87-308-16092

REPORT

ON

VOLUME SURVEYS AND TESTING

OF

TAILINGS AND MINE DUMPS ON THE LAKE FR. CROWN GRANT & SURF ONE AND BEAR 1, 2, 3 MINERAL CLAIMS

SURF INLET PROPERTY
PRINCESS ROYAL ISLAND, BRITISH COLUMBIA

MINING DIVISION: SKEENA
NTS 103H/2W
LATITUDE: 53°05.4'
LONGITUDE: 128°53'

OWNER(S)
~~MATACHEWAN CONSOLIDATED MINES, LIMITED~~
SURF INLET MINES LTD.
Placer Development Limited
P.H. McCloskey

OPERATOR(S)
TRM ENGINEERING LTD.
SURF INLET MINES LTD.

by
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DATE SUBMITTED:
JULY 02, 1987

WORK CARRIED OUT:
Field Work
August 13 - October 09, 1986
Ore Sorting & Petrographic Examination
October 23 - November 5, 1986
Report - October 28, 1986 - April 16, 1987

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SUMMARY

Detailed ground surveys were carried out on the Surf Inlet property during the period of August 13 to October 9, 1986 by TRM Engineering Ltd. and Surf Inlet Mines Ltd.

Work done includes plan and volume surveys of mine dumps located near the 550 Level Portal of Surf Inlet Mine, surveys of the configuration of the tailings area on Paradise Creek, surveys of the main portal areas of the Surf and Pugsley Mines and survey traverses of trails between the stockpiles and tailings dumps.

Volume calculations were carried out on the stockpiles. Approximately 150,000 tons (136,000 tonnes) of material is contained in the two mine dumps. Ore sorting tests were conducted on four samples collected during the survey. Neither the photometric, using the M16 photometric device, nor magnetic, using the M27 apparatus, properties discriminated between mineralized and unmineralized rock samples from the dumps.

A preliminary calculation of the volume of the tailings located in the area near the mouth of Paradise Creek is 588,400 tons (534,000 tonnes). A more detailed survey is required to accurately evaluate the amount of tailings. Petrographic examination of samples of the tailings indicate that the contained quartz is not suitable as a silica product. Gold recovery testing may be warranted if adequate volume of sufficient grade can be confirmed.

Detailed sampling programs are recommended for both the mine dumps and tailings on the Surf Inlet property to confirm the tonnage and grade of the materials.

INTRODUCTION

The Surf Inlet property is located on Princess Royal Island on the northwestern coast of British Columbia. Gold mineralization is present in an extensive, complicated shear system hosted by gneissic volcanics and metasediments in the Coastal Plutonic Complex.

Two underground mines, the Surf Inlet and Pugsley, and milling facilities were developed on the property in the early 1900's. By 1942, 382,351 ounces (11,891,116 g) gold, 200,752 ounces (6,492,187 g) silver and 6,134,341 pounds (2,782,537 kg) copper had been recovered from a total of 1,091,131 tons (989,874 tonnes) produced from the mines. The average head grade was 0.425 oz gold/ton (14.57g/tonne). Mill recoveries averaged between 88% and 92%.

Preliminary sampling programs carried out on mine dumps by Cominco Ltd. in 1981 and on the stockpiles and tailings by TRM Engineering Ltd. in 1985 indicate that important gold values are contained in these materials. The TRM work also included metallurgical testing which showed that the gold is recoverable using the current metallurgical techniques. Detailed volume measurements and sampling programs were recommended as a result of these surveys.

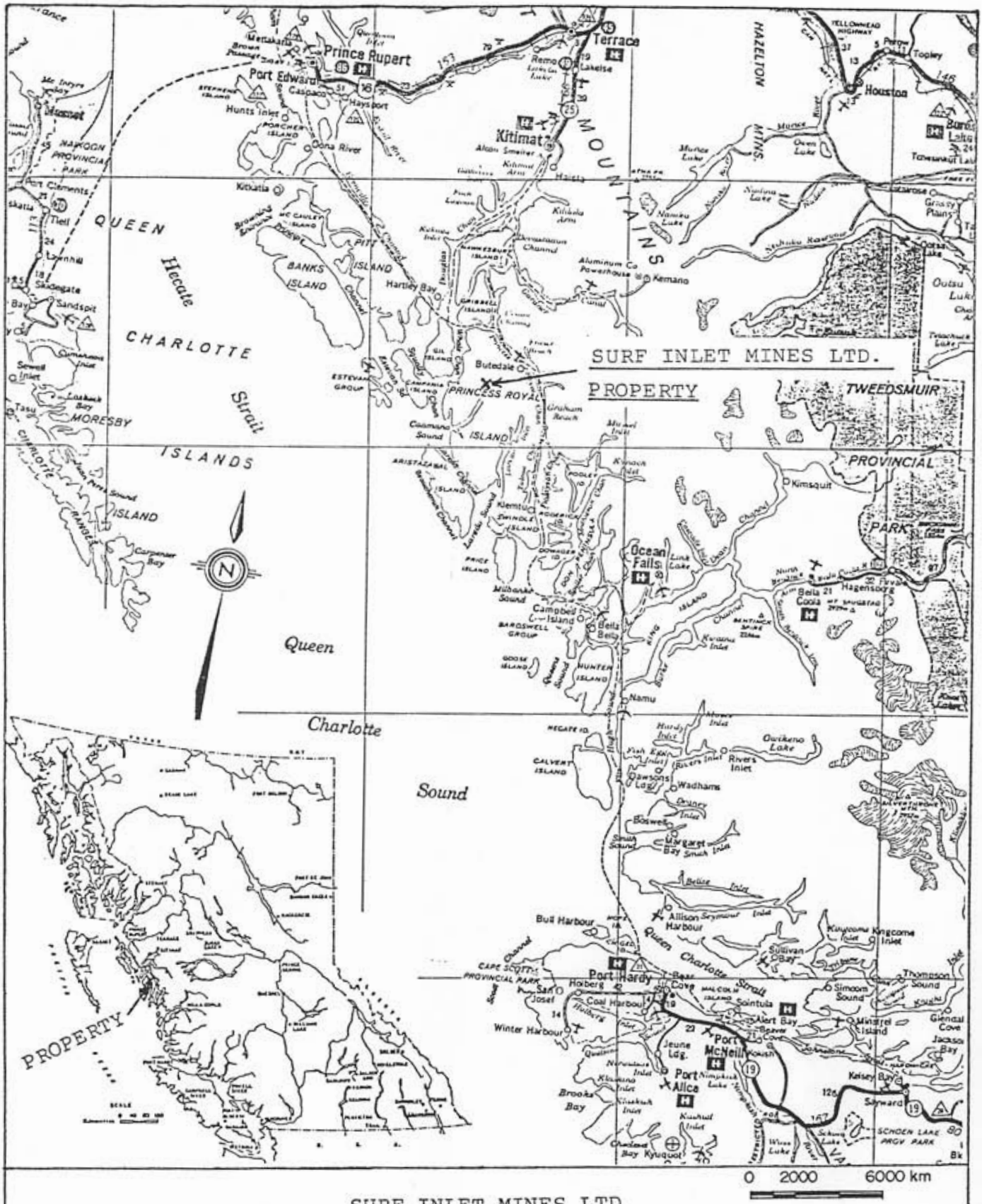
During the period of August to October, 1986 TRM Engineering and Surf Inlet Mines Ltd. carried out detailed ground surveys in order to accurately locate mine portals, assess best access routes around the property and to evaluate the volume of the stockpiles and tailings. In conjuction with these surveys, further samples of the tailings and mine dump materials were collected. The dump samples were tested by two ore sorting techniques. The tailings samples were examined and assessed for the potential to recover and market the contained quartz. This report summarizes the results of these studies.

LOCATION AND ACCESS

The Surf and Pugsley Mines are located near the head of Surf Inlet on Princess Royal Island approximately 160 kilometers southeast of the main supply base at Prince Rupert (Figure 1). The property is at 53° 05' N latitude and 128° 53' W longitude in mapsheet NTS 103 H/2W about 105 km southwest of Kitimat and 115 km northwest of Bella Bella. The nearest sizeable community is Hartley Bay, 44 km northeast. The docking facility at Butedale on the east coast of Princess Royal Island is a port of call for ships travelling the "Inside Passage" between Vancouver and Prince Rupert. Butedale is 16 km east of the Surf Inlet minesite. Ocean-going ships were able to call on the wharf at the head of Surf Inlet when the mines were in production. Currently the most active center of mineral exploration near Surf Inlet is Trader Resource Corp.'s gold project on Banks Island, 90 km to the northwest.

The Surf and Pugsley ore bodies, located on the north and south sides of Paradise Creek, are 11 km from the wharf and hydro-electric power site at the outlet of Cougar Lake. In the past, electric tramways and barges formed the supply link from the mines to tidewater. A tug and barge carrying fifteen 1-ton mine cars operated on the lake. At the mouth of Paradise Creek an overhead trolly electric railroad ran to the camp on an even grade. An incline from the ocean dock to the lake, a distance of 314 feet (95.71 m) and equipped with an electric hoist completed the transportation. Fixed wing aircraft with floats can land on Paradise Lake and a short foot-trail connects Paradise Lake to the minesite.

Topography in the area is very rugged with steep sided peaks rising to a maximum elevation of 1100 m ASL. The lowest level in Puglsey Mine is the 1500 level which is 500 feet (152 m) below sea level. The lowest level on the Surf Mine is the 1400 level and is 275 feet (84 m) below sea level.



SURF INLET MINES LTD.

SURF INLET PROPERTY, B. C.

LOCATION MAP

FIGURE 1

Scale 1 : 2,400,000

PROPERTY AND TITLE

The property, as shown in Figure 2, consists of the following mineral tenure:

(a) Crown granted mineral claims (a total of 21 claims) optioned from owner, Matachewan Consolidated Mines, Limited

Bee	Lot 1915	Lake Fr.	Lot 32
Bench	35	Lakeview	229
Bluebell	2485	Marcia	2484
Bluff	34	Mountain Fr.	37
Cassie	228	Olive	227
DLS	31	Princess Royal	7
Excelsior	9	Sadie	8
Granite	1916	Sea Fr.	1914
Gulch	33	Twin Peaks	38
Independence Fr.	222	UTA Fr.	36
La Quivree	39		

(b) Mineral claims optioned from Matachewan Consolidated Mines, Limited. Registered owner is R.D. McCloskey, who holds the title in trust for Matachewan.

Claims	Units	Rec. Numbers	Expiry Date
Bear 1	15	2221	April 16, 1988
Bear 2	15	2222	April 16, 1987
Bear 3	20	2223	April 16, 1987

Total = 50 units

(c) Mineral claims optioned from owner, Placer Development Ltd.

Claims	Units	Rec. Numbers	Expiry Date
Jen 1	20	2693	Nov. 27, 1987
Jen 2	20	2694	Nov. 27, 1987
Jen 3	10	2695	Nov. 27, 1987
Jen 4	20	2696	Nov. 27, 1987

Total = 70 units

PROPERTY AND TITLE (cont'd)

(d) Reverted Crown granted mineral claims (a total of 11 claims) optioned from owner, Placer Development Ltd.

Claims	Lot No.	Rec. Numbers	Expiry Date
Sheet Anchor Fr.	2105	1979	Jan. 14, 1991
Summit	226	1980	Jan. 14, 1990
Bonanza	224	1981	Jan. 14, 1990
Anaconda	223	1982	Jan. 14, 1990
Turner Fr.	221	1983	Jan. 14, 1988
Homestake	21	1984	Jan. 14, 1988
Seagull	2097	1985	Jan. 14, 1991
Little Tomy Fr.	2098	1986	Jan. 14, 1991
Brown Bear	2099	1987	Jan. 14, 1991
Sunlight Fr.	2103	1988	Jan. 14, 1991
Sea Lion Fr.	2104	1989	Jan. 14, 1991

(e) Mineral claims optioned from owner, Coastoro Resources Limited

Claims	Units	Rec. Numbers	Expiry Date
Cougar 1	6	2614	October 1, 1991
Cougar 2	2	2615	October 1, 1989

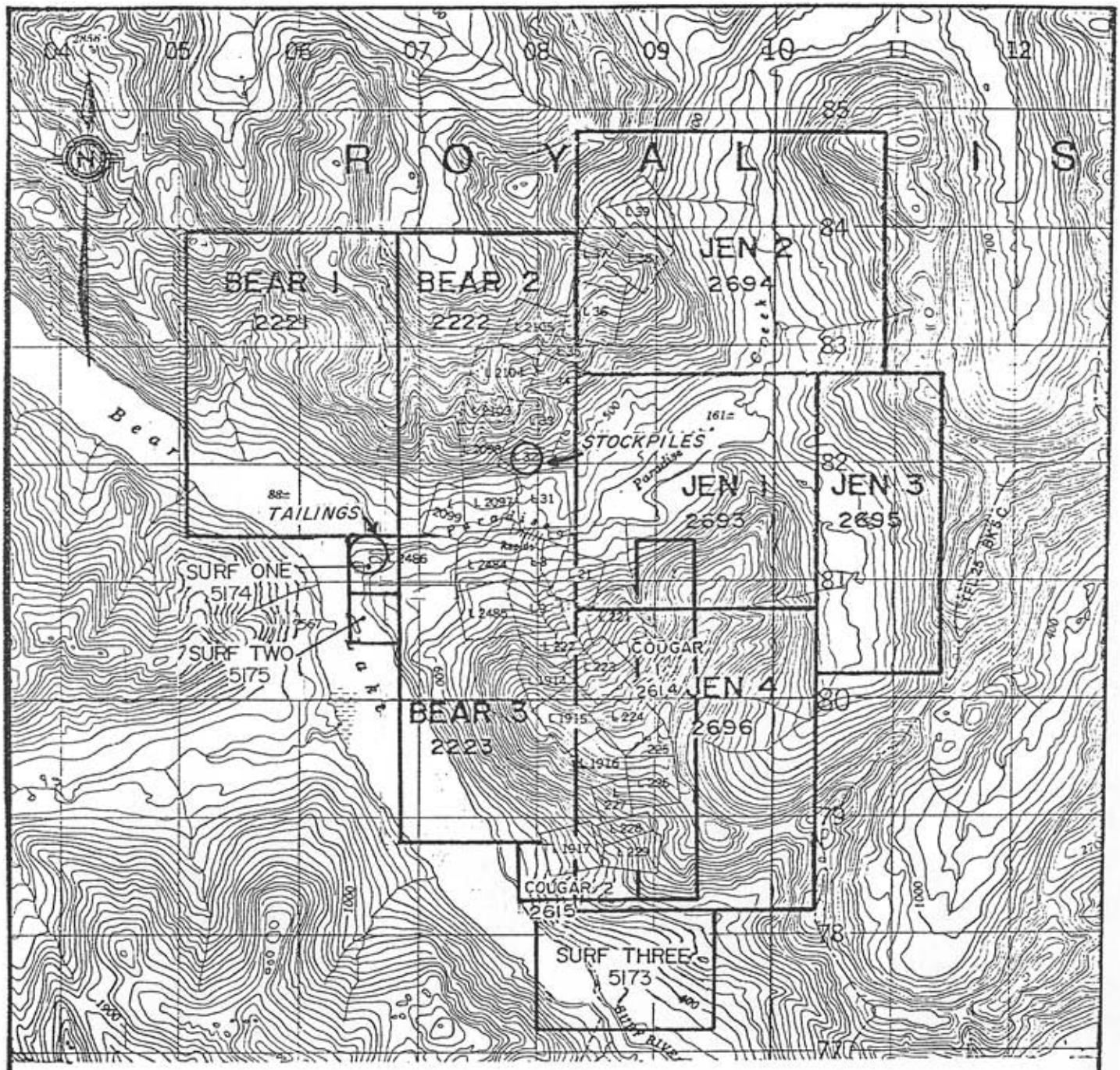
Total = 8 units

(f) Staked mineral claims

Claims	Units	Rec. Numbers	Expiry Date	Registered in Name of
Surf One	1	5174	Feb. 28, 1991	Surf Inlet Mines Ltd.
Surf Two	1	5175	Feb. 28, 1991	Surf Inlet Mines Ltd.
Surf Three	6	5173	Feb. 28, 1989	Surf Inlet Mines Ltd.

Total 8 units

Mineral claims in sections (a) to (d) are held under option by T. van Wollen and M. McClaren. The Cougar claims (in section e) are held under option by Fleet Developments Ltd. All options have been assigned to Surf Inlet Mines Ltd.



CLAIM & INDEX MAP

PROJECT: SURF INLET

ENG.: TRM ENGINEERING LTD.

FIGURE 2

HISTORY

The original discovery of gold in the Surf Inlet area was made in the late 1800's by tracing white quartz float from the bottom of the valley which enters Bear Lake from the east, up to where the vein outcrop on the north and south sides of the valley. The first claims were located in 1898 and are the oldest in the Skeena Mining Division exclusive of the Queen Charlotte Islands (McConnell, 1914).

Trial shipments of the ore were first made in 1902, and although these yielded excellent values in gold (about 5 oz per ton) and copper (about 3%), subsequent work was discouraging (Roddick, 1970). There is no record of the tonnage or value produced in this period and some doubt arose as to the average grade of the ore. Activity on the property remained at a low level until 1912 when a more vigorous development program began. The property was initially known as the "D.L.S. Group" and was owned by Surf Inlet Mines Limited who optioned them to the Belmont Canadian Mines Ltd., a subsidiary of Tonopah-Belmont Development Company, who developed and bought the property by reorganizing it into the Belmont-Surf Inlet Mines Ltd. The property produced continuously from September 1, 1917 to June 30, 1926. Records show that 848,883 tons (770,107 tonnes) of ore were produced from which 322,297 oz (10,023,437 g) of gold, 176,734 oz (4,496,427 g) of silver and 5,244,772 pounds (2,379,029 kg) of copper were recovered (Dolmage, 1946).

The 1918 Minister of Mines Annual Report indicates a mill recovery of 92%. Dolmage (1946) reports for the period 1916 - 1926:

> During that period, 848,883 tons of ore were mined, of which 57,632 came from the Pugsley. The average grade of this ore was 0.425 ounces of gold, 0.30 ounces of silver and 6 pounds of copper per ton. The maximum daily production was 400 tons and the average operating costs were $5.20 per ton. To the end of 1925, detailed records show that from 822,233 tons of ore mines, 307,452.9 ounces of gold;[1] 169,348 ounces of silver and 5,083,530 pounds of copper were recovered.

[1]The above figures are taken from reports by Charles Mentzel.

HISTORY Cont'd...

The figures quoted by Dolmage indicate approximate gold recoveries of 88% assuming an average head grade of Ø.425 oz/ton (14.57 g/tonne). The operators felt that there was no remaining ore when the mine closed in 1926.

In 1934, after the price of gold was raised, a new company was formed, Princess Royal Gold Mines, by J.B. Woodworth, to acquire, rehabilitate and operate the property. This attempt failed and in 1935 the mine was again closed. The company was refinanced in 1936 and its name changed to Surf Inlet Consolidated Gold Mines Ltd. The old mill was originally rated at 3ØØ tons per day but much of the machinery was removed prior to 1934 or had become obsolete. Milling resumed at 5Ø tons per day in 1936 and was gradually stepped up to a little over 1ØØ tons per day by 194Ø (Honsberger, 1973).

Overall, to the end of 1942 when the mine was closed by a scarcity of labour and general war conditions, total recorded production from the property amounted to 1,Ø91,131 tons (989,874 tonnes), of which 169,886 tonnes (154,129 tonnes) came from the Pugsley and the remaining 921,245 tons (835,754 tonnes) from the Surf ore body. from this ore were recovered 382,351 ounces (11,891,116 g) of gold, 2Ø8,752 ounces (6,492,187 g) of silver and 6,314,341 pounds (2,782,537 kg) of copper (Dolmage, 1946).

When the mine was in operation, power was obtained from an efficient low head hydro-electric plant constructed in 1916 using a reinforced concrete dam of the Ambursen patent type. The dam is high enough to raise the level of the lower lake to make a continuous waterway from the head of the dam to the foot of the mountain, about 1.6 km from the mine.

In 1981 Cominco Ltd., in joint venture with Placer Development Ltd., carried out mapping, sampling and diamond drilling programs on the Surf property. Preliminary sampling of the surface stockpiles was also done. The 55Ø level mine dumps from the Surf Inlet mine were estimated to contain 4ØØ,ØØØ tons (362,88Ø tonnes) at an average grade of Ø.Ø87 oz/ton 92.98 g/tonne) gold (Freeze, 1981).

In 1985-1986 TRM Engineering Ltd. and Surf Inlet Mines Ltd. conducted a series of sampling programs, surveys and metallurgical testwork to evaluate the tonnage and grade of the stockpiles and tailings on the Surf Inlet property.

records and recent field observations. The overall plan was to systematically evaluate all available data and carry out ground control surveys to accurately tie in all information in order to fully assess the economic potential of the property.

WORK DONE

The field program was carried out from August 13 to October 9, 1986 and included mainly ground control surveys, prospecting and sampling. Reconaissance traverses were carried out using compass and chain. A Sokkisha Red Mini 2 E.D.M. device, Zeiss Theo 020 A Transit and Sokkisha B2 Level were employed to conduct detailed surveys. Approximately 29 km of detailed surveyed lines were established (not including the road traverse) much of the line surveyed required at least some line cutting.

Chain saws were used to cut line and clear brush for survey traversing. Two 14-foot boats with 9 1/2 hp motors were used for travel to and from the tailings area and to carry out depth sounding measurements in Paradise Creek and Bear Lake.

After a general orientation traverse was done, a survey grid, in imperial measurement was planned for the project-area. The imperial system was used in order to correlate the data with the old workings of the Surf and Pugsley Mines.

The grid is centered on base station TH-1, located 50 feet (15.24 metres) south of the first level of the old millsite (see Figure 3). The coordinates of TH-1 are 10,000 N, 10,000E and 200 feet (60.96 metres) elevation.

Mine Dumps

(i) Volume Survey

The stockpiles under study are located near the 550 Level Portal of the Surf Inlet Mine. Figure 4 is a plan of the dumps. Figures 5 to 16 are cross sections of the dumps from which volume calculations were done. Cross sectional and radial topographic data accuracy is $\pm$ 1.0' for the northing and easting and $\pm$ 0.5' for elevation. The information shown was generated using the following field procedures:

(1) A baseline and closed loop traverse of the dumps was carried out which provided control for linecutting and pick up of the cross sections.

The location of the 550 Portal and old crusher site was also surveyed. Second order elevation control was established for this work by a closed level loop traverse using the benchmark (TH-1) elevation.

(2) Ten north-south cross sections at 50 foot (15.24 m) intervals, and five intermediate sections, at 25 to 30 foot spacings, were surveyed giving the accurate topography of the surface of the dumps. As shown on Figure 4 some traverse lines are located at the perimeter or between the two stockpiles of interest. Only those sections which display some cross sectional area of the dumps are included in this report.

(3) Section lines were extended and a radial topography pick up was done. This information was used to establish original ground (topography and slope of the ground beneath the dumps) by extrapolating the topography of the area around the dumps to that underneath the dumps.

The area and volume of each section are shown on Table 1. The figures were calculated using the following formula:

$$VOL=(AREA_L+AREA_{L-1})\ INT/2$$

$$AREA=1/2[EL_1(D_2-D_n)+ \ldots +EL_n(D_L-D_{n-1})]$$

Where:

VOL = Average volume between two stations.
AREA = Cross sectional area at a station.
INT = Interval between stations.
EL = Elevation at a point on a cross section.
D = Horizontal distance (offset) from centerline at cross section.
i = Subscript referring to current point or stations.
n = Subscript referring to last point or station.
numberic subscript: refers to point or station number.

Using a tonnage figure of 18 ft^3/ton (an average value for broken rock), the total volume of the mine dumps is approximately 150,000 tons (136,000 tonnes). Of this total, about 118,838 tons (107,810 tonnes) are contained in the West Dump and 30,931 tons (28,061 tonnes) in the East Dump.

Results from a preliminary sampling program by TRM Engineering Ltd. in November, 1985 indicated a grade of 0.151 oz/ton (5.18 g/tonne) Au for the West Dump and 0.067 oz/ton (2.28 g/tonne) Au for the East Dump (Shearer et al,

TABLE I

VOLUME CALCULATION
SUMMARY SHEET

For: Mine Dumps Measurements

Section or Plan	Section Width (ft)	Area (ft^2)	Volume	Volume (ft^3)	Notes
8 + 87	6.5'	0	0	0	
9 + 00	31.5'	1,049.25	16,525.5	16,525.5	
9 + 50	28'	13,388.7	283,402.2	299,927.7	
9 + 76	25'	11,783.7	320,629.4	620,557.1	WEST
10 + 00	37'	11,555.2	431,769.5	1,052,326.6	DUMP
10 + 50	50'	10,587.4	553,563.9	1,605,890.5	
11 + 00	50	7,160.3	443,691.1	2,049,581.6	
11 + 50	25'	0	89,503.8	2,139,085.4	
12 + 30	10'	0	0	0	
12 + 50	35'	2,166.9	37,920.8	37,920.8	
13 + 00	50'	3,274.0	136,021.4	173,942.2	
13 + 50	38'	3,373.6	126,304.2	300,246.5	EAST
13 + 75	25'	3,249.9	82,794.9	383,040.7	DUMP
14 + 00	37'	2,373.8	104,037.9	487,078.6	
14 + 50	44'	553.9	64,409.5	551,488.1	
14 + 88	19'	0	5,262.4	556,750.5	

Total Volume = Volume (West) + Volume (East)
= 2,1390,085.4 + 556,750.5
= 2,695,835.9 ft^3/18 ft^3/ton
= 149,768.7 tons

Say 150,000 tons or 136,078 tonnes

1986). Using these preliminary grade estimates, the average grade for the stockpiles is Ø.133 oz/ton (4.57 g/tonne) and the total gold contained is 19,95Ø ounces (62Ø,445 grams).

(ii) Sampling

Four samples of mine dump material were collected in preparation for testing by Ore Sorters (Canada) Limited of Peterborough, Ontario. Sample locations are shown on Figure 4. Each sample consists of 3Ø pieces of material and each piece has approximate dimensions of 2" x 2" (4.5 cm x 4.5 cm). The samples represent the main rock types in the dumps and are described below:

RNSI	86-ØØ1	pure milky quartz
RBSI	86-ØØ2	rusty quartz with 5-5Ø% pyrite, minor chalcopyrite
RBSI	86-ØØ3	biotitic, gneissic granodiorite
RNSI	86-ØØ4	chloritic hornblende diorite

(iii) Sorting Test

A sorting test utilizing the M16 photometric and M27 conductivity sensing techniques was carried out by Ore Sorters at no cost. Descriptions of the testing and results are included in Appendix I. Operating principles for the M16 and M27 equipment are also described.

Road Traverse

An EDM survey traverse was carried out from TH-6, located immediately below the mine dumps, to TH-72 at the old Bear Lake docksite to chart a proposed road way accros the property. This route (see Figures 3b and 17) was chosen from three chain and compass traverses. The other routes were eliminated due to poor drainage and because extensive rock work would have to be done to establish a road grade. A trail was cut along the preferred route for access to the tailings area. The cost of this work was applied along with similar work done in the area at the head of Surf Inlet, in November, 1986, as physical assessment work.

Survey control for work on the tailings area, the 9ØØ level Portal of the Surf Inlet Mine, and the 9ØØ level Portal of the Pugsley Mine (see details on Figures 3 and 3b) was established from stations on the road. In addition, claim posts for the Surf One and Surf Two claims were surveyed in conjunction with the road traverse. The claim lines of Surf One are shown on Figure 17.

Tailings

(i) Volume Survey

The tailings site is located at the confluence of Paradise Creek and Bear Lake. The area can be reached by boat, along Paradise Creek or by foot along the trail (see road traverse) from the main campsite.

Some linecutting was necessary to establish access from the surveyed station on the road (TH-72) to the station on Paradise Creek (TH-75). This traverse provided survey control (elevation and co-ordinates) for a radial topographic pickup of the perimeter of the tailings on Bear Lake. The survey control was also used to tie in the locations of depth sounding measurements done along Paradise Creek and Bear Lake. The depth soundings as shown on Figure 18 were carried out as follows:

(1) A baseline was established along the edge of Paradise Creek. The baseline consists of stations, staked and flagged, at 100 ft (30.48 m) intervals.

(2) A weighted tape measure was dropped into the creek adjacent to each station. A sample of the bottom sediments was retrieved to determine whether it was the tailings or natural creek sediments. The measurement on the tape at the bottom was recorded (see Figure 18). Depth (thickness) estimates of the tailings are shown in brackets on Figure 18.

(3) Several stations at the end of the baseline were surveyed to tie in the depth sounding measurements in with the other survey work.

The outline of the tailings as shown on Figure 17 is interpreted from air photos and modified using survey information. Arbitrary section lines were chosen. Using the depth soundings, the approximate thickness of the material at the mouth of Paradise Creek and upstream to the limits of the tailings was determined. From these and other field observations, estimates of the thickness of the tailings along the section lines were made. These values are shown on the plan. Actual cross sections are not included since they were not surveyed in the field.

The area and volume of the tailings along each section line were calculated in the same way as that for the mine dumps (see Mine Dumps for a description of the formula used). The data calculated is summarized in Table II. The conversion factor 100 lbs/ft^3 is the average weight of

dry sand as derived from the Engineering Field Tables of the US Departments of Agriculture and Interior (1976). Using this conversion a preliminary estimate of the quantity of tailings material is 588,400 tons (534,000 tonnes).

According to historical records 1,091,131 tons (989,874 tonnes) were milled. Therefore the estimated quantity of material from the current survey is low. Due to the location of the tailings, in and about Paradise Creek, it is probable that a certain amount of the material would have been reworked and deposited in Bear Lake beyond the bounds of the survey-area. In addition, the present work is of a preliminary nature. A more detailed survey is necessary to accurately predict the quantity of tailings that remains in the delta of Paradise Creek.

(ii) Sampling

Two representative samples, consisting of approximately 100 pounds (45.36 kg) each, were collected from pits excavated by shovel and shipped in 5 gallon pails. Sample locations are shown on Figure 17.

(iii) Silica Recovery Study

Sampling of the tailings pile was done to study the potential to extract an industrial silica product from the material. Portions of the samples described above were sent to the Canada Centre for Mineral and Energy Technology (CANMET), Ottawa, Ontario for petrographic study which was carried out at no cost. The analyst described the silica content of the sample and also suggested what procedure would be necessary in order for CANMET to test gold recovery from the tailings. The results and recommendations are included in Appendix II.

TABLE II
VOLUME CALCULATION SHEET
SUMMARY SHEET

for: Tailings Estimate

Section or Plan	Section Width Intervals (ft)	Area (ft^2)	Volume (ft^3)	Volume (ft^3)	Notes
1	35'	0	0	0	
2	165'	8,320	686,400	686,400	
3	295	13,617	3,235,781	3,922,181	
4	195	8,545	2,160,843	6,083,025	
5	230	8,010	1,903,825	7,986,850	
6	410	3,300	2,318,550	10,305,400	
7	360	1,500	864,000	11,169,400	
8	230	680	250,700	11,420,100	
9	335	800	100,000	11,768,000	
			11,768,000		

Volume = 11,768,000 ft^3 x 100 lbs/ft^3
= 1,176,800,000 lbs/2,000 lbs
= 588,400 tons or 534,000 tonnes

CONCLUSIONS AND RECOMMENDATIONS

Mine Dumps

Approximately 150,000 tons (136,000 tonnes) of material is contained in the mine dumps near the 550 Level Portal of the Surf Inlet Mine.

Further sampling is required in order to confirm the grade of the dumps. Shearer et al (1986) recommended that a series of large trenches or pits be excavated at regular intervals throughout the stockpiles and representative samples be collected. Based on the present study, the procedures described below should be taken into consideration during the detailed sampling and feasibility work.

(1) Sample sites should be located on the surveyed cross section lines for ease of plotting and to maintain a record of grade and tonnage.

(2) The pits or trenches should be excavated to original ground wherever possible in order to confirm the volume survey estimates.

(3) The cross sections should be modified as necessary and kept as a constant record of the Inventory of the stockpiles.

(4) All survey hubs should, where possible, be left undisturbed and be referenced for remeasurement during production.

The mine dumps contain four main rock types - gneissic granodiorite, chloritic hornblende diorite, milky quartz and rusty quartz with 5 to 50% pyrite (ore grade material). The ore sorting techniques used to test the stockpile material were generally unsuccessful. Neither photometric (reflectivity detected by M16 instrument) nor conductance/magnetic properties (gross conductance and magnetic properties detected by M27 instrument) satisfactorily distinguished between the rock types in order to separate gold bearing vein quartz from the other constituents of the samples.

A new photometric system currently being developed by ORE SORTERS may be able to detect the visual differences in the Surf mine dump rocks. Further testing using the new device is recommended.

Tailings

Preliminary area and volume surveys of the tailings piles were conducted. An estimated 588,400 tons (534,000 tonnes) of tailings are contained in the area near the mouth of Paradise Creek. This is the first attempt that has been made to measure the volume of the tailings.

A more detailed survey and sampling program is required to fully define the volume and grade of the tailings. Shearer et al (1986) recommended that "sampling be extended on a regular grid using a power-auger or light-weight core drill." A more specific proposal can be made based on the information from the present study. It is described below.

(1) A light-weight core drill should be used to recover samples for analysis of grade and to define the depth of the material.

(2) The sampling should be done on a surveyed grid pattern in order to (a) recalculate the volume of the tailings using surveyed cross sections and the method described in the section on the mine dumps and (b) define areas of economic and non-economic grade in the tailings materials so that a system of selective recovery could be planned if necessary.

Petrographic examination of the tailings samples by CANMET revealed that the tailings consist of 50-55% clear grains of angular to sharply angular quartz, 25-30% iron stained quartz and a host of felspar, mica, green to brown to black ferromagnesium silicates. Beneficiation of such material in order to obtain a silica byproduct would be costly and would probably result in a recovery of only 30 to 35%. The angular to sharply angular habit of the quartz would also reduce the marketability of the product.

A gold recovery test using approximately 1 ton of tailings material on a cost recovery basis was suggested by CANMET. A grade of 0.05 oz/ton (1.71 g/tonne) gold is considered marginal, although technically feasible. If adequate volume of tailings material at a grade above 0.05 oz/ton could be delineated using the grade control system described in 2 (b) above, the gold recovery testing would be warranted.

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APPENDIX I

TESTWORK REPORT

ON

ORE SORTERS (CANADA) LIMITED

SURE INLET MINES LTD

GOLD ORE SAMPLE

October 23, 1986
OREVCO INC
S. Wilkinson

1.0 INTRODUCTION

A sample was forwarded by Surf Inlet Mines Ltd for sorting trials at the ORE SORTERS (CANADA) LIMITED test centre. The material was prepared into four samples, representative of the principal rock types at the Surf Inlet mine and was to be statically tested using photometric scanning and conductivity/magnetic sensors.

OREVCO was requested to assist in the testing of the Surf Inlet material and supplied a test officer familiar with the sorting equipment and the geology of gold ores. During October 21 and 22, the sample was examined, and fully tested utilizing the sorting parameters available on the Model 16 and Model 27.

The four samples, identified as RNSI 86-001 TO 004, were separated into a gneissic granodiorite, a diorite, and two varieties of vein quartz; a pure milky quartz, and a rusty pyritic type. Each rock type was visually distinct with "ore-grade" material believed limited to the pyritic quartz.

The test procedure for the samples included the presentation of the individual lumps of each rock type to the Model 27 detection system to determine if it may possible to discriminate by gross conductance or magnetic properties. Secondly, the reflectivities of the rock types were tested using the Model 16. It was found that of the material supplied, neither photometric nor conductance/magnetic properties could be used to distinguish between the rock types to satisfactorily separate the gold bearing vein quartz from the other constituents of the sample.

2.0 DESCRIPTION OF SAMPLES

The Surf Inlet Mines material was prepared in four samples, consisting of rock lumps approximately 2" in size. Each sample contained particles of the principal rock types of the mine dump that was being considered for production. The samples were described as being varieties of the ore, gangue and wallrock.

RNSI 86-001 contained mainly white quartz that was only sparcely mineralized with very minute pyrite grains. It was suggested that this sample contained no gold concentrations of interest.

RBSI 86-002 was a second variety of vein quartz that was well mineralized with suphides and coated with red-brown limonitic stain. Most of the gold content of the mine was believed contained by this quartz ore. The principal sulphide was pyrite and occurred as fine to coarse grains that showed varying degrees of oxidation. Fresh pyrite surfaces displayed weak metallic reflectiveness that appeared "dirty" or drab with a slightly white hue. No chalcopyrite was seen in the examined hand specimens.

The biotitic, gneissic granodiorite of RBSI 86-003 and the chloritic hornblende diorite of RNSI 86-004 were medium-grained, composed mainly of feldspars, amphibole and biotite. The granodiorite's foliation was principally defined by the alignment of mineral grains. Both rock types had little or no sulphide content and displayed a salt and pepper appearance.

3.0 TESTWORK PROCEEDURE

The testing of the Surf Inlet mine samples was completed in order to evaluate the potential for sorting the mine dump material. The primary objective was to find a method of concentrating the pyritic vein quartz and removing the barren rock. As the gold appeared restricted to sulphide-bearing particles, the first sorting parameter examined was the variation in conductivity and magnetic reponses of the various rock types.

Each particle of each sample was hand-fed to the Model 27 sensing system and the machine conductivity and magnetic responses noted. The variances in the reponses were then compared with the sulphide content but no relationship could be determined. The pyrite present did not significantly affect either the conductivity or magnetic characteristics of the rocks. This was supported by testing patches and individual grains of pyrite with an ohmmeter that showed the mineral to be essentially nonconductive. The magnetic responses similarly had too little variation to be useful for separating any one rock type.

The static testing of the four rock types on the photometric Model 16

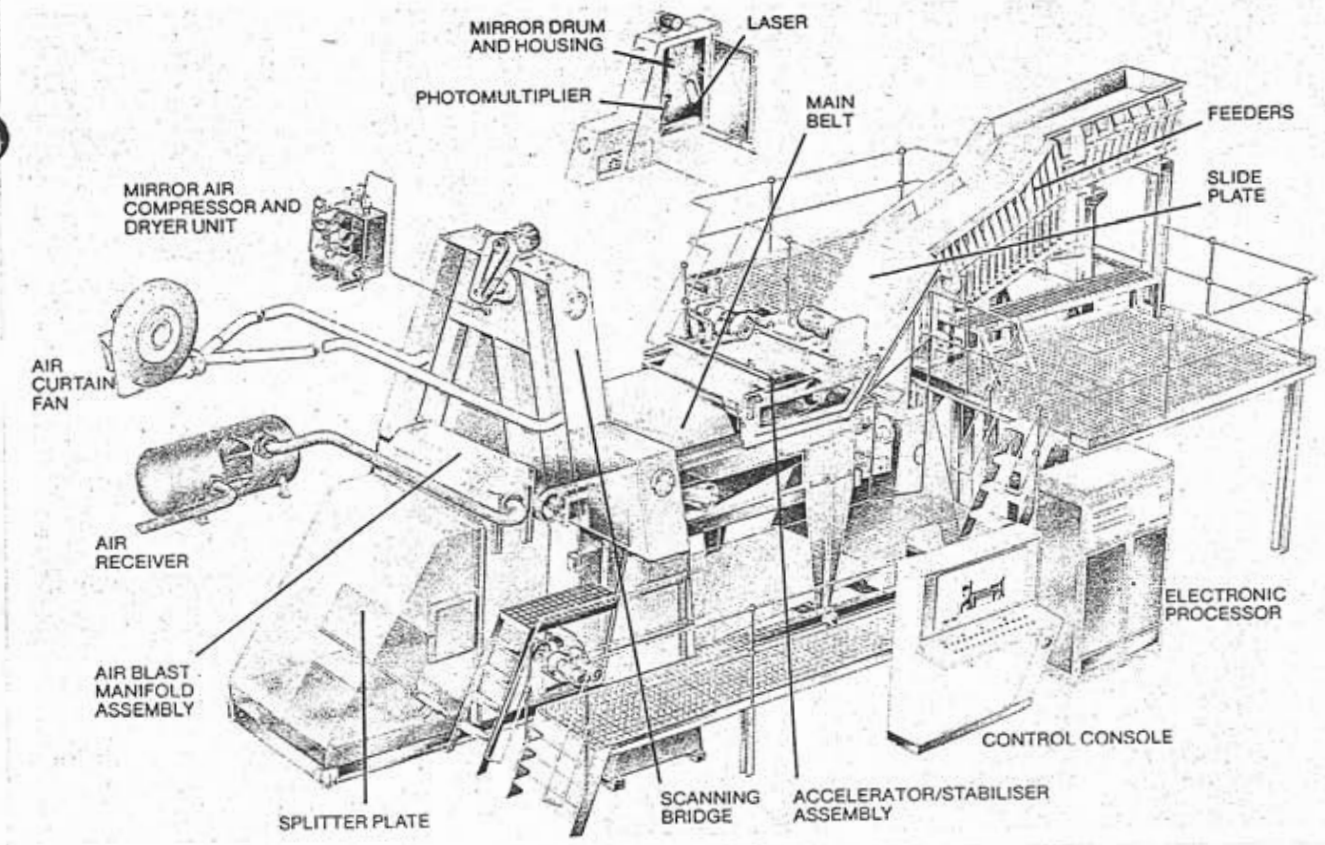
was completed next. The best result was the ubiquitous strong reflectiveness of the milky quartz of RNSI 86-001. Unfortunately, the stained pyritic quartz, granodiorite and diorite samples had reflective qualities that were well overlapped. Even applying the sophisticated feature options available with the Model 16 did not allow discrimination of the rock types.

4.0 INTERPRETATION AND RECOMMENDATION

The curiously non-conductive sulphide, identified simply as pyrite, is an anomaly. In most instances, mineralization as strong as seen in the Surf Inlet mine samples would be a good to ideal sorting parameter. However, in view of the results of the complementary ohmmeter tests, it is apparent that conductiveness is not an option by which the sorting may be accomplished.

The overlap in reflective characteristics of the gold-bearing vein quartz with the primary wallrocks eliminated the applicablity of the Model 16. However, the new photometric system currently being developed by ORE SORTERS to be mounted on the Model 27 may be more capable of recognizing the visual differences inherent in the rock types. Therefore, it is recommended that the test material be retained for further trials when the latest system is available.

MODEL 16 Photometric Sorter



Operating Principles

The sized material to be sorted is drawn from a surge bin and delivered by way of two vibrating feeders and a slide plate onto the main belt of the Model 16.

Washing sprays fitted to one of the feeders remove slimes and enhance the light-reflecting properties of the material.

An accelerator/stabiliser assembly accelerates the rocks and stabilises them firmly on the main belt for well spaced, random, mono-layer presentation to the optical system.

On reaching the end of the main belt the rocks are discharged in a controlled, free-flight trajectory and pass through the scanning bridge section of the sorter.

Inside the scanning bridge a laser/rotating mirror/photomultiplier assembly effectively scans the entire width of the rock stream 2,000 times per second, achieving a scan rate of one scan for every 2mm of rock length.

Signals from the photomultiplier are transmitted to an electronic processor which analyses the reflectance data for each and every rock and also determines its size and position in the rock stream.

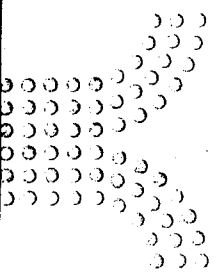
Reflectance data for each rock is compared against preselected operating settings to determine whether it should be accepted or rejected. The sorter's electronic processor then activates the appropriate air valves which are housed in a blast manifold located above the rock stream to cleanly deflect selected rocks out of their normal free-flight trajectory.

Blasted and unblasted rocks are collected for removal on separate conveyor belts, located either side of a splitter plate.

Throughput Capacities

Material to be sorted is fed onto the main belt of the Model 16 in a random mono-layer presentation.
Sorting width is fixed at 800mm with belt speed regulated to 4 metres per second.
Machine throughput capacity is therefore a function of the particle size distribution of the feed and its specific gravity.

MODEL 27 Conductivity/Magnetic Response Sorter



Measurements of electrical conductivity and magnetic properties have long been recognized as fundamental physical parameters in determining mineral type and quality. The development of a technique for rapidly assessing these two variables on a rock-by-rock basis has led to the development of a unique new system for beneficiating run-of-mine material.

Using a highly sensitive patented detector system developed by RTZ Ore Sorters, the Model 27 Conductivity/ Magnetic Response Sorter provides the only economical solution to a number of age old mineral processing problems. Waste materials in run-of-mine ore can now be rejected at a stage immediately after primary crushing, enriching mill feeds and creating valuable space in the circuit that can be turned to profitable production.

The Model 27 provides mining organizations with the opportunity to substantially lower operating costs, raise productivity and build profitability through increased rates of production.

Naturally, it is important to relate the many advantages of the Model 27 to specific mining operations and requirements.

Here are some of the important benefits to be readily gained through the application of this new, versatile and cost efficient approach to large particle beneficiation.

- The proven ability to profitably utilize low grade ore bodies and waste dumps as a source of valuable raw materials.
- The ability to increase production without the need for costly plant expansions.
- Substantial energy savings through the fast economical removal of wastes early in the mineral processing operations.
- The ability to relax costly selective mining practices.
- Improved metallurgical control and mineral recovery through higher more uniform mill feed grades and the removal of nuisance impurities.
- Reduced tailings disposal and environmental problems through the rejection of wastes at large particle sizes.
- Reduced transport costs, particularly in toll-milling situations.
- Where applicable, lower operating and capital costs than conventional processes such as heavy media separation.

Operating Principles

The sized material to be sorted is drawn from a surge bin by the primary vibrating feeder. The rocks are then deposited on the "channelised" secondary feeder which aligns the rocks in four independent streams.

All parallel streams are fed to the slide plate where due to gravitational forces the rocks are accelerated and spaced out in the longitudinal direction. Each rock stream passes over a detector mounted under the slide plate which assesses the conductivity and/or magnetic properties of the individual rocks. The detectors then relay this information to the sorter's electronic processor.

The rocks then pass through the optical system which measures their size and exact position in the rock stream. Stored responses from the detector system and evaluated rock size are now used by the processor to calculate the theoretical ore grade of each rock. This is then compared against a preselected cut-off value to determine which rocks should be selected as ore and which should be rejected as waste.

The electronic processor then activates the appropriate valves in the sorter's air blast manifold to deflect selected rocks out of their normal trajectory. Depending on operating requirements the system can be set to blast either ore or waste fractions. Separated materials are then collected on individual conveyors for removal to their appropriate destinations.

MODEL 27 Conductivity/Magnetic Response Sorter

Applications

The Model 27 Conductivity Magnetic Response Sorter is intended primarily for sorting sulphides and native metals. It can be applied to any ore body where variations in conductivity or magnetic properties are reliable indicators for distinguishing between ore and waste products in run-of-mine material or for determining differences in actual ore grade.

The high sensitivity of the machine's unique detection system enables it to respond to even the slightest differences in conductivity and/or magnetic properties giving it extreme versatility for use with a wide variety of mineral types.

Some of the more common materials that have been found suitable to this form of sorting include Copper, Lead, Zinc, Nickel, and Silver. By simple adjustments to the machine settings cut-off grades can be varied to suit plant operating requirements at any particular point in time. The following table shows some examples of typical Model 27 performance on a variety of mineral types.

RTZ Ore Sorters have testwork facilities for determining the suitability of your particular ore body to sorting. If you would like to take advantage of our testing facilities please contact your nearest RTZ Ore Sorters office.

Gold
Size Range −65 + 38 mm

Product	Wt%	Assay Au g/t	Distribution %
Accept	62.2	9.95	99.5
Reject	37.8	0.09	0.5
Calc. Head	100.0	6.23	100.0

Lead, Zinc
Size Range −100 + 38 mm

Product	Wt%	Assay %		Distribution %	
		Pb	Zn	Pb	Zn
Accept	70	2.88	20.2	92.4	97.0
Reject	30	0.55	1.47	7.6	3.0
Calc. Head	100	2.18	14.58	100.0	100.0

Copper
Size Range −75 + 25 mm

Product	Wt%	Assay % Cu	Distribution %
Accept	60.9	2.910	97.2
Reject	39.1	0.167	2.8
Calc. Head	100.0	1.820	100.0

Scheelite
Size Range −100 + 50 mm

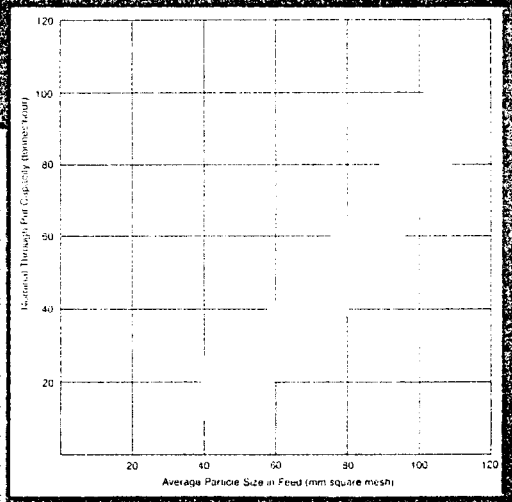
Product	Wt%	Assay % WO3	Distribution %
Accept	73.4	0.68	98.0
Reject	26.6	0.04	2.0
Calc. Head	100.0	0.59	100.0

Basic Data

The Model 27 Conductivity/Magnetic Response sorter is available in two different configurations to suit materials ranging in size from 25 mm to 150 mm.

The following graph can be used to indicate the approximate throughput tonnages at different particle size.

The tonnages are dependent on a number of variables such as specific gravity and the feeding characteristics of the rocks.



Compressed Air Consumption.

Compressed air usage rates are a factor of the amount of material to be blasted in a given time and its particle size distribution.

The decision whether to blast ore or waste is usually taken on the basis of blasting whichever is the lesser fraction e.g. If a particular feed contains 20% ore and 80% waste it would be normal to blast ore to minimize air consumption.

Typical compressed air consumption.

Size Range	Air Consumption Cubic Meters tonne/blasted
25–75 mm	40
75–150 mm	20

TEST RESULTS/CONDUCTIVE SORTING — Sulphide Ores. Most of the test results shown refer to the coarse fraction of the ore only. Please note that the fines are not sortable and would be included with the "Accept" fraction of the sorted material. The recoveries refer to sorted feed only and these are substantially increased when adding the fines which on average constitute 20-40% by weight of run-of-mine ore.

Specifications

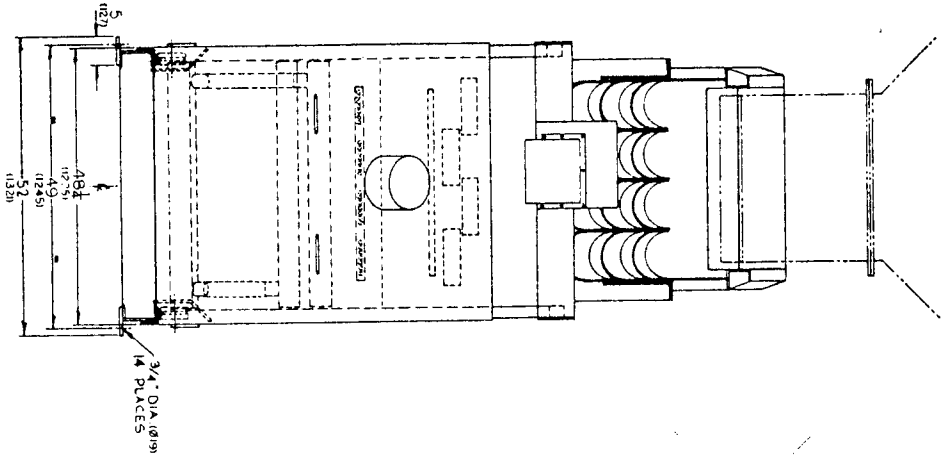
RTZ Ore Sorters International Branch Offices

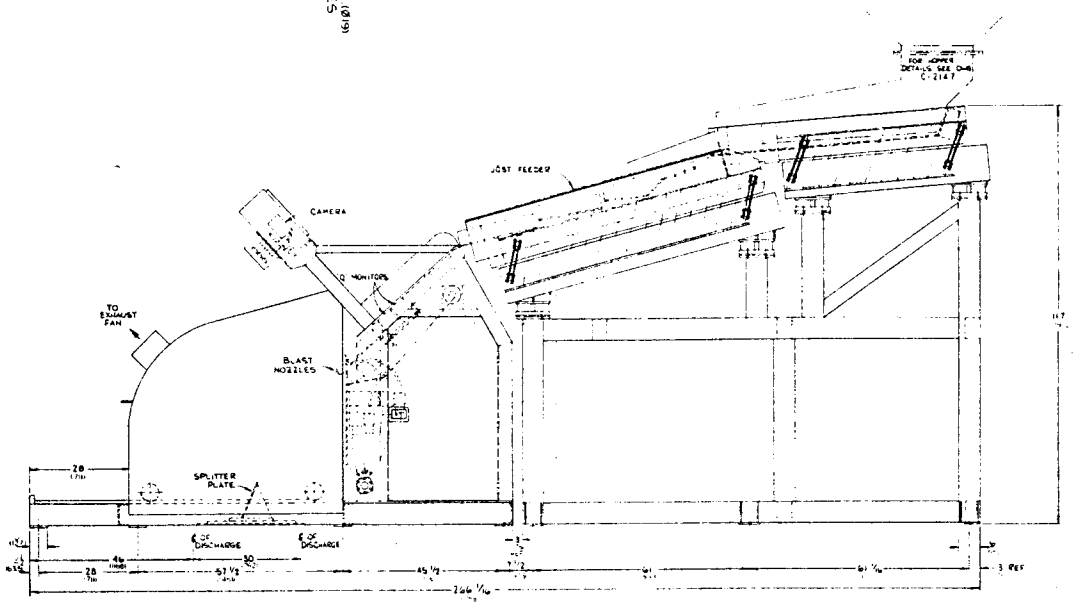
North and South America, Africa
211 Perimeter Centre Parkway, Suite 1030
Atlanta, Georgia 30346 U.S.A.
Telephone (404) 396-6150 • Telex 804466
(RTZOS ATL)

839 Erskine Avenue,
Peterborough, Ontario K9J 5V1 Canada
Telephone (705) 745-0543
Telex 06-962858 (ORESORTERS PBO)

Europe and Middle East
8 Victoria Hill
Eye
Suffolk 1P23 7BX
England
Telephone 379-870300 • Telex 817662
(HESTAV G)

Australia, S.E. Asia, India
P.O. Box 8192, G.P.O. Stirling St.
Perth, W.A. 6000, Australia
Telephone (9) 325-9499 • Telex 94411
(ORSORT AA)





Electrical Power:
35 kW 3 phase 50/60 Hz to suit local requirements.

Compressed Air:
700 k Pa supply
Refer table on P3 for consumption details.

Weight:
6 Tonnes.

APPENDIX II

Energy, Mines and Resources Canada
Research and Technology
Canada Centre for Mineral and Energy Technology
555 Booth Street
Ottawa, Ontario
K1A 0G1

Energie, Mines et Ressources Canada
Recherche et technologie
Centre canadien de la technologie des minéraux et de l'énergie
555, rue Booth
Ottawa (Ontario)
K1A 0G1

November 5, 1986

Mr. Arthur Freeze
Surf Inlet Mines
Suite 701-744 Hastings St.
Vancouver, B.C.
V6C 1A5

Dear Mr. Freeze:

Re: Treatment of gold tailings; your letter of October 28, 1986

When Mr. Murray McClaren of TRM Engineering, Vancouver, first contacted me re these tailings, our discussion primarily centred around the potential for the recovery and marketing of the contained quartz. In this regard, I suggested that he forward a representative sample for examination. Two samples, forwarded by Surf Inlet Mines, subsequently were received.

I have examined these samples under a binocular microscope. They are essentially similar in composition, each consisting of:

- 50 to 55% of clear grains of angular to sharply angular quartz
- 25 to 30% of iron-stained quartz (?)
- a host of other minerals including feldspar, mica, and green to brown to black ferromagnesium silicates

Beneficiation of these tailings to recover a high-purity quartz sand could be costly and would involve high intensity magnetic separation, froth flotation, and acid leaching with a recovery of perhaps only 30 to 35 per cent. Further, it is extremely unlikely that the beneficiated sand would meet current very stringent specifications for silica, iron and alumina (99.6, 0.025, 0.15% respectively) for glass sand, quite apart from the fact that markets for glass-grade sand on the west coast are limited. The angular-to sharply-angular grain shape would discourage use of the beneficiated sand for foundry purposes. This sand probably could be used, as mined, as construction sand and for sand-blast purposes provided markets for such materials can be located.

Mr. McClaren indicated that these tailings contained 0.05 oz./ton of gold. Although marginal, recovery of the contained gold is undoubtedly technically feasible. Assistance in developing a process for recovery of this gold is

.../2

available in CANMET, however, such assistance would of necessity be on a cost recovery basis. Should you wish such assistance you should forward your request to:

Mr. L. Sirois
Director, Mineral Sciences Laboratories
555 Booth St.
Ottawa, Ontario
K1A 0G1

I will retain the two samples submitted for the next few weeks in the event that you wish to have them assayed/evaluated for gold recovery.

Very truly yours,

R.K. Collings
Non-Metallic Minerals

RKC/mv

c.c. L. Sirois
D. Doyle
W. Cameron
M. Cristovici

March 12, 1987

RE: Recovery of Gold

As noted, suggestion was made that Surf contact L. Sirois regarding cost recovery - if interested.

I do not know whether further contact was made - you may wish to call L. Sirois in this regard - if interested (613-995-4088).

Steps in contract for cost recovery are as follows -

1. You identify precisely what work you wish us to do, e.g., investigate the technical feasibility and establish a process for the recovery of gold from tailings based on, say, a 1-tonne sample.

2. We determine the amount of effort that will be required to do this job and equate man-hours to dollars to arrive at a contract price, e.g., $5,000.00.

3. We notify you of the estimated cost of the work and, following your signing a contract agreement (if interested), proceed with work, complete a report of the work, and bill you for same.

R.K.C.

APPENDIX III

STATEMENT OF QUALIFICATIONS

I, R. Keith Burton of the City of Kelowna, in the Province of British Columbia, do hereby certify:

1. I graduated in Mineral Technology from the Northern Alberta Institute of Technology in Edmonton, Alberta in 1981.

2. I have practiced since graduation as a Mineral Technologist, carrying out surveying, prospecting, sampling and drafting. I have worked for B.C. Dept. of Highways, Carolin Mines, Aquarius Resources, TRM Engineering Ltd. and TVW Engineering Ltd.

3. I have personally conducted volume surveys and calculations, survey traverses, prospecting and sampling and supervised in general the field work on the Surf Inlet Property, Princess Royal Island.

Dated this 14th day of April, 1987

STATEMENT OF QUALIFICATIONS

I, Sharon L. Gardiner, of the District of North Vancouver, in the Province of British Columbia, do hereby certify:

1. I graduated with a Bachelor of Science, Honours Degree in Earth Sciences (cooperative program) from the University of Waterloo in May, 1979.

2. I have practiced my profession continuously since graduation.

3. I am a Fellow of the Geological Association of Canada.

4. I have compiled this summary using reports by K. Burton and discussions with J. Michell.

Dated at Vancouver, this 29th day of May, 1987.

S. Gardiner

Sharon L. Gardiner

CERTIFICATION

I, John G.B. Michell of the District of North Vancouver, in the Province of British Columbia, do hereby certify:

1. I am a mining engineer residing at 2643 Fromme Road, North Vancouver, British Columbia.

2. I graduated from the Camborne School of Mines, Cornwall, England, in 1951.

3. I have practiced my profession as a mining engineer continuously since graduation in Canada, West Africa and the Philippines.

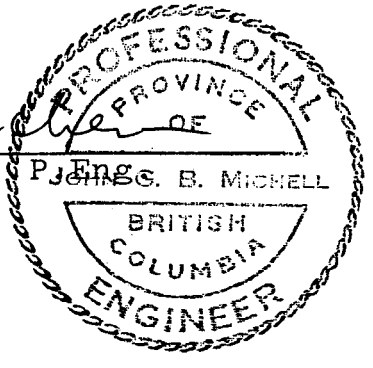
4. I am a Registered Professional Engineer in the Province of British Columbia. I am also a member of the Canadian Institute of Mining and Metallurgy and of the Society of Mining Engineers of the A.I.M.E.

5. This report was written under my supervision.

Dated at Vancouver, British Columbia, this 2nd day of July, 1987.

J.G.B. Michell

J.G.B. Michell, P.Eng.



APPENDIX IV

COST STATEMENT

Field Work: August 13 to October 9, 1986

WAGES			
K. Burton	Aug 13-20,30,31 Sept 1-18, Oct 1-9 33.5 days @ $170/day	$ 5,695.00	
P. Huxley	Aug 16-20,30,31 Sept 1-18, Oct 1-4,9 29 days @ $150/day	4,350.00	
T. Nicholson	Aug 16-20,30,31 Sept 1-18, Oct 1-4,9 29 days @ $155/day	4,495.00	
			$14,540.00
Camp Costs	91.5 man days @ $40/day		3,660.00
Field Supplies			2,564.56
Field Equipment Rental	Survey Equipment & Accessories 1 month @ $858.19/month	858.19	
	Chain Saws (3) 1 month @ $40/month/saw	120.00	
			978.19
Fuel			528.00
Shipping Costs			379.29
Transporation			
Air Charter	Float Plane 14.6 flights @ $600 (ave)/flight	$ 8,759.29	
	Helicopter 9,8 hrs @ $495/hr+fuel	5,339.91	
Truck Rental	4x4 1/2 month @ $600/month	300.00	
	6100 km @ $0.05/km	305.00	
Boat Rental	2 boats & motors 1 month @ $400/mo/boat	800.00	
		$15,504.20	
LESS:	Amount claimed with physical work (Nov. 27, 1986)	1,632.09	
			13,872.11
Travel Expenses	August 13-16, 1986		481.25
Communications			
Radio Rental	Traeger Radio 29 days @ $19.30/day	559.70	
	SBX-11 & FM Handsets 29 days @ $11.25/day	326.25	
	Long Distance Charges	498.99	
			1,384.94
	TOTAL FIELD COSTS		38,388.35

REPORT: October, November, 1986 and March 20-April 16, 1987

A. Freeze Oct. 28, Nov. 12,17,30, 1986 1.5 days @ $135/day	$ 200.00
S. Gardiner Mar 20, 23,31-Apr 2-16 7 days @ $155/day	1,085.00
K. Burton April 2,3,6,7,14 5 days @ $155/day	775.00
J. Michell April 15 1/2 day @ $230/day	115.00
S. Sandquist April 15,16 1 day @ $80/day	80.00
I. Korec 13 hrs @ $17.25/hr	224.25
F. Chong 30 hrs @ $17.25/hr	517.50
Reproduction, Office Supplies & Shipping Costs	250.00
TOTAL REPORT COSTS	$ 3,251.75
TOTAL REPORT & FIELD COSTS	$41,640.10

Work to be applied as follows:

Lake Fr Crown Grant to Northeast Group
Surf One etc. to Southwest Group (copy of Notices to Group are attached)

Fieldwork August to October, 1986

Northeast Group 78% of total $29,942.91 to P.A.C.
Southwest Group 22% of total $ 8,445.44 to Bear 1,2,3

Report October, 1986 to April, 1987

Northeast Group 72% of total $ 2,350.00 to Jen 3,4
Southwest Group 28% of total $ 900.00 to Bear 1,2,3

As per Statements of Exploration & Development:

1.	Portable Assessment Credit - Surf Inlet Mines Ltd.		$29,942.91
2.	Southwest Group - Fieldwork	$8,445.44	
	- Report	900.00	
	TRM Engineering Ltd. P.A.C. Withdrawl	2,754.56	
			12,100.00
3.	Northeast Group - Report	2,350.00	
	TRM Engineering Ltd. P.A.C. Withdrawl	650.00	
			3,000.00

10

COPY

Province of British Columbia
Ministry of Energy, Mines and Petroleum Resources
MINERAL RESOURCES BRANCH–TITLES DIVISION

MINERAL ACT

FORM I

NOTICE TO GROUP

Mining Division ..... Skeena ..... Location .... Princess Royal Island .....

Name of group ..... Northeast ..... Map No. 103H/12W.

We, the undersigned owners* of the following adjoining claims, desire to group them according to the provisions of the *Mineral Act*:—

NAME OF CLAIM	No. of Units	Record No.	Month of Record	SIGNATURE OF OWNER*	Free Miner Certificate No.
Cougar 1	6	2614	10	A. Gardiner	218465
Cougar 2	2	2615	10	agent for	
Jen 1	20	2693	11	Coastrod Resources Limited	218464
Jen 2	20	2694	11	Placer Development Ltd	221336
Jen 3	10	2695	11	J. T. Shearer	220781
Jen 4	20	2696	11		
Surf Three	6	5173	2		
Homestake	1	1984	1		
Turner Fr	1	1983	1		
L32 Lake Fr	1	Crown Grant			
L33 Gulch	1	↓			
L34 Bluff	1				
L35 Bench	1				
L36 UTA Fr	1				
L37 Mountain Fr	1				
L38 Twin Peaks	1				
L39 La Quivree	1				
L228 Cassie	1				
L229 Lakeview	1				
L7 Princess Royal	1				
L31 DLS	1				

Province of British Columbia
Ministry of Energy, Mines and Petroleum Resources
MINERAL RESOURCES BRANCH–TITLES DIVISION

SUB-RECORDER
RECEIVED
NOV 27 1986
M.R. # ..... $.....
VANCOUVER, B.C.

MINERAL ACT

FORM I

NOTICE TO GROUP

Mining Division ..... Skeena ..... Location ... Princess Royal Island .....

Name of group ..... Southwest ..... Map No. ..103H/2W

We, the undersigned owners* of the following adjoining claims, desire to group them according to the provisions of the *Mineral Act*:–

NAME OF CLAIM	No. of Units	Record No.	Month of Record	SIGNATURE OF OWNER*	Free Miner Certificate No.
Bear 1	15	2221	4		
Bear 2	15	2222	4	R.H. McCleskey	278781
Bear 3	20	2223	4	Placer Development	221336
Sheet Anchor Fr	1	1979	1	I.T. Shearer	220781
Summit	1	1980	1		
Bonanza	1	~~1980~~ 1981	1		
Anaconda	1	1982	1	A. Gardner	218465
Seagull	1	1985	1		
Little Tomy Fr	1	1986	1		
Brown Bear	1	1987	1		
Sunlight Fr	1	1988	1		
Sea Lion Fr	1	1989	1		
Surf One	1	5174	2		
Surf Two	1	5175	2		
Sadie L8	1	Crown Grant			
Bee L1915	1	↓			
Bluebell L2485	1				
Sea Fr L1914	1				
Marcia L2484	1				
Olive L227	1				
Granite L1916	1				
Excelsior L9	1				
Independence Fr L222	1				

4 000 E | 5 000 E | 6 000 E | 7 000 E | 8 000 E | 9 000 E | 10 000 E | 11 000 E

11 000 N | 10 000 N | 9000 N | 8000 N | 7000 N

10 150 E | 9 750 E

560.0 | 560.2 | 547.1 | 530.5 | 525.9 | 522.9 | 521.1 | 527.2 | 509.8 | 506.4 | 504.9 | 503.9 | 513.4 | 527.7 | 504.5 | 577.6

10 750N

TH-15 | TH-14 | TH-13 | TH-17 | TH-16 | TH-18 A

Surf 550 Portal

SURF 550 PORTAL

0 40 80 feet

0 10 20 metres

SCALE 1:480

193.7 | 192.2 | 174.8 | 174.7 | 174.6 | 192.3 | 172.1 | 168.4 | 167.7 | 167.4 | 166.2 | 167.3

Surf 900 Level

TH-37 | TH-38

9 790 N

SURF 900 LEVEL

0 40 80 feet

0 10 20 metres

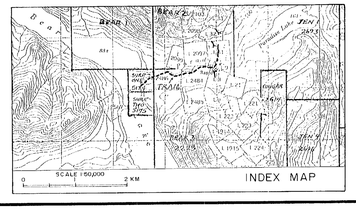
SCALE 1:480

Surf 550 Portal (See Detail this sheet)

TH-1A | TH-15 | TH-14 | TH-13 | TH-16 | TH-18 | TH-20 | TH-19 | TH-23 | TH-24 | TH-25 | TH-12 | TH-21 | TH-7 | TH-22 | TH-10 | TH-11 | TH-5 | TH-6 | TH-8 | TH-9 | TH-27 | TH-26 | TH-28 | TH-4 | TH-3 | TH-29 | TH-2 | Millsite | TH-30 | TH-1 | TH-31

Surf 900 Level (See Detail this sheet)

TH-37 | TH-38 | Power House | TH-32 | TH-33 | TH-36 | Mine Stores and Office | TH-34 | Storage Shack | TH-35 | TH-39 | TH-40 | TH-41 | TH-42 | Dorm Building | TRM - 1986 CAMP AREA | TH-43 | TH-44 | TH-45 | TH-47 | TH-46 | TH-79 | TH-80 | Pugsley 900 Level | TH-48 | TH-49 | TH-50 | TH-51 | TH-52 | TH-53 | TH-54 | TH-55 | TH-56 | TH-57 | TH-58 | TH-59 | TH-60 | TH-61 | TH-62 | TH-63 | TH-64 | TH-65 | TH-66 | TH-67 | TH-68 | TH-69 | TH-70 | TH-71 | TH-72 | TH-74 | TH-75 | TH-76 | TH-77



INDEX MAP

△ SURVEY STATION

○ SIDE SHOT, ELEV IN FEET

ADIT

100 50 0 200 400 600 feet

0 50 100 150 meters

SCALE 1:2,400

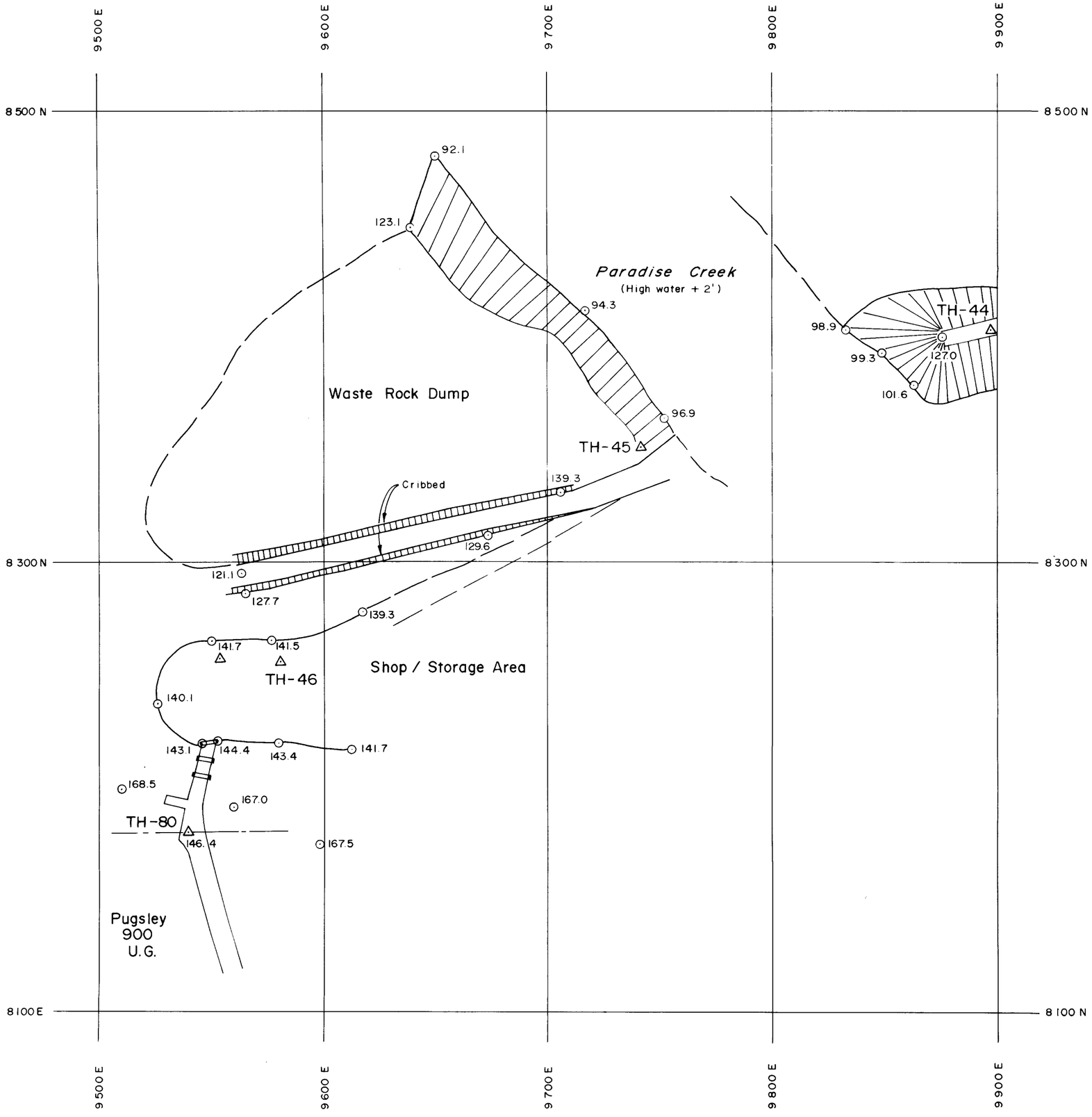
GEOLOGICAL BRANCH
ASSESSMENT REPORT

16,092

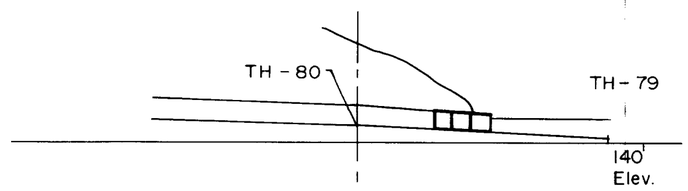
SURF INLET MINES LTD.

SITE SURVEY PLAN SHOWING SURF MINE PORTALS DETAILS

PROJECT :	SURF INLET
ENG. :	TRM ENGINEERING LTD
FIGURE Nº. 3a	APRIL 1987



Pugsley 900 Level
U. G. Section along drift



GEOLOGICAL BRANCH
ASSESSMENT REPORT

16,092

1 : 480
0 20 40 60 feet
0 10 metres

SURF INLET MINES LTD.

PUGSLEY 900 LEVEL PORTAL AND PARADISE CREEK CROSSING DETAILED PLAN

PROJECT :	SURF INLET
ENG. :	TRM ENGINEERING LTD.
FIGURE Nº. 3b	APRIL 1987

SECTIONS
8+87
9+00
9+50
9+76
10+00
10+50
11+00
11+50
12+30
12+50
13+00
13+50
13+75
14+00
14+50
14+88
15+00

550 PORTAL

O/S Lt. 386.24
O/S Lt. 452.28
O/S 250.00'
O/S Lt. 141.35

9+00
10+00
11+00
12+00
13+00
14+00
15+00

10,700N
10,500 N
10,300 N

9800E
10,000E
10,200E
10+402E

TH 20 496.4
TH 19 474.9
TH 18 500.1
TH 17 503.2
TH 16 501.9
TH 15 502.3
TH 14 494.2
TH 13 489.2
TH 12 383.4
TH 11 315.3
TH 10 371.1
TH 9 290.6
TH 8 298.8
TH 7 495.2
TH 6 303.9
TH 5 328.6
TH 24 501.5
TH 25 486.3
TH 23 501.6
TH 22 433.3
TH 21 487.6

BROG 466.3
BROG 466.6
BROG 466.1
BROG 466.7
BROG 467.8
BROG 465.3
BROG 464.2
BROG 456.0
BROG 443.0
BROG 424.7
BROG 399.8
BROG 396.5
BROG 386.4
BROG 375.0
BROG 361.6
BROG 361.2
BROG 346.3
BROG 334.7
BROG 353.1
BROG 315.1
BROG 301.2
BROG 312.8
BROG 329.2
BROG 342.5
BROG 438.2
BROG 427.6
BROG 420.0
BROG 419.8
BROG 374.3
BROG 372.3
BROG 361.0
BROG 377.1
BROG 378.8
BROG 387.6
BROG 432.4
BROG 500.1
BROG 503.6
BROG 500.4
BROG 500.1

OM 459.3
OM 435.7
TP 24-1 464.4
TP 24-2 447.9

EAST SIDE DUMP AREA

WEST SIDE DUMP AREA

Sample area for samples
RBSI 87-002,003 B
RNSI 87-001,004

B.L. 0+00

CHUTE

GULCH
ore bins
WEST DUMP
EAST DUMP
LAKE FR. BEAR 2
DLS
INDEX MAP
SCALE 1:5000

GEOLOGICAL BRANCH
ASSESSMENT REPORT
16,092
SCALE 1:240
0 20 40 80FEET
0 5 10 20 METRES

LEGEND

△ SURVEY STATION WITH ELEVATION IN FEET

⊙ 292.6 SIDE-SHOT — Original ground (Elevation in ft.) Broken rock = BROG Other material = OM

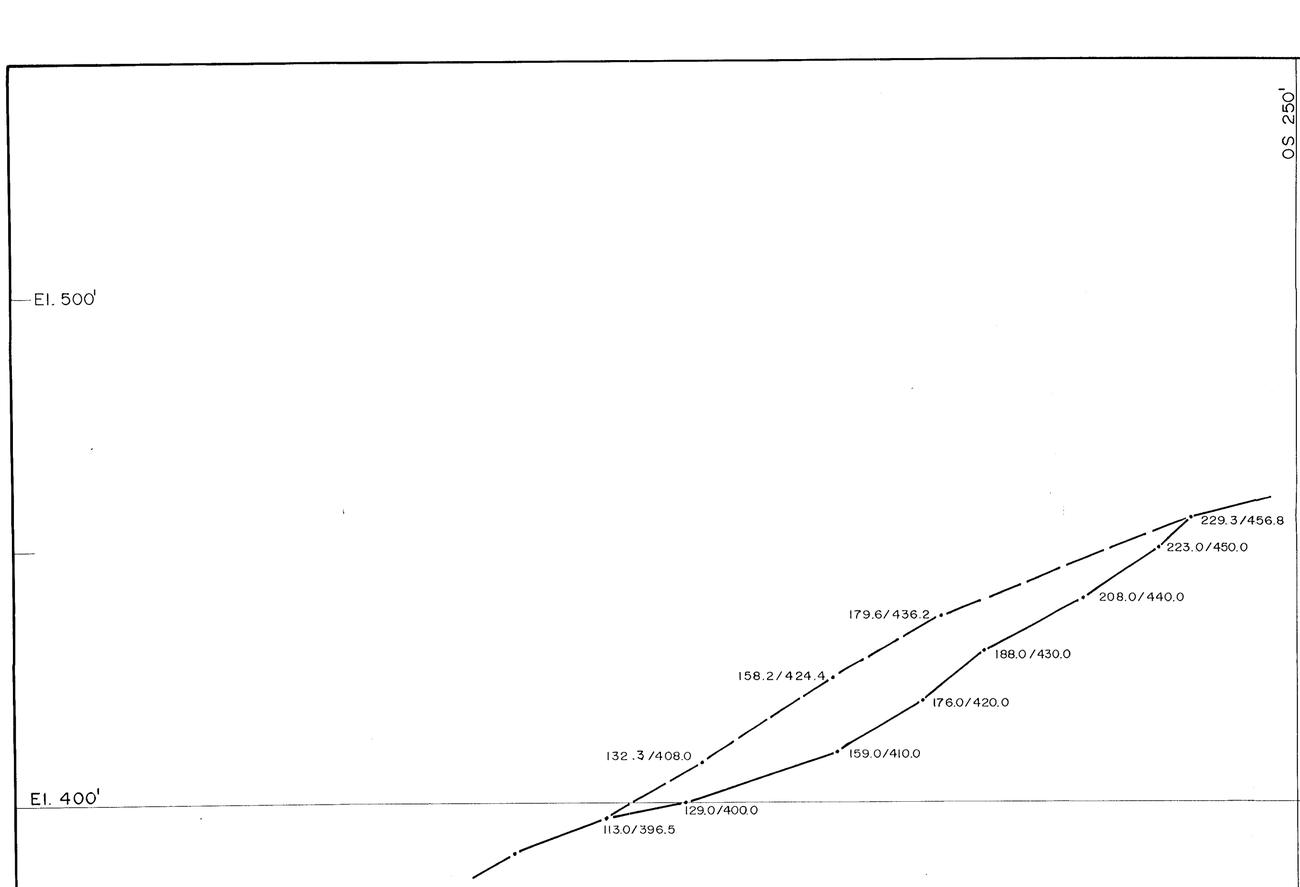
CONTOURS AT 10FT. INTERVAL

SURF INLET MINES LTD.
VANCOUVER CANADA

MINE DUMP
DETAIL SURVEY PLAN

PROJECT : SURF INLET
ENG. : TRM ENGINEERING LTD.
FIGURE Nº. 4 APRIL 1987

CHONG



GEOLOGICAL BRANCH
ASSESSMENT REPORT

16,092

SCALE 1:240

0 20 40 80 FEET
0 5 10 20 METRES

LEGEND

3772/432.4 OFFSET / ELEVATION IN FEET

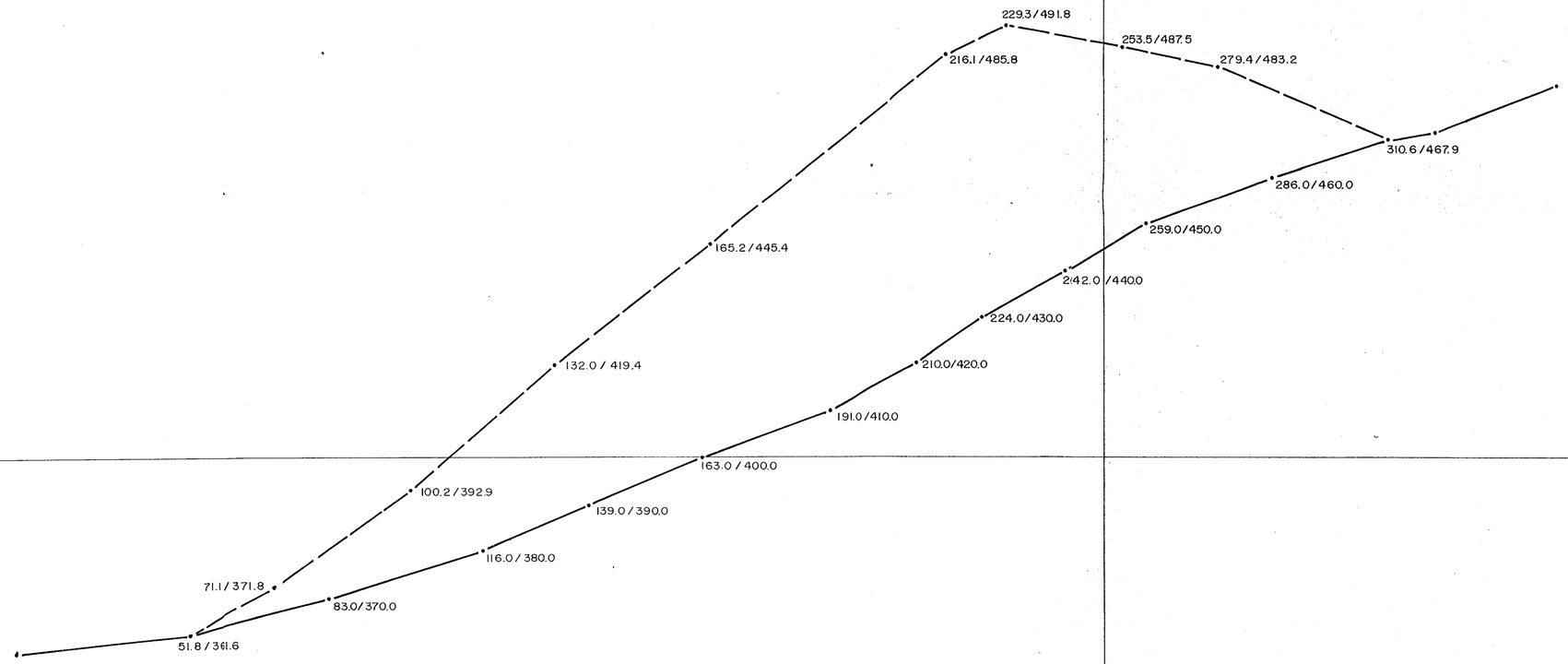
A = 1049.24 ft^2
I = 31.5 ft.
V = 16,525.45 ft.^{3}
EV = 16,525.45 ft.^{3}

SURF INLET MINES LTD.
VANCOUVER CANADA

MINE DUMP
CROSS SECTION 9+00E
WEST SIDE DUMP

PROJECT: SURF INLET
ENG.: TRM ENGINEERING LTD.
FIGURE Nº. 5 APRIL 1987

CHONG



GEOLOGICAL BRANCH
ASSESSMENT REPORT

16,092

SCALE 1:240

0 20 40 80 FEET
0 5 10 20 METRES

LEGEND

377.2/432.4 OFFSET / ELEVATION IN FEET

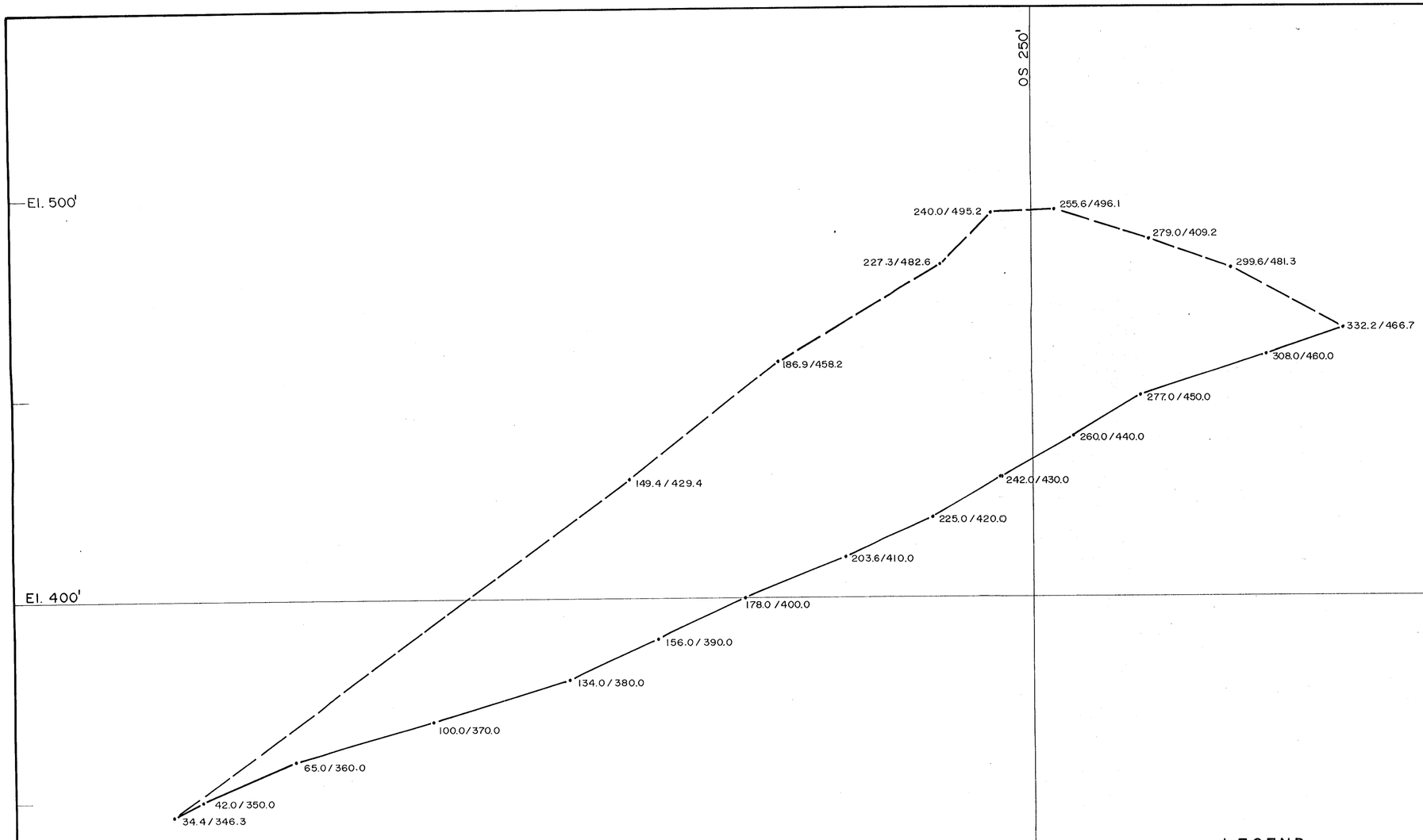
A = 13,866.67 ft.^{2}
I = 38.0 ft.
V = 283,402.20 ft.^{3}
EV = 299,927.65 ft.^{3}

SURF INLET MINES LTD.
VANCOUVER CANADA

MINE DUMP
CROSS SECTION 9+50 E
WEST SIDE DUMP

PROJECT: SURF INLET
ENG.: TRM ENGINEERING LTD.
FIGURE Nº. 6 APRIL 1987

CHONG



GEOLOGICAL BRANCH
ASSESSMENT REPORT

16,092

SCALE 1:240

0 20 40 80 FEET
0 5 10 20 METRES

LEGEND

3772/432.4 OFFSET / ELEVATION IN FEET

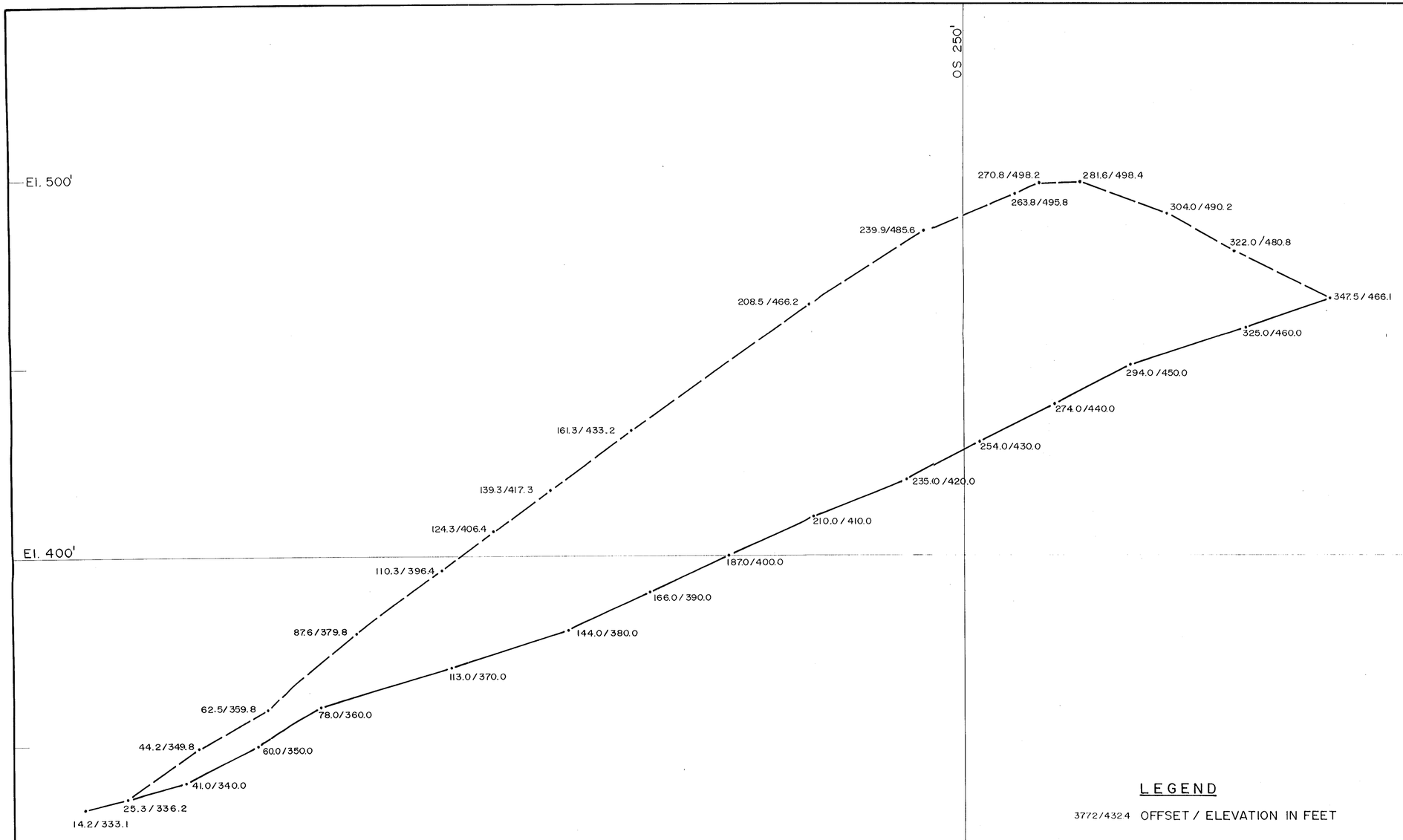
A = 11,783.68 ft^2
I = 25.0 ft
V = 320 629.38 ft.^{3}
EV = 620,557.02 ft.^{3}

SURF INLET MINES LTD.
VANCOUVER CANADA

MINE DUMP
CROSS SECTION 9+76 E
WEST SIDE DUMP

PROJECT: SURF INLET
ENG.: TRM ENGINEERING LTD.
FIGURE Nº. 7 APRIL 1987

CHONG



GEOLOGICAL BRANCH
ASSESSMENT REPORT

16,092

SCALE 1:240

0 20 40 80 FEET
0 5 10 20 METRES

LEGEND

3772/4324 OFFSET / ELEVATION IN FEET

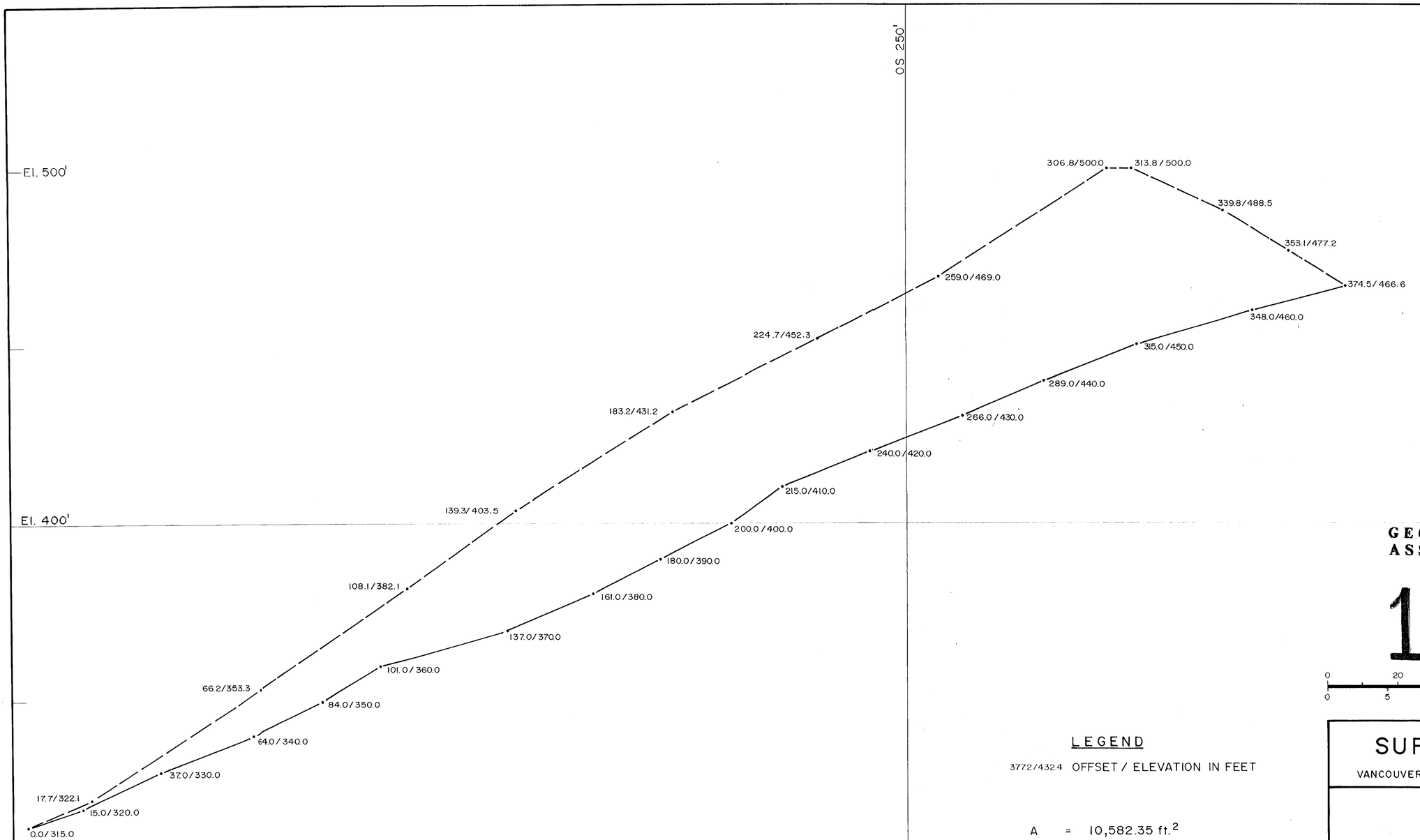
A = 11,555.21 ft.^{2}
I = 37.0 ft.
V = 431,769.47 ft.^{3}
EV = 1,052,326.49 ft.^{3}

SURF INLET MINES LTD.
VANCOUVER CANADA

MINE DUMP
CROSS SECTION 10+00 E
WEST SIDE DUMP

PROJECT · SURF INLET
ENG. : TRM ENGINEERING LTD.
FIGURE Nº. 8 APRIL 1987

CHONG



GEOLOGICAL BRANCH
ASSESSMENT REPORT

16,092

SCALE 1:240

0 20 40 80 FEET
0 5 10 20 METRES

LEGEND

377.2/432.4 OFFSET / ELEVATION IN FEET

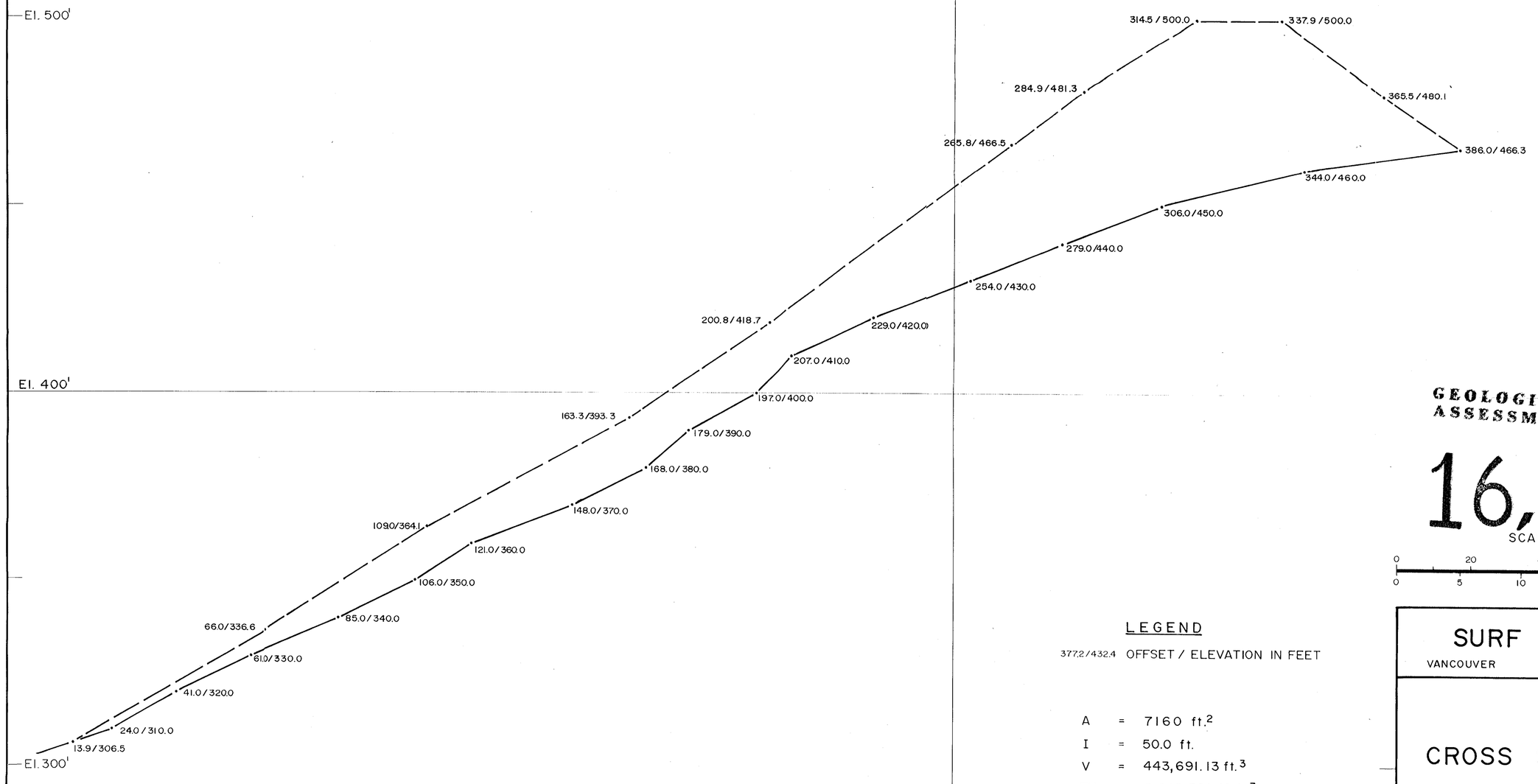
A = 10,582.35 ft.^{2}
I = 50.0 ft.
V = 553,563.88 ft.^{3}
EV = 1,605,890.36 ft.^{3}

SURF INLET MINES LTD.
VANCOUVER CANADA

MINE DUMP
CROSS SECTION 10+50E
WEST SIDE DUMP

PROJECT · SURF INLET
ENG. : TRM ENGINEERING LTD.
FIGURE Nº. 9 APRIL 1987

CHONG



GEOLOGICAL BRANCH
ASSESSMENT REPORT

16,092

SCALE 1:240

0 20 40 80 FEET
0 5 10 20 METRES

LEGEND

377.2/432.4 OFFSET / ELEVATION IN FEET

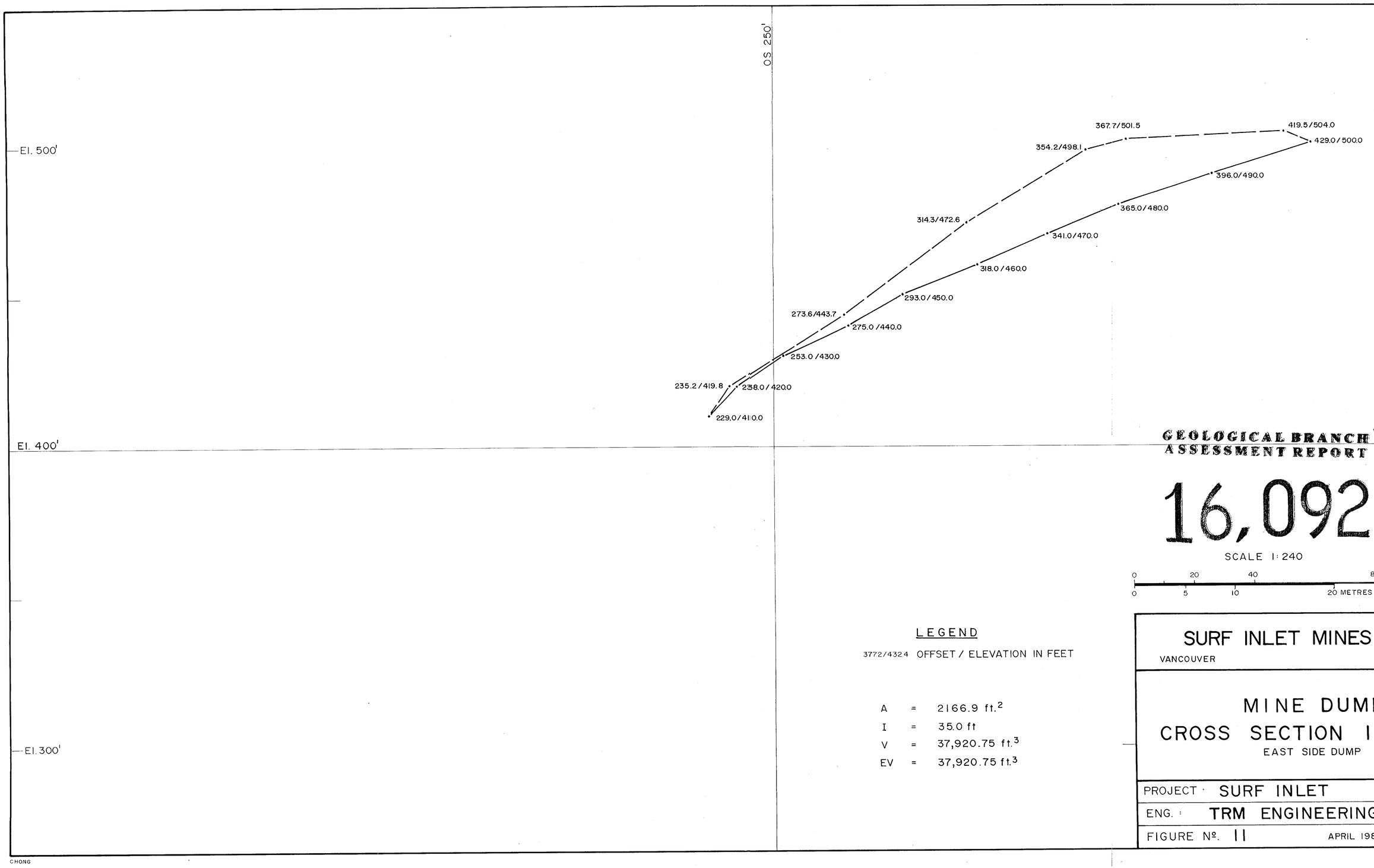
A = 7160 ft.^{2}
I = 50.0 ft.
V = 443,691.13 ft.^{3}
EV = 2,049,581.49 ft.^{3}

SURF INLET MINES LTD.
VANCOUVER CANADA

MINE DUMP
CROSS SECTION 11+00 E
WEST SIDE DUMP

PROJECT: SURF INLET
ENG.: TRM ENGINEERING LTD.
FIGURE Nº. 10 APRIL 1987

CHONG



GEOLOGICAL BRANCH
ASSESSMENT REPORT

16,092

SCALE 1:240

0 20 40 80 FEET
0 5 10 20 METRES

LEGEND

3772/4324 OFFSET / ELEVATION IN FEET

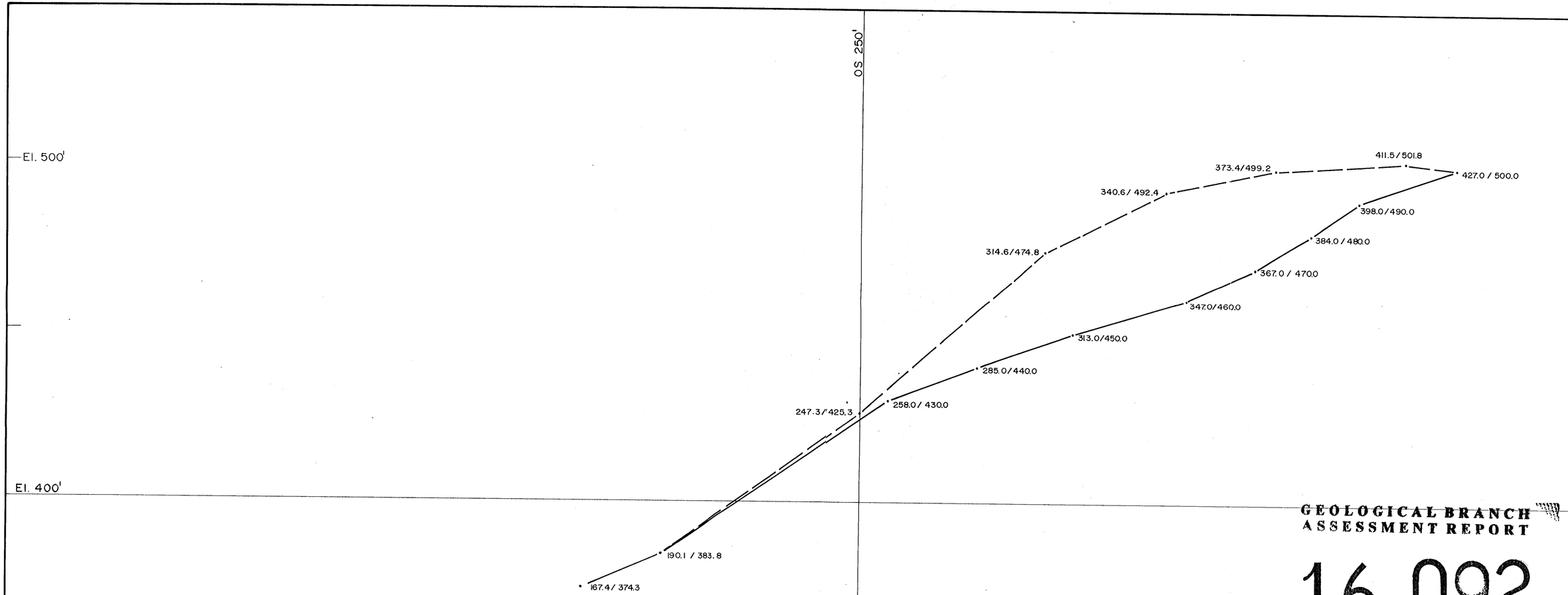
A = 2166.9 ft.^{2}
I = 35.0 ft
V = 37,920.75 ft.^{3}
EV = 37,920.75 ft.^{3}

SURF INLET MINES LTD.
VANCOUVER CANADA

MINE DUMP
CROSS SECTION 12+50E
EAST SIDE DUMP

PROJECT · SURF INLET
ENG. : TRM ENGINEERING LTD.
FIGURE Nº. 11 APRIL 1987

CHONG



GEOLOGICAL BRANCH
ASSESSMENT REPORT

16,092

SCALE 1:240

0 20 40 80 FEET
0 5 10 20 METRES

LEGEND

377.2/432.4 OFFSET / ELEVATION IN FEET

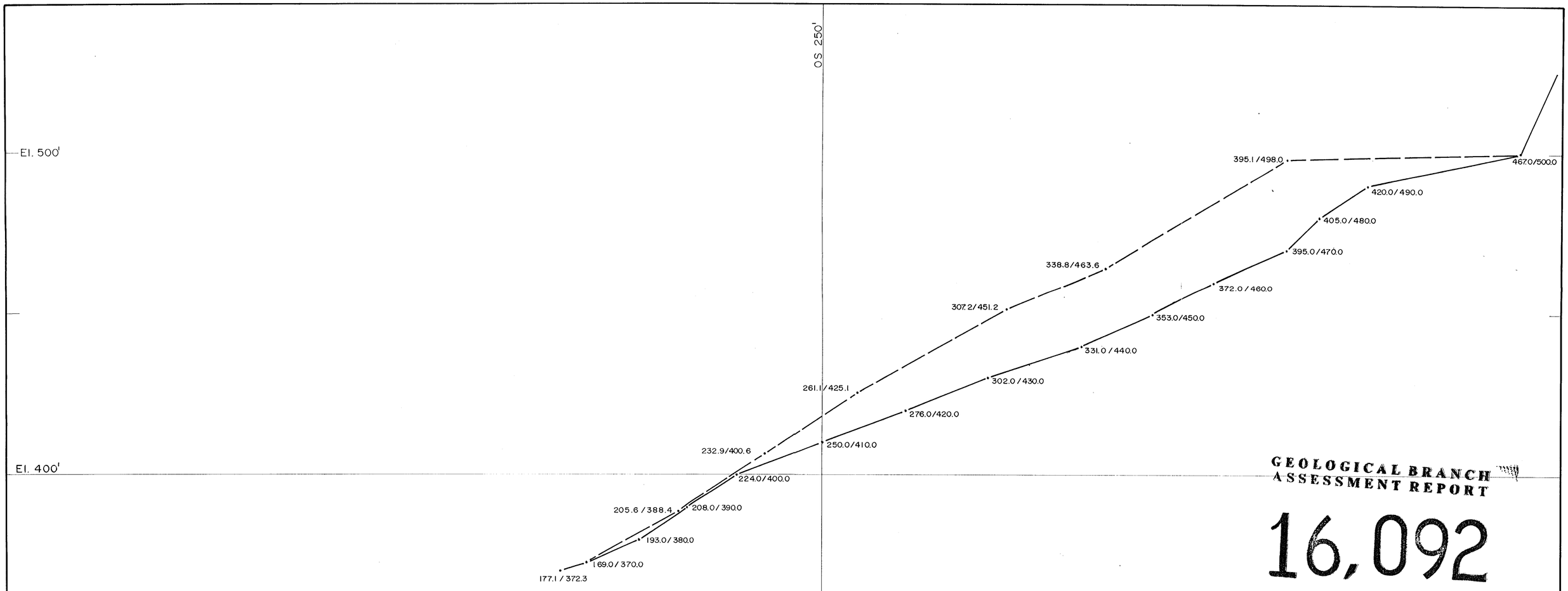
A = 3273.96 ft.^{2}
I = 50.0 ft.
V = 136,021.38 ft.^{3}
EV = 173,942.13 ft.^{3}

SURF INLET MINES LTD.
VANCOUVER CANADA

MINE DUMP
CROSS SECTION 13+00 E
EAST SIDE DUMP

PROJECT · SURF INLET
ENG. : TRM ENGINEERING LTD.
FIGURE Nº. 12 APRIL 1987

CHONG



GEOLOGICAL BRANCH
ASSESSMENT REPORT

16,092

SCALE 1:240

0 20 40 80 FEET
0 5 10 20 METRES

LEGEND

3772/432.4 OFFSET / ELEVATION IN FEET

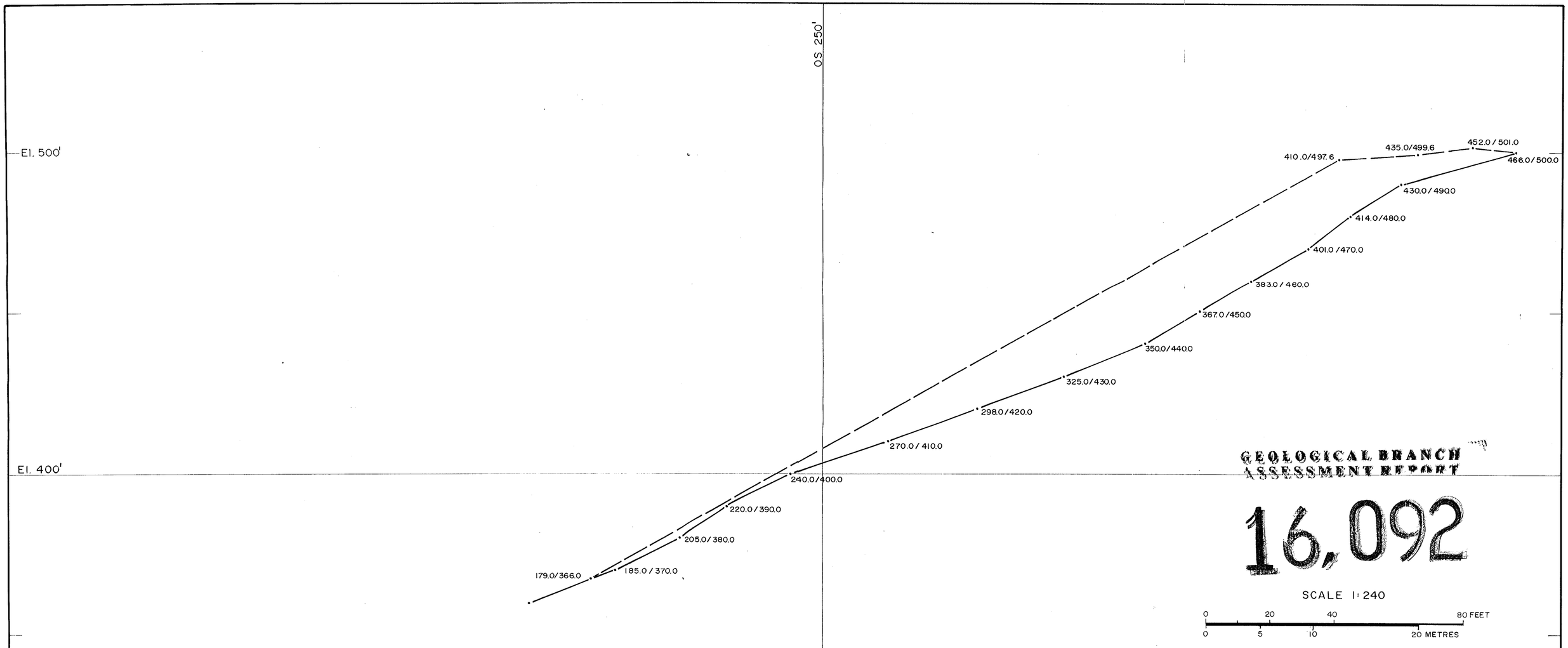
A = 3373.64 ft.^{2}
I = 38 ft.
V = 126,304.21 ft.^{3}
EV = 300,246.34 ft.^{3}

SURF INLET MINES LTD.
VANCOUVER CANADA

MINE DUMP
CROSS SECTION 13+50E
EAST SIDE DUMP

PROJECT · SURF INLET
ENG. : TRM ENGINEERING LTD.
FIGURE Nº. 13 APRIL 1987

CHONG



SCALE 1:240

0 20 40 80 FEET
0 5 10 20 METRES

LEGEND

3772/4324 OFFSET / ELEVATION IN FEET

A = 3249.9 ft.^{2}
I = 25.0 ft.
V = 82,794.19 ft.^{3}
EV = 383,040.52 ft.^{3}

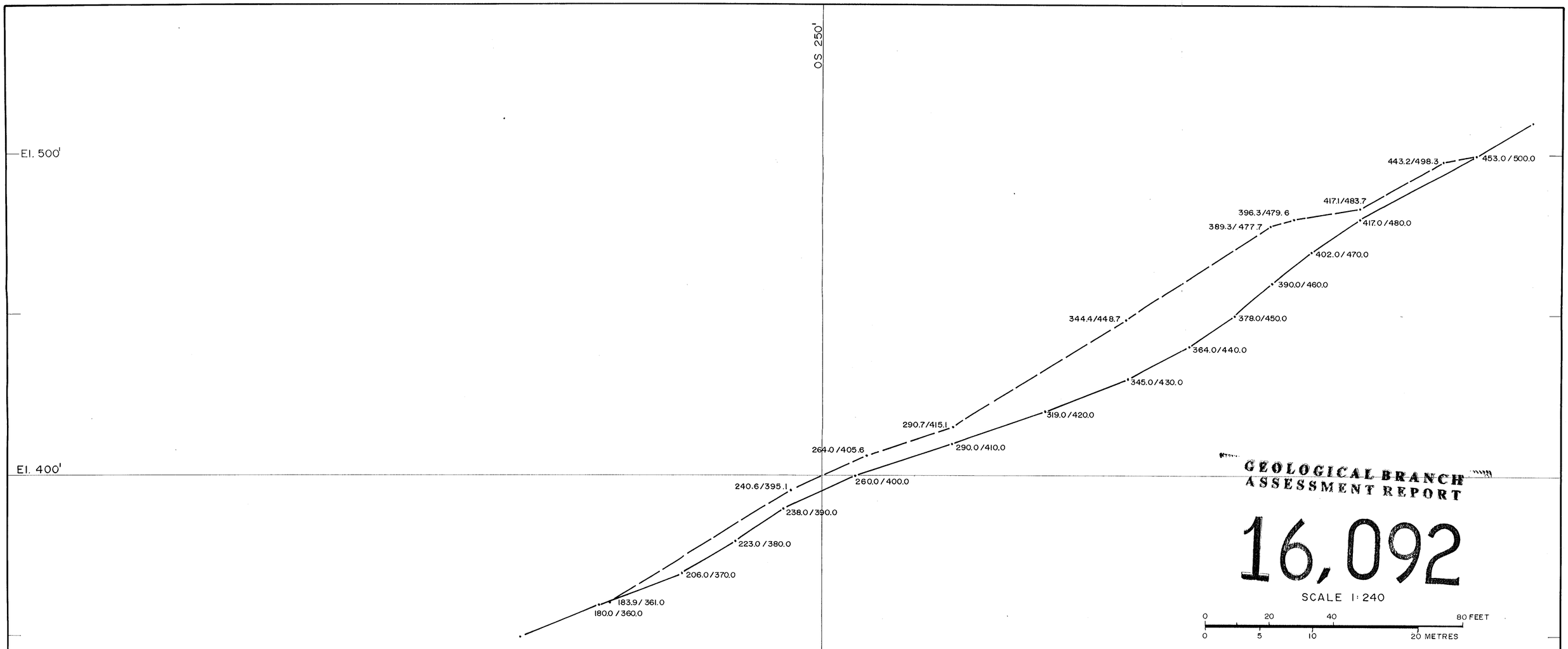
SURF INLET MINES LTD.

VANCOUVER CANADA

MINE DUMP
CROSS SECTION 13+75 E
EAST SIDE DUMP

PROJECT · SURF INLET
ENG. : TRM ENGINEERING LTD.
FIGURE Nº. 14 APRIL 1987

CHONG



SCALE 1:240

0 20 40 80 FEET
0 5 10 20 METRES

LEGEND

3772/432.4 OFFSET / ELEVATION IN FEET

A = 2373.77 ft.^{2}
I = 37.0 ft.
V = 104,037.90 ft.^{3}
EV = 487,078.42 ft.^{3}

SURF INLET MINES LTD.

VANCOUVER CANADA

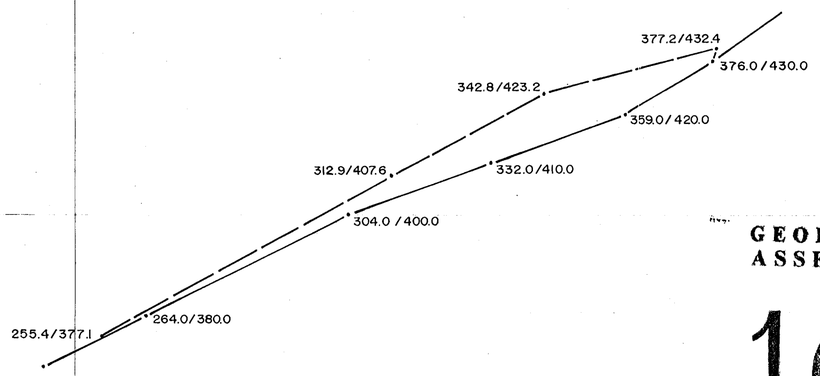
MINE DUMP
CROSS SECTION 14+00 E
EAST SIDE DUMP

PROJECT: SURF INLET
ENG.: TRM ENGINEERING LTD.
FIGURE Nº. 15 APRIL 1987

CHONG

El. 500'

OS 250'



El. 400'

El. 300'

GEOLOGICAL BRANCH
ASSESSMENT REPORT

16,092

SCALE 1:240

0 20 40 80 FEET

0 5 10 20 METRES

LEGEND

3772/4324 OFFSET / ELEVATION IN FEET

A = 553.94 ft.^{2}

I = 44.0 ft.

V = 64,409.51 ft.^{3}

EV = 551,487.93 ft.^{3}

SURF INLET MINES LTD.

VANCOUVER CANADA

MINE DUMP
CROSS SECTION 14+50 E
EAST SIDE DUMP

PROJECT · SURF INLET

ENG. : TRM ENGINEERING LTD.

FIGURE Nº. 16 APRIL 1987

CHONG

4000E 5000E 6000E 7000E

9000N

9000 N

1 (0+65E)
2 (1+30E)
3 (3+95 E)
4 (7+20 E)
5 (7+90E)
6 (11+80 E)
7 (16+10 E)
8 (19+00 E)
9 (20+70 E)
10 (25+70 E)

BEAR LAKE

PARADISE CREEK

SURF ONE I.P.

SBSI 86-01

SBSI 86-02

Tree line

Tree line

DOCK SITE PILINGS

BEAR LAKE DOCK SITE

TH 59
TH 60
TH 61
TH 62
TH 63
TH 64
TH 65
TH 66
TH 67
TH 68
TH 69
TH 70
TH 71
TH 72
TH 74
TH 75
TH 76
TH 77

8000 N

B.L

0+00 3+00E 6+00E 9+00E 12+00E 15+00E 18+00E 21+00E 24+00E

Survey station
Side shot , elev. in feet
Sample location
Actual outline of tailings area
Outline of tailings area as used for volume calculations
Claim line (surveyed between Nº. 1 post of Surf One and Two)
• 10.820 Tails thickness , offset on cross section in feet

Total Volume = 11,768,000 ft3
x 100 lbs / ft3 conversion
= 1,176,800,000 lbs ÷ 2000 = 588,400 tons x .9072 = 534,000 tonnes

(refer to table 2 for calculations summary)

GEOLOGICAL BRANCH
ASSESSMENT REPORT

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SCALE 1:1000

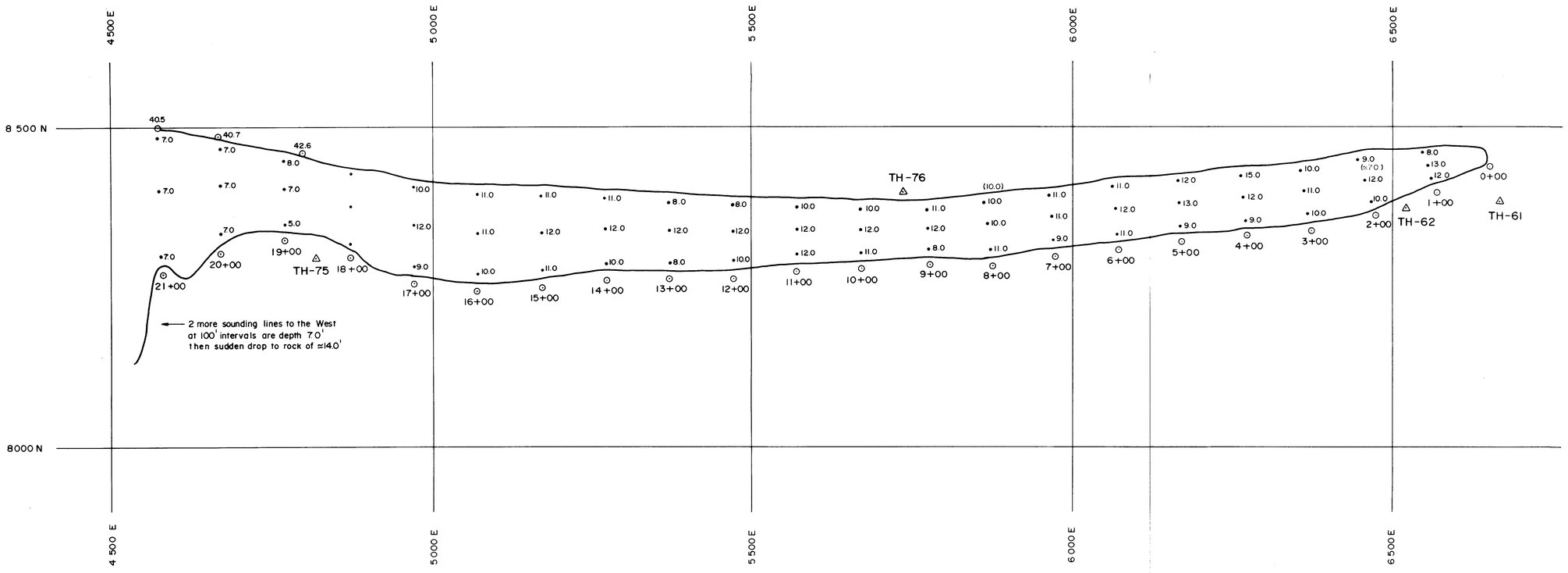
0 100 200 300 FEET
0 30 60 90 METERS

SURF INLET MINES LTD.

TAILINGS PLAN
SHOWING ESTIMATED THICKNESS

PROJECT : SURF INLET
ENG. : TRM ENGINEERING LTD.
FIGURE Nº. 17 APRIL 1987

CHONG



0 50 100 200 300 feet
0 25 50 75 meters
SCALE 1: 1,200

△ SURVEY STATION
⊙ SIDE SHOT
• 12.0 DEPTH SOUNDING MEASUREMENT IN FEET
•(xx) TAILS THICKNESS IN FEET

GEOLOGICAL BRANCH ASSESSMENT REPORT

16,092

SURF INLET MINES LTD.

PARADISE CREEK DEPTH SOUNDINGS

PROJECT :	SURF INLET
ENG :	TRM ENGINEERING LTD.
FIGURE Nº 18	APRIL 1987