.02 - Basis of Payment

Payment for loading, hauling, placing and compaction of Class IV material derived from stockpiles provided will be made at the unit price bid per cubic yard in place under Item 2(e) of the Schedule of Quantities and Prices. This price shall include the cost of all materials, labour, plant and small tools required to excavate, haul, place, level, and compact the material. No payment will be made for overhaul.

2.12 PAYMENT ITEM 2(f) SUPPLY AND PLACEMENT OF CLASS V TAILING SAND MATERIAL FOR EMBANKMENT CONSTRUCTION

2.12.01 - Method of Measurement

The quantity of materials to be paid for will be determined by computing the volume of in-place compacted embankment fill based on original ground surface as determined by survey and to the neat lines of fill placement required as shown by the drawings.

2.12.02 - Basis of Payment

Payment for the excavation, hauling, placing and compaction of Class V fill will be made at the unit price bid per cubic yard in place under Item 2 (f) of the Schedule of Quantities and prices. This price shall include all materials, labour, plant, and small tools required to excavate, haul, place and compact the material. No payment will be made for overhaul.

Golder Associates
CONSULTING GEOTECHNICAL ENGINEERS

May 5, 1980

Notice To All Bidders:

Re: Tender Documents - Cyprus Anvil Mining Corporation
Tailings Containment Construction 1980 Embankment Dam Raising
Faro, Yukon Territory

Bidders are advised of the attached changes made to the above Tender Documents.

These changes will be incorporated into the final Tender Documents as provided under Article 1.a.9 of the General Conditions.

Bidders must acknowledge this addendum on the Tender Form as provided for in Part 12 of the Form of Tender.

All bidders are requested to acknowledge receipt of this Addendum by Telex or by telephone (with written follow-up) as soon as possible after receipt to:

Golder Associates
5915 - 3 Street S.E.
Calgary, Alberta
T2H 1K3
Telex 03-822539 (Goldersand)
Telephone (403) 252-5525

Yours very truly,
GOLDER GEOTECHNICAL CONSULTANTS LTD.

H.G. Gilchrist, P.Eng.

HGG:kk
Attached: Addendum 1

May 5, 1980
File No. 792-2041

Cyprus Anvil Mining Corporation
Tailings Containment Construction
1980 Embankment Dam Raising
Faro, Yukon Territory

ADDENDUM 1

1.1 (Page C-1) Contract Schedule (A)
Payment Item 2(d) and 2(e)...Change in Approximate Quantity....

(4 copies of the revised Contract Schedule A Addendum No. 1.1 are attached separately. Each original Tender package contained 2 complete sets of Tender Documents and 2 copies of Form of Tender and Schedules.

IMPORTANT: The revised Contract Schedule A is to be incorporated into each of these.

1.2 (Page G-4) Detailed Specifications
Item 2.02...Change in Class III Embankment Drainage Zone Material Specifications and Location....

2.02 Class III - Embankment Drainage Zone Material

It is intended that this material will be obtained from Borrow Area 'B' through advance coarse screening by others. It will be designated as Class III material and used as drainage zone material in the embankment.

U.S. Standard Sieve Size	Minimum Percent by Weight Passing	Maximum Percent by Weight Passing
8 in.	100	100
6 in.	95	100
1 1/2 in.	55	100
3/8 in.	0	75
No. 4	0	45
No. 40	0	5

This material shall be loaded, spread and and compacted by the contractor using equipment and procedures which will not produce segregation of particle sizes.

1.3 (Page G-8) Detailed Specifications...Change in Wording....

2.08 PAYMENT ITEM 2(b) - EXCAVATION, HAULING, PLACING AND COMPACTION OF CLASS I MATERIAL FOR EMBANKMENT CONSTRUCTION

2.08.02 - Method of Measurement

The quantity of materials to be paid for will be determined by computing the volume of in-place compacted embankment fill based on original ground surface and completed construction as determined by survey. Materials placed beyond the neat lines shown on the contract drawings will not be included in the measurement for payment.

1.4 (Page G-8) Detailed Specifications...Change in Wording....

2.09 PAYMENT ITEM 2(c) - EXCAVATION FROM DESIGNATED BORROW AREAS, HAULING, PLACEMENT AND COMPACTION OF CLASS II SELECT FILTER ZONE MATERIAL FOR EMBANKMENT CONSTRUCTION

2.09.02 - Method of Measurement

The quantity of materials to be paid for will be determined by computing the volume of in-place compacted embankment fill based on original ground surface and completed construction as determined by survey. Materials placed beyond the neat lines shown on the contract drawings will not be included in the measurement for payment.

1.5 (Page G-9) Detailed Specifications...Change in Wording....

2.10 PAYMENT ITEM 2(d) LOADING, FROM DESIGNATED STOCKPILE SOURCE, HAULING, PLACEMENT AND COMPACTION OF CLASS III EMBANKMENT DRAINAGE ZONE MATERIAL FOR EMBANKMENT CONSTRUCTION.

2.10.01 - Method of Measurement

The quantity of materials to be paid for will be determined by computing the volume of in-place compacted embankment fill based on original ground surface and completed construction as determined by survey. Materials placed beyond the neat lines shown on the contract drawings will not be included in the measurement for payment.

1.6 (Page G-9) Detailed Specifications...Change in Wording....

2.11 PAYMENT ITEM 2(e) - LOADING, HAULING, PLACEMENT AND COMPACTION OF CLASS IV SCREENED FILTER ZONE MATERIAL FOR EMBANKMENT CONSTRUCTION

2.11.01 - Method of Measurement

The quantity of materials to be paid for will be determined by computing the volume of in-place compacted embankment fill based on original ground surface and completed construction as determined by survey. Materials placed beyond the neat lines shown on the contract drawings will not be included in the measurement for payment.

1.7 (Page G-10) Detailed Specifications...Change in Wording....

2.12 PAYMENT ITEM 2(f) SUPPLY AND PLACEMENT OF CLASS V TAILINGS SAND MATERIAL FOR EMBANKMENT CONSTRUCTION

2.12.-1 - Method of Measurement

The quantity of materials to be paid for will be determined by computing the volume of in-place compacted embankment fill based on original ground surface and completed construction as determined by survey. Materials placed beyond the neat lines shown on the contract drawings will not be included in the measurement for payment."

1.8 Contract Drawing No. 7922041-3

...Delete reference to drainage zone as noted on drawing (attached)...

1.9 Contract Drawing No. 7922041-5

...Change in road base structure (attached)...

ADDENDUM No. 1

CONTRACT SCHEDULE A

SCHEDULE OF QUANTITIES AND PRICES

CONTRACTOR_____

Payment Item No.	Description	Unit	Approx. Quantity	Unit Price	Amount
1(A)	ITEM A - MOBILIZATION	L.S.	-	-	_____
	ITEM 1 - Clearing, Grubbing and Stripping				
1(a)	Clearing & Grubbing	acre	1.5	_____	_____
1(b)	Stripping and removal of topsoil	cu.yd.	3,000	_____	_____
	ITEM 2 - Excavation and Earthworks				
2(a)	Excavation and disposal of riprap, filter gravel, abutment soils and debris relating to removal and reconstruction of the decant facilities		Item 2(a) to be paid in accordance with Article 24 of the General Conditions N/A	N/A	N/A
2(b)	Excavation, hauling, placement and compaction of Class I material	cu.yd.	200,000	_____	_____
2(c)	Excavation, hauling, placement and compaction of Class II filter zone material	cu.yd.	21,800	_____	_____
2(d)	Loading, hauling, placement and compaction of Class III drainage zone material	cu.yd.	7,120	_____	_____
2(e)	Loading, hauling, placement and compaction of Class IV screened filter zone material	cu.yd.	2,100	_____	_____
2(f)	Excavation, hauling, placement and compaction of Class V embankment tailing sands material	cu.yd.	278,400	_____	_____

ADDENDUM No. 1

SCHEDULE OF QUANTITIES AND PRICES

CONTRACTOR_____

Payment Item No.	Description	Unit	Approx. Quantity	Unit Price	Amount
	ITEM 3 - Premium Cost of Bond: The following will be paid by Owner in accordance with Clause 20 A of the General Conditions	N/A	N/A	N/A	_____
					$
	TOTAL CONTRACT PRICE				_____

ADDENDUM No. 1

CONTRACT SCHEDULE A

SCHEDULE OF QUANTITIES AND PRICES

CONTRACTOR_____

Payment Item No.	Description	Unit	Approx. Quantity	Unit Price	Amount
1(A)	ITEM A - MOBILIZATION	L.S.	-	-	_____
	ITEM 1 - Clearing, Grubbing and Stripping				
1(a)	Clearing & Grubbing	acre	1.5	_____	_____
1(b)	Stripping and removal of topsoil	cu.yd.	3,000	_____	_____
	ITEM 2 - Excavation and Earthworks				
2(a)	Excavation and disposal of riprap, filter gravel, abutment soils and debris relating to removal and reconstruction of the decant facilities		Item 2(a) to be paid in accordance with Article 24 of the General Conditions N/A	N/A	N/A
2(b)	Excavation, hauling, placement and compaction of Class I material	cu.yd.	200,000	_____	_____
2(c)	Excavation, hauling, placement and compaction of Class II filter zone material	cu.yd.	21,800	_____	_____
2(d)	Loading, hauling, placement and compaction of Class III drainage zone material	cu.yd.	7,120	_____	_____
2(e)	Loading, hauling, placement and compaction of Class IV screened filter zone material	cu.yd.	2,100	_____	_____
2(f)	Excavation, hauling, placement and compaction of Class V embankment tailing sands material	cu.yd.	278,400	_____	_____

ADDENDUM No. 1

SCHEDULE OF QUANTITIES AND PRICES

CONTRACTOR_____

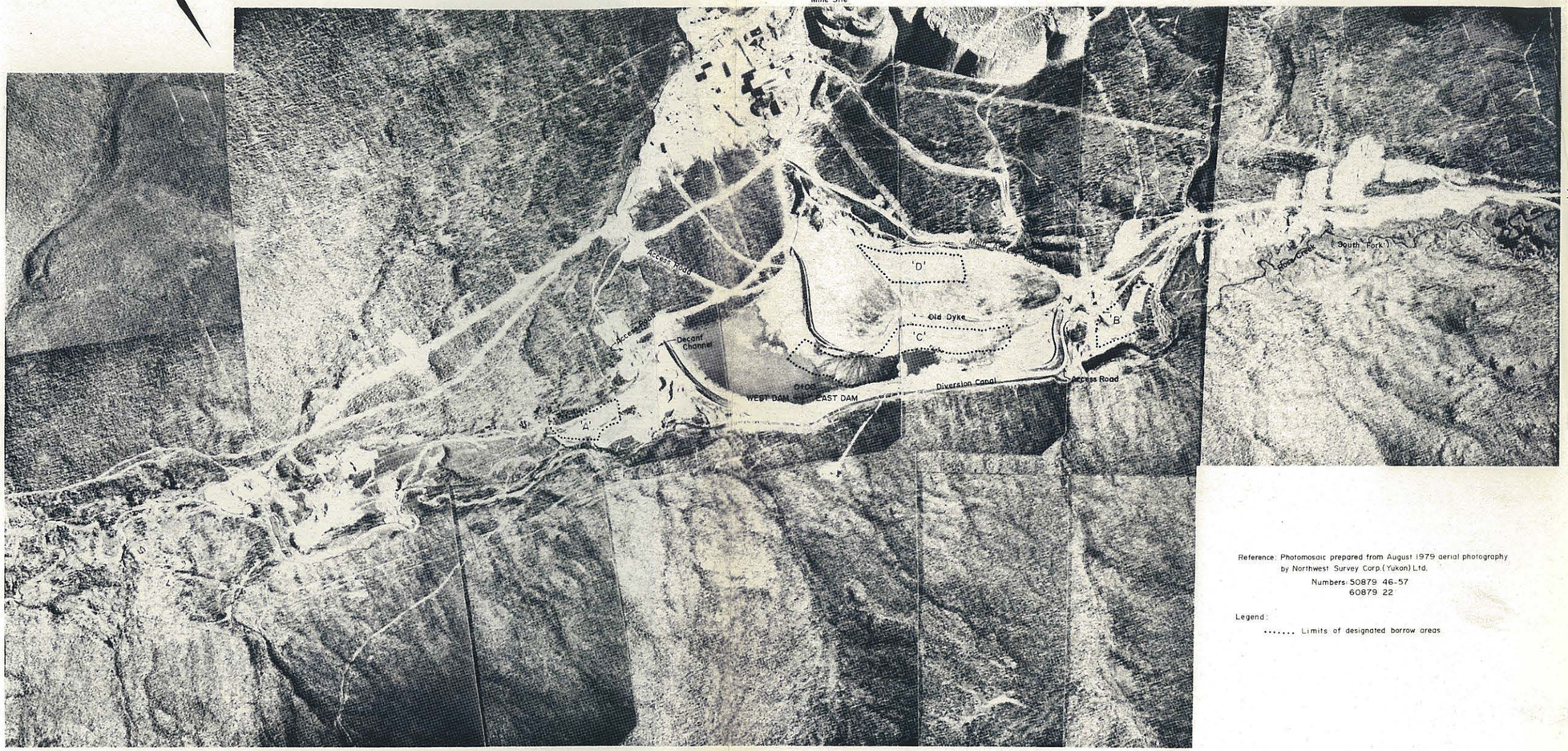
Payment Item No.	Description	Unit	Approx. Quantity	Unit Price	Amount
	ITEM 3 - Premium Cost of Bond: The following will be paid by Owner in accordance with Clause 20 A of the General Conditions	N/A	N/A	N/A	_____
					$
	TOTAL CONTRACT PRICE				═══

CYPRUS ANVIL MINING CORPORATION

Faro Yukon Territory

1980 EMBANKMENT DAM RAISING

Golder Associates **1980**



Reference: Photomosaic prepared from August 1979 aerial photography by Northwest Survey Corp.(Yukon) Ltd.
Numbers: 50879 46-57
60879 22

Legend:
..... Limits of designated borrow areas

LEGEND

NO	DESCRIPTION	DATE	BY

REVISIONS

Scale 1:10,000 (approx.)
Job No. 792 - 2041
Drawing No. 1
Drawn by R.W.
Reviewed by
Date April 1980
Date April 1980

CYPRUS

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Yukon Territory
Cyprus Anvil Mining Corporation

SITE PLAN

1980 EMBANKMENT DAM RAISING

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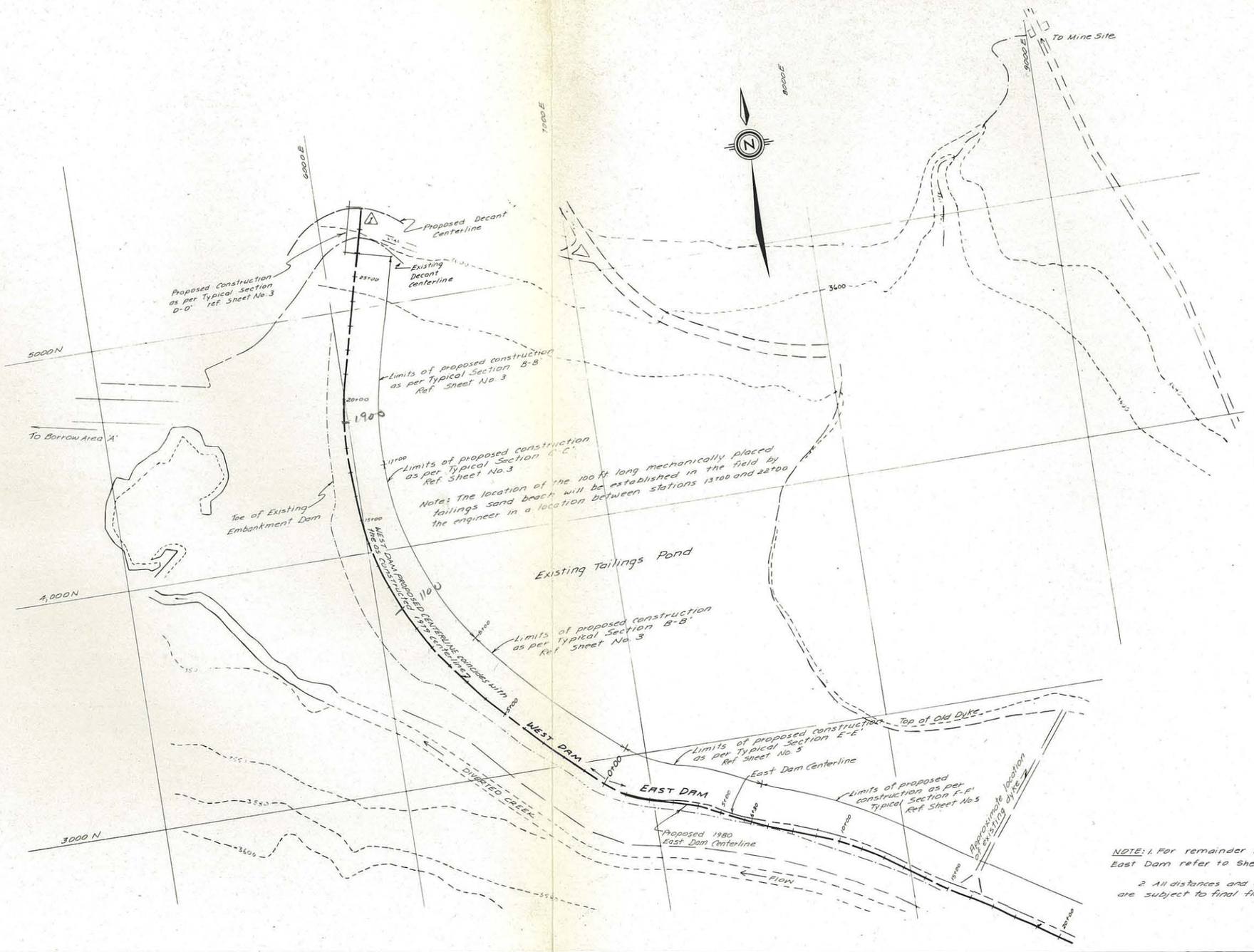
Golder Geotechnical Consultants Ltd.
Sheet 1 of 5



NOTE: 1. For remainder of East Dam refer to Sheet No. 4.

2. All distances and elevations are subject to final field survey.

LEGEND

NO	DESCRIPTION	DATE	BY
1	Change existing & proposed Decant Channel centrelines	June 3/1980	J.V.

REVISIONS

PROFESSIONAL ENGINEER H.G. GILCHRIST YUKON TERRITORIES

Scale: 1 in. to 200ft.
Job No. 792 2041
Drawing No. 2
Drawn by R.W.
Reviewed by
Date April 1980
Date April 1980

CYPRUS ANVIL

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Yukon Territory

Cyprus Anvil Mining Corporation

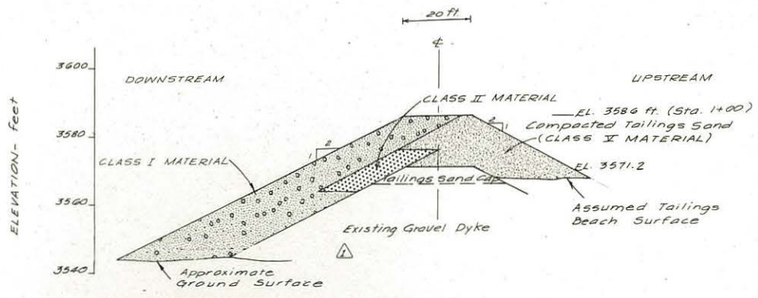
WEST DAM
STA. 0+00 to STA. 26+00
EAST DAM
STA. 0+00 to STA. 20+00

1980 EMBANKMENT DAM RAISING

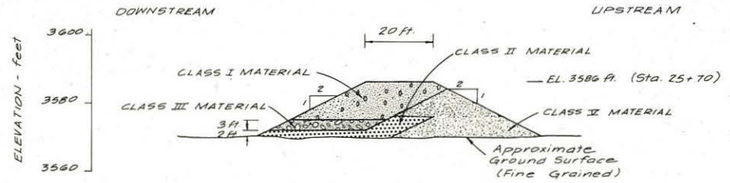
Golder Associates

Golder Geotechnical Consultants Ltd.

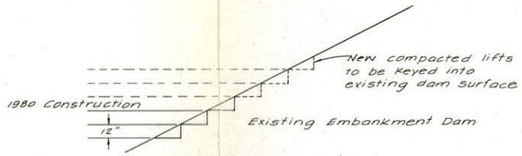
Sheet 2 of 5



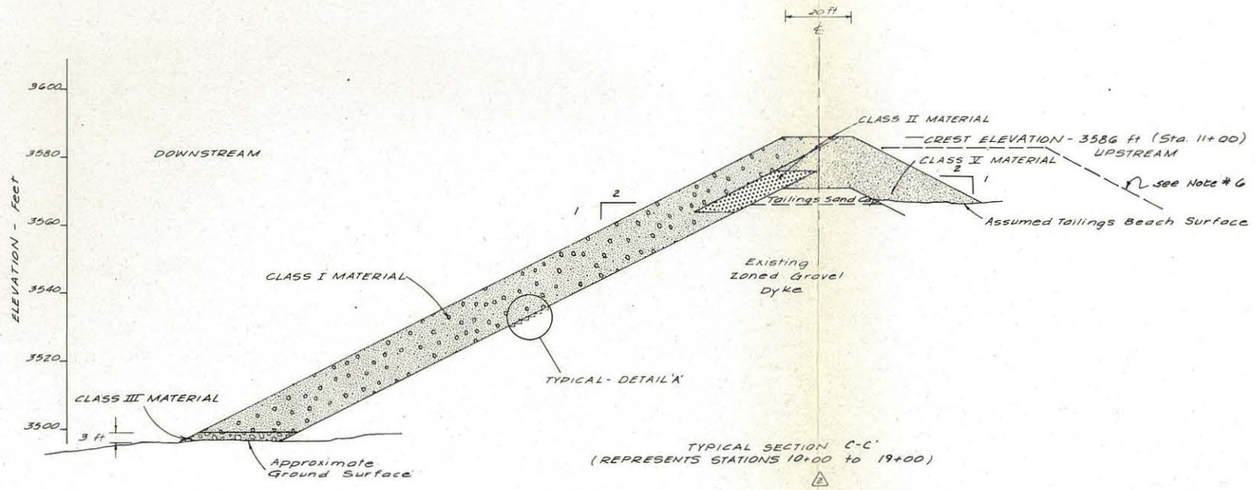
TYPICAL SECTION B-B'
(REPRESENTS STATIONS 0+00 to 10+00)
and 19+00 to 26+00



TYPICAL SECTION D-D'
(REPRESENTS STATIONS 26+00 to 27+86)



TYPICAL DETAIL 'A'
Scale : 1" to 5'
(For East and West Dams at existing dam surfaces)



TYPICAL SECTION C-C'
(REPRESENTS STATIONS 10+00 to 19+00)

NOTES

1. West Dam Crest elevation 3586 feet - typical
2. Area beneath proposed new construction foundation to be cleared of all deleterious materials and proof rolled with a heavy vibrating roller to the satisfaction of the engineer. Areas found to be unsuitable are to be subexcavated and replaced with Class I material compacted to 100% of the standard Proctor maximum dry density at optimum moisture content.
3. Materials used in 1980 construction to be compacted in 12" loose lift thickness to 100% of the standard Proctor maximum dry density at the optimum moisture content.
4. Class III material not to be placed in direct contact with Class V material without a minimum 1 foot thick layer of Class II filter material in between.
5. All sections looking in direction of increasing station numbers
6. A mechanically placed tailings sand beach (Class V Material) of 100 feet length and 50 feet top width is to be situated at a location between Station 13+00 and 22+00 (See Sheet # 2)
7. Top surface of existing embankment dams to be scarified for a depth of 0.5 feet prior to placement of new fill.

LEGEND

NO	DESCRIPTION	DATE	BY
2	Change locations of Sections B-B', C-C', D-D'	June 9/1980	JU
1	Remove note	May 21/1980	JM

REVISIONS

PROFESSIONAL ENGINEER
H.G. GILCHRIST
YUKON TERRITORIES

Scale: 1 inch to 20 feet	
Job No. 792 - 2041	
Drawing No. 3	
Drawn by R.W.	Reviewed by
Date April 1980	Date April 1980

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TYPICAL WEST DAM SECTIONS
Sta. 0+00 to Sta. 26+00

1980 EMBANKMENT DAM RAISING

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Sheet 3 of 5

NO.	DESCRIPTION	DATE	BY
5	Remove note	June/80	JV
4	Remove label 'Top of Dam'	June/80	JV
3	Remove designation 'Proposed'	June/80	JV
2	Add south section	June 16/80	JV
1	Change station locations	June 16/80	JV

LEGEND

REVISIONS

PROFESSIONAL ENGINEER H.G. GILCHRIST YUKON TERRITORIES

Scale 1 inch to 200 feet
Job No. 792 2041
Drawing No. 4
Drawn by R.W. Date April 1980
Reviewed by KS JVM Date April 1980

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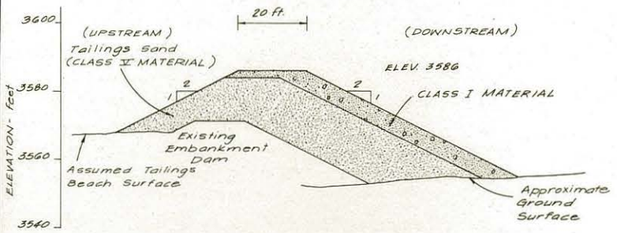
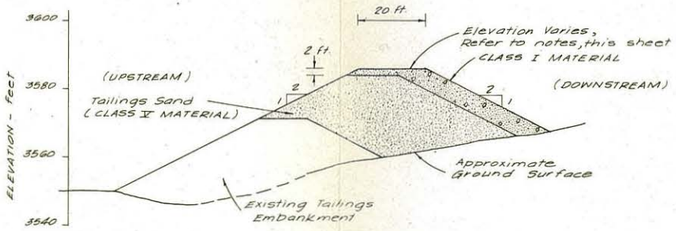
EAST DAM
STA. 5+00 to MAIN ACCESS ROAD ABUTMENT
1980 EMBANKMENT DAM RAISING

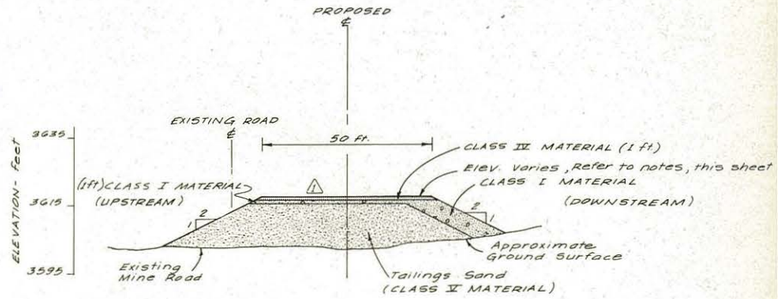
Golder Associates
Golder Geotechnical Consultants Ltd.
Sheet 4 of 5



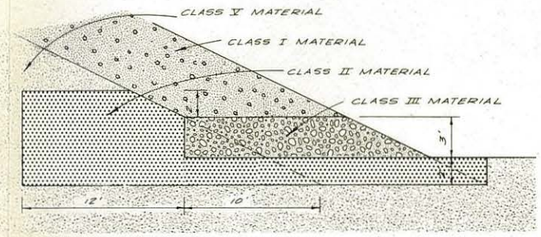
TRANSITION ZONE E-E'
TYPICAL SECTION
(REPRESENTS STATIONS 0+00 to 6+30)



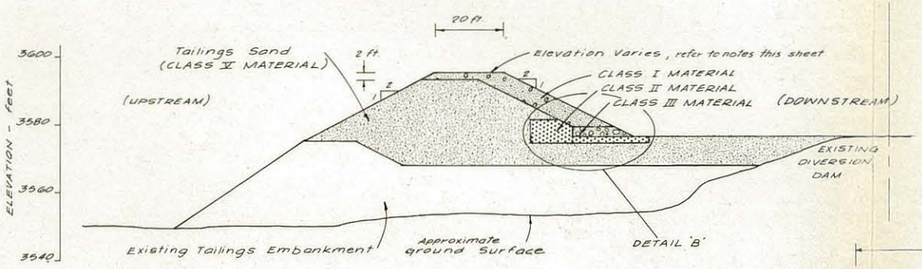
TYPICAL SECTION F-F'
(REPRESENTS STATIONS 6+30 to 28+00
AND 48+00 to 51+00)



TYPICAL SECTION H-H'
(REPRESENTS STATIONS 51+00 to 61+30)



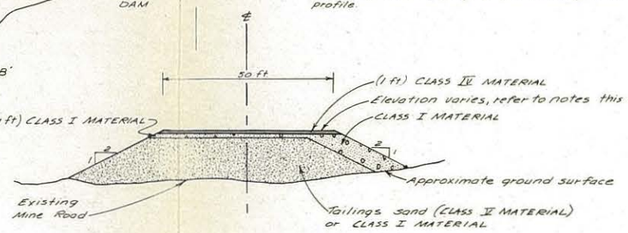
DETAIL 'B'
Scale: 1"=5'



TYPICAL SECTION G-G'
(REPRESENTS STATIONS 28+00 to 48+00)

10. Mine road elevations:
Sta. 4100 S at El. 3596.45 > at 3.4 % slope
to Sta. 1100S (50+00E) at El. 3606.65

11. Construct new mine road Sta 4100 S to 5916S so that surface, crown and superelevation conform with the curvature and sloping of the existing mine road profile.



TYPICAL SECTION I-I'
(Represents stations 1+37 S (49+60E) to 4100 S on existing mine road toward Faro.)

NOTES

1. East Dam Station 0+00 to 6+30 is a transition zone which evenly shifts the centerline construction of the West Dam to downstream construction on the East Dam.

2. East Dam crest elevations:

Station 0+00 at El. 3586 feet
to Station 20+00 at El. 3586 feet > at 0.40% slope
to Station 30+00 at El. 3590 feet > at 0.67 % slope
to Station 45+00 at El. 3600 feet > at 1.33% slope
to End of Construction at El. 3620 feet

3. Area beneath proposed new construction Foundation to be cleared of all deleterious materials and proof rolled with a heavy vibrating roller to the satisfaction of the engineer. Areas found to be unsuitable are to be subexcavated and replaced with class I material compacted to 100% of the standard Proctor Maximum dry density at optimum moisture content.

4. Materials used in 1980 construction to be compacted in 12" loose lift thickness to 100% of the standard Proctor maximum dry density at the optimum moisture content.

5. Class III material not to be placed in direct contact with Class V material, without a minimum 1 foot thick layer of Class II filter material in between.

6. All Sections looking in direction of increasing station numbers.

7. All distances and elevations are subject to final field survey.

8. Top surface of existing embankment dams to be scarified for a depth of 0.5 feet prior to placement of new fill.

9. Construct new dam top road widths as follows so as to conform with existing mine road width at 60+00 E

Station	Width (ft)	Station	Width (ft)
50+00 E	50	54+00 E	44
51+00 E	49	57+00 E	43
52+00 E	48	58+00 E	42
53+00 E	47	59+00 E	41
54+00 E	46	59+65 E	40.35
55+00 E	45		

LEGEND

NO.	DESCRIPTION	DATE	BY
1	Add section I-I'	June/80	JV
2	Add notes 8 to 11.	June/80	JV
3	Correction of slope	June, 1980	JM
4	Change road base material	May 2, 1980	JM

REVISIONS

PROFESSIONAL ENGINEER
H.G. GILCHRIST
YUKON TERRITORIES

Scale: 1 inch to 20 feet
Job No. 792-2041
Drawing No. 5
Drawn by R.W.
Reviewed by
Date April 1980
Date April 1980

CYPRUS ANVIL
Faro
Yukon Territory
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TYPICAL EAST DAM SECTIONS

1980 EMBANKMENT DAM RAISING

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Sheet 5 of 5

APPENDIX III

Contents

- Piezometer Location Reasoning
- Figure 3-1, Piezometer Location Plan
  Record of Borehole Sheets detailing
  the installations

APPENDIX III

PIEZOMETER INSTALLATION RECORDS

This appendix contains the Record of Borehole sheets for the piezometers installed at various locations on the tailings dam which was raised by approximately 15 ft. during the summer of 1980. The basis of selection of locations for the piezometers is as discussed in the following preamble to the Record of Borehole sheets.

Section 19+00 West (Vicinity of Old Airport Runway)

This reach of the dam was initially constructed as a zoned section with a glacial till core over the pervious terrace gravel foundation. The purpose of the piezometer to Elev. 3550 (about core crest elevation) is to determine if the core is being overtopped by the seepage flow through the embankment section. The piezometer to Elev. 3565 is intended for future observation of the phreatic surface if the beach were to be overtopped, knowing that there is no chimney drain in this section.

Having seepage information for this typical section is important both from the fact that the section is now more than 50 ft. high and that visual observation alone cannot provide assurance that it is performing as computations suggest it should.

Sections 15+00 & 11+00 West (Sections on high dam)

These sections are located at about the 1/3 points of the high dam where the section consists of a glacial till core to about 3550 elevation, a sloping drain some distance downstream of the core to somewhat less than Elev. 3570, plus a downstream base of section drain. The piezometers, two on one section and three on the other, are intended to show depth of seepage overtopping the core, foundation pressure vertically below the crest, and whether or not artesian conditions are present in the foundation

stratigraphy downstream of the toe. Aside from the importance of this information to the managment of initial filling of the Down Valley pond and buttressing of the backslope of the dam, the performance of this section will provide basic information concerning the section raising design for the Intermediate Dam of the Down Valley scheme. On the basis that Section 11+00 is drilled first and that the installations are good and the results conclusive, the two crest-toe location piezometers on Section 15+00 could be cancelled.

Section 5+00 West (On south gravel terrace)

This section of the dam is coreless and it rests on the relatively pervious terrace gravels. The safety of the section is predicted on a well depressed phreatic surface, particularly because there are no internal drainage sections within the dam which would control maximum phreatic level rise so it is important to be assured that the level is indeed at an acceptable elevation. The piezometer proposed will communicate with the base of the constructed section and will satisfy the above objectives.

Section 17+50 East (East of Causeway)

This section is a relatively high, almost totally sand section and indeed, this combined with the absence of a beach on the upstream slope makes it important to observe the phreatic performance of the embankment. The proposed piezometer will extend to the base of the embankment section from the crest, and it will show the piezometric head at that point. This information, together with the creek level adjacent makes possible the assessment of this section.

Section 34+00 East

This section has been selected for a piezometer extending to about channel access road elevation because -

a) There is a minimum distance between the dyke and the diversion channel;

b) The embankment section is of tailings sand except for a downstream facing of gravel;

c) There is no beach along the section;

d) There is a higher percentage of slimes in the contained tailings and therefore it is important to obtain assurance that the combination of adverse features concerning the dyke are not operating to additive disadvantage.

Section 38+00 East

This section of the east dam is generally similar to that of 34+00 discussed above, but with one important exception. It is that it is flanked beyond the outside toe by the diversion dam which was constructed as a zoned fill to achieve initial diversion of Rose Creek. While that dam functioned acceptably in heading up the creek to secure diversion into the terrace canal, it now has a higher water level on its downstream side, the effect of which is to create a high tailwater level for seepage through the tailings dam section. There is thus potential for instability in the downstream toe as the south end of the pond is filled and seepage through the section increases. A piezometer will track the potential need for local beach building or toe filter construction, and therefore maintenance of a safe section in this unique area of the dam.